HISPANA

TRIGONOMETRIA

HISPANA,

RESOLVTIO

TRIANGVLORVM PLANI, & Sphærici: conſtructio Sinuum, Tangentium, Secantium, & Logarithmorum, eorumque vſus.

AVTHORE

A. R. P. IOSEPHO ZARAGOZA, Valentino Societatis IESV in Suprema Hiſpaniarum Inquiſitione propoſitionum Fidei Cenſore: olim in Collegijs Balearico, Barcinonenſi, & Valentino Theologiæ Scholaſticæ, modo in Matritenſi Academia Imperialis Collegij Matheſeos Profeſſore Regio.

Ad Excellentiſsimum Dominum D. GASPAREM DE HARO ET GVZMAN, Marchionem del Carpio, & Eliche, Comitem Ducem de Olivares, ad Pontificem Maximum Regio nomine Legatum Ordinarium, &c.

SECVNDA EDITIO.

VALENTIÆ. Apud Hyeronimum de Villagraſſa. Anno Dom. 1673.

Cum ſuperiorem Licentia.

EXCELLENTISSIMO DOMINO
D. GASPARI DE HARO ET GVZMAN,
Marchioni del Carpio, Duci de Montoro,
Comiti Duci de Olivares, Comiti de Morente,
Marchioni de Eliche, Dño Status de Sorbas,
Regiarum Arciũ, & Turrium Cordubensium
perpetuò Gubernatori, & Regalium Stabulorũ
summo Prefecto, Alguacilio maiori Civitatis;
& Inquisitionis Cordubensis, perpetuò Arcium
Hispalensium, & Classium officinæ Præfecto,
& etiam Castri, & Arcis de Moxacar: Magno
Indiarum Cancellario, & Registratori earun-
dem perpetuo, Alcantarensis Ordinis Maximo
Commendatori, Hispaniarum Regi à Cubicu-
lis, primo à Venationibus, & Regiorum
tractuum del Pardo, Valsain,
& Zarzuela Præfecto,
&c.

TRigonometriæ Hispanæ iterum in no-
vam lucem prodeunti (Excellentissi-
me Princeps) Mæcænas alius inqui-
rendus mihi non fuit, quàm Exc.ª V.ª
Matheleos enim dignitas eum Patro-
num exigit, qui splendore sanguinis, &
ingenij magnitudine tantæ scientiæ
nobilitatem amplificet; quę omnia in te vno adeò vigent,
vt vix sup parem nostro hoc sæculo invenire liceat. Adeò
illustres parentes tibi natura concesit, vt si eorum facta

nolles æmulari, degenerare non posses. Maiorum contraxisti virtutem filius progenitoribus maior, in hoc mirandus, quod virtus in te contracta maior in compendio appareat, splendidius luceat: ita enim expressisti omnes, vt dum vivis Maiorum neminem perijsse, neminem in te desiderari credamus: & cum illi fuerint in nullo non maximi, dubitare liceret, in quo maior esse potueris, ni tantam magnitudinem maiorem esse potuisse in epitome, tua magnitudine comprobasses. Maiorum igitur gloria nobilis es, & nobilior tua, cùm illam summo incremento perficeris, & effeceris tuam. Eam ex factis proprijs adeptus es claritatem, vt quam ex stirpe habuisti maximam, minimam in te, ac otiosa foret, nisi quę tecum sine meritis nata, tecum merendo adulta, amplissima effecta fuerit, & immensa.

Inter virtutes, quæ maximè Heroas decent, est fortitudo facilè Princeps: fortis tamen est, non qui inter fortes nascitur, nec qui magna molitur, sed qui ardua perficit, qui fortissimè vivit, triumphator non tam aliorum sæpè, quam sæpius sui: tuam igitur fortitudinem commendat iugis de te ipso triumphus. Immania confeciisse prælia magnum est, sed me iudice, ingenuas fovere artes, sapientiæ cummulare gloriam, innata magnitudine modestè vti, maius est fortitudinis argumentum. Tygris fluviorum omnium velocissimus bellicam fortitudinem exprimit, quæ mirabili pernicitate, sonitu, ac strepore magno, cursuq; rapidissimo fertur, & obstantia, quæque proruit, & demolitur. Hæc in sui admirationem vulgares animos rapiunt, qui vnum rei corticem, & nudam superficiem corporeis oculis intuentur. Nobilibus autem, & sapientibus viris, quibus intima, & profundiora aquilino mentis obtutu, rimari licèt, Tygridis rapiditati præfertur Nili profunditas, & tranquillitas summa, vt qui placido cursu immensa aquarum volumina explicans, feraces inundat campos, vniversam provintiam alluit, irrigat, & fæcundat: tale est benignitatis, sapientiæ, ac moderationis tuæ profluvium, quod te apud hostes commorante, nobis effluxit, cum depositio armorum strepitu, pacem Regno, tibique gloriam peperisti immortalem: duxisti Bellonam, vt Martem opprimeres, & generares pacem, quæ bellorum est finis. Bellicam ergo laudem te omnibus præripuisse credimus, vt qui non degener maiores tuos potentes bello, robustos viribus, & martiali gloria toto terrarum Orbe clarissimos in vnum expresseris omnes; sed cum *vis consilij expers mole ruat sua*, literarum studia, Marhesios præcipuè foves, quæ militarem artem perficiunt, vt in te *præclaram faciat mixturam cum sapientia fortitudo*. Duplici tum corde, tum sensu animi Elephantus esse dicitur, & altero quidem ira incendi ad bellum, altero mitigari, & leniri ad sapientiam traditur ab Æliano: hoc quidem magnanimos decet viros, hac te sapientia, ac generositate præditum adumbrari, ambiget nemo, qui egregia tua facinora in bello, & pace cognoverit. Dubium igitur mihi non est, quin fortitudo tua sapiẽtia committe invicta sit ad labores, constans ad pericula, ad illecebras dura, rigidior ad voluptates, & in expiabili prælio adversus omnia vitiorum monstra decertet. Hinc quod de Asbesto Lychno Poëta cecinit, de splendore tuo flammæ cœlestis æmulo, posteritas iugi memoria recinet.

Evomit æterna vigiles in lampade flammas
Quas nulla Æolijs tempestas obruet alis.

Hæc animi magnitudo te Magno Philippo iunxit arctissime, Palladia hæc virtus te legatum constituit Regium pro Carolo Secundo ad Pontificem Maximum viribus licèt fractis, & imbecillis ex valetudine cruribus, sed mente adeò firma, & vivida; consilio ita certo, & stabili, vt suspicari liceat te Romam expetere, ne Christiani Orbis caput sine tuo cerebro vixisse doleat posteritas. Perge igitur, Heros maxime, in Vrbem

ipe-

ſpectaculis aſſuetam, quæ forte ſpectaculum te ipſo nobilius non vidit unquam: perge felix, & pro tua benignitate ſine opuſculũ hoc eſſe itineris commité, tecum *libenter ibit in Vrbem* non invitus, licèt verecundia forte, ac rubore perfuſus, cum Trigonometria, quæ omnium eſt menſura, immenſæ tuæ magnitudinis menſuram nullam inveniat. Vale.

Excellentiſsime Domine.

Excellentiæ Veſtræ
Obſequentiſſ. in Chriſto ſervus

Ioſephus Zaragoça.

LICENTIÆ SVPERIORVM.

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FACVLTAS R. P. PROVINCIALIS,
Toletanæ Provinciæ Societatis Ieſu.

Didacus de Valdes.

ERRORES PRIMO CORRIGENDI.

Pag.	Lin.	Error.	Corrig.
12.	27.	ABC.	BAC
18.	22.	MP.	AP.
18.	27.	CH.	BH.
18.	23.	atur.	ator.
22.	25. & 39.	&29.	
26.	11. cõtria.	cõtraria.	
36.	32.	16.	19.
37.	3.	ictus.	itur.
45.	8.	onem.	orem.
46.	15.	789.	798.
48.	2.	1238.	238.
53.	26.	126.	128.
56.	12.	45. *m.*	54. *m.*
58.	31.	relinquo.	reliquo.
64.	4.	(2.1.1.)	(1.1.2)
64.	12.	*cbd*,	*odb*,
68.	8.	BE,	DE,
70.	25.	mibus,	matibus,
85.	23.	NE.	NC.
97.	12.	*bubet*,	*habet*.
99.	14.	CAD,	CDA,
105.	24.	EDH,	EBH,
114.	24.	ACB,	ACb,
115.	16.	*latus, Angulum*,	
120.	5.	ſita,	ſitæ,
131.	22.	VI R,	VI B,

Corrigenda in Tabulis.

Sub gradu 1. & 2. in fine paginæ, vbi ſunt numeri 179. 89. 90. corrige 178. 88. 177.

Sub *gr.* 22. 10. *m.* in ordine Sinuum, prima littera eſt 8. corrige 9.

Ad ſimiles errores cognoſcendos pro vniverſis Tabulis, obſervandum eſt quemlibet numerum medium eſſe inter proxime ſuperiorem, & inferiorem.

LECTORI.

TRigonometria per vniversum Matheseos tractum longe difusa immensum ferè habet vsum, ad omnes superficies Rectilineas extensum, licèt nomen vnà Triangulorum mensuram præseferat. Huius cognitione destitui opprobium est Mathematici, & è converso: *Ex Angulis latera, ex lateribus Angulos* (verba sunt Magni Vietæ) *& mixtim in Triangulis, tàm Planis, quàm Sphæricis assequi, summa gloria Mathematici est.* Trigonometriam illustrarunt Ioannes de Regiomonte, Georgius Ioachimus Rheticus, Valentinus Otho, Franciscus Vieta, P. Christophorus Clavius, Mauritius Bresius, Thomas Finkius, Lansbergius, Maginus, Pitiscus, Bassantinus, Adrianus Romanus, Benjamin Vrsinus, Longomontanus, Snellius, Neperus, Briggius, Vlac, Stevinus, Froboenius, Oughtred, Metius, Sethus Vbardus, Gellibrant, Cavalerius, Herigonius, P. Gaspar Schotus, & Illustrissimus Caramuel: quos omnes merito literarius orbis veneratur Magistros, & impense concelebrat. Nihilominus meus iste labor, nec inutilis, neque inanis censebitur, vt spero, illis præcipuè, qui sedulo animadverterint difficultatem: retinendæ praxis, & demonstrationis resolutionum in Trigonometria Sphærica; quæ ad vnam facillimam figuram in hoc opere redacta est. Animus fuit Trigonometriæ ipsius applicationem adiungere: postea verò hanc speciali volumini reservandam esse duxi, quod innumeris ferè Problematibus ad Mathematicarum vsum apprime necessarijs refertum, vt publici iuris fiat, cito in communem lucem prodibit.

4

PROBLEMA I. Data Hypothen. & vno latere. Inven.

I. *Latus aliud.*		II. *Ang. conterminum.*		III. *Ang. oppositum.*	
Sinus 2. perp.	BH.	Tangens Hypoth.	EB.	Sinus Hypoth.	EB.
Radius	AH.	Tang. perp.	BH.	Sinus perp.	BH.
Sinus 2. Hypoth.	EB.	Radius	PR.	Radius	ED.
Sinus 2. basis	EH.	Sin. 2. anguli	B.	Sinus anguli	E.

PROBLEMA II. Data Hypothenusa, & angulo. Inven.

I. *Latus conterminum.*		II. *Latus opp. angulo.*		III. *Angulū reliquum.*	
Radius.		Radius	ED.	Radius.	
Sin. 2. ang.	B.	Sinus ang.	E.	Sin. 2. hypoth.	EB.
Tang. hypoth.	EB.	Sinus hypoth.	BE.	Tang. ang.	B.
Tang. lateris	BH.	Sinus lat. opp.	BH.	Tang. 2. ang.	E.

PROBLEMA III. Datis duobus lateribus. Inven.

I. *Hypothen.*		II. *Angulum.*	E.	III. *Angulum*	B.
Radius.		Sin. lat. conterm.	EH.	Sin. lat. conterm.	BH.
Sin. 2. lateris	BH.	Radius.		Radius.	
Sin. 2. lateris	EH.	Tang. lat. opp.	HB.	Tang. lat. opp.	HE.
Sin. 2. Hypot.	EB.	Tang. anguli	E.	Tang. anguli	B.

PROBLEMA IIII. Dato latere, & ang. contermino. Inven.

I. *Hypothen.*		II. *Latus opp.*		III. *Angulū reliquum.*	
Radius.		Radius.	EG.	Radius	BQ.
Sin. 2. ang.	E.	Sin. lat. conterm.	EH.	Sin. 2. lat.	BH.
Tan. 2. lat.	EH.	Tang. ang.	E.	Sin. ang.	B.
Tan. 2. Hypot.	EB.	Tang. lat. opp.	BH.	Sin. 2. ang.	E.

PROBLEMA V. Dato latere, & angulo opp. Inveni.

I. *Hypothen.*		II. *Latus reliquum.*		III. *Angulum reliq.*	
Sin. ang.	E.	Tang. ang.	E.	Sin. 2. lat.	BH.
Sin. lat.	BH.	Tang. lat. opp.	BH.	Sin. 2. ang.	E.
Radius.	DE.	Radius	EG.	Radius	BQ.
Sin. hyp.	EB.	Sinus lat.	EH.	Sin. 1. ang.	B.

PROBLEMA VI. Datis duobus angulis. Inveni.

I. *Hypothen.*		II. *Latus* BH.		III. *Latus.*	EH.
Tang. ang.	B.	Sin. 1. ang. con.	B.	Sin. ang. cont.	E.
Tan. 2. ang.	E.	Sin. 2. ang. opp.	E.	Sin. 2. ang. opp.	B.
Radius	BP.	Radius	DF.	Radius.	GF.
Sin. 2. hyp.	EB.	Sin. 2. lat.	BH.	Sin. 2. lat.	EH.

QVADRANTALE. *Soluitur vt rectang. convertendo lat. in ang: & contra.*

TRIGONOMETRIA PLANA.

Rectangula.

PROBLEMA I. *Fig.6.*

Datis latere, & angulis inven.

I. *Aliud latus.*	II. *Hypothen.*
BE. radius	BE. sin.ang. A.
ED. tāg.ang. B.	BD. radius
BC. latus datum	BC. lat. opp. A.
CA. latus quæs.	BA. Hypoth.

PROBLEMA II. *Fig.7.*

Dat. Hypoth. & latere. inven.

I. *Angulos.*	II. *Latus aliud.*
BA. Hypoth.	Inveniātur prius
BC. latus	anguli: deinde in
BD. radius	venietur latus ex
BE. sin.ang.A.	probl.1.
vel sin.2. ang. B.	

PROBLEMA III. *Fig.8.*

Dat. Hypoth. & angulis. inven.

I. *Latus CA.*	II. *Latus BC.*
BD. radius	BD. radius
DE. sin.ang.B.	BE. sin.ang.A.
BA. Hypoth.	BA. Hypoth.
CA. lat. opp. B.	BC. latus opp. A.

PROBLEMA IIII. *Fig.9.*

Dat. duobus lateribus inven.

I. *Angulos.*	II. *Hypothen.*
BC. latus maius	Inveniātur prius
CA. latus minus	anguli: deinde in
BE. radius	venietur Hypo-
ED. tāg.ang. B.	th. ex probl.1.
vel tan.2.ang.A.	

Obliquangula.

PROBLEMA I. *Fig.10.*

Datis angulis, & latere inven.

I. *Latus AB.*	II. *Latus BC.*
Sinus ang. B.	Sinus ang. B.
Latus opp. CA.	Latus opp. CA.
Sinus ang. C.	Sinus ang. A.
Latus opp. AB.	Latus opp. CB.

PROBLEMA II. *Fig.11.*

Dat. 2. lat. & ang. opp. inv.

I. *Angulos.*	II. *Latus.*
CA. Lat. opp. B.	Inveniātur prius
Sinus ang. B.	anguli : deinde
AB. lat. opp. C.	invenietur latus
Sinus ang. C.	ex probl.1.

PROBLEMA III. *Fig.12.*

Dat. 2. lat. & ang. medio. inven.

I. *Angulos.*	II. *Latus aliud.*
Summa laterum	Inveniātur ang.
differ. laterum.	deinde latus ex
tāg. semisū. B. C.	probl.1.
tāg. semidi. B. C.	

Summa 3. & 4. est B: differ. est C.

PROBLEMA IIII. *Fig.14.*

Dat. 3. lateribus. inven.

Quemlibet angulum.

Adde compl. logarinth. laterum, logarithmis semisummæ, & semidifferentiæ basis, & differentiæ laterum: dimidium aggregati est sinus semianguli opp. basi.

MONITVM VNIVERSALE.

In omni proportione sumitur prioris termini compl. logar: ad radium si ille sit minor isto, vel ad duplum radium si fuerit maior: ex summa trium aufertur 1. ad sinistram si compl. sumptum est ad radium: vel 2. si ad duplum radium: & remanet logar. quarti termini quæsiti.

PROBLEMA I. *Prorectangulis Sphæricis ex Nepero.*

Sinus cuiuslibet partis, & radius medij sunt inter Tangentes vicinarum: & etiam inter sinus 2. remotarum.

Tangens vicinæ, amotæ sinus esto secundus.

Partes sunt latera, & complementa Hypothenusæ, & angulorum (omisso recto) quæ signantur hac nota ○ : vt in *Fig.* 7.

PROBLEMA II. Rectangula solventur ex data basi, &

Sum. hyp. & perp.	*Summa 1. & 4. est Hypoth. Differ. est perpend.*	*Difer. hyp & perp.*	*Inde reliqua innotescent.*
Tan. semisummæ.		Tan. semi difer.	
Tan. semi basis.		Tan. semibasis.	
Tan. semi basis.		Tan. semibasis.	
Tan. semi difer.		Tan. semisummæ.	

PROBLEMA III. *In obliq. ex 2. alternis, & media.*

Segmenta basis.	*Summa 3. & 4. est segm. maius. Difer. est minus.*	*Segmenta anguli.*
Sin. summæ angulorũ.		Sin. summæ laterum.
Sin. difer. angulorum.		Sin. difer. laterum.
Tan. semibasis.		Tan. 2. semianguli.
Tan. semidifer. segm.		Tan. semidifer. segm.

PROBLEMA IIII. Ex data parte, segmentis, & summa includentiũ

Latera includentia.	*Semisumma 3. & 4. est pars maior. Semidif. est minor.*	*Anguli includentes.*
Tan. 2. semianguli.		Tan. semibasis.
Tan semidif. segm.		Tan. semidif. segm.
Sin. summæ laterum.		Sin. summæ angulorum.
Sin. difer. laterum.		Sin. difer. ang.

PROBLEMA V. Ex data media, segmentis, & difer. includentium

Latera includentia.	*Semi summa 3. & 4. est pars maior. Semidif. est minor.*	*Anguli includentes.*
Tan. semidif. segm.		Tan. semidif. segm.
Tan. 2. semianguli.		Tan. semibasis.
Sin. difer. laterum.		Sin. difer. angulorum.
Sin. summæ laterum.		Sin. summæ angulorum.

PROBLEMA VI. Ex 2. alternis, & difer. segm. mediæ.

Basim inclusam.	*Duplum quarti est pars quæsita.*	*Angulum inclusum.*
Sin. difer. angulorum.		Sin. difer. laterum.
Sin. summæ ang.		Sin. summæ laterum.
Tan. semidif. segm.		Tan. semidif. segm.
Tan. semibasis.		Tan. 2. semianguli.

SPECIES I.

PROBLEMA I. Datis 3. partibus alternis: quær. opp.

I. *Ex 3. lateribus Angulus.*	II. *Ex 3. angulis Latus.*
Adde compl. logar. sinuum laterum, lograrithmis semisummæ, & semidif. basis & differentiæ laterum: dimidiũ aggregati est sinus semiãguli.	Sume compl. ad 180. vnius anguli ex includentibus latus quæsitum & fit eadem operatio. Dimidium aggregati est sinus semilateris.

SPECIES II.

PROBLEMA II. Ex 2. alternis, & media: quær. alterna.

I. *Latus: ex 2. lat. & ang.*		II. *Angulus ex 2. ang. & lat.*	
Radius.	Sin. 2. segm. DC.	Radius.	Sin. segm. CAD.
Sin. 2. ang. C.	Sin. 2. segm. DB.	Sin. 2. lat. AC.	Sin. segm. BAD.
Tan. lat. AC.	Sin. 2. lat. AC	Tan. ang. C.	Sin. 2. ang. ACB
Tan. segm. CD.	Sin. 2. lat. AB.	Tã. 2. ang. CAD	Sin. 2. ang. ABC

PROBLEMA III. Ex 2. alternis, & media: quær. opp.

I. *Angulus ex 2. lat. & ang.*		II. *Latus ex 2. ang. & lat.*	
1. oper. vt supra.	Sin. segm. CD.	1. oper. vt supra.	Sin. 2. seg. CAD.
Seg. 2. est summa, si perp. cadit extra, vel differ. si cadit intra.	Sin. segm. DB.	*Seg. 2. est summa, si perp. cadit, extra, vel differ. si cadit intra.*	Sin. 2. seg. BAD.
	Tan. 2. ang. C.		Tan. 2. lat. AC.
	Tan. 2. ang. B.		Tan. 2. lat. AB.

SPECIES III.

PROBLEMA IIII. ex 2. alternis, & opp. quær. alterna.

I. *Latus ex 2. lat. & ang. op.*		II. *Angulus ex 2. ang. & lat. opp.*	
1. oper. vt supra.	Sin. 2. lat. AC.	1. oper. vt supra.	Sin. 2. ang. ACB
Latus BC. est summa, vel dif. vt supra.	Sin. 2. lat. AB.	*Ang. BAC. est summa, vel diffe. vt supra.*	Sin. 2. ang. ABC
	Sin. 2. seg. CD.		Sin. ang. CAD.
	Sin. 2. seg. DB.		Sin. ang. BAD.

PROBLEMA V. Ex 2. alternis, & opp. quær. media.

I. *Latus ex 2. ang. & lat. opp.*		II. *Angulus ex 2. lat. & ang. opp.*	
1. oper. vt supra.	Ta. 2. ang. ACB.	1. oper. vt supra.	Ta. 2. lat. AC.
CB. est summa, vel dif. vt inpr. 3.	Ta. 2. ang. ABC.	*BAC. est summa, vel dif. vt inpr. 3.*	Ta. 2. lat. AB.
	Sin. segm. CD.		Sin. 2. ang. CAD
	Sin. segm. BD.		Sin. 2. ang. BAD

PROBLEMA VI. Ex 2. alternis, & opp. quær. opposita.

I. *Angulus ex 2. lat. & angulo op.*		II. *Latus ex 2. ang. & lat. opp.*	
	Sin. lat. AB.		Sin. ang. BCA.
Operatio vnica.	Sin. lat. CB.	*Operatio vnica.*	Sin. ang. BAC.
	Sing. ang. ACB.		Sin. lat. AB.
	Sin. ang. BAC.		Sin. lat. BC.

Totum opus in tres libros distributum volui. Primus Canonem Trigonometricum, naturam, inventionem, vsumque mirabilem Logarithmorum exprimit, quæ omnia Trigonometriæ Planæ, & Sphæricæ comunia sunt. Secundus, de Trigonometria plana totus est. Tertius autem de Sphærica.

CAPVT PRIMVM.

DE SINIBVS, TANGENTIBVS, ET Secantibus.

1 SInus, Tangentes, & Secantes rectæ quædam sunt, quæ ad Triangulorum solutionē considerantur in Circulo; cum autem rectarum ad id spectantiū aliæ omninò intra Circulum cadant, aliæ prorsus extra, aliæ verò partim extra partim intra, opus fuit diversa ijs indere nomina distinctionis ergo. Sinus omninò intra Circulum cadūt, at Tangentes Circulū tangunt prorsusque eminent extra, Secantes illam secant, & partim extra, partim intra sunt.

2 Mathematici cuiuscumque circuli peripheriam in 360. partes divisam intelligunt, quas gradus appellant, singulos autem gradus in 60. partes, quas vocant minuta, vel scrupula prima, singula verò minuta in 60. secūda, singula secunda in 60. tertia, &c.

3 Partes Circuli sunt Angulorum mensura, vt si in puncto A. fig. 1. constituatur Angulus, & ex eo Circulus describatur, contineatque Arcus CB. gradus 60. & minuta 15. continebit etiam Angulus ABC. gradus 60. minuta 15. &c. Cum autem integer Circulus 360. gradus habeat, Semicirculus DBM. erit graduum 180. quadrans verò MB. qui mensura est Anguli recti MAB. graduum 90. quare omnes Anguli recti interse æquantur; omnes si-

quidem 90. gradibus constat. Angulus 90. gradibus maior, erit Obtusus; minor verò Acutus.

4 Complementum Anguli, vel Arcus est id, quod deficit ipsi, referturque ad Quadrantem, vel Semicirculum. Complementum Anguli obtusi semper est ad Semicirculum; *Exem gr.* sit Angulus DAC. vel Arcus DC. graduum 120. quibus demptis ex Semicirculo 180. relinquetur Angulus CAB. vel Arcus CB. graduum 60. eritque BC. complementum ad Semicirculum Arcus CD. complementum Anguli acuti esse potest ad Quadrantem, vel Semicirculum. Si Arcus CB. vel Angulus CAB. sit gradum 60. subducanturque ex Quadrante BM. 90. remanebit CM. vel CAM. graduum 30. & erit MC. complementum Arcus CB. scilicèt ad Quadrantem. Si verò BC. graduum 60. auferatur ex Semicirculo BCD. 180. relinquetur CD. graduum 120. eritque CD. complementum ad Semicirculum Arcus BC. Idem dicendum est de Angulis.

5 Diameter est linea quæ transit per centrum, & Circulum dividit in duas partes æquales, vti DB. cuius semissis AB. est *Semidiater*, vel *Radius*, qui ex centro in circumferentiam erit, & omnes Radij sunt æquales, atque etiam Diametri. Videant Tyrones Proæmialia saltem Geometriæ nostræ.

6 Linea omnium potissima Radius est, ad quam aliæ omnes circuli referuntur, & licèt in quascumq; partes dividi posset, operationū facilitas exigit, vt in vnitatem cum aliquot ciphris resolvatur, veluti in partes 10000. vel in 1000000. &c. quæ divisio inservit ad determinandam quantitatem reliquarum circuli linearum, quæ sunt chordæ, Sinus, Tangentes, & Secantes; omnes enim, vt mensurentur cum Radij partibus conferuntur.

7 *Chorda*, subtensa, vel inscripta est recta, quæ tota intra Circulum cadit, & finitur duobus punctis extremis Arcus, cui subtenditur vti CG. est chorda, vel subtensa

Arcus CBG. quia terminatur duobus punctis CG. quæ sunt eiusdem Arcus extrema.

8 *Sinus rectus*, vel *Sinus primus* est recta, quæ ab vno Arcùs extremo perpendicularis incidit Diametro per extremum aliud transeunti. In exemplo sit Arcus CB. & per centrum A. & punctum B. transeat Diameter DAB & ex puncto C. cadat perpendicularis CE. erit CE. Sinus rectus, vel Sinus primus Arcus CB. & Anguli acuti CAB. ipsamet recta CE. Sinus primus erit Arcus DC. quia etiam perpendicularis est Diametro DAB. per extremum D. Arcus CD. transeunti: quare Sinus Anguli acuti CAB. Sinus quoque est Anguli obtusi CAD. videlicèt sui complementi ad Semicirculum.

9 *Sinus Totus* est Sinus Quadrantis, vel Anguli recti, & est ipsemet Radius. Cum enim BM. quadrans sit; perpendicularis MA. cadit in centrum A. itaque Sinus MA. est ipsemet Radius AM. & cum MA. perpendicularis maxima sit omnium, quæ in Diametrum DB. cadere possunt, erit etiam *Sinus Maximus*, *Sinus Totus*, vel *Totalis*, vel *Radius*, quæ voces idem omninò significant.

10 *Sinus secundus* cuiusque Arcùs est ipsemet Sinus primus suæ differentiæ ad Quadrantem, veluti si Arcus sit BC. graduum 60. demptis ijs ex Quadrante 90. remanebit differentia graduum 30. & perpendicularis CO. quæ est Sinus primus Arcus CM. erit Sinus secundus Arcus CB. Si verò Arcus sit DC. graduum 120. ablato ex eo Quadrante DM. 90. relinquetur differentia MC. graduũ 30. cuius Sinus primus est CO. eritque Sinus secundus Arcus DC. cum autem in Rectangulo OE. latera opposita sint æqualia OC. AE. (7.l.1.) erit AE. Sinus secundus Arcus BC. & pariter Arcùs CD. ita vt Sinus secundus Anguli acuti, sit ipsemet Sinus primus sui complementi ad Quadrantem; Sinus verò secundus Anguli obtusi est Sinus primus differẽtiæ, vel excessus quo Quadrantem superat.

11 *Sinus Versus*, vel *Sagitta* est Diametri portio comprehensa inter Sinum primum, & Circuli circũferentiam. Exempli gratia CE. est Sinus rectus Arcus CB. & EB. est Sinus Versus Arcùs CB. ED. verò, Sinus Versus Arcus DC. ergo Sinus Versus EB. Arcus BC. vna cum Sinu secundo AE. æquatur Radio AB. & Sinus Versus ED. minus Sinu 2. AE. Arcus DC. æquatur Radio AD. ergo cognito Sinu secundo AE. Arcus BC. si auferatur AE. ex Radio, vel Sinu toto AB. supererit EB. Sinus Versus Arcus CB. si autem AE. Sinus secundus Arcus DC. addatur Radio AD. erit ED. Sinus Versus Arcus DC. vel Anguli Obtusi DAC. in Angulo igitur acuto subducitur Sinus secundus, in Obtuso verò additur Radio, & habetur Sinus Versus: ob hanc potissimum causam calculus Tabulæ Sinuum Versorum ommittitur.

12 *Tangens* est linea, quæ Circulum contingit in vnico puncto, & est perpendicularis ad extremum Diametri, quæ transit per illud punctũ (7.l.3.) Tangens ista infinita esse potest: Tangens verò Arcus est recta, quæ in altero Arcus extremo Circulũ contingit, & determinatur rectà, quæ à centro transit per extremum alterum eiusdem Arcus vti BH. est Tangens Arcus BC. quia Arcum in extremo B. tangit, & finitur rectà AH. quæ à centro prodit per punctum C. dicitur *Tangens prima*, vt distinguatur à secunda.

13 *Tangens secunda* vnius Arcus, Quandrãte minoris, vel Anguli acuti, est ipsamet Tangens prima sui complementi ad Quadrantem, veluti si Arcus sit BC. complemẽtum eius erit CM. & MP. est Tangens prima Arcus MC. dico MP. esse Tangentem secundam Arcus BC. Pari ratione BH. quæ est Tangens prima Arcus BC. erit Tangens secunda Arcus CM. &c.

14 *Secans prima* cuiusque Arcus, vel Anguli acuti est recta, quæ prodit à centro, & secat Tangentem primã, Secans verò *secunda* est recta, quæ secat Tangẽtem secun-

dam, ibique terminatur: veluti AH. est Secans prima Arcus BC. quia AH. terminatur ad Tangentem primã BH, sed AP. est Secans secunda Arcus CB. quia terminatur ad Tangentem secundam MP. rursus AP. est Secans prima Arcus MC. & AH. est Secans secunda eiusdem Arcus MC. ergo Tangentes, & Secantes primæ vnius Arcus sunt Tangentes, & Secantes secundæ sui complementi ad Quadrantem, & econtra.

15 Arcus maiores 90. gradibus, & Anguli Obtusi non habent Tangentes, & Secantes aliàs quam complementorum suorum ad Semicirculum: quare si Angulus sit graduum 120. eius Tangens prima, & secunda; item Secans prima, & secunda erit eadem, quæ graduum 60. sui complementi ad Semicirculum. Observatione dignum est, quoties dicitur *Sinus*, *Tangens*, vel *Secans*, absolutè subintelligitur *Sinus primus*, *Tangens prima*, *Secans prima*, quoties non additur terminus secundus, vel secunda.

CAPVT SECVNDVM.

DE FVNDAMENTIS CANONIS Trigonometrici.

16 *Differentia quorumlibet duorum Arcuum, vel Angulorum est eadem, quæ suorum complementorum ad Quadrantem, vel Semicirculum.* Fig. 1.

Sint Arcus duo DR. DL. quorum differentia est RL. complementa ad Quadrantem sunt RM. LM. & ipsorum differentia item est RL. complementa ad Semicirculum sunt RB. LB. & illorum differentia est RL. ergo semper est eadem.

17 *Sinus cuiuslibet Arcus est semissis Chordæ Arcus dupli, & Sinus duorum Arcuum proportionales sunt Chordis Arcuum duplorum.* Fig. 1.

Sit

Sit Arcus BC. eiusque Sinus CE. productus vsque ad G. cum Radius AB. sit perpendicularis ad CG. (5. 8.) æquabuntur Arcus CB. BG. item CE. EG. (2. l. 3.) CE. dimidium est CG. & Arcus CBG. duplus CB. ergo Sinus CE. Arcus CB. est semissis chordæ CG. Arcus dupli CBG. igitur si sumatur quilibet alius Arcus CM. & eius duplus CL. erunt proportionales: vti CO. est dimidium CL. ita CE. est dimidium CG. & alternando vt Sinus CO. ad Sinum CE. ita chorda CL. ad chordam CG. (5. l. 5.)

18 *Sinus primus, & secundus æque possunt ac Radius. Sinus primus, & Sinus Versus æque possunt ac Chorda. Chorda differentiæ duorum Arcuum, æque potest ac differentiæ earumdem Sinuum primorum, & secundorum.* Fig. 1.

Sit Arcus BC. (Fig. 1.) eiusque Sinus primus CE. Sinus verò secundus CO. id est AE. Radius est AC. ergo cum Angulus E. rectus existat, erit quadratum ex AC. æquale quadratis AE. EC (4. l. 2.) igitur AE. EC. æquant possunt ad Radius AC. Pari ratione Arcus CL. Sinus primus CZ. & Sinus Versus LZ. æque possunt ac Chorda LC. quoniam quadratum LC. æquatur duobus quadratis CZ. ZL. Rursus Chorda GN. differentia Arcuũ BN. BG. æque potest ac KG. differentia Sinuum primũ GE. SN. & KN. differentia Sinuum secundorũ GX. NI.

19 *Sinus primus vnius Arcus medio loco proportionalis est inter semissem Radij, & Sinum Versum Arcus dupli.* Fig. 1.

Sit Arcus DL. & DLC. duplum eius: erit DZ. Sinus primus Arcus LD, & DE. Sinus Versus Arcus DLC. cũ Triangula DZA. DEC. habeant angulos ad Z. & E. rectos, & Angulum ad D. communem, æquiangula sunt (3. l. 1.) ergo vt DE. ad DC. ita DZ. ad DA. (2. l. 6.) & alternando vt DE. ad DZ. ita DC. ad DA. (5. l. 5.) igitur vt DE. ad DZ. ita DZ. semissis DC. ad semissem Radij DA. (4. l. 5.) ergo DZ. Sinus primus Arcus DL. me-

dio

dio loco proportionalis est inter Sinum Versum DE. Arcus dupli DLC. & Semiradium DA. &c.

20 *Radius medius proportionalis est inter Tangentes Arcus primam, & secundam.* Fig. 1.

Sit Arcus BC. eius Tangens prima BH, & MP. Tangens secunda: cum MA, BH. perpendiculares sint ad BA erunt parallelæ (13. P.) & Anguli Alterni MAP. AHB æquales (2. l. 1.) & Anguli M. B. recti æquales: ergo Triangula AMP. HBA. sunt Equiangula (3. l. 1.) igitur proportionales sunt HB. Tangens prima ad BA. Radium vt AM. Radius ad MP. Tangentem secundā (2. l. 6) quare Radius medius est inter Tangentem primam & secundam.

21 *Radius medius proportionalis est inter Sinum primum, & Secantem secundam vnius Arcus, vel inter Sinum secundum, & Secantem primam.* Fig. 1.

Sit Arcus BC. cuius Sinus primus est CE. & Secans secunda AP. cum sint Æquiangula. (vt antea) Triangula AMP. CEA. erunt proportionalia: vti CE. Sinus primus ad CA. Radium; ita AM. Radius ad AP. Secantem secundam (2. l. 6.) ergo Radius medius est inter Sinum primum CE. & Secantem secundam AP. vel inter CE. Sinum secundum Arcus MC. & AP. Secantem primam eiusdem, &c.

22 *Radius ad Tangentem Arcus rationem habet, quam Sinus secundus ad Sinum primum, eiusdem Arcus.* Fig. 1.

Sit Arcus CB. eius Tangens BH. Sinus primus CE. Sinus secundus CO. vel AE. cum AB. perpendicularis sit ad EC. BH. (§. 8. & 12.) erunt CE. BH. parallelæ (13. P.) ergo vt AE. Sinus secundus ad EC. Sinum primum; ita AB. Radius ad BH. Tangentem, (2. l. 6.)

23 *Radius ad Secantem primam vnius Arcus rationem habet, quam Sinus primus ad Tangentem primam.* Fig. 1.

In ijsdem Triangulis ACE. AHB. Radius AC. est ad Sinum primum CE. vti Secans AH. ad Tangentem HB. (2. l. 6.) ergo alternando AC. Radius ad AH. Secantem, est vt Sinus CE. ad Tangentem HB.

24 *Radius eandem rationem habet cum Secante 1. quam Tangens 2. cum Secante 2.* Fig. 1.

Sit Arcus BC. cuius Secans 1. est AH. Tangens 2. MP. & Secans 2. AP. in Triangulis similibus AMP. HBA. sunt proportionales MP. Tangens 2. ad PA. Secantem 2. vti BA. Radius ad AH. Secantem 1. (2. l. 6.)

25 *Sinus 1. & 2. vnius Arcus directè proportionales sunt cum Secante 1. & 2. eiusdem Arcus.* Fig. 1.

Sit A. Sinus 1. B. Sinus 2. Sit C. Secans 1. A. B. D. Secans 2. R. Radius, cum Radius medium R. proportionale sit inter A. & D. (§. 21.) erit C. D. Rectangulum ex A. in D. æquale Quadrato Radij (1. l. 6.) & quoniam ipsemet Radius medium proportionale est inter C. & B. (§. 21.) erit Quadratum ex Radio æquale Rectangulo sub C. & B. (1. l. 6.) ergo Rectangulū ex A. in D. æquale est Rectangulo sub C. & B. (3. P.) ergo latera reciprocè proportionalia sunt, vt A. Sinus 1. ad B. Sinum 2. ita C. Secans 1. ad D. Secantem 2. (1. l. 6.)

26 *Tangens 1. & 2. vnius Arcus reciprocè proportionales sunt cum Sina 1. & Secante 2. vel cum Sinu 2. & Secante 1. eiusdem Arcus.*

Sit A. Tangens 1. R. Radius. B. Tangens 2.
Sit C. Sinus 1. R. Radius. D. Secans 2.

Cum Radius medius sit inter A. & B. (§. 20.) erit Rectangulum ex A. in B. æquale Quadrato ex Radio (1. l. 6.) & quia Radius medius quoque est inter C. & D. (§. 21.) erit Rectangulum sub C. & D. æquale Quadrato ex Radio (1. l. 6.) ergo Rectangulum ex A. in B. æquatur Rectangulo sub C. & D. (3. P.) ergo latera reciproca proportionalia sunt (1. l. 6.) vt A. Tangens 1. ad C. Sinum 1. ita D. Secans 2. ad B. Tangentem 2. Idem est de Sinu 2. & Secante 1. propter eandem rationem.

27 *Tangentes 1. & 2. cuiusque Arcus reciprocè proportionales sunt cum Tangente 1. & 2. cuiuslibet alterius Arcus: vel cum Sinu 1. & Secante 2. vel cum Sinu 2. & Secante 1. Item Sinus 1. & Secans 2. vnius Arcus reciprocè proportionales sunt cum Sinu 1. & Secante 2. vel cum Sinu 2. & Secante 1. cuiusque alterius Arcus, & è contra.*

Demonstratio eadem prorsus est, quia Radius medius est inter hos, & illos (§. 20. & 21.) ergo Rectangula erunt æqualia, & latera reciproca, vt anteà (1.l.6.)

28 *Chorda differentiæ duorum Arcuum ad differentiam Sinuum 2. eorumdem rationem habet, quam Radius ad Sinum Arcus intermedij.* Fig. 1.

Sint duo Arcus BN. BG. ipsorum differentia NG. & recta GN. chorda differentiæ Arcuum. Sinus 2. Arcuum sunt NI. GX. & eorum differentia NK. cum AT. perpendicularis sit ad chordam GN. bifariam secabit chordam, & Arcum (2.l.3.) ergo Arcus BT. est Arcus intermedius, eiulque Sinus TF. igitur quia GE. perpendicularis est ad BA. & AT. ad GN. & Anguli Verticales AVE. GVT. sunt æquales æquabitur EAV. Angulo VGN. (3.l.1.) ergo quia VGN. cum GNK. vnum rectum efficit, & AVE. cum EAV. constituit quoq; rectũ, æquales erunt etiam EVA. GNK. & cum æquales sint AVE. ATF. (2.l.1.) æquales item erunt ATF. GNK. igitur Triangula Rectangula ATF. GNK. Æquiangula sunt (3.l.1.) & latera proportionalia (2.l.6.) ergo chorda GN. ad NK. differentiam Sinuum secundorum est, vt Radius AT. ad Sinum TF. Arcus intermedij BT.

Aliæ proportiones reperiuntur apud Lansbergium, Clavium, & alios, quas omitto, quia ad nostram methodum superfluæ sunt.

CAPVT TERTIVM.

DE LATERIBVS FIGVRARVM regularium.

29 LAtera figuratum regularium, atque Sinus inde exorti eò erunt exactiores, quo Radij divisio maior existet, & quia in extractione Radicum irrationalium elici nequit numerus verus, & in operationum continuatione augetur error, vt evadat iste insensibilis, expedit quatuor, vel sex cyphras addere Radio præter eas, quæ in Sinuum Tabulam electæ fuerint: veluti si Sinus investigandi sint ad Radium; 100. 000. 000. sumatur ad operationem Radius 1000. 000. 000. 000. & ex Sinibus inventis reijciantur quatuor litteræ ad dextram, & Sinus absque errore sensibili remanebunt.

De latere Hexagoni.

30 Latus Hexagoni est ipsemet Radius circuli (5. p. 3. Geometriæ Practicæ) ergo si Radius statuatur 1000. 000. 000. 000. hic etiam erit valor lateris Hexagoni.

De latere Trianguli. Fig. 2.

31 Circulo in sex partes diviso, est ABC. Triangulũ equilaterũ (5. p. 3.) & ducta BD. erit ipsa latus Hexagoni: ergo cum Angulus ABD. in Semicirculo rectus sit (3.l.3.) Quadratum ex AD. æquabitur duobus Quadratis AB. BD. (4.l.2.) & quia AD. Diameter dupla est Radij AE. erit AD. 2000. 000. 000. 000. eius Quadratum 4000. 000. 000. 000. 000. 000. 000. 000. & cum BD. sit latus Hexagoni æquale Radio, erit eius Quadratum 1000. 000. 000. 000. 000. 000. 000. 000. quo sublato ex Quadrato AD. remanebit Quadratũ ex AB. 3. 000. 000. 000. 000. 000. 000. 000. cuius radix quadrata est latus Trianguli AB. 1732050807568.

De latere Quadrati. Fig. 3.

32 Si duæ Diametri AB. CD. secantur ad Angulos rectos, erunt CA. AD. latera Quadrati (5.p.4.) ergo quia Angulus ad A. rectus est, duo Quadrata CA. AD. æquabuntur Quadrato ex CD. (4.l.2.) cumque DA. AC. sint æquales; vnum quodque Quadratum dimidium erit Quadrati CD. ergo existente Quadrato 4.000.000.000.000.000.000.000.000.000. cuius semissis 2000.000.000.000.000.000.000.000.000. est Quadratum ex AC. eius radix quadrata erit latus AC. 1414213562373.

De latere Pentagoni. Fig. 4.

33 Sit BC. Diameter, DA. Radius perpendicularis, DE. dimidium DC. sit EF. æqualis ipsi EA. & ducantur AF. quæ erit latus Pentagoni. Ita practicos operari ait Caramuel in sua Geometria, pag. 333. & quærit: *An ne bene?* Illam per Sinus probat, & ita concludit: *Ergo secura est regula.* Nequeo satis mirari tantum Mathematicum Sinus adhibuisse in examen propositionis Ptolomeo demonstratæ, *lib. 1. cap. 9. Almag.* ac deinceps à Clavio, & Herigonio *in Schol. prop. 10. lib. 13.* & à pluribus alijs: demonstratur etiam in nostra Geometria Minimorum, *part. 2. prop. 167.* vndè Sinus per hanc examinandi sunt, non è converso.

34 Quadratum AE. æquatur ED. DA. & AF. ipsi FD. DA. (4.l.2.)

Qum *AD.*	10000000000000000000000000
Qum *DE.*	2500000000000000000000000
Qum *AE.*	12500000000000000000000000
Eius Radix Qa est latus AE. vel EF.	111803398874
ED. est dimidium Radij.	500000000000
Dempta ED. ex EF. est FD.	618033988749
Qum *FD. est*	381966011248999058585001
Qum *AD. est*	10000000000000000000000000
Summa Qum	13819660112489990585850010
Eius Radix Qa est AF.	117557050458
Et est latus Pentagoni, vti iam diximus.	

De latere Quindecagoni. Fig. 5.

35 Sit ABDEG. Pentagonum, & ACF. Triangulum. Arcus AB. BD. graduum 72. eritque ABD. graduum 144. cum verò AC. circuli sit tertia pars, graduum 120. erit CD. graduum 24. Arcus Quindecagoni, quia autem ABH. AGH. Semicirculi æquales sunt; si demantur Arcus æquales ABD. AGE. relinquentur æquales DH. HE. ergo Radius ZH. bifariam secat chordã DE. & est ipsi perpendicularis, item CF. (2.l.3.) eruntq; DE. CF. parallelæ interse, vti etiam perpendiculares ad illas DS. RP. (13.P.) igitur cum Quadratum ex CD. æquetur Quadratis CS. & DS. (4.l.2.) inventis CS. & DS. reperta erit, & CD. quæ latus est Quindecagoni.

36 *Praxis talis est.*

CF. latus Trianguli.	1732050807568
DE. latus Pentagoni.	1175570504584
CP. est dimidium CF.	866025403784
DR. est dimidium DE.	587785252292
Differentia est CS.	278240151492
Qum *CP.*	749999999999240241518656
Qum *DR.*	345491502811970091253264

Ablatis ex Quadrato Radij ZC. & ZD. remanebunt quadrata ex ZP. & ZR. (4.l.2.)

Qum *ex ZP.*	250000000000759758481344
Qum *ex ZR.*	654508497188029908746736
Radix quadrata est ZP.	500000000000
Radix quadrata est ZR.	809016994375
Differentia est PR. vel SD.	309016994375
Differentia CP. & DR. est CS.	278240151492
Qum *ex SD.*	95491502812558781640625
Qum *ex CS.*	77417581902291109826064
Summa est.	172909084714849891466689
Eius Radix quadrata est CD.	415823381635
Et hæc est latus Quindecagoni.	

De latere Decagoni. Fig. 5.

37 Latus Decagoni est DH. atque eius Quadratum æquale Quadratis DR. RH.

Radius ZH. est.	1000000000000
ZR. per §. 36. est.	809016994375
Differentia est RH.	190983005625
DR. per §. 36. est.	587785252291
Qum ex RH. est.	36474508437558781640625
Qum ex DR. est.	345491502811970091253264
Duorum summa.	381966011249528872893889
Radix quadrata est DH.	618033988749

Atque hoc est latus Decagoni, eodem modo reperientur figuræ omnes duplorum laterum.

CAPVT QVARTVM.

METHODVS INVESTIGANDI SINVS, Tangentes, & Secantes exponitur.

38 *INvenire Sinus graduum 60. 45. 36. 30. 18. & 12. item Sinus complementorum suorum.*

Quoniam semissis chordæ Sinus est dimidij Arcus (§. 17.) Triangulum verò gradus 120. subtendit, Quadratum 90. Pentagonum 72. Hexagonum 60. Decagonum 36. Quindecagonum 24. semisses chordarum, erunt Sinus dimidiorum Arcuum.

	Arc	*Chordæ.*	*Gr*	*Sinus.*
Triang.	120	1732050807568	60	866025403784
Quadr.	90	1414213562373	45	707106781186
Pentag.	72	1175570504584	36	587785252292
Hexag.	60	1000000000000	30	500000000000
Decag.	36	618033988749	18	309016994374
Quinde.	24	415823381635	12	207911690817

Invenire Sinus complementorum.

39 Quoniam Sinus 1. & 2. æque possunt ac Radius (§. 18.) si Quadratum ex Sinu 1. subducatur ex Quatrato Radij, & à residuo extrahatur Radix quadrata; erit hæc Radix Sinus 2. vel Sinus complementi.

Sinus 1. gr. 36. est.	587785252292
Eius Qum est.	345491502811970091253264
Qum ex Radio.	1000000000000000000000000
Residuum est.	654508497188029908746736
Radix quadrata est Sinus 2. gr. 36.	809016994374

Atque etiam Sinus 1. complementi sui, quod est graduum 54. hac arte reperientur Sinus secundi, si cognoscantur primi, & vice versa primi, si cognoscantur secundi.

Grad.	*Sinus.*	*Complement.*	*Sinus.*
60	866025403784	30	500000000000
45	707106781186	45	707106781186
36	587785252292	54	809016994374
30	500000000000	60	866025403784
18	309016994374	72	951056516295
12	207911690817	78	978147600733

Invenire Sinus semissis, vel Arcus dupli.

40 Quoniam Sinus 1. vnius Arcus medio loco proportionalis est inter Semiradium, & Sinum Versum Arcus dupli (§. 19.) si Sinus Versus ducatur in Semiradium, Radix quadrata producti erit Sinus 1. dimidij Arcus. Si verò Sinus Arcus multiplicetur per Semiradium; Radix quadrata producti erit Sinus Versus Arcus dupli, eius autem differentia ad Radium erit Sinus 2. eiusdem Arcus dupli, & per §. 39. invenietur Sinus 1.

Ex Arcu gr. 12. & quæritur Sinus gr. 6. & 24.

Radius.	10000000000
Sinus 2.gr.12.	97814760073
Sinus Verſus, gr.12.	21852399267
Semiradius.	5000000000
Productus.	10926199633500000000000
Eius Radix quadrata eſt Sinus gr.6.	1045284632676
Eius Sinus 2. per §.39. eſt.	99452189536

41 Pari artificio reperientur Sinus 1.& 2. graduũ; inſuper 1.*gr.*30.*min.*deinde Sinus *min.*45. Tandem Sinus dimidiorum complementorum,&c.

Grad.	*Sinus.*	*Compl.*	*Sinus.*
12. 00	207911690817	78. 00	968147600378
6. 00	104528463267	84. 00	994521895368
3. 00	52335956242	87. 00	998629534754
1. 30	26176948307	88. 30	999657324975
0. 45	13089595571	89. 15	999914327574

42 Prætereà invenientur Sinus dimidiorũ complementorũ. Et quoniam Sinus 2.gr.78.eſt 207911690817. ſubducto eo ex Radio, ſupererit Sinus Verſus 792088309183 qui multiplicatus per Semiradium, & eruta radice quadrata; Sinus 1. graduum 39. erit 629320391049. & Sinus 2. per §. 39. erit 777145961456. eodem pacto reperientur omnes ſubſequentes.

39. 00	629320391049	51.00	777145961456
19. 30	333806359233	70.30	942641491092
9. 45	169349503849	80.15	985556059058
42. 00	669130606358	48.00	743144825477
21. 00	358367949545	69.00	933580426497
10. 30	182235525492	79.30	983254907563
5. 15	91501618663	84.45	995804927574
43. 30	688354575693	46.30	725374371012
21. 45	370557437509	68.15	928809552871
44. 15	697790459841	45.45	716301943424

43 *Inſuper Sinus ſemiſsis horum complementorum.*

25.30	430511096808	64.30	902585284349
12.45	220697435021	77.15	975342320508
35.15	577145190073	54.45	816641555161
24.00	406736643075	66.00	913545457642
34.30	566406236924	55.30	824126188622
17.15	296541574975	72.45	955019944457
39.45	639439001980	50.15	768841832073
23.15	394743856384	66.45	918791210148

44 *Deinde Sinus ſemiſsis horum complementorum.*

32.15	533614515915	57.45	845727821703
33.00	544639035015	57.00	838670567945
16.30	284015344703	73.30	858819734868
8.15	143492621991	81.45	989651386819
27.45	465614520325	62.15	884987634463

Tandem Sinus ſemiſsis horum complementorum.

28.30	477158760259	61.30	878857112661
14.15	246153293028	75.45	969230909706
36.45	598324600570	53.15	801253812691
30.45	511293086077	59.15	859406411501

45 Sicut ex Sinu graduum 12.orti ſunt Sinus triginta duo,& ſuorũ complemẽtorum, ita eadem praxi §.40.& 42.naſcentur 16, Sinus cum ſuis cõplementis, è Sinu graduum 36.deinde 8.è Sinu graduũ 30.ac deinceps 4.è Sinu *gr.*45.qui omnes 60. ſummam efficiunt, cum complemẽtis autem ſummam 120. diſtantes interſe minutis 45.& in Tabulam referentur hoc ordine.

Grad.	*Sinus 1.*	*Sinus 2.*	*Compl.*
0. 45	13089595571	999914327574	89. 15
1. 30	26176948307	999657324975	88. 30
2. 15	39259815759	999229036240	87. 45
3. 0	52335956242	998629534754	87. 0
3. 45	65403129230	997858933238	86. 15
4. 30	78459095727	996917333733	85. 30
5. 15	91501618663	995804927574	84. 45

Hac ratione continuabitur vsque ad gradus 45. del cendendo, ascendendo verò per illorum complementa v que ad *gr.* 89. 15. *min.*

Invenire Sinus vnius minuti.

46 Quoniam minimus Sinus repertus fuit minuto rum 45. inquirendo Sinus semissium procedatur vsqu ad Arcum vno minuto minorem, quod continget in sext semisse hac arte.

Min.		*Sinus* 1.	*Sinus* 2.
45.	A.	013089595571	999914327574
45/2	B.	006544937697	999978581664
45/4	C.	003272486506	999994645402
45/8	D.	001636245443	999998661346
45/16	E.	000818122995	999999665335
45/32	F.	000409061532	999999916331
45/64	G.	000204530770	999999979082
1. *m.*	H.	000290888203	999999957692

47 Ergo quia perventum est eò vsque vbi Arcus, & Sinus insensibiliter proportionales sunt, nam vt Arcus F. 45/32 duplus est Arcus G. 45/64 illius quoque Sinus duplus est huius, reperietur per regulam auream Sinus 1. *min.* scilicèt, vt numerator 45. ad denominatorem 64. ita Sinus Arcus G. ad Sinum Arcus H. qui Sinus est 1. *minut.* ergo ducto 000204530770. in 64. diviso autem producto per 45. prodit Sinus 1. *min.* qui est 000290888203. atque eius Sinus 2. per §. 39. est 999999957692.

Ratio promovendi Tabulam.

48 Cognitis Sinibus 1. & 2. vnius minuti invenientur Sinus Arcuum duplorum per §. 40. hac arte.

Si-

Sinus 1. *min.*	290888203
Semiradius.	500000000000
Productus.	145444101500000000000
Eius Radix quadrata est Sinus Versus 2. *min.*	169232
Ergo Sinus 2. *per* §. 11.	999999830868
Et Sinus 1. *per* §. 39.	581776385

Continuando hoc modo reperientur Sinus 4. 8. 16. 32. *minutorum*: ergo Sinus *gr.* 1. 4. *min.* igitur Sinus *gr.* 2. 8. *min.* &c. ergo Sinus semissis suorum complementorum, vti in §. 40. &c.

Modus perficiendi Tabulam.

49 Inventis Sinibus *min.* 2. & 4. reperientur Sinus *min.* 3. ita: duplato Sinu 1. *min.* habebimus chordam 2. *min.* eritque 581776406. quæ etiam est chorda differentiæ duorum Arcuum 2. & 4. *min.* differentia Sinuum secundorum in minutis 2. & 4. est 507696. ergo proportionales sunt per §. 28.

Chorda 2. *min.*	581776406
Ad differentiam Sinuum secundorum.	507696
Vt Radius.	100000000000
Ad Sinum min. 3.	87266451 5

Multiplicato 2. in 3. diviso autem producto per 1. exit quartus, qui Sinus est 3. *min.* Arcus, scilicèt, medij inter 2. & 4. *min.*

Rursus chorda ad differentiam Sinuum primorum, vt Radius ad Sinum 2. 3. *min.*

50 Determinato Sinu 3. *min.* reperientur Sinus Arcuum duplorum 6. 12. 24. 48. 1. *gr.* 36. &c. vti in §. 48. ergo etiam Sinus semissis suorum complementorum, &c. vti in §. 40. Notis Sinibus *min.* 4. & 6. invenientur Sinus *minut.* 5. qui Arcus intermedius est: ergo Arcus dupli 10. 20. 40. *minut.* &c. Agnitis Sinibus *minut.* 8. & 10. reperientur Sinus *minut.* 9. & illorum dupli 18. 36. &c. Ita procedendum est ad inveniendos omnes Sinus minutorum imparium, & suorum duplorum, &c.

donec *minut.* 45. ad impleantur, quorumduplis, & complementorum semisibus consumabuntur, & perficietur Tabulæ. In Sinibus minutorum imparium, non levis compendij est divisorem perpetuò esse chordam *minut.* 2. vti in §. 49.

Exactior ratio ad Tabulas perficiendas.

51 Qui perfectissimas Tabulas conficere velit, assumat pro Radio vnitatem cum 20. cyphris, & repertis Sinibus, vt anteà vsque ad Sinum *minut.* 45. ad inveniendum Sinum 1. *min.* continuabit bipartitionem prout in §. 46. duabus operationibus superadditis: hoc est, $\frac{45}{2}\ \frac{45}{4}\ \frac{45}{8}\ \frac{45}{16}\ \frac{45}{32}\ \frac{45}{64}\ \frac{45}{128}\ \frac{45}{256}$ qui sunt ferè secunda 11. iamque evadet insensibilior differentia inter Arcus, & Sinus: quare reperietur Sinus secundorum 10. per regulam auream, vt $\frac{45}{256}$ ad Sinum suum, ita $\frac{10}{60}$ ad Sinum suum. Cognito Sinu $\frac{10}{60}$ qui sunt *sec.* 10. invenientur Sinus Arcuum duplorum nempè *sec.* 20. & 40. deinde Sinus Arcus intermedij per §. 49. qui sunt *sec.* 30. Deinde Sinus Arcuum duplorum, *min.* 1. 2. 4. 8. &c. & absolvetur Tabula, vt in præcedentibus. Denique reijcientur ab vniversis Sinibus inventis quinque litteræ ad dextram, & remanebunt Sinus ad Radium 1. cum 15. cyphris, vel abiectis 8. litteris, supererit Radius 1. cum 12. cyphris. Qui autem laboris in patiens non fuerit ad decades secundorum, poterit Canonem perficere.

Methodus ad investigandas Tangentes.

52 Quia proportionales sunt, Sinus 2. ad Sinum 1. vt Radius ad Tangentem, si multiplicetur Sinus 1. in Radium, & productus dividatur per Sinum 2. erit quotiens Tangens 1. per §. 22. è contra, si Sinus 2. ducatur in Radium, & productus dividatur per Sinum 1. prodit Tangens

gens 2. eiusdem Arcus. Rursus quia Radius media proportione est ad Tangentem 1. & 2. si Quadratum Radij dividatur per Tangentem 1. exibit Tangens 2. per §. 20.

Ratio inquirendi Secantes.

53 Cum Radius medius proportionalis sit inter Sinum 2. & Secantem 1. per §. 21. si dividatur Quadratum Radij per Sinum 2. fiet quotiens Secans 1. & insuper cum Radius medius proportionalis, sit inter Sinum 1. & Secantem 2. si Quadratum Radij dividatur per Sinum 1. prodibit Secans 2.

54 Pari artificio reperientur vniversæ Tangentes, & Secantes graduum omnium, & minutorum Quadrantis, & confecta erit Tabula, Sinuum, Tangétium, & Secãtium. Verùm quia operationes Logarithmorum sunt longè faciliores; exponemus modo artem, quà Sinus, Tangentes, & Secantes transferantur in Logarithmos.

CAPVT QVINTVM.

DE NATVRA, ET PROPRIETATIBVS Logarithmorum.

55 *Logarithmi* sunt quidam numeri artificiales, qui in Progressione Arithmetica veris numeris Geometricæ progressionis respondent. Prima eorum adinventio, & Trigonometrico Canoni applicatio Ioanni Nepero Scoto, Varoni de Merchiston debetur; tam etsi Logarithmorum species ab isto Authore edita commodior non fuerit, ipsius tamen speculationi debemus illam, qua hodie vtimur, fero enim cognitis Logarithmorum suorum incommodis, cum salus iam senectute fracta ad alios novos calculandos non sufficeret; præbuit formam, quam deinceps Henricus Briggius, y Adrianus Vlac, eius consilio executioni man-

darunt, estque illa met, quæ hodie servatur. Vniversa illorum fabrica, & vsus à sequentibus progressionum proprietatibus pendet.

56 *In quacumque Progressione Arithmetica (cuius nempè termini procedunt semper cum æquali excessu) summa extremorum æquatur summæ duorum quorumlibet terminorum ab extremis æqualiter distantium, necnon duplo medij termini.*

Sint pro exemplis Progressiones sequentes.

Termin.	*a.*	*b.*	*c.*	*d.*	*e.*	*f.*	*g.*	*m.*	*n.*
Progressio. I.	4.	6.	8.	10.	12.	14.	16.	18.	20.
Progressio. II.	5.	8.	11.	14.	17.	20.	23.	26.	29.
Progressio. III.	1.	2.	3.	4.	5.	6.	7.	8.	9.
Progressio. IV.	0.	1.	2.	3.	4.	5.	6.	7.	8.

57 In qualibet appositarum quatuor Progressionũ termini primus, & nonus, qui & vltimus est, æquantur tertio, & septimo, siquidem in Progressione I. terminus *a.* est 4. vltimus verò 20. summa est 24. Tertius est 8. Septimus autem 16. at 8. & 16. efficiunt quoque 24. In Progressione II. *a.* & *n.* 5. 29. sunt 34. item *c.* & *g.* ex 11. quoque & 23. fiunt 34. &c. At in omnibus Progressionibus, si terminus medius dupletur, qui est *e.* eius duplum æquabitur summæ duorum extremorum, sicuti in Progressione I. 12. & 12. faciunt 24. ac etiam 4. & 20. In II. bis 17. faciunt 34. vt 5. & 39. & sic de cæteris.

58 Huius ratio est, quia cum excessus sit semper æqualis; quò terminus *a.* minor est *c.* eò vltimus maior est *g.* ergo *a.* & vltimus æquantur *c.* & *g.* Rursus quò *a.* est minor *e.* medio, eò vltimus maior est ipso medio: ergo *a.* & vltimus æquantur duplo medio.

59 Hinc perspicuum fit *b.* & *k.* æquari *e.* & *g.* cum enim æquales sint *a.* & vltimo; æquales quoque inter se erunt (3. P.) item infertur in quacumque Progressione Arithmetica, si ex summa quorumlibet duorum terminorum dematur alter; residuum esse terminum alium, qui tantum distet à maiori, quantum minor à primo: veluti si ex summa tertij, & septimi auferatur *a.* exit *n.* qui tantum à *g.* distat, quantum *c.* ab *a.* cum enim æquidistantium summæ sint æquales, necessarium est dempto vno relinqui alium.

60 *In quacumque Progressione Geometrica, Productus ex primo, & vltimo æquatur Producto duorum terminorum ab extremis æqualiter distantium, vel producto, quifit ex medio in se ipsum multiplicato.*

Num. term.	*a.*	*b.*	*c.*	*d.*	*e.*	*f.*	*g.*	*m.*	*n.*
Progressio I.	3.	6.	12.	24.	48.	96.	192.	384.	768
Progressio II.	1.	2.	4.	8.	16.	32.	64.	128.	256
Progressio III.	1.	3.	9.	27.	81.	243.	729.	2187.	6561

Veluti in Progressione I. si *c.* & *g.* qui sunt 12. & 192. multiplicantur, fit Productus 2304. ac idem producitur ex *a.* & *n.* qui sunt 3. & 768. Rursusque idem si *e.* qui est terminus medius, in se ipsum ducatur 48. in 48. producitur 2304. idem est si multiplicentur *d.* & *f.* &c. Horum demonstratio brevis est, quia ratio *a.* ad *c.* est duplicata rationis *a.* ad *b.* & etiam ratio *g.* ad *n.* erit quoque duplicata eiusdem rationis: ergo *a.* est ad *c.* vt *g.* ad *n.* (1. l. 5.) quare rectangulum sub *a.* & *n.* æquatur rectangulo ex *c.* in *g.* (1. l. 6.) Rursus ratio *a.* ad *e.* ex ijsdem rationibus componitur quibus ratio *e.* ad *n.* ergo sunt proportionales *a.* ad *e.* vt *e.* ad *n.* quare rectangulum sub *a.* & *n.* æquatur Quadrato *e.* & eodem modo in omnibus æquidistantibus ab extremis, &c.

61 Vnde colligitur Productum quorũlibet duorum terminorũ ab extremis æqualiter distantium, æquari Producto quorumcumq; aliorum duorum terminorũ ab ijsdẽ extremis æqualiter distantiũ: vterlibet æquatur Producto extremorum (*9.* 59.) ergo inter se sunt æquales (3. P.) idem infertur si Productus quorumlibet duorũ terminorum dividatur per quemlibet alium terminum; Quotiens

 erit

erit novus terminus, qui à maiori tantum distabit, quantum divisor à minori. Nam cum Producti æquidistantium sint æquales, si Productus dividatur per vnum terminum, necessariò erit Quotiens alius terminus æquidistans: quare altero Producto per terminum 1. diviso; fit Quotiens terminus vltimus, qui à maiori multiplicato tantùm distat, quantùm minor à primo.

62 *Si duæ Progressiones vna Arithmetica, altera vero Geometrica, sibi ipsis respondeant, summa, & subtractio terminorum Arithmeticorum æquipollet semper multiplicationi, & divisioni Geometricorum, termini autem Arithmetici erunt Geometricorum Logarithmi.*

Exemplum sit in sequentibus Progressionibus.

Termin	*Progress. Geometricæ.* I.	II.	III.	IV.
a.	3	2	4	1
b.	6	6	8	2
c.	12	18	16	4
d.	24	54	32	8
e.	48	162	64	16
f.	96	486	128	32
g.	192	1458	256	64
m.	384	4374	512	128
n.	768	13122	1024	256

	Progress. Arithmetica. I.	II.	III.	IV.	V.	VI.
a.	5	9	1	0	8	4 †
b.	7	10	2	1	7	3 †
c.	9	11	3	2	6	2 †
d.	11	12	4	3	5	1 †
e.	13	13	5	4	4	0
f.	15	14	6	5	3	-1
g.	17	15	7	6	2	-2
m	19	16	8	7	1	-3
n.	21	17	9	8	0	-4

63 In Progressione I. Geometrica si termini *d.* & *f.* multiplicétur, scilicèt, 24. per 96. & Productus 2304. dividatur per *b.* qui est 6. fiet Quotiens 384. qui octavus terminus est. Assumpta mox Progressione Arithmetica I. si *d.* & *f.* in vnam summam redigantur, videlicèt 11. & 15. fient 26. ablato *b.* qui est 7. remanebunt 19. qui est *m.* Eadem est ratio, de quacumque Progressione Geometrica, si enim Productus quorumlibet duorum terminorum dividatur per alium; Quotiens tantùm à maiori distabit, quántùm

tum divisor à minori per §. 60. in Arithmetica autem si ex duorum terminorum summa auferatur alius; residuum tantùm à maiori distabit, quantùm subtractus à minori per §. 59. ergo semper ex summa, & subtractione terminorum Arithmeticorum exibit alius terminus, qui prodeunti ex multiplicatione, & divisione Geometricorum respondeat.

De infinitis Logarithmorum speciebus.

64 Terminos Progressionis Arithmeticæ, quæ Geometricæ correspõdet terminorũ Geometricorum, *Logarithmos appellamus*, scilicèt, à voce Greca, *Logos*, Latine *Ratio*, & *Arithmos*. Latine *numerus* quare *Logarithmi* sunt numeri rationales, & relati, qui Progressionis Geometricæ veris, & absolutis terminis respondẽt. Cum autem eidẽ I. Progressioni Geometricæ apponi possint, non tantum sex Arithmeticæ, sed etiã aliæ infinitæ, quæ diverso excessu posunt effingi, propterea Logarithmorũ species infinitæ sunt pro vna, eademque Progressione Geometrica, & vice versa, quia I. Progressioni Arithmeticæ, non solùm respondẽt quatuor Geometricæ, sed etiam infinitæ aliæ, quę adstrui possunt duplæ, triplæ, quadruplę, &c. Inquacumque specie rationis, ideò ijdem *Logarithmi* diversis numeris absolutis infinitè correspondere valent.

De Logarithmis Directis, & Retrogradis.

65 Logarithmi Directi sunt, qui terminorum Geometricorum ordinem servant, crescunt autem *Logarithmi*, quandò numeri quibus respondent, augentur: ex hac specie sunt I. II. III. & IV. Progressio Arithmetica. Retrogradi verò sunt ij, qui contra terminorum Geometricorum ordinem procedunt, & vbi augentur isti, illi decrescunt, & è contra. Ex hac specie sunt V. & VI. Progressio Arithmetica, quia autem vbi ad vnitatem per-

venitur, nullus iam extat numerus minor, qui verus sit, promoventur Logarithmi cum cyphra, & numeris figuratis, vel fictis, qui nihilo minores sunt, & hac lineola denotantur – quæ significat *minus*, veluti ista + *plus*: atque adeò Logarithmi cyphra inferiores sunt *diminuti*, *defectivi*, & *negativi*.

Incommoda Logarithmorum refluentium.

66 Et si summa, & subtractio in Logarithmis retrogradis æquipolleat multiplicationi, & divisioni terminorũ Geometricorum, quãdo tamen Logarithmi signa habent contria + & – necessarium est additionis, & subtractionis operationes contrarias esse, vti admonui in lib. 3. cap. 3. nostræ Arithmeticæ, quod quidem magnum incommodum affert, maximè ijs, qui in Algebraticis operationibus parum versati sunt. Exempli gratia, si in Progressione I. Geometrica multiplicentur *b.* & *f.* hoc est 6. per 96. procreabitur 576. quibus divisis per *a.* qui est 3. gignetur *g.* qui est 192. Assumpta igitur Progressione VI. Arithmetica, si addantur *b.* & *f.* hoc est + 3. & – 1. additionis vice subducetur 1. ex 3. & supererit + 2. quæ summa erit ex + 3. – 1. Si ex hac summa + 2. auferatur *a.* terminus, qui est + 4. quia 4. demi nequit ex 2. contrario modo subtrahetur 2. ex 4. & remanebunt 2. cum signo contrario ita – 2. qui est *g.* & respondet num. 192. Progressionis Geometricæ I.

Nemò inficiari potest has operationes molestas esse ijs præsertim, qui recens ad illas accedunt; quin etiam æquivocationi obnoxiæ sunt, & dubitationi vtrum addi, vel subtrahi, vel statui cum signo + vel – debeant. In extractione radicum (quæ mirabile Logarithmorũ compendium est) eadem incommoda sæpius occurrunt. Neperus post exantlatas Logarithmorum retrogradorum Tabulas hæc incommoda agnovit, & largitus est formam Logarithmorum directe procedentium, quos deinceps ef-

efformarunt Briggius, & Vlac, qui retrogradis præferendi sunt.

CAPVT SEXTVM.

ELECTIO LOGARITHMORVM Directorum.

67 TAmetsi Logarithmi Directi anteponendi sunt retrogradis, cum illorum species innumeræ esse possint propter Progressionum infinitatem; electionis nova materia supereſt. Ex omnibus Progressionum speciebus, optimæ sunt Geometricæ, quæ ab vnitate incipiunt, & Arithmeticæ, quæ à cyphra, vel cero: vt sunt IV. Geometrica, & IV. Arithmetica, §. 62. Nam cum in operationibus terminorum Geometricorum sæpius multiplicandum, vel dividendum sit per terminum primum, si hic sit vnitas, neque multiplicando augebit, neque dividendo minuet numerum. In terminis Arithmeticis cyphra non adauget summam, neque subtractionem imminuit.

Electio Progressionum Geometricæ, & Arithmeticæ.

68 Selectis iam speciebus, deest individuorum electio, Progressiones enim Geometricæ, quæ ab vnitate incipiunt infinitæ esse possunt, *duplæ*, *triplæ*, *quadruplæ*, &c. Arithmeticæ verò, quæ à cyphra ordiuntur infinitæ quoque esse possunt, cum varijs intervallis 0. 1. 2. 3. 4. &c. Dico ergo Progressiones Logarithmis commodiores esse simpliciores, clariores, faciliores, & inteligentiæ magis obviæ, ex Geometricis decupla, cuius vniversi termini ex vnitate plus vnica cyphra, constant, quę singulis terminis additur, veluti 1. 10. 100. 1000. &c. Ex Arithmeticis verò illa optima est, cuius excessus est vnitas cum cyphris quotcumque, quas tamen non expedit minus esse, quam octo, vt hic apparet.

69

Progres. Geometrica. Numeri.	*Termini.*	*Progres. Arithmetica Logarithmi.*
1	*a.*	0.00000000
10	*b.*	1.00000000
100	*c.*	2.00000000
1000	*d.*	3.00000000
10000	*e.*	4.00000000
100000	*f.*	5.00000000
1000000	*g.*	6.00000000
10000000	*m.*	7.00000000
100000000	*n.*	8.00000000
1000000000	*p.*	9.00000000
10000000000	*q.*	10.00000000

70 Primæ Logarithmorum litteræ ad siniſtram, quæ punctis diſtinguntur, ſunt eæ, quæ naturalem Progreſſionem conſtituunt cum exceſſu vnitatis; has litteras vocamus *Characteriſticas*, ſunt enim veluti ſignum, aut character, quo deſignantur litteræ, quibus conſtat numerus Progreſſionis Geometricæ, cui ipſa reſpondet. Omnes enim numeri digiti, qui cadunt inter 1. & 10, Logarithmum ſuũ habet inter cyphram, & 1.00000000. atque adeò Characteriſticam habet cyphram 0. omnes numeri, qui duab⁹ litteris conſtãt, ac ſunt inter 10. & 100. Logarithmos ſuos habẽt inter 1.00000000. & 2.00000000. quorum prima littera, vel Characteriſtica eſt vnitas 1. Vniverſi numeri ex tribus litteris compoſiti, & inter 100. & 1000. cadentes; Logarithmos ſuos habent inter 2.00000000. & 3.00000000. quorum Characteriſtica eſt 2. ita vt Characteriſtica ſemper vnitate minor ſit litteris numeri, cui Logarithmus correſpondet: quare ſi Characteriſtica ſit 4. liquet iam numerum ex 5. litteris compoſitum eſſe, & è converſo ſi numerus quinque litteris, vel Characteribus conſtet, erit Characteriſtica 4. & ſic de reliquis.

Sum-

Summa æquivalet multiplicationi.

71 Vniverſis Logarithmorum ſpeciebus competit ſummam, & ſubtractionem terminorum Arithmeticorum æquipollere multiplicationi, & diviſioni Geometricorum per §.62. Verùm ſola ſumma multiplicationi, & ſubtractio diviſioni non æquivalet, niſi Progreſsio Geometrica incipiat ab vnitate, Arithmetica verò à cyphra: ſi enim ex ſumma Logarithmorum duorum ſubducatur primus. Multiplicatio autem numerorum correſpondentium dividatur per primum, procreabuntur termini correſpondentes (§.62.) cum enim ſubſtrahere cyphram, & dividere per vnitatem, neque ſummam, neque multiplicationem imminuat, ſequitur ſolam ſummam in noſtris Logarithmis æquipollere ſemper multiplicationi. Id verò licèt termini ſint tres, vel quatuor, &c. Veluti ſi *b. c.* & *f.* addãtur; conflabitur Logarithmus 8.00000000. qui eſt *n.* at ſi *b.* & *c.* Geometricorum multiplicentur 10. per 100. prodibit 1000. hoc per *f.* multiplicato, qui eſt 100000. producetur 100000000. qui eſt *n.* & Logarithmo 8.00000000. reſpondet.

Subtractio ſola æquivalet diviſioni.

72 Provenit id ex §.71. Nam cum ex ſumma *c.* & *d.* oriatur *f.* Logaritmus; ſi à *f.* auferatur *d.* neceſſe eſt reddi *c.* Pari ratione ſi in Progreſsione Geometrica multiplicentur *c.* & *d.* gignetur *f.* ergo vice verſa ſi *f.* dividatur per *d.* orietur *c.* & ſubtractio Logarithmorum diviſioni collateralium numerorum correſpondebit ſemper.

De quadrata Radice, & medio proportionali.

73 *Si Logarithmus dupletur, vel ducatur in 2. produ-cetur Logarithmus numeri quadrati; si autem Logarithmus dividatur per 2. erit Quotiens Logarithmus Radicis.*

Quia ſumma æquivalet multiplicationi (§. 71.) ergo ſi multiplicato numero *c.* per ſemetipſum 100. per 100 exit *e.* qui eſt 10000. quadratus ex 100. ſi Logarithmus *e.* aſſumatur bis, quod idem eſt ac multiplicare illum per 2. prodibit Logarithmus *e.* qui eſt 4. oooooooo Logarithmus quadrati ex 100. è contra ſi Logarithmus 4. oooooooo. dividatur per 2. iterum reſtituetur Logarithmus 2. oooooooo. qui Logarithmus eſt numeri 100 radix quadrati 10000. Ergo quia ducto *c.* in *e.* & extracta radice Producti, radix illa eſt medium proportionale, ſi Logarithmi *c.* & *e.* addantur; ſemiſsis ſummæ erit Logarithmus medij proportionalis.

De reliquis poteſtatibus ipſarumque radicibus.

74 Ducto numero in ſeipſum exit Quadratus: ducto autem Quadrato in ipſummet numerum prodit Cubus: multiplicato item Cubo per eundem numerum; gignitur Quadrato Quadratus, & ſic in infinitum, vti dixi in Arithmetica, *lib. 2. cap. 1.* ergo quia ſumma æquipollet multiplicationi (§. 71.) ſi Logarithmus addatur bis conflabitur Logarithmus Quadrati: ſi verò addatur ter fiet Logarithmus Cubi: denique ſi addatur quater, habebitur Logarithmus Quadrati Quadrati, & ſic in infinitum. Ergo etiam vice verſa ſi Logarithmus Quadrati dividatur per 2. erit Quotiens R^2 vel radix Quadrata, autem Logarithmus dividatur per 3. reddetur Logarithmus R^3 vel radicis Cubicæ: & ſi Logarithmus Quadrati

to Quadrati dividatur per 4. reddetur Logarithmus radicis Quadrato Quadratæ, vel R^4 & ſic in infinitum.

CAPVT SEPTIMVM.

DE ARTE INVENIENDI LOGARITHMOS intermedios.

75 DVos tantum Logarithmos in binos numeros pro libitu aſsignare poterit Arithmeticus, reliqui omnes determinati iam ſunt ex natura ſua, & arte ſunt indagandi. In noſtra fabrica numeris 1. & 10. decernimus Logarithmos 0. oooooooo. & 1. oooooooo. promotis deinceps numeris in eadem ratione 1. 10. 100. 1000. &c. continuabuntur Logarithmi cum eodem exceſſu, vti in §. 69. ſed cum inter 1. & 10. numeri intermedij 8. deficiant, ac inter 10. & 100. deficiant 89. & inter 100. & 1000. 899. &c. Adinventio Logarithmorum illis reſpondentium ſpecialem ingerit dificultatem, quæ in hoc capite exantlanda venit, cuius intelligentia vnicè pendet a §. 71. 72. 73. & 74.

76 Sicuti in Sinuum fabrica monitum eſt ad reperiendos Sinus exactos, opus eſſe quatuor, vel ſex cyphras addere Radio ob iacturam, quæ in Radicum irrationalium extractione fit; ita prorſus in Logarithmis, ſi ij novem litteras habere oporteat, ſatius erit inchoare operationes cum 15. vel 20. & poſt abſolutam fabricam abijcere ad dextram ſex vltimas litteras, vel plures iuxta eas, quæ additæ fuerint. Fabrica horum Logarithmorum conſiſtit in mediorum proportionalium adinventione per Radicem quadratam, veluti in Arithmetica lib. 2. §. 51. dictum fuit.

De Logarithmo numeri 2.

77 Quoniam numerus 2. inter 1. & 10. intercidit; addemus ſingulis 20. cyphras, quò operatio fiat exactior, atque inter hos duos numeros inquiremus medium proportionale, eiuſque Logarithmum (*§. 73.*) qui eſt numerus tertius C. ſequentis Tabulæ. Quia autem 2. cadit inter A. & C. inter hos duos reperietur aliud medium proportionale, qui eſt D. cum ſuo Logarithmo per *§. 73.* mox inter C. & D. invenietur aliud medium cum ſuo Logarithmo, qui eſt E. & hac arte inter proximè maiorem quam 2. & proximè minorem, continuabitur mediorum proportionalium adinventio donec poſt operationes 32. extat L. qui eſt 1.9999999999. ita proximus ipſi 2. vt inſenſibiliter ab eo differat, cuius Logarithmus, qui eſt 0.30102999578. haberi poteſt ſine errore pro Logarithmo numeri 2. operationem videre licèt in Tabula ſequenti: Columna 1. continet numerorum ordinem A B C. &c. exigui caracteres numeros denotant, inter quos aſſumptum eſt medium proportionale: veluti

C. *ab.* ſignificat tertium numerum, C. medium eſſe proportionalem inter A. & B. Similiter O. *ln.* denotat O. medium eſſe inter L. & N. & ſic de reliquis.

78 *Formula inveſtigandi Logarithmum numeri 2.*

	Numeri.	*Logarithmi.*
A.	1.00000000000000000	0.00000000000000
B.	10.00000000000000000	1.00000000000
C. *ab.*	3.16227766016837933	0.50000000000000
D. *ac.*	1.77827941003892280	0.25000000000000
E. *cd.*	2.37137370566165530	0.37500000000000
F. *de.*	2.05352502645714600	0.31250000000000
G. *df.*	1.91095297497044050	0.28125000000000
H *fg.*	1.98095697855033870	0.29687500000000
I. *fh*	2.01691455473033040	0.30468750000000
L. *hi.*	1.99885481187351030	0.30078125000000
M. *il.*	2.00786437860240930	0.30273437500000
N. *lm*	2.00335453114490980	0.30175781250000
O. *ln.*	2.00110340674029220	0.30126953125000
P. *lo.*	1.99997879329239570	0.30102539062500
Q *op.*	2.00054102099050990	0.30114746093750
R. *pq.*	2.00025988738777070	0.30108642578125
S. *pr.*	2.00011933540200970	0.30105590820312
T. *ps.*	2.00004906311272770	0.30104064941406
V. *pt.*	2.00001392789394840	0.30103302001953
X. *pu.*	1.99999636051601940	0.30101920532227
Y. *ux.*	2.00000514418569560	0.30103111267090
Z. *xy.*	2.00000075234603540	0.30103015899658
A. *xz*	1.99999855417980300	0.30101968215942
B *za.*	1.99999965326262590	0.30102992057800
C. *zb*	2.00000020980425520	0.30103003978729
D. *bc.*	1.99999992803342160	0.30102998018265
E. *cd.*	2.00000006541883370	0.30103000998497
F. *de.*	1.99999999673612650	0.30102999508285
G. *ef.*	2.00000003107247980	0.30103000253391
H *fg.*	2.00000001389930310	0.30102999880934
I. *fh.*	2.00000000531271480	0.30102999694610
L. *fi.*	2.00000000101942060	0.30102999601555
M. *il.*	1.99999999887277350	0.30102999554920
N. *im.*	1.99999999994609710	0.30102999578237

79 In præmissa Tabula, numeri A.& B. columnæ secundæ sunt 1.& 10. quibus singulis additæ sunt cyphræ sexdecim, reliqui sunt medij successivè extracti multiplicatis, scilicèt, duobus, inter quos quæritur medium, & eruti radice Producti. Duo numeri primi columnæ tertiæ Logarithmi sunt ex 1.& 10. reliqui sunt Logarithmi mediorum, additis nimirũ duobus Logarithmis, inter quos medium quæritur, & assumpta semisse summæ per §.73.

80 Pari artificio reperietur Logarithmus 3. quia autem 3. cadit inter 1.& 10. Locabuntur ij primùm in Tabula additis cyphris, &c. Reperienturque semper medij proportionales inter proximè maiorem, & proximè minorem ipso 3. donec exeat numerus 3. cum cyphris decem, vel numerus 2. cum decem litteris 9. cuius Logarithmus sumi poterit pro Logarithmo numeri 3. absque errore sensibili. Idem dices de numero 7. cum hæc omnia speciali difficultate careant novam formulam exponere supervacuum esse duxi.

Regula alia in Logarithmum numeri 3.

81 Ducatur 3. in se ipsum toties quoties opus sit, vt exeat numerus, qui duabus primis litteris conveniat cum aliquo ex medijs in formula §.78. repertis, & post multiplicationes 8. invenio 19683. in Tabula autem præmissa observo G. esse proxime ipso minorem: H. verò proximè maiorem. Sumo hos duos numeros cum suis Logarithmis, eruntque A.& B. formulæ sequentis. Continuetur deinde mediorum proportionalium adinventio, suorumque Logarithmorum inter proximè maiorem, & minorem quam 19683. donec prodeat iste numerus cum cyphris quinque, & vbi perveneris ad operationes 24. invenias D. *ac.* qui sine errore sumi potest pro 19683. Itemque eius Logarithmus 0. 2940612926. & immutata Characteristica cyphra in 4. quòd numerus 19683. habet quinq; lit-

litteras (§.70.) erit verùs Logarithmus 4. 2940912924. qui divitus per 9. (sumptus enim est novies numerus 3. in multiplicationibus 8.) erit 0.4771212547. qui est Logarithmus numeri 3.

82 *Formula Logarithmi numeri 3.*

	Numeri.	*Logarithmi.*
A.	19109529749704405	0.281250000000
B.	19809567785503387	0.296875000000
C. *ab.*	19456400615886356	0.289062500000
D. *bc.*	19632190067904055	0.292968750000
E. *bd.*	19720679499652940	0.294921875000
F. *de.*	19676385041348564	0.293945312500
G. *ef.*	19698519840896686	0.294433593750
H. *fg.*	19687449330325334	0.294189453125
I. *fb.*	19681916408356205	0.294067382812
L. *hi.*	19684682674943266	0.294128417968
M. *il.*	19683299493053775	0.294097900390
N. *im*	19682607938556427	0.294082641601
O. *mn*	19682953712767906	0.294090270996
P. *mo.*	19683126602151535	0.294094085693
Q. *op.*	19683040157269895	0.294092178344
R. *oq.*	19682996934971445	0.294091224670
S. *qr.*	19683018546108806	0.294091701507
T. *rs.*	19683007740537159	0.294091463088
V. *rt.*	19683002337753560	0.294091343879
X. *ru.*	19682999636362317	0.294091284275
Y. *ux.*	19683000987057892	0.294091314077
Z. *xy.*	19683000311710093	0.294091299176
A. *xz.*	19682999974036202	0.294091291725
B. *za.*	19683000142873147	0.294091295450
C. *ab.*	19683000058454675	0.294091293588
D. *ac.*	19683000016245438	0.294091292656

De Logarithmo numeri 11.

83 Si inter numeros 10. & 100. §. 69. continuetur inventio mediorum proportionalium inter proximè maiorem, & minorē ipso 11. donec exeat numerus etiam 11. cum novem, vel decem cyphris, repertus erit Logarithmus numeri 11. *Aliter* si numerus 11. multiplicetur in se ipsum sexies; prodibit 19487171. qui cadit inter C. & D. §. 82. Si verò sumantur illi numeri cum suis Logarithmis erunt duo primi. Tabulæ sequentis nempè A. & B.

84 *Formula Logarithmi numeri 11.*

	Numeri.	*Logarithmi.*
A.	19456400615886356	0.289062500000
B.	19632190067904055	0.292968750000
C. *ab.*	19544097700542905	0.291015625000
D. *ac.*	19500199858919038	0.290039062500
E. *ad.*	19478287926431815	0.289550781250
F. *ae.*	19489240813202296	0.289794921875
G. *af.*	19483763600265150	0.289672851562
H. *fg.*	19486502014243704	0.289733886718
I. *fb.*	19487871365609615	0.289764404296
L. *bi.*	19487186677898736	0.289749145507
M. *bl*	19486844343064292	0.289741516113
N. *lm.*	19487015509727466	0.289745330810
O. *ln.*	19487101093622856	0.289747238159
P. *lo.*	19487143885713812	0.289748191833
Q. *lp.*	19487165281794528	0.289748668670
R. *lq.*	19487175979843695	0.289748907089
S. *qr.*	19487170630818377	0.289747787879
T. *rs.*	19487173305330853	0.289748847484
V. *st.*	19487171968074569	0.289748817682
X. *su.*	19487171299446462	0.289748802781
Y. *sx.*	16487170965132417	0.289748795330
Z. *xy.*	16487171132289439	0.289748799055
A. *yz.*	16487171048710927	0.289748797193
B. *ya.*	19487171006921672	0.289748796261

Pro-

85 Promotâ mediorum proportionalium inventione inter proximè maiorem, & minorem quam 19487171. post operationes 22. repericus B. *ya.* cuius decem primæ litteræ non differunt à numero verò. Sumpto ergo eius Logarithmo, & immutata Characteristica cyphra in 7. quia numerus 8. litteras habet, erit 7.289748796 2. Logarithmus numeri 19487171. Divisus autem Logarithmus per 7. (sexies enim multiplicatus in se ipsum numerus 11.) quod idem est ac elicere R7 per §. 74. erit Logarithmus numeri 11. qui est 1.041392685 2.

De Logarithmis per summas, & subtractiones.

86 Inventis Logarithmis numerorum 2. 3. & 11. per facilè habentur alij plures, nam cum summa æquipolleat multiplicationi, subtractio verò divisioni. Si numerus 2. ducatur in se ipsum gignetur 4. ergo assumpto Logarithmo numeri 2. bis, conflabitur Logarithmus numeri 4. & quia bis 4. efficiunt 8. additis Logarithmis ex 4. & 2. fiet Logarithmus numeri 8. quia autem 10. diviso per 2. fit quotiens 5. Si subducatur Logarithmus numeri 2. ex Logarithmo numeri 10. supererit Logarithmus numeri 5. &c. Quare si duo numeri multiplicati, vel divisi alium efficiant, summa, vel subtractio Logarithmorum suorum dabit alterius Logarithmum, hac arte nullo ferè negotio plurimi Logarithmi reperiri possunt.

De Logarithmis numerorum primorum.

87 Numeri primi sunt ij, quos sola vnitas metiri potest, nec ab aliorum integrorum multiplicatione gignuntur, veluti 2. 3. 5. 7. 11. 13. 17. 19. 23. 29. 31. 37. 41. 43. 47. &c. quos vsque ad 10000. inveneri-

stu-

ſtudioſus in ſectione 5. miſcellanea Franciſci Schooten. Inter 1.& 1000. ſunt numeri primi 168. Hi omnes inveſtigandi ſunt, vt Logarithmus numeri 2. vel vt Logarithmus numeri 3. & 11. ſed quò altius aſcendunt numeri, eò redduntur breviores operationes.

De Logarithmis per proportionem.

88 Quando numerus ſuperat 1000. licèt ſit numerus primus, Logarithmus eius ita invenietur. Quæritur *exempl gr.* Logarithmus numeri 1011. Logarithmus numeri 1010. eſt 3. 0043213738. Logarithmus numeri 1012. eſt 3. 0051805126. differentia eſt 8591387. eius ſemiſsis 4295694. quæ differentia proxima eſt Logarithmorum 1010. & 1011. ſed minor iuſto. Sumatur deinde Logarithmus numeri 1014. qui eſt 3. 0060379550. huius, & primi differentia eſt 17165812. & inſtituatur regula trium. Si differentia 17165812. dat differētiam 8591387. quid dabit 8591387? ducto ſecundo in tertium diviſo autem producto per primum: fit quotiens 4299938. quæ differentia proxima eſt Logarithmorum ex 1010. & 1011. ſed maior iuſto. Additis igitur differentia inventa minore 4295694. atque hac reperta maiore 4299938. conflatur 8595632. eius ſemiſsis eſt 4297816. eſtque differentia propinquior Logarithmorum 1010. & 1011. Ergo ſi Logarithmo numeri 1010. qui eſt 3. 0043213738. addamus vltimam differentiam inventam, quæ eſt 4297816. obveniet Logarithmus numeri 1011. abſque errore qui eſt 3. 0047511554.

89 Eadem ratione ſi ſumamus Logarithmos 1008. 1010. & 1012. inveniemus Logarithmum numeri 1009. qui numerus primus eſt: ſimiliter cum Logarithmis 1012. 1014. 1016. reperiemus Logarithmum numeri 1013. qui etiam numerus primus eſt, &c. In his operationibus nunquam error excedit vltimam litterarū, & quò numeri erunt

erunt maiores, eò imminuetur error. Demùm abiectis ex Logarithmis omnibus vltimis litteris, vti admonitum eſt in §. 76. remanebunt Logarithmi abſque vllo errore.

CAPVT OCTAVVM.

EXPOSITIO CANONIS TRIGONOMETRICI.

90 PRima Tabula poſt librum tertium Canon Trigonometricus eſt, quæ omnes gradus, & minuta Semicirculi continet ab 1. *min.* vſque ad *grad.* 180. cum Sinibus, & Tangentibus Logarithmicis, qui ſunt Logarithmi, Sinuum, & Tangentium. Vna quæque pagina in duas columnas dividitur, quarum ſingulæ quatuor numerorum ordines habent, primus, & quartus ſingulorum graduum minuta dumtaxat comprehendunt: in 2. & 3. apponuntur Sinus, & Tangentes cum ſuis titulis.

91 Gradus 180. diſtracti ſunt in quatuor Semiquadrantes. Prior columna cuiuſque paginæ, in parte ſuperiori, & ad ſiniſtrā exhibet gradus à cyphra, vſque ad 44. & in deſcenſu occurrunt illorum *minuta* 0. 1. 2. &c. In parte autem inferiori ad dexteram habentur gradus minoribus numeris expreſsi à 135. vſque ad 179. & aſcendendo reperiuntur eorum minuta 0. 1. 2. 3. &c. Secunda columna cuiuſque paginæ in parte inferiori, & ad dexteram continet *gradus* à 45. vſque ad 89. & aſcendendo exhibet illorum *minuta* 0. 1. 2. &c. In parte autem ſuperiori ſunt *gradus* à 90. vſque ad 134. minoribus etiam numeris expreſsi, & in deſcenſu eorum minuta.

Invenire complementa cuiuſque Anguli.

92 Si Angulus minor ſit *gr.* 45. veluti *gr.* 39. *min.* 27. & ſcire velimus eius complementum ad Quadrantem

quæ-

quæratur 39. suprà priorem columnam, & in descensu inuenientur *min.* 27. prosequendo lineam *min.* 27. vsque ad vltimam ordinem, secundæ columnæ offendo *min.* 33. in parte verò inferiori *gr.* 50. Dico ergo *gr.* 50. *min.* 33. esse complementum ad Quadrantem *gr.* 39. *min.* 27. Si autem inquiratur complementum ad Semicirculum *gr.* 39. *m.* 27. repertis suprà priorem colũnam 39. & in descensu *min.* 27. prosequendo lineam, vsque ad 4. ordinem eiusdẽ columnæ, offendo *min.* 33. in parte verò inferiori *gr.* 140. Dico *gr.* 140. *min.* 33. esse complementum ad Semicirculum *gr.* 39. *min.* 27.

93 Si Angulus Acutus maior sit *grad.* 45. vti *grad.* 58. *min.* 19. quærantur *grad.* 58. in parte inferiori secundæ columnæ, & ascendendo reperientur *min.* 19. prosequendo eius lineam ad sinistrã, offendo in columna prima *min.* 41. & in parte superiori *gr.* 31. Aio *gr.* 31. *min.* 41. esse complementum ad Quadrantem *gr.* 58. *min.* 19. & prosequendo lineam eorumdem *min.* 19. vsque ad ordinem 4. eiusdem columnæ invenio *minut.* 41. sursum autem *grad.* 121. Dico *gr.* 121. *min.* 41. esse complementum ad Semicirculum *gr.* 58. *min.* 19.

94 Si verò Angulus sit Obtusus, & minor 135. veluti *gr.* 121. *min.* 41. quærentur *gr.* 121. in parte superiori columnæ secundæ, in primo ordine, & in descensu occurrent *min.* 41. prosequendo eius lineam ad dextram inveniuntur *min.* 19. infrà autem *gr.* 58. Aio *gr.* 58. *min.* 19. esse complementum ad Semicirculum *gr.* 121. *min.* 41. Si verò Angulus maior sit *gr.* 135. veluti *gr.* 148. *min.* 19. sumentur *gr.* 148. in parte inferiori columnæ primæ, & ascendendo vsque ad 19. prosequendo eius lineam ad sinistram reperiuntur *min.* 41. suprà verò *gr.* 31. Dico *gr.* 31. *min.* 41. esse complementum ad Semicirculum *grad.* 148. *min.* 19. &c.

95 Itaque gradus oppositi superior, scilicèt, & inferior cuiusque paginæ maioribus caracteribus designati; sunt

sunt alter alterius complementum ad Quadrantem: duo verò oppositi superior, & inferior cuiusque columnæ diversis caracteribus expressi; sunt alter alterius complementum ad Semicirculum. Superior, & inferior duarum columnarum in medio positi, & minoribus caracteribus scripti, sunt alter alterius complementum ad tres Quadrantes. Minor è duobus superioribus, vti etiam è duobus inferioribus, cuiusque paginæ semper est id, quo maior Quadrantem excedit.

Invenire Sinus, & Tangentes Arcuum.

96 Quævis columna Sinus, & Tangentes habet, qui sunt Sinus 1. & Tangens 1. *gradus*, & *minutorum*, qui in sunt in eadem columna, tàm in parte superiori, quàm in inferiori; verùm Sinus, & Tangentes vnius columnæ sunt Sinus 2. & Tangens 2. *graduum*, & *minutorum*, qui existunt in altera columna eiusdem paginæ. Ita vt in eadem pagina reperiantur Sinus 1. & 2. vnius Anguli: Sinus 1. & 2. sui complementi ad Quadrantem, vel Semicirculum. In titulo Sinuum, & Tangentium non scribitur 1. nec 2. quia ipsemet, qui primus est vnius *gradus*, est secundus *gradus* oppositi in altera columna.

97 Sit Arcus, vel Angulus *grad.* 23. *min.* 37. quæritur Sinus 1. & Tangens 1. primùm invenio *gr.* 23. in parte superiori, & in descensu *min.* 37. prosequendo eius lineam, respondet illi Sinus 1. 9. 6027278. sequitur Tangens 1. 9. 6407156. & prosequendo lineam vsque ad alteram columnam illius Sinus 2. est 9. 9620122. & Tangens 2. 10. 3592844. Si Arcus sit *gr.* 66. *min.* 23. offendo in parte inferiori secundæ columnæ *gr.* 66. & in ascensu *min.* 23. prosequendo eius lineam ad sinistram occurrit illicò eius Tangẽs prima 10. 3592844. mox Sinus primus 9. 9620122 & prosequendo lineam vsque alteram columnam invenitur Tangens 2. scilicèt 9. 6407156. deinde Sinus 2. nempè 9. 6027278.

98 Sit Angulus *grad.* 113. *min.* 37. offendo primùm *gr.* 113. in parte ſuperiori ſecundæ columnæ, & in deſcenſu *min.* 37. proſequendo eius lineam ad dexteram reperitur Sinus primus 9. 9620122. deinceps Tangens prima 10. 3592844. revertendo ad ſiniſtrã, & tranſeundo ad primam columnam in eadem linea invenio Tangentem 2. eſſe 9. 6407156. ad latus autem Sinuum 2. eſſe 9. 6027278. Si Arcus, vel Angulus ſit *gr.* 156. *min.* 23. inveniam *gr.* in parte inferiori colamnæ primę, & in aſcenſu reperiam *min.* 23. proſequendo eius linean ad ſiniſtram in Sinuum ordine, offendo eius Sinum 9. 6027278. ad latus verò Tangentem 9. 6407156. & incedendo ad ſecundã columnã in eadem linea invenio Sinum 2. eſſe 9. 9620122. item Tangentẽ 2. eſſe 10. 3592844. itaque in columna vbi gradus extat in eadẽ datorum minutorum linea reperiuntur Sinus 1. & Tangens 1. & pergendo ad alteram columnam invenitur in eadem linea Sinus 2. & Tangens 2.

Ad invenire Sinus, & Tangentes ſecundorum.

99 Quando Angulus, vel Arcus haber gradus, minuta, & ſecunda, veluti *grad.* 23. *min.* 37. *ſec.* 25. & quæritur Sinus 1. Sumetur Sinus *grad.* 23. *min.* 37. vt antè eſtque 9. 6027278. Deinde qui ſequitur immediatè, & eſt 9. 6030166. ablato minore ex maiore; relinquitur differentia = 2888. Dicamque per regulam trium ſi 60. *ſec.* quibus conſtant ſingula minuta, dant pro differẽtia 2888. quid dabunt 25. *ſec?* Duco differentiam 2888. in 25. *ſec.* data, fit Productus 72200. quo diviſo per 60. prodit 1203. hæc differentia, vel quotiens additur primo Logarithmo, ſi is minor ſit ſecundo, vel demitur ſi maior exiterit. Addita ergo differentia inventa Sinui minori 9. 6027278. erit ſumma Sinus *gr.* 23. *min.* 37. *ſecund.* 25. & eſt 9. 6028481.

100 Eodem pacto invenietur Sinus 1. Anguli

grad. 156. *minut.* 22. *ſecund.* 35. Sinus 1. *grad.* 156. *min.* 22. eſt 9. 6030166. ſubſequens eſt 9. 6027278. atque minor differentia eſt 2888. Aio ſi 60. dant 2888. quid dabunt 35? Exit 1685. ſubducto quotiente iſto ex Logarithmo primo 9. 6030166. quia maior fuit, prodit 9. 6028481. vt antè, & eſt Sinus 1. *grad.* 156. *min.* 22. *ſec.* 35. hac in parte cautè procedendum eſt illi, qui haſce operationes recèns aggreditur, ſi enim ſummam cum ſubtractione, aut vice verſa confundat, errorem vtique in operatione committet. In Tangentibus porrò eadem obſervanda veniunt, quæ in Sinibus. Modus autem inveniendi Secantes, & Sinus Verſos tradetur ad §§. 120. & 122.

Reperire Angulum dato eius Sinu, vel Tangente.

101 In omnibus operationibus Trigonometricis invenimus Sinum, vel Tangentem, & per illum agnoſcemus Angulum, vel Arcum. Sit datus Sinus primus 9. 6028481. quæratur in Tabulis eius proximè minor in prima, vel ſecunda columna, ſed in ordine Sinuum, & offendo in columna prima eius proximè minorẽ 9. 6027278 & ad ſiniſtram 37. ſuprà verò *grad.* 23. Dico hunc eſſe Sinum 1. 23. *grad.* 37. *min.* & quia ad dexteram reſpondent ei *minut.* 23. infernè autem *grad.* 156. eſt quoque Sinus 1. *gr.* 156. *min.* 23. cum ergo compertum habeam Angulum futurum eſſe Acutum; dicam eſſe *gr.* 23. *min.* 37. Si autem futurum eſſe Obtuſum agnoverim, dicam eſſe *grad.* 156. *min.* 23.

102 Dato ipſomet Logarithmo 9. 6028481. tanquam Sinu 2. vnius Anguli, quæritur vt anteà in ordine Sinuum, & invento in prima columna eius proximè minori, cum ſciam eſſe Sinus 2. proſequar eius lineam vſque ad alteram columnam, & offendam *min.* 37. ſuprà verò *gr.* 113. & continuata linea inveniam *min.* 23. & infrà *gr.* 66.

Dico ergo esse Sinum 2. *gr.* 66. *m.* 23. item *gr.* 113. *m.* 37. Si ergo mihi constet Angulum Acutum esse debere, cognoscam esse 66. 23. Si verò Obtusum fore compererim, erit 113. 37. sed ignota specie Anguli determinari nequit Arcus, vel Angulus, licèt regularitèr Acuti obveniant. Idem dicendum est de Tangentibus, ita vt sumatur perpetuò Logarithmus proximè minor, & Angulus ei correspondens tanquam verus, licèt tantum proximus sit: nam in Sinu 1. & Tangente 1. Angulus Acutus minor iusto exit; Obtusus verò maior, & vice versa in Sinu 2. & Tangente 2. Acutus maior iusto prodibit: Obtusus verò minor, quantumvis differentia negligatur, cum nec ad vnum quidem minutum perveniat.

Invenire secunda Sinus, vel Tangentis.

103 Quando studiosus operationem exactiorem obtinere cupit, non acquiescit invento gradu, & minuto proximo; sed etiam inquirit secunda scrupula, quo Angulus fiat exactior. Sit datus idem Logarithmus 9. 6028481. vti Sinus 1. vnius Anguli, reperio eius proximè minorem 9. 6027278. eiusque Angulum Acutum 23. 37. Obtusum autem 156. 23. Sinus proximè maior est 9. 6030166. differentia proximi minoris, & maioris est 2888. dematur minor 9. 6027278. à Logarithmo dato 9. 6028481. erit differentia 1203. dicamque per regulam trium. Si differentia 2888. dat differentiam 1203. quid dabunt 60. *sec.*? Prodeunt *sec.* 25. ista *secunda* addandur Angulo Acuto, fietque 23. 37. 25. subducantur verò ex Obtuso, & relinquentur 156. 22. 35. idem est in Tangente 1. sed contrarium in Sinu 2. & Tangente 2. quæ omnia caute observanda sunt, æquivocatio enim facilè potest subrepere.

CA-

CAPVT NONVM.

EXPOSITIO TABVLÆ LOGARITHMICÆ.

104 POst Canonem Trigonometricum sequitur Tabula Logarithmica, quæ numerorum absolutorum Logarithmos continet ab vnitate, vsque ad 11100. quæ vniversis Trigonometriæ operationibus sufficiunt. Qui verò illam vberiorem exoptat, apud Vlac inveniet deductam ab vnitate, vsque ad centum millia numerorum.

Invenire Logarithmum numeri Tabulæ, & numerum integrum Logarithmi dati.

105 Quæratur in Tabula numerus datus, sitq; 4044. in cuius latere ad dextram invenitur eius Logarithmus 3. 6068111. è contra si detur Logarithmus 3. 6068111. quæratur in Tabula inter Logarithmos, & in eius latere ad sinistram reperitur numerus 4044. Quando Logarithmus datus in Tabula non invenitur præcisè, sumatur propinquior, & numerus ad sinistram pro verò haberi poterit. Sit datus Logarithmus 3. 6252988. invenio Logarithmum 4219. minorem esse, maiorem verò Logarithmum 4220. hunc numerum pro verò assumam, quia propinquior est maiori, quam minori, si propinquiorem attendere nolimus; sufficiet proximè minorem assumere.

Invenire Logarithmum cuiuslibet fractionis.

106 Si numerator fractionis maior sit denominatore, demitur Logarithmus denominatoris à Logarithmo numeratoris; residuum est Logarithmus fractionis, veluti si dentur $\frac{29}{17}$ numerator est 29. eius Logarithmus 1. 4623980. denominator est 17. eius Logarith-

mus.

mus 1. 2304489. reſiduum eſt 0. 2319491. atque Logarithmus eſt fractionis $\frac{29}{17}$. Si verò numerator minor ſit denominatore auferetur Logarithmus numeratoris à Logarithmo denominatoris, reſiduum cũ ſigno ⊢ erit Logarithmus fractionis, ſed negativus, vel defectivus. Sit fractio $\frac{17}{29}$ Logarithmorũ differentia eſt 0. 2319491. præfixo ſigno ⊢ erit ⊢0. 2319491. Logarithmus fractionis $\frac{17}{29}$.

Ad invenire Logarithmum integri cum fracto.

107 Sit numerus 358 $\frac{7}{12}$. ſumatur prius Logarithmus integri 358. & eſt 2. 5538830. mox ſequens, qui eſt 2. 5550944. differentia vtriuſque eſt 12114. Ergo per regulam auream ſi denominator 12. dat 7. quid dabit differentia 12114? Hac multiplicata per 7. & Producto 84789. diviſo per 12. prodit 7066. id additur Logarithmo numeri integri 2. 5538830. & fit ſumma 2. 5545896. Logarithmus numeri 358 $\frac{7}{12}$.

Cuiuſvis Logarithmi, integrum, & fractum reperire.

108 Sit Logarithmus 2. 5545896. quæro eius proximè minorem, & iuxta 358. offendo 2. 5538830. & proximè maiorem 2. 5550944. differentia inter maiorem, & minorem eſt 12114. differentia inter minorem, & medium eſt 7066. denominator fractionis ſit 12. vel quia datus, vel quia electus. Dico ergo per regulam trium: Si differentia minoris, & maioris 12114. dat minoris differentiam, & medij 7066. quid dabit denominator 12? Multiplicato 7066. per 12. diviſo autem Producto per 12114. exit quoties 7. & eſt numerator. Dico ergo hunc Logarithmum 2. 5545896. eſſe Logarithmum numeri 358 $\frac{7}{12}$; facilitatis gratia eligere opportet denominatorem 10. vel 100. vel 1000.

&c.

Invenire Logarithmum partium decimarum.

109 De partibus decimis de vtilitate quam afferunt Architectis militaribus, & Mathematicis egi in *lib. 1.* Arithmeticæ *cap.* 9. & 10. Datæ ſint decimæ $\frac{79}{100}$. Logarithmus nemeratoris 79. eſt 1. 8976271. denominatoris verò 100. eſt 2. 0000000. differentia eſt. 0. 1023729. cum ſigno ⊢ erit ⊢ 0. 1023729. Logarithmus *defectivus* numeri $\frac{79}{100}$.

Reperire decimas Logarithmi negativi.

110 Sit Logarithmus defectivus ⊢ 0. 1023729. ſubduco illum ex Logarithmo numeri 1000. qui eſt 3. 0000000. & remanet 2. 8976271. quem reperio propè 790. eſtque numerator numeri 1000. Dico ergo ⊢ 0. 1023729. eſſe Logarithmo fractionis $\frac{790}{1000}$. hoc eſt $\frac{79}{100}$.

Invenire Logarithmum integrorum, & decimarum.

111 Sit numerus 3725. $\frac{238}{1000}$. Logarithmus numeri 3725. eſt 3. 5711263. proximè maior eſt 3. 5712428. vtriuſque differentia eſt 1165. hac multiplicata per numeratorem 238. fit Productus 277270. quo diviſo per 1000. hoc eſt ablatis à dextera tot litteris, quot habet cyphras numerus 1000. exeunt 277. additis his Logarithmo 3. 5711263. prodit Logarithmus 3. 5711540. numeri 3725. $\frac{238}{1000}$.

Invenire integros, & decimas cuiuslibet Logarithmi.

112 Sit Logarithmus 3. 5711540. offendo in Tabula eius proximè minorem 3. 5711263. & 3725. proximè maior eſt 3. 5712428. differentia maioris, & minoris eſt 1165. differentia verò minoris, & medij eſt 277. Aio, ſi 1165. dant 277. quid dabunt 1000? Addo tres cyphras numero 277. quod idem eſt ac multiplicare per 1000. fit Productus 277000. quo diviſo per 1165. obveniunt 238. milleſimæ: ergo 3725. $\frac{238}{1000}$. eſt numerus Logarithmi dati 3. 5711540.

Invenire Logarithmum numerorum maiorum 10000.

113 Sit numerus 37251238. quatuor priores litteræ ad sinistram dividantur puncto sic 3725. 238. & ex reliquis constituatur fractio tot cyphris, quot habet litteras hoc modo 3725. $\frac{238}{1000}$ reperiatur eius Logarithmus per §. 111. qui est 3. 5711540. Si characteristicæ addantur 3. quia fractio tres litteras adiecit numero, erit Logarithmus 6. 5711540. numeri integri 3725238.

Invenire numerum Logarithmi maioris quam 4.0000000.

114 Sit Logarithmus 6. 5711540. veluti si characteristica esset 3. & Logarithmus 3. 5711540. reperio eius proximè minorem propè 3725. & est 3. 5711263. proximè verò maior est 3. 5712424. differentia maioris, & minoris 1165. minoris autem, & medij 277. adiectis tot cyphris, quot habet litteras differentia characteristicarum fit 277000. hoc Producto diviso per 1165. exit 238. & Logarithmus 3. 5711540. est Logarithmus numeri 3725. $\frac{238}{1000}$ vti in §. 112. sumpto ergo tanquam integro 10 3725238. esse numerum Logarithmi dati 6. 5711540.

Invenire complementum Logarithmicum.

115 Complementum Logarithmicum est differentia inter Logarithmum, & Radium 10. 0000000. ablato ergo Logarithmo ex Radio remanet complementum Logarithmicum.

Radio, & Logarithmo etiam non scriptis reperitur facilime complementum si sumatur differentia cuiusque litteræ vsque ad 9. in vltima verò vsque ad 10. veluti à 6. vsque ad 9. desunt 3. à 5. vsque ad 9. desunt 4. à 7. vsque ad 9. deficiunt 2. &c. in vltima autem à 8. vsque ad 10. deficiunt 2. Si Logarithmus maior sit Radio vti in Tangentibus vltra *gr.* 45. sumitur complementū ad

Exemplum.

Radius.	10. 0000000.
Logarithmus.	6. 5711458.
Complement.	3. 4288542.

ad Radium Duplum 20. 0000000. eodem pacto omissa vnitate priori ad sinistram ac sit non esset. Sit Tangens 10. 3599731. dico à cyphra vsque ad 9. desunt 9. à 3. vsque 9. desunt 6. à 5. vsque ad 9. deficiunt 4. &c. estque complementum 9. 6400269.

De Logarithmis Caramuelis.

116 Superiori anno 1670. prodijt in lucem Mathematica nova Illustrissimi Caramuelis, vbi in tom. 2. novos quosdam affert Logarithmos Retrogrados, quos refluentes ipse vocat cum Tabula *Sinuum, Tangentium, & Secantium*, & Briggianis commodiores esse autumat, tametsi patiantur incommoda à nobis perpensa §§. 65. & 66. Is tamen cui tanti Authoris opera videre non licuit, huiusmodi Tabulas facillimo negotio construet, si Logarithmorum nostrorum complementa assumat. Hac vna animadversione Caramuel quæstionem illam paginæ 863. solvere potuit nempè: *An Briggiana Chilias nostro Canoni coaptari possit.*

CAPVT DECIMVM.

APPLICATIO LOGARITHMORVM.

117 PRæmissus labor compensatur facilitate, & vtilitate Logarithmorum, quæ sanè admirabilis est, maximè in regula proportionis, extractione Radicum, inventione mediorum proportionalium, & in resolutione, & trasformatione figurarum, & corporum regularium.

De regula proportionis.

118 Quatuor terminis proportionalibus existentibus Rectangulum ex medijs æquatur Rectangulo ab extremis (1. l. 6.) ergo si tres detur invenietur quartus, multiplicato enim secundo in tertium, habemus Rectangulum mediorum, quia autem istud Rectangulum idem est ac

Rectangulum extremorum, si dividatur per primum, qui alter extremus est, exibit quartus, qui est extremus reliquus: ergo cum in Logarithmis, summa multiplicationi, subtractio verò divisioni æquivaleat (§.71.& 72.) si addatur Logarithmi B.& C. ex summa verò demat Logarithmus A, relinquetur Logarithmus D. vel quarti proportionalis. Dispositio huiusmodi esse potest:

Logarithmo D. respondet in Tabula numerus 75. In regula inversa observanda sunt, quæ in Arithmetica nostra diximus, *lib.* 1. §.76.

	Term. propor.	*Logarithmi.*
A. Si	12.	1.0791812
B. dant	36.	1.5563025
C. quid	25?	1.3979400
	b.+c.	2.9542425
D. dãt	75. *b.+c.−a.*	1.8750613

De complemento Logarithmico in proportione.

119 Si pro Logarithmo A. sumatur eius complementum, veluti in §.115. summa trium multata Radio dabit *Logarith.* D.

Summa trium Logarithmorum est 11.8750613. dempto Radio remanet 1.8750613. dimissa, scilicèt, vnitate ad sinistram. Si complementum sumatur ad duplum Radium, auferetur à summa 2. quod idem est, ac demere duplum Radium ad quem sumptũ est complementum. Ratio totius operationis est, quia cum primus Logarithmus subtrahendus esset, addidimus eius cõplementum ad Radium: vnde quod subtrahere omisimus, & quod addidimus æquantur Radio: ergo summa omniũ superat Logarithmum quæsitũ toto integro Radio, quare ablato Radio remanet quartus Logarithmus D. quæsitus, hæc praxis faciliores reddit operationes, cuius vsum videre licet in vniverso libro 2.& 3. Idem dices de complemento ad duplum Radium: tunc ergo duplus Radius auferendus erit ex summa.

	Term. propor.	*Logarithmi.*
A. Si	12. *Cõpl.*	8.9208188
B. dant	36.	1.5563025
C. quid	25?	1.3979400
D. dant	75. *summa*	1.8750613

Ratio inveniendi Secantes Logarithmicas.

120 Secantes in Canone Trigonometrico scienter omittimus cum in nostra methodo minimè requirãtur, tùm quia facilè reperientur per regulam sequentem.

Complementum Sinus 1. vnà cum Radio, qui est vnitas ad sinistram; fit Secans 2. Complementum Sinus 2. vnà cum Radio fit Secans 1. Quæritur Secans 2. *gr.* 35. *min.* 8. Sinus 1. est 9.7600311. eius complementum 0.2399689. præfixa vna vnitate, quod idem est ac addere Radium; est 10.2399689. Secans 2. Si verò quæratur Secans 1. Sinus 2. *gr.* 35. *min.* 8. est 9.9126551. eius complementum 0.0873449. vnà cum Radio fit Secans 1. 10.0873449. Sumpto complemento cuiusque litteræ vsque ad 9. Sinu etiam non scripto (§.115.) invenitur Secans æquè velociter, ac si in Tabula, vel Canone Trigonometrico esset.

121 Huiusce rei demonstratio pendet à §.21. Radius enim media proportione est inter Sinum 1.& Secãtem 2. vnius Arcus. Si notus sit Sinus 1. & Radius, reperietur Secans 2. per proportionem, dispositis terminis vti in §.119.

	Termin. proport.		*Logarithmi.*
Vt	*Sinus* 1. *gr.* 35. 8. *min.*	*Compl. Log.*	0.2399689
ad	*Radium*		10.0000000
ita	*Radius*		10.0000000
ad	*Secantem* 2.	*summa*	10.2399689

Complementum Sinus nihil immutatur, cyphræ enim non adaugent summam, quia verò Radius bis reperitur in summa, & auferri debet semel (§.119.) remanet in summa Radius, & complementum Sinus: ergo complementum Sinus 1. vna cum Radio est Secans 2. pari ratione demonstrabitur complementum Sinus 2. vnà cum Radio esse Secantem 1.

Invenire Logarithmum Sinus Versi.

122 Sit Arcus *gr.* 50. eius semisis sunt *gr.* 25. ergo quia Sinus 1. vnius Arcus medius est proportionalis inter

Semiradium, & Sinum Versum Arcus dupli §. 19. erunt termini proportionales, & ordinabuntur vti in §. 119.

Termini proportionales.			*Logarithmi.*
Vt *Semiradius*	5000000000.	C.L.	0.3010299
ad *Sinum* 1.	*gr.* 25.		9.6259483
ita *Sinus* 1.	*gr.* 25.		9.6259483
ad *Sinum Versum*	*gr.* 50.	*summa*	9.5529265

Hinc exoritur hæc regula practica. Logarithmus numeri 2. vnà cum Sinu duplici cuiuslibet Arcus, multatus Radio, dat Sinum Versum Logarithmicum Arcus dupli. Quoniam Logarithmus numeri 2. complementum est Logarithmi Semiradij absoluti: prout sequenti exemplo.

Log. num. 2.	0.3010299
Sinus gr. 25.	9.6259483
Sinus gr. 25.	9.6259483
Summa est Sinus Versus 50. *gr.*	9.5529265

Invenire quamlibet Radicem cuiusque numeri.

123 Logarithmus numeri dividatur per exponétem Radicis, & obveniet Logarithmus Radicis quæsitæ. Radix quadrata est $R^{\cdot}_{2}$ eius exponens 2. Radix Cubica est $R^{\cdot}_{3}$ sequuntur $R^{\cdot}_{4}$ $R^{\cdot}_{5}$ &c. vti diximus in *lib.* 2. *Arithmetica*, §. 9. Ergo ad reperiendam $R^{\cdot}_{2}$ quæ quadrata est dividetur per 2. ad $R^{\cdot}_{3}$ dividetur per 3. & sic deinceps. Sit numerus 625. & eius Logarithmus 2.7958800. quæritur $R^{\cdot}_{2}$ diviso Logarithmo per 2. exit 1.3979400. cui in Tabula Logarithmica respondet numerus 25. qui est $R^{\cdot}_{2}$ vel Radix quadrata numeri 625. Sit Rursus numerus 1728. eius Logarithmus 3.2375437. quæritur $R^{\cdot}_{3}$ quæ Cubica est. Diviso Logarithmo per 3. prodit 1.0791812. eius numerus 12. & est *Radix Cubica* numeri 1728. &c. hæc practica emanat ex §. 73. & 74.

Invenire quoscumque medios proportionales.

124 Quando termini Geometrici proportionem aliquam continuant, Logarithmi cum æquali excessu proce-

cedunt §. 62. ergo si differentia duorum Logarithmorum dividatur per numerum mediorum vnitate adauctum; fiet quotiens excessus æqualis Logarithmorum. Sint dati numeri 2. & 128. eorum Logarithmi sunt 0.3010300. & 1.1072100. differentia est 1.8061800. Si quæratur vnus medius proportionalis dividatur per 2. & exit 0.9030900. qui est excessus, is verò additus Logarithmo minori 0.3010300. prodit 1.2041200. cui numerus correspondens est 16. & est medium proportionale inter 2. & 128. suntque continui 2. 16. 128.

125 Si quærantur duo media proportionalia: differentia 1.8061800. dividatur per 3. & obveniet excessus 0.6020600. is minori adiectus 0.3010300. est primum medium 0.9030900. eius autem numerus 8. addito rursus excessu 0.6020600. Logarithmo prioris medij 0.9030900 prodit Logarithmus 1.5051500. eius verò numerus 32. ergo quatuor proportionalia sunt 2. 8. 32. 128. atque 8. & 32. sunt duo media. Si quærantur quinque media, dividetur differētia 1.8061800. per 6. & est excessus 0.3010300 adiectus Logarithmo minori 0.3010300. procreatur 0.6020600. cuius numerus est 4. Addito rursus excessu efficitur 0.9030900. cuius numerus est 8. Addito iterum excessu, fit 1.2041200. cuius numerus est 16. Adiecto adhuc excessu, prodit 1.5051500. cuius numerus est 32. Addito rursus excessu, exit 1.8061800. cuius numerus est 64. atque continui sunt 2. 4. 8. 16. 32. 64. 128. & quinque media inter duo extrema inventa sunt, &c.

Continuare rationem aliquam in infinitum.

126 Sit ratio 3. ad 6. si Logarithmorum suorum differentia addatur continuè maiori; obvenient Logarithmi terminorum continuorum. Logarithmus numeri 3. est 0.4771212. numeri autem 6. est 0.7781512. differētia est 0.3010300. addita maiori Logarithmo, fit 1.0791812. cuius numerus est 12. adiecta rursus vltimo Logarithmo, prodit 1.3802112. cuius numerus est 24. addita iterum

vltimo, exit 1. 6812412. cuius numerus est 48. & sic in infinitum: & sunt continui 6. 12. 24 48. quia differentiæ Logarithmorum suorum sunt æquales propter proprietatem expressam §. 62. Si ratio maioris inæqualitatis sit, vt 48. ad 24. auferetur à minori continuè differentia Logarithmorum, quæ operatio contraria existit.

Regula aurea Astronomica.

127 In vsu Tabularum Astronomicarum occurrit sæpius pars proportionalis, in hunc finem constructa est Tabula sexagenaria, absque ea tamen facillime reperitur quartus proportonalis per compendium *nostræ Arithmeticæ, lib. 1. §. 138.* Logarithmi inseruiunt etiam operationibus istis eadem facilitate, quà præcedentibus, quam obrem disposita est Tabula Logarithmica cum gradibus, minutis, & secundis necessarijs, atque ordine operationibus hisce congruo.

Dispositio Tabulæ Logarithmicæ.

128 In parte superiori cuiuslibet columnæ insunt gradus, & minuta: gradus denotatur littera G. supernè, minuta verò littera M. secunda à cyphra vsque ad 59. collocata sunt ad sinistram cuiusque paginæ, & vniversis columnis eiusdem paginæ correspondent.

Invenire Logarithmos graduum, minutorum, & secundorum, vel è contra.

129 Sint dati *gr.* 0. *min.* 37. *sec.* 15. reperiantur primò *gr.* 0. *min.* 37. in parte superiori, & in eadem pagina ad sinistram descendendo sumantur *sec.* 15. & prosequendo eius lineam vsque ad columnam, vbi sunt *gr.* 0. *m.* 37. comperio respondere illi Logarithmum 3. 3492775. qui est idē Logarithmus numeri 2235. dico ergo 3. 3492775. esse Logarithmum *gr.* 0. *min.* 37. *sec.* 15. vel secundorum 2235. si datus sit Logarithmus 3. 3492775. quæratur in Tabula, & in parte superiori eiusdem columnæ reperiētur *gr.* 0. *m.* 37 & prosequendo lineam Logarithmi ad sinistram offendētur *sec.* 15. aio igitur Logarithmum esse *gr.* 0. *m.* 35. *sec.* 15. &c.

Re-

Repirire Logarithmum horarum, & minutorum, vel è contra.

130 Sumantur horæ in parte superiori, perinde ac si essent graduum minuta, minuta verò horæ ad sinistram, tanquam si essent graduum secūda, & invenietur, vt anteà Logarithmus; exempli gratia: Si quæratur Logarithmus *hor.* 19. *min.* 48. sumentur in parte superiori *gr.* 0. *min.* 19. & ad sinistram *sec.* 48. & prosequendo eius lineam è regione 0. 19. offendo 3. 0748164. qui Logarithmus est *hor.* 19. *min.* 48. Si duo, vel tres dies ad sint, ad horas revocandi sunt multiplicando per 24. & horas, quibus singuli dies constat. Vice versa datur Logarithmus 3. 0748164. quæratur in Tabulā, & in parte superiori respondent ei 0. 19. id est *hor.* 19. ad sinistram autem reperiuntur *sec.* 48. hoc est *min.* 48. vnius horæ.

Invenire Logarithmos plurium graduum, & minutorum, vel è contra.

131 Quia Tabula 3. *gr.* non excedit, si plures sint vsū in motu Lunæ, vel Cometarum; reperietur Logarithmus vt in horis; hoc est sumptis gradibus tanquam minutis, minutis verò tanquam secundis, exempli causa quæratur Logarithmus *grad.* 19. 48. *minut.* & invenietur, vt anteà 3. 0748164. & dato Logarithmo offendentur *gr.* 19. *minut.* 48. vti in §. 130.

Regula proportionis Astronomicæ.

132 Disponuntur termini, & sumitur complementum Logarithmicū primi, vti in §. 119. summa trium multata Radio dat quartum Logarithmum.

	Exemplum 1.		*Logarithmi.*
A.	*Si* 1. *gr.* 0. *m.*	C. L.	6. 4436975
B.	*dat* 35. *m.* 22. *sec.*		3. 3267454
C.	*quid dabūt* 28. *m.* 44. *sec?*		3. 2365373
D.	*& exeunt* 16. *m.* 56. *sec.*	*summa*	3. 0069802

Exem-

Exemplum 2. *Logarithmi.*

A. Si	1.gr.15.m.39.sec.	C.L.	6.3430398
B. dant	0.gr.57.m.43.sec.		3.5394525
C. quid dabũt	0.gr.24.m.16.sec.		3.1631614
D. & exeunt	0.gr.18.m.31.sec.	*summa*	3.0456537

Exemplum 3. *Logarithmi.*

A. Si Sol vno die, vel	24.hor.	C.L.	6.8416375
B. percurrit	59.m.50.sec.		3.5550944
C. quid	16.hor.45.m?		3.0021661
D. & prodeunt	41.m.46.sec.	*summa*	3.3988980

Exemplum 4. *Logarithmi.*

A. Si	13.gr.45.m.	C.L.	7.0788339
B. dant	24.hor.0.m.		3.1583625
C. quid dabũt	11.gr.20.m?		2.8325089
D. & exeunt	19.hor.34.m.	*summa*	3.0697053

133 *Ad reperiendam horam Aspectuum.*

Si duo Astra sint directa, vel ambo Retrograda.

Vt motuum differentia	11.gr. 0.m.	C.L.	7.1804561
ad horas diei	24.hor.0.m.		3.1583625
ita Astrorum distantia	7.gr. 0.m.		2.6232493
ad horam aspectus	15.hor.16.m.		2.9620679

Si vnum sit Directum, alterum verò Retrogradum.

Exemplum 6.

Vt summa motuum	1.gr.54.m.54.sec.	C.L.	6.1615287
ad horas diei	24.hor. 0.m.		3.1583625
ita Astrorum distantia	58.m.24.sec.		3.5445641
ad horam aspectus	12.hor.11.m.		2.8644553

Finis Libri primi.

LIBER SECVNDVS DE TRIGONOMETRIA PLANA.

TRigonometria Plana *est scientia, quæ Triangula Plana Rectilinea mensurat, atque resolvit. Triangulum Planum Rectilineum est illud, quod in superficie plana lineis rectis formatur. Triangulum igitur tribus Arcubus circuli, vel quibuslibet tribus lineis curvis in superficie plana descriptum, licèt Triangulum Planum dici possit; non tamen Trigonometriæ Planæ est obiectum, eò quod Rectilineum non sit, vel tribus lineis rectis minimè concludatur.*

CAPVT PRIMVM.

SVPPOSITIONES GEOMETRIÆ Triangulorum.

1 QVodvis Triangulum Planum Rectilineũ Rectãgulũ est, vel Obliquangulum. Rectangulum est, quod vnum Angulum Rectum habet. Obliquangulum

verò, quod tres Angulos omnes habet Obliquos, nullumque rectum. Triangulorum species reperientur in Geometria nostra, Proemiali 12.

2 Tres Anguli cuiusque Trianguli Rectilinei æquipollent gradibus 180. hoc est duobus Angulis Rectis, (3. l. 1.) ergo summa quorumlibet duorum Angulorum minor erit perpetuò gradibus 180. Item si quivis Angulus demetur ex 180. residuum erit summa duorum reliquorum. Si verò duorum summa auferatur à 180. residuum erit Angulus tertius. Si denique dimidium Anguli subtrahatur ex gradibus 90. residuum erit semisumma duorum reliquorum, & è contra. Ratio addendi, & subtrahendi gradus, & minuta, invenietur in Arithmetica nostra *lib. 1. cap. 2. & 3.*

3 In Triangulo Rectangulo duo Anguli Acuti vnũ Rectum constituunt, qui est graduum 90. Si latera, quæ Angulum Rectum ambiunt, sint æqualia, quivis Angulus oppositus erit semissis recti: nam lateribus æqualibus, æquales Anguli opponuntur (5. l. 1.) & quia ambo vnum Rectum efficiunt, erit vnusquisque Semirectus.

4 Si Triangulum sit Isosceles, perpendicularis bifariam secat basim, & Angulum à lateribus æqualibus comprehensum. Si verò perpendicularis bifariam basim, vel Angulum secet, erit Triãgulum Isosceles, & latera æqualia. Si perpendiculum semibasi æquale sit, Angulus Verticalis Rectus erit. Si autem maius fuerit semibase, erit Angulus Acutus: si verò minus, erit Obtusus.

5 Si Triangulum Æquilaterum sit, erit quoque Æquiangulum; si autem Æquiangulum, erit etiam Æquilaterum.

6 Duo latera cuiusq; Trianguli maiora sunt relinquo. Latus maius maiori Angulo oppenitur. Angulus verò maior, maiori lateri: quare cognito maiori latere, maior Angulus latere non potest, & è contra.

7 In quocumque Triangulo si Angulus vnus æquetur

tur duobus reliquis, Angulus Rectus erit: si verò minor sit, erit Acutus, & si maior, erit Obtusus. Et viceversa si Rectus fuerit æquabitur summæ duorum relinquorum, si Acutus, duobus reliquis minor erit: si verò Obtusus, maior. Complementa ad Quadranten, vel Semicirculum invenientur, *lib. 1. §. 4.*

CAPVT SECVNDVM.

DEMONSTRATIONES TRIGONOMETRIÆ Planæ.

8 IN Triangulis Rectangulis latus, quod Angulum Rectum subtendit, *Hypothenusa* appellatur, & ab alijs dicitur *Basis.*

DEMONSTRATIO I.

In Triangulo Rectangulo Hypothenusa ita se habet ad latera, vt Radius ad Sinus Angulorum oppositorum.

Fig. 6.

Sit Triangulum ABC. ex centro B. descripto quovis circulo DR. continuentur BAD. & BCR. & ducta perpendicularis DE. Sinus erit Anguli B. (lib. 1. §. 8.) quia verò Anguli ad C. & E. Recti sunt, erunt CA. DE. parallelæ (2. l. 1.) ergo BCA. BED. Triãgula Similia sunt, & latera habent proportionalia (2. l. 6.) ergo Hypothenusa BA. est ad latus AC. vt Radius BD. ad Sinum DE. qui est Sinus Anguli oppositi B. insuper si ab Angulo D. describatur circulus BG. Hypothenusa AB. erit ad latus BC. vt Radius BD. ad Sinum BE. Anguli oppositi D. qui æqualis est Angulo A. Ergo Hypothenusa ad quodlibet latus est, vt Radius ad Sinum Anguli oppositi, & alternandò Hypothenusa ad Radium, vt latus ad Sinum Anguli oppositi, etiamque invertendo Radius ad Hypo-

thenusam, vt Sinus Anguli ad latus oppositum, &c. (4.l.5.)

DEMONSTRATIO II.

9 *In Triangulo Rectangulo latus Angulo adiacens ita se habet ad latus oppositum ipsi Angulo, vt Radius ad Tangentem eiusdem Anguli.*

Item. *Latus ita se habet ad Hypothenusam, vt Radius ad Secantem Anguli comprehensi.*

Fig. 9.

Sit Triangulum ABC. à centro B. describatur quilibet circulus, & continuatis BAD. BCE. sit ED. perpendicularis Radio, eritque ED. Tangens Anguli B. (l.1.§.12.) quia autem Anguli ad C. & E. ponuntur Recti, erunt BC. ED. parallelæ (2.l.1.) Triangula verò BAC. BDE. Æquiangula, & latera habebunt proportionalia (2.l.6.) ergo latus BC. ad latus CA. est, vt Radius BE. ad Tangentem ED. Anguli B. oppositi lateri CA. Item, quia BD. est Secans 1. Anguli B. (l.1.§.14.) latus BC. erit ad Hypothenusam BA. vt Radius BE. ad Secantem BD. Rursus si circulus describatur ab Angulo D. erit latus AC. ad latus CB. vt Radius DE. ad Tangentem EB. Anguli ad D. vel A. etiamque *alternando*, vel *invertendo*, proportionales erunt. (4.l.5.)

DEMONSTRATIO III.

10 *In quovis Triangulo latera proportionalia sunt Sinubus Angulorum oppositorum, & è contra.*

Fig. 10. 11.

Sit quodlibet Triangulum ABC. descripto circulo per tres Angulos (4.prob. nostræ Geometriæ Practicæ) divisisque bifariam Arcubus in E. F. G. Quoniam Anguli in peripheria semisses sunt Arcuum oppositorum, (3.l.3.) erit EB. mensura Anguli C. & BF. mensura Anguli A. & AG. Anguli B. Sinus autem Arcus EB. Sinus erit Anguli C. Sinus verò Arcus AG. Sinus B. &c. Ergo quia chorda AB. est ad chordam AC. vt Sinus Arcus EB. ad Sinum Arcus AG. (l.1.§.17.) erit BA. ad AC. vt Sinus Anguli C. ad Sinum Anguli B. & pariter AB. ad BC. vt Sinus Anguli C. ad Sinum Anguli A. itemque *alternando, vel invertendo*, &c. (4.l.5.)

DEMONSTRATIO IV.

11 *In quocumque Triangulo summa laterum ad ipsorum differentiam, est vt Tangens semisummæ Angulorum oppositorum ad Tangentem semidifferentiæ eorundem.*

Fig. 12.

Sit Triangulum ABC. continuetur BAD. itaut AD. AC. itemque DR. AB. æquales sint, eritque DB. summa laterum; RA. illorum differentia, connectatur DC. & AE. ad hanc rectam perpendicularis secabit illam bifariam, & insuper Angulum DAC. (5.l.1.) & quia externus Angulus DAC. summa est Angulorum B. & C. (3.l.1.) erit EAC. semisumma: ductis RL. AH. parallelis BC. cum BA. sit æqualis RD. erit CH. æqualis LD. (2.l.6.) ergo LE. EH. remanebunt æquales (4.P.) & Anguli EAL. EAH. & insuper LAD. HAC. (5.l.1.) at LAH. differentia est Angulorum DAH. HAC. qui sunt æquales Angulis B. & C. (2.l.1.) propter parallelas AH. BC. ergo EAH. semidifferentia est Angulorum B. & C. Descripto igitur circulo Radio AE. erit EC. Tangens semisummæ EAC. & EH. Tangens semidifferentiæ EAH. & cum LR. HA. CB. parallelæ existant, proportionales erunt BD. ad RA. vt DC. ad LH. (2.l.6.) itemque vt DC. ad LH. ita semisis EC. ad semissem EH. (5.l.5.) ergo per 1.l.5. proportionales sunt.

Vt BD. *Summa laterum CA. & AB.*
ad RA. *Differentiam eorundem laterum.*
ita EC. *Tangens semisummæ Angulorum B. & C.*
ad EH. *Tangentem semidifferentiæ eorundem.*

CONSECTARIVM

12 Ergo cognita semisumma, & semidifferentia, si semissummæ DAE. addatur semidifferentia EAH. componetur Angulus maior DAH. æqualis B. Si verò ex semisumma EAC. demat̃ur semidifferentia EAH. superabit Angulus minor HAC. æqualis C. & vice versa adiecta semidifferentia EAH. parti minori HAC. exurget semisumma CAE. atque id vniversale, & commune est omnibus quantitatibus.

DEMONSTRATIO V.

13 *In quolibet Triangulo basis, vel latus maius ita se habet ad summam laterum, vt illorum differentia ad differentiam segmẽtorum, quæ fiunt à perpendiculo à vertice in basim.*

Fig. 13.

Sit Triungulum ABC. basis, vel latus maius CA. perpendicularis BE. Radio BC. qui est latus minus, describatur circulus, & producatur AB. vsque ad G. ergo quia BG. BC. æquales sunt; erit ABG. summa laterum AB. BC. & quoniam perpẽdicularis BE. bifariam secat chordam CD. (2. l. 3.) cum æquales sint CE. ED. erit DA. differentia segmentorum CE. EA. Tũm quia æquales sunt BC. BI. erit HA. differentia laterum CB. BA. Ergo quia Secantes AG. AC. exterioribus segmentis sunt reciprocæ (6. l. 6.) proportionales erunt.

Vt AC. *Basis, vel latus maius.*
ad GA. *Summam laterum.*
ita HA. *Differentia laterum.*
ad DA. *Differentiam segmentorum basis.*

Præ-

14 Præcedentes demonstrationes Trigonometriæ Planæ sufficiunt; visum est tamen sequentem adnectere, quæ Triangulo solvendo inservit ex datis tribus lateribus, eadem praxi Triangulis etiam Sphericis inservienti.

DEMONSTRATIO VI.

15 In quocumque Triangulo proportionales sunt,

Vt *Rectangulum est lateribus Angulum comprehendentibus.*
ad *Rectangulum semissummæ, & semidifferentiæ basis, & differentiæ laterum.*
ita *Quadratum Radij.*
ad *Quadratum Sinus Semianguli comprehensi.*

Sit Triangulum *abc.* Fig. 14. 15. 16. & *am.* æqualis *ba.* eritque *mc.* differentia laterum. Sint *em, cn.* æquales, relinquetur *bn.* differentia basis *bc.* & differentiæ laterum *cm.* vel *cn.* ergo si *bd. dn.* æquales sint, erit *bd.* vel *nd.* semidifferentia basis, & differentiæ laterum. Quia autem addita semidifferentia *dn.* parti minori *nc.* efficitur semisumma (§. 12.) erit *dc.* semisumma basis, & differentiæ laterum; quia verò *ab, am.* æquales sunt, perpendicularis *ap.* secabit bifariam Angulum *a.* & rectam *bm.* (5. l. 1.) & considerato Arcu *bm.* est *ab.* Radius, & *bp.* Sinus semisis Anguli *bam.* (lib. 1. §. 17.)

16 Caracteres significant Q. Quadratum, R. Rectangulum: + plus: − minus: ∞, esse æqualem. Primùm igitur demonstrabitur demissa perpendiculari *bo.* in singulis tribus casibus. Q. *bc.* esse æqualem 2, R. *ac. om.* + Q. *em.* moxque R. *bac.* ad R. *bdc.* esse vt Q. *ab.* ad Q. *bp.*

17 In singulis tribus casibus Q totius vnà cum Q. alterius segmenti æquatur 2. R. totius in idem segmentum, & Q. segmenti reliqui (1. l. 2.) ergo Q. *ac.* + Q. *am.* æquatur 2. R. *cam.* + Q. *mc.*

In priori casu Q *bc.* ∞, Q. *bo.* + Q. *oc.* hoc est Q. *ac.* + Q. *om.* ergo Q. *bc.* ∞, 2. R. *ca. om.* + Q. *mc.*

In secundo casu Q.*bc.*∞, Q.*ba.* quod est *am.* + Q.*ac.* 2.R.*cao.* (4.l.2.)

Item Q.*am.* + Q.*ac.*∞, 2.R.*cam.* + Q.*mc.* Tùm 2.R.*cam.* + 2.R.*cao.*∞, 2.R.*ca. om.* (2.l.1.) ergo Q.*am.* + Q.*ac.* + 2.R.*cao.*∞, 2.R.*ca. om.* + Q.*cm.* ergo Q.*bc.* æquale est 2.R.*ca. om.* + Q.*mc.*

In tertio casu Q.*bc.* + 2.R.*cao.*∞, Q.*ba.* quod est *am.* + Q.*ac.* (4.l.2.) & Q.*am.* + Q.*ac.*∞, 2.R.*cao.* + R.*om. ac.* + Q.*cm.* (1.l.2.) ergo Q.*bc.*∞, 2.R.*om. ac.* + Q.*cm.*

18 In omnibus igitur casibus Q.*bc.* − Q.*cm.*∞, 2.R.*om. ac.* & quia Q. ex tota *bc.* − Q.*cm.* quod est *cn.* differentia partium, æquale est 4.R. *cbd.* partium inæqualium (2.l.2.) erunt 2.R.*om. ac.*∞, 4.R.*cdb.* ergo ½ R.*om. ac.*∞, R. *cdb.*

19 Ratio igitur Q. *ab.* ad R. *ab. om.* est vt *ab.* ad *om.* ratio verò R. *ab. ac.* ad R. *ac. om.* est etiam vt *ab.* ad *om.* (1.l.6.) ergo Q. *ab.* ad R. *ab. om.* est, vt R. *ab. ac.* ad R. *ac. om.* igitur Q. *ab.* ad ½ R. *ab. om.* est vt R *ab. ac.* ad ½ R. *ac. om.* quod est *cdb.* & quoniam Triangula *bom. apm.* Æquiangula sunt, cum Angulos ad *o.* & *p.* rectos habeant, & Angulum ad *m.* communem; proportionales sunt *am.* ad *mp.* quæ est *bp.* vt *bm.* ad *mo.* (2.l.6.) ergo *am.* ad *bp.* vt ½ *bm.* quæ est *bp.* ad ½ *om.* ergo R. *am.* ½ *om.* quod est R. *ab.* ½ *om.* quod est R. ½ *ab. om.* quod est *cdb.* æquatur Q. *bp.* (1.l.6.) cum verò offensum sit Q. *ab.* ad ½ R. *ab. om.* quod est Q. *bp.* esse vt R. *ab. ac.* ad R. *cdb.* proportionales erunt.

R. *ab. ac.* laterum Angulum *a.* includentium.
ad R. *cdb.* semisummæ, & semidifferentiæ prædictæ.
vt Q. ex Radio *ab.*
ad Q. *bp.* Sinus Anguli *bad.* quod est ½ *bac.*

CA-

CAPVT TERTIVM.

RESOLVTIO TRIANGVLI PLANI Rectanguli.

20 VNumquodque Triamgulum tria habet latera, & Angulos tres, ex tribus Angulis Trianguli Plani latera inveniri nequeunt: nam si in Triangulo ABC. *Fig.* 7. continuentur latera, & ducatur DE. parallela CA. Triangulum ABC. eosdem habebit Angulos, ac BDE. (2.l.6.) cum verò infinitæ parallelæ duci possint, infinita Triangula Æquiangula constituentur, quare sola laterum proportio determinari potest, non tamen quantitas Verùm tribus alijs quibuslibet datis invenientur reliqua.

21 Maioris perspicuitatis gratia res datæ, vel cognitæ (quæ à Græcis *Didomena* nuncupantur) à quæsitis *Zitumena* dictis distinguendæ sunt, cognitæ lineola quadam denotantur, quæsita verò punctis, & ab alijs cyphra: vt in Triangulo ABC. *Fig.* 11. Angulus B. & latera AB. AC. dantur cognita, latus autem CB. & Anguli A. & C. supponuntur inquiri.

22 In Triangulo Rectangulo duæ tantum res postulantur, Angulus enim Rectus pro cognito haberi debet, & propterea à multis lineola nulla insignitur. Latus Angulo Recto subtensum *Hypothenusam* vocamus; Rectas verò Angulum Rectum includentes *Latera*. Cognito Angulo Acuto alterutro, manifestatur reliquus, qui eius complementum est ad Quadrantem, & generaliter observandum est, si *Hypothenusa* in proportione ad sit per demonstrationem primam Triangulum solvi; si autem duo latera reperiantur in proportione resolvitur Triangulum per demonstrationem secundam præmissi capitis.

23 In omni proportione apponitur complementum Logarithmicum prioris termini, vti diximus *lib.* 1. *§.* 119. atque adeò quando Radius primum occupat locum, eius complementum est cyphra, quam scribere opus nequaquam est, summam enim, neque auget, neque minuit, licèt illam in omni praxi conscripserim perspicuitati studens. Complementum autem Logarithmi ita indicatur C.L. ad cuius inventionem sumendum est complementum cuiusque litteræ vsque ad 9. vti diximus *lib.* 1. *§.* 115. In proportionibus vniversis summa trium Logarithmorum, multata Radio, Logarithmum quartum exhibet. Demitur Radius, vnitate sublata, quæ ad sinistram scribenda erat, vel subductis ex Characteristica 10. Si autem prior terminus sit Tangens vltra *grad.* 45. sumetur complementum ad duplum Radium, & à Characteristica, quæ in summa prodit auferentur 20. quod idem est ac demere duplum Radium, quæ in futuros huiusmodi casus hic admonuisse sufficiat.

24 PROBLEMA I.

Dato vno latere, & Angulo.

1. *Invenire reliquum latus.* 2. *Invenire Hypothenusam.*

I. INVENIRE RELIQVVM LATVS.

In Triangulo ABC. *Fig.* 6. est BC. pedum 345. Angulus ad B. 40. 00. *min.* ergo A. erit 50. 00. *min.* quæritur latus CA. per *§.* 9.

	Proportio §. 9.		*Gradus.*	*Logarith.*
Vt	BE.	*Radius.*	C.L.	0.0000000
ad	ED.	*Tang. Ang. B.*	40.00.*m.*	9.9238135
ita	BC.	*Latus cognitum. ped.*	345. *ped.*	2.5378191
ad	CA.	*Latus quæsitum. ped.*	289½. *pe.*	2.4616326

In-

II. INVENIRE HYPOTHENVSAM.

	Proportio §. 8.		*Logarithmi.*
BE	*Sin. Ang. A. gr.* 50. *&* 2. *Ang. B.* 40. *gr.*	C.L.	0.1157459
BD.	*Radius.*		10.0000000
BC.	*Latus opp. A. & cont. B. pedum* 345.		2.5378191
BA.	*Hypothenusa, pedum* 450½.		2.6535650

26 PROBLEMA II.

Data Hypothenusa, & vno latere.

1. *Invenire Angulos.* 2. *Invenire reliquum latus.*

I. INVENIRE ANGVLOS.

In Triangulo ABC. *Fig.* 7. datis BC. BA. quæruntur Anguli A. & B.

	Proportio §. 8.		*Logarithmi.*
BA.	*Hypothenusa.*	*pedum* 450½. C.L.	7.3464349
BC.	*Latus.*	*pedum* 345.	2.5378191
DB.	*Radius.*		10.0000000
BE.	*Sinus Ang. opp. D. vel A. gr.* 50.00.*m.*		9.8842540
	qui est Sinus 2. Ang. ad B. gr. 40.00.*m.*		

27 INVENIRE RELIQVVM LATVS.

Primò reperiuntur Anguli A. & B. per *§.* 26. mox per *§.* 24. invenietur latus.

BE.	*Radius.*	Fig. 6.	C.L.	0.0000000
ED.	*Tang. Ang. B. gr.*	40.00.*m.*		9.9238135
BC.	*Latus conterm. B. ped.*	345.		2.5378191
CA.	*Latus oppositum B. ped.*	289.½.		2.4616326

28 PROBLEMA III.

Data Hypothenusa, & vno Angulo.

I. INVENIRE LATERA.

In Triangulo A B C. *Fig.* 8. datis B A. & Angulo B. quæruntur latera BC. CA.

Ad latus CA. inveniendum §.8.

			Logarithmi.
BD. *Radius.*		C.L.	0.0000000
BE. *Sinus Ang. B.*	*gr.* 40. 00. *m.*		9.8080675
BA. *Hypothenusa data ped.*	450 $\frac{1}{3}$.		2.6535651
CA. *Latus oppositum B. ped.*	289 $\frac{1}{2}$.		2.4616326

Ad latus CB. inveniendum.

BD. *Radius.*		C.L.	0.0000000
BE. *Sinus 2. Ang. B. gr.*	40.00. *m.*		9.8842540
BA. *Hypothenusa data ped.*	450 $\frac{1}{3}$.		2.6535651
BC. *Latus conterm. B. ped.*	345.		2.5378191

29 PROBLEMA IV.

Datis duobus lateribus.

1. *Invenire Angulos.* 2. *Invenire Hypothenusam.*

I. INVENIRE ANGVLOS.

In Triangulo ABC. *Fig.* 9. datis BC. CA. quæruntur Anguli B. & A.

Proportio §.9.

			Logarithmi.
BC. *Latus maius.*	*pedum* 345.	C.L.	7.4621808
CA. *Latus minus.*	*pedum* 289 $\frac{1}{2}$.		2.4616326
BE. *Radius.*			10.0000000
ED. *Tang. minoris Ang. B.*	40.00. *m.*		9.9238134

quæ est *Tangens 2. Ang. mai. A.* 50.00. *oppositi maiori lateri.*

30 *II. INVENIRE HYPOTHENVSAM.*

Primò, reperiantur Anguli B. A. per §.29. deinde Hypothenusam.

Pro Hypoth. ex §.25.

			Logarithmi.
DE. *Sinus 1. Ang. B.*	*gr.* 40.00. *m.*	C.L.	0.1919324
DB. *Radius.*			10.0000000
AC. *Latus oppositum B. pedum*	289 $\frac{1}{2}$.		2.4616326
AB. *Hypothenusa, pedum*	450 $\frac{1}{3}$.		2.6535650

CA-

CAPVT QVARTVM.

RESOLVTIO TRIANGVLI PLANI Obliquanguli.

31 PROBLEMA I.

Datis duobus Angulis, & vno latere.

I. INVENIRE RELIQVA DVO LATERA.

Cognitis duobus Angulis datus etiam est tertius per §.2. in Triangulo ABC. *Fig.* 10. cogniti sunt Anguli A. & C. & latus CA. inquiruntur latera BA. BC.

Proportio §.10.	*Partes.*	*Logarithmi.*
Sinus Anguli B.	*gr.* 50. *m.* 15. C.L.	0.1141629
ad *Latus oppositum CA.*	*ped.* 448.	2.6512780
vt *Sinus Ang. C.*	*gr.* 35. *m.* 20.	9.7621775
ad *Latus oppositum AB.*	*ped.* 337.	2.5276184

& *Sinus Ang. B.* ad *latus CA.* vt *Sinus Ang. A.* ad *latus CB.*

32 PROBLEMA II.

Datis duobus lateribus, & alterutro Angulo oppositio.

1. *Invenire Angulos duos.* 2. *Invenire reliquum latus.*

I. INVENIRE ANGVLOS DVOS.

In Triangulo ABC. *Fig.* 11. cognitis Angulo B. & lateribus BA. & AC. quæruntur Anguli A. & C.

Proportio §.10.	*Partes.*	*Logarithmi.*
Latus CA. oppositum B.	*ped.* 400. C.L.	7.3979400
ad *Sinum Ang. B gr.* 54. 30. *m.*		9.9106860
vt *Latus AB. oppositum C.*	*ped.* 300.	2.4771212
ad *Sinum Anguli C.* 37. 38. *m.*		9.7857472

Complementum ad 180. Angulorum C. & B. erit Angulus A. per §.2.

33 *II. INVENIRE RELIQVVM LATVS.*

Primò, reperientur Anguli per §. 32. deinceps latus CB. per §. 31. Sinus Anguli B. ad latus AC. vt Sinus Anguli A. ad latus CB.

34 PROBLEMA III.

Datis duobus lateribus, & Angulo intermedio.

1. *Invenire duos Angulos.* 2. *Invenire reliquum latus.*

I. INVENIRE DVOS ANGVLOS.

In Triangulo ABC. *Fig.* 11. Angulus BAC. est 61. 16. CA. 400. AB. 300. investigantur Anguli B. & C. Complementum 61. 16. est 118. 44. summa Angulorum B. & C. eius semisis 59. 22.

CA. + AB. 700. CA. − AB. 100.

Proportio §. 11.	*Partes.*		*Logarithmi.*
1. *Summa laterum.*	*ped.* 700.	C.L.	7.1549019
2. *Differentia laterum.*	*ped.* 100.		2.0000000
3. *Tang. semissum B. & C. gr.* 59. 22. *m.*			10.2275434
4. *Tang. semidifferentiæ B. & C. gr.* 13. 34. *m.*			9.3824453

Summa 3. & 4. *est B.* *gr.* 72. 56. *oppos. maiori lateri.*
Differentia 3. & 4. *est C. gr.* 45. 48. *oppos. minori lateri.*

35 *II. INVENIRE RELIQVVM LATVS.*

Primò, reperiantur Anguli B. 72. 56. & C. 45. 48. per §. 34. deinde invenietur latus CB. per Problem. 1.

Proportio §. 31.	*Partes.*		*Logarithmi.*
Sinus Anguli C.	*gr.* 45. 48. *m.*	C.L.	0.1445349
Latus oppositum AB.	*ped.* 300.		2.4771212
Sinus Anguli A.	*gr.* 61. 16. *m.*		9.9429335
Latus oppositum CB.	*ped.* 367.		2.5645896

36 Præmissis tribus Problemibus vniversa Rectangula solvi possunt; breviores tamen, & faciliores sunt operationes capitis superioris.

PRO-

37 PROBLEMA IV.

Datis tribus lateribus.

I. INVENIRE ANGVLVM QVEMLIBET. §. 13.

1. *Latus minus BC.*	300.	*in Triangulo ABC.* Fig. 13.	
2. *Latus medium AB.*	400.		*Logarithmi.*
3. *Latus maius AC.*	600.	C.L.	7.2218487
4. *Summa* 1. & 2.	700.		2.8450980
5. *Differentia* 1. & 2.	100.		2.0000000
6. *Differentia segm. AD.*	$116\frac{2}{3}$.		2.0669467
7. *Differ.* 3. & 6. *DC.*	$483\frac{1}{3}$.		
8. *Semissis* 7. *est EC.*	$241\frac{2}{3}$.	*Summa Logarith.* 3. 4. & 5.	
9. *Summa* 6. & 8. *AE.*	$358\frac{1}{3}$.	*est Logarith.* 6.	

38 Ergo in Rectangulis AEB. BEC. invenientur Anguli A. & C. cognitis AB. BC. & AE. & CE. per §. 26.

Pro Angulo ABE. & A. per §. 26.			*Logarithmi.*
Hypothenusa AB. pedum	400.	C.L.	7.3979400
ad *Latus, vel seg. AE. pedum*	$358\frac{2}{3}$.		2.5542869
vt *Radius.*			10.0000000
ad *Sinum Ang. ABE. gr.*	63. 37.		9.9522269
qui est *Sinus* 2. *Ang. A. gr.*	26. 23.		

Pro Angulo EBC. & C. §. 26.			*Logarithmi.*
Hypothenusa BC.	300.	C.L.	7.5228788
ad *Latus, vel segm. EC.*	$241\frac{2}{3}$.		2.3832159
vt *Radius.*			10.0000000
ad *Sinum Ang. CBE. gr.* 53. 40. *m.*			9.9060947
qui est *Sinus* 2. *Ang. C. gr.* 36. 20. *m.*			

Summa ABE. EBC. gr. 117. 17. *m. est Ang. ABC.*

39 ALITER.

In eodem Triangulo ABC. *Fig.* 13. inuestigatur Angulus ABC.

Dispositio per §.15.		*Logarithmi.*
1. *Latus maius includens*	*AB.*	400. C.L. 7.3979400
2. *Latus minus includens*	*BC.*	300. C.L. 7.5228788
3. *Differentia laterum*	*AB. BC.*	100.
4. *Latus oppositum Ang.*	*ABC.*	600.
5. *Summa 3. & 4.*		700.
6. *Differentia 3. & 4.*		500.
7. *Semisumma semissis 5.*		350. *Log.* 2.5440680
8. *Semidifferentia semissis 6.*		250. *Log.* 2.3979400
9. *Summa 4. Logarithmorum*		19.8628268
10. *Eius semissis est Sinus Arcus*		gr. 58. 38½. *m.* 9.9314134
11. *Arcus duplus est Ang. ABC.*		117. 17. *m.*

REGVLA PRACTICA.

Addantur complementa Logarithmica laterum Logarithmis semisummæ, & semidifferentiæ inter basim, & differentiam laterum; semissis summæ erit Sinus 1. dimidij Anguli.

Tametsi demonstratio §.15. prolixa sit, & dificilis, hæc tamen praxis inde exorta facilis est, & per commoda, cum sit eadem ac illa, quà lib. 3. §.81. vtimur ad Trianguli Spherici resolutionem.

Finis Libri secundi.

LIBER TERTIVS DE TRIGONOMETRIA SHPERICA.

TRigonometria Sphærica *est scientia Triangulorum, quæ in superficie Sphæræ tribus Arcubus circuli maximi describuntur. Triangula igitur in superficie plana tribus Arcubus circulorum æqualium, vel inæqualium comprehensa huiusce Trigonometriæ obiectum minimè sunt, non enim formantur in superficie Sphærica, neque etiam facta minoribus circulis in superficie Sphærica, quia sub circuli maximi tribus Arcubus non comprehenduntur. Est ergo Trigonometria Sphærica Mathematicæ pars vtilissima, cuius vsus latissimè diffunditur per omnia, quæ ad Sphæram, Geographiam, Nauigationem, Horologiographiam, & Astronomiam pertinent, vt in eius applicatione videre licebit, ad huius tamen intelligentiam non vlla elementa Sphærica requiruntur, quæ in prioribus capitibus demonstrantur, nè lector obtinendæ demonstrationis gratia ad Theodosij, vel Menelai Sphærica ableganduus sit.*

CAPVT PRIMVM.

DE CIRCVLIS MAXIMIS, ET ANGVLIS Sphæricis.

1 *Circulus Maximus in Sphæra est, qui communem cum illa centrum habet.* Hinc fit quamlibet circuli Diametrum per eius centrum transeuntem, transire quoque per centrum Sphęræ, atque huius etiam Diametrum esse, quia autem Diameter Sphæræ maior Recta est omnium, quæ in ea consistere possunt, circulus eãdem habens Diametrum, maior quoque est, & Maximus appellatur; nullus enim maior dari potest, licèt infinitos admittat æquales. Reliqui omnes circuli, qui Maximi non sunt, neque commune cum Sphæra centrum habent, vocantur circuli minores, inter quos, qui longius à centro distat minor est propinquiore, cuius demonstratio eadem est, quàm chordarum circuli. (2. l. 3.)

2 *Duo Circuli Maximi bifariam se inter secant.*

Fig. 1.

Circuli EGF. EDF. secantur in punctis E. F. eritque communis Sectio planorum suorum recta EAF. (1. l. 11.) ergo quia centrum Sphæræ omnibus circulis Maximus est commune, erit in vtroque plano (§. 1.) & in communi Sectione EAF. igitur cum EAF. transeant per centrum vtriusque Diameter communis erit, & Semicirculi EGF EDF. idem dicesde quibuslibet alijs duobus circulis Maximis.

3 *Polus Circuli Maximi est punctum in superficie Sphæræ, à quo omnes Rectæ, vel Arcus ad Circumferentiã Circuli protracti æquales sunt, & gr. 90. constãt, vel Quadrante Circuli.*

Concipiatur circulus EDF. si omnes Arcus à pũcto R. exeuntes NR. RD. RP. æquales sint; erit punctum R. Polus circuli EDF. pari ratione, quia omnes Arcus à pũcto

cto E. ducti EV. EA. ED. EG. æquales existunt; erit E. Polus circuli, quem refert recta VAG. A. verò Polus circuli EGF. &c. Ergo cum EAF. Semicirculus sit §. 2. & EA. AF. æquales, erunt Quadrantes *gr.* 90. &c.

4 *Angulus Sphæricus est duorum Circulorum Maximorum ad invicem inclinatio, eius autem mensura Planorum suorum inclinatio, vel Arcus Circuli Maximi interceptus, qui Polum suum habet in concursu, vel puncto Anguli.*

Circuli EDF. EGF. secantur in puncto E. & E. Polus est circuli GDAV. dico Arcum GD. mensuram esse Anguli GED. circuli HX. GV. secantur in A. puncto, quod Polus est circuli EGFV. Arcus verò HG. mensura est Anguli HAG. circuli ECF. TCI. secantur in C. puncto, quod Polus est circuli MSZ. & Arcus NS. mensura est Anguli Sphærici ECS. &c.

5 *Angulus quem duo Circuli Maximi efficiunt, æquatur distantiæ Polorum suorum, & è contra.*

Sint circuli EDF. EGF. quorum Poli A. R. Angulus verò GED. atque eius mensura GD. quia RD. & AG Quadrantes æquales sunt (§. 3.) ablato Arcu communi AD. relinquetur AR. Polorum distantia æqualis DG. mensuræ Anguli DEG. denominatio Anguli Sphærici eadem est, quæ Rectilinei; si *gr.* 90. sit, erit Rectus: si verò *gr.* 90. minor, Acutus: si maior, Obtusus; idem dicendum est de complementis eorum ad Quadrantem, vel Semicirculum, &c.

6 *Si qui vis Circulus per Polos alterius transeat, Polos suos in altero habebit, & cum illo Angulos Rectos constituet, & è contra.*

Sit circulus EGFV. cuius Polus A. per quem transit circulus GAV. aio Polum circuli GAV. esse in circulo GEV. Angulos verò ad V. & G. Rectos esse 90. *gr.* dividatur Semicirculus GEV. bifariam in E. & ducto circulo EAF. quia Arcus AE. ex Polo A. Quadrans est (§. 3.) & EV. EG. Quadrantes quoq; æquales existũt; erit E. Polus

circuli GAV. (§. 3.) & ineſt in circulo GEV. ergo cum EA. diſtantia Polorum æqualis ſit Angulo EVA. (§. 5.) erit hic *grad.* 90. æqualis Quadranti EA. ergo Rectus; & rurſum EGA. AGF. FVA. ſimiliter, quoniam circuli YRO. MRZ. GRV. tranſeunt per punctum R. Polum circuli EDF. Recti erunt Anguli ad N. D. P. &c. Viceverſa ſi Anguli ad V. & G. Recti exiſtant, diſtantia Polorum E. A. erit *gr.* 90. ergo VAG. tranſibit per Polum A. & VEG. per Polum E. (§. 5.)

7 *Anguli quos duo Circuli Maximi efficiunt in duabus ſectionibus, æquales ſunt; item illorum complementa, & vnuſquiſque cum complemento ſuo æquivalet duobus Rectis, Verticales autem æquales ſunt inter ſe.*

Sint circuli EGF. EDF. puncta verò ſectionum E. F. & A. Polus circuli EGF. aſſumptis EG. GF. Quadrantibus æqualibus; circulus GAV. habebit Polos ſuos in E. & F. (§. 6.) ergo Arcus GD. erit menſura Angulorum GED. DFG. (§. 4.) atque æquales erunt iſti, cum vnam & eandem menſuram habeant. Item illorum complemẽta DEV. VFD. cum eorum menſura ſit DV. igitur quia Arcus GD. DV. Semicirculum conſtituunt, ſunt GFD. DFV. rurſus GED. DEV. æquales duobus Rectis. Eadem eſt ratio in circulis GAV. HAX. quoniam circuli EGF. Polum ſuum habet in concurſu A. & HG. HV. Semicirculum efficiunt; GAH. HAV. duobus Rectis æquivalent, & quia GHV. HVX. Semicirculi æquales ſunt, dempto Arcu communi HEV. remanebunt æquales GH. VX. qui menſura ſunt Angulorum Verticalium oppoſitorum GAH. VAX.; ergo iſti æquales erunt. (§. 4.)

CAPVT SECVNDVM.

DE TRIANGVLIS SPHÆRICIS in communi.

8 *Triangulum Sphæricum eſt, quod Circuli Maximi tribus Arcubus illud includentibus, in ſuperficie Sphæræ comprehenditur.*

Eius denominatio eadem eſt, quam Trianguli Plani Rectilinei. Si Rectum Angulum habeat, Rectangulum erit. Si Obtuſum, erit Obtuſangulum. Si verò omnes tres Angulos Acutos habeat, erit Acutangulum. Dicitur Æquilaterum, cum tria latera æqualia ſint. Iſoſceles verò cum duo latera habet æqualia: Scalenum, ſi tria latera inæqualia ſint.

9 *Demonſtrationes prop. 4. 5. & 6. noſtræ Geometriæ communes ſunt etiam Triangulis Sphæricis.*

De Triangulis omninò æqualibus.

1. *Si tria latera vnius æqualia ſint tribus alterius.* 2. *Si duo latera duobus alterius æqualia, æqualem Angulum comprehendant.* 3. *Si duo Anguli, & vnum latus, alterius æqualibus correſpondeant.* 4. *Si duo latera æquentur duobus alterius, vnũ verò Angulum oppoſitum æqualem habeãt, & alterum eiuſdem ſpeciei; omnia erunt æqualia.*

10 ### De Trianguli partibus.

1. *Latera æqualia, æquales Angulos ſubtendunt.* 2. *Æquales Anguli opponuntur lateribus æqualibus.* 3 *Maius latus, maiorem Angulum ſubtendit; maior verò Angulus latus maius.* 4. *Quælibet duo latera maiora ſunt reliquo.* Conſectaria. 5. *Triangulum Æquilaterum, Æquiangulum eſt: Æquiangulum verò, Æquilaterum etiam eſt.* 6. *In Triangulo Iſoſceli Arcus, qui bifariam ſecat baſim, bifariam ſecat, & Angulum. Si verò bifariam ſecet Angulum, baſim quoque bifariam ſecabit, & perpendicularis eſt, & è contra.* 7. *Si perpendiculum bifariam ſecet baſim vnius Trianguli, Angulum quoque bifariam*

secabit; si verò Angulum, etiam basim, si tamen Arcus basim & Angulum bifariam secet, perpendicularis erit, & Triangulum perpetuò Isosceles. 8. *Si duo Arcus æquales à puncto in alium cadant, à Perpendiculo, quod Quadrans non est, æqualiter recedent, & cum illo æquales Angulos constituent, & contra: maior verò Arcus minorem efficit Angulum; & magis à Perpendiculo recedit (si Anguli sint Acuti, minus (si Obtusi.* 9. *Minor Arcus à puncto in alium cadens est Perpendiculum quod vnicum est, nisi Quadrans fuerit.*

11 De Triangulorum inæqualitate.

1. *Si duo Triangula duo latera habeant æqualia, quod maiorem continet Angulum, basim habebit maiorem.* 2. *Quod autem maiorem habet basim, Angulum continebit maiorem.* 3. *Si duo Triangula in eadem, vel æquali basi constituta sint, quod supra illam vnum Angulum maiorem habuerit, alterum verò minorem, vel æqualem, & latera habebit minora.* 4. *Continebunt tamen Angulum maiorem.* 5. *Idem erit si à basis terminis duo Arcus ad punctum intra Triangulum concurrant.*

Hæ omnes propositiones eodem modo demonstrantur, quo 4. 5. & 6. *lib.* 1. nostræ Geometriæ, atque adeò illarum demonstrationes hìc inculcare superfluum videretur.

12 *In quolibet Triangulo Sphærico tria latera minora sunt integro Circulo.* Fig. 1.

Sit quodvis Triangulum YPF. productis circulis, vsque ad inter Sectionem O. aliud Triangulum exurgit PFO. cuius latera PO. OF. maiora sunt PF. §. 10. ergo Semicirculi duo YPO. YFO. maiores sunt tribus lateribus PF. FY. YP. quare tria latera minora sunt integro circulo.

13 *Dato quocumque Triangulo, aliud secundum efficitur in Polis Arcuum suorum, cuius duo latera æqualia sunt duobus Angulis primi, tertium autem latus complementum est Anguli reliqui, idem dices de Angulis secundi, cum lateribus primi.*

Sit

Sit Triangulum ABC. Polus Arcus AC. est Z. Polus BA. est Y. & BC. est R. dico in Triangulo YRZ. latera YR. RZ. æqualia esse Angulis ABC. BCA. & latus YZ. esse complementum ad Semicirculum Anguli BAC. quoniam Quadrantes YQ. RP. æquales sunt, subducto RQ. erit YR. æqualis QP. mensuræ Anguli ABC. & dempto SR. ex Quadrantibus ZS. RN. supererit ZR. æqualis SN. mensuræ Anguli ACB. & adiecto XZ. Quadrantibus YX. ZI. fiet YZ. æqualis IX. mensuræ Anguli XAI. complementi Anguli CAB. ergo patet veritas, &c.

14 Eadem ratione si assumamus Polum O. Arcus BA. in Triangulo RZO. erit RZ. æqualis SN. mensuræ Anguli BCA. & dempto OI. ex Quadrantibus HO. IZ. remanebit OZ. æqualis IH. mensuræ Anguli BAC. & RO. complementum erit RY. hoc est QP. mensuræ Anguli ABC. Rursus si summamus Polum M. Arcus AC. in Triangulo MYR. erit MY. æqualis HI. mensuræ Anguli HAI. & YR. æqualis QP. mensuræ Anguli ABC. & MR. complementum Arcus RZ. hoc est NS. mensuræ Anguli BCA. &c. Ergo vniversaliter semper reperitur Triangulum secundum, cuius duo latera æquantur quibuslibet duobus Angulis primi, tertium verò latus complementum est Anguli tertij.

15 *Dato quolibet Triangulo in Polis suorũ Arcuum aliud constituitur, cuius tria latera complementa sunt ad Semicirculũ trium Angulorum primi, tres verò Anguli secũdi complementa trium laterum primi.* Fig. 1.

In eodem Triangulo ABC. si assummamus Polos R. Arcus BC. M. Arcus AC. & O. Arcus BA. exurgit Triangulum MRO. latus MR. complementum est RZ. hoc est NS. mensuræ Anguli BCA. & RO. complementum est YR. hoc est QP. vel ABC. & MO. complementum OZ. hoc est HI. vel BAC. ergo tria latera Trianguli MRO.

complementa sunt Triangulorum ad A. B. C. insuper I S. mensura Anguli ad M. complementum est S T. vel AC. & QH. mensura Anguli ad O. complementum est QX. vel AB. & NP. mensura Anguli MRO. complentum est Arcuum EN. PF. hoc est CDB. ablato enim ND. ex Quadrantibus ED. NC. remanent æquales EN. DC. & rursus dempto DP. ex Quadrantibus FD. PB. supersunt FP. DB. æquales: ergo tres quoque Anguli Trianguli RMO. complementa sunt trium laterum ABC. & constat propositum, &c.

16 *In quocumque Triangulo Sphærico Angulus Externus minor est duobus Internis oppositis.* Fig. 1.

Sit Triangulum ABC. & Angulus externus ACP. quia in tribus Polis M. Y. R. Triangulum YRM. constituitur, & latus YR. æqualis est Angulo ABC. & YM. Angulo CAB. & MR. complementum est Anguli ACB. (§. 13.) erit MR. æqualis Angulo ACP. & cum MR. minor sit MY. YR. (§. 12.) erit Angulus Externus ACP. minor duobus Internis oppositis ABC. CAB. &c.

17 *In quolibet Triangulo Sphærico tres Anguli maiores sunt duobus Rectis, minores verò sex.* Fig. 1.

Sit Triangulum ABC. Anguli duo ABC. CAB. maiores sunt externo ACP. (§. 16.) ergo tres ABC. CAB. BCA. maiores existent duobus BCA. ACP. quia verò duo BCA. ACP. duobus Rectis æquivalent (§. 7.) erunt tres ABC. CAB. BCA. duobus Rectis maiores: pari ratione in Triangulo MRO. quilibet Internus cum suo Externo duos conficit Rectos MRO. cum ORZ. (§. 7.) ergo tres Interni cum tribus Externis componunt sex Rectos, quare ablatis Externis remanebunt Interni sex Rectis minores.

18 *Triangulum Sphæricum habere potest tres Angulos Rectos, duos Rectos, & unum Obtusum; item duos Obtusos, & unum Rectum, & tres Obtusos.*

In Triangulo AFG. tres Anguli AFG. GAF. FGA. Recti sunt, in quo casu omnia tria latera sunt Quadrantes. In Triangulo HAF. Anguli ad F. & H. Recti sunt, & HAF. Obtusus: duo latera sunt Quadrantes HA. AF. & HF. Quadrante maius. In Triangulo NZF. Anguli ad Z. & F. Obtusi sunt, & Angulus ad N. Rectus. In Triangulo MRO. tres Anguli Obtusi sunt.

CAPVT TERTIVM.

DE TRIANGVLIS SPHÆRICIS singillatim.

19 *IN Triangulo Rectangulo latera Angulum Rectũ ambientia eiusdem speciei sunt cum lateribus oppositis.*

In Triangulo EDG. DG. minus est Quadrante, quia Angulus ad E. Acutus est, & EG. Quadrans est, quòd Angulus ad D. Rectus sit. In Triangulo EBH. latera BH. HE. minora sunt Quadrante, sicut Anguli oppositi ad E. & B. In Triangulo NZF. Angulus Rectus est ad N. & latera NZ. NF. Quadrantem excedunt, vti Anguli Obtusi ad F. Z.

20 *In Triangulo Rectangulo si Anguli Obliqui, vel latera Angul: Recti sint eiusdẽ speciei; Hypothenusa minor erit Quadrante; si verò diversæ, Hypothenusa maior erit Quadrante.*

In Triangulo EBH. Anguli ad B. E. Acuti sunt, & Hypothenusa EB. minor Quadrante ED. In Triangulo GRZ. Anguli ZRG. GZR. sunt eiusdem speciei Obtusi, & Hypothenusa ZR. minor Quadrante ZS. In Triangulo YRG. latera RG. GY. eiusdem speciei sunt Quadrante maiora, Hypothenusa verò YR. minor. In Triangulo HBF. latera BH. HF. diversæ speciei sunt, & Hypothenusa BF. Quadrante maior. In Triangulo ECI. Anguli ad C. E. diversæ sunt speciei, & Hypothenusa EC. maior Quadrante ED.

21 *In Triangulo Rectangulo Anguli duo superant Quadrantem, & qui vis Angulus Obliquus maior est differentia alterius, & Quadrantis.*

In Triangulo EBH. tres Anguli EBH. HEB. BEH. duos Rectos excedunt (§. 17.) ergo ablato Recto H. erunt BEH. HBE. plus quàm Rectus: ergo quia verò quia B. cum complemento suo ad Quadrantem Rectum constituit, erit Angulus ad E. maior complemento Anguli ad B. & in Triangulo FBH. cõtinuatis circulis exurgit Triangulum BHE. Angulus ad E. ostensus est maior differentia Anguli EBH. & Quadrantis: differentia verò à Quadrante Anguli EBH. & FBH. vna, & eadem est (l. 1. §. 16.) ergo quia Anguli ad E. & F. æquales sunt (§. 7.) erit F. maior differentiâ inter Quadrantem, & Angulos HBF. doctrina tradita in §§. 17. 18. 19. 20. & 21. magni momenti est ad cognoscendum num Triangulum recte propositum, vel solutum sit.

22 *In Triangulo Isosceli Anguli ad basim eiusdem sunt speciei cum lateribus, & è contra.*

In Triangulis YRZ. RMO. suppositis YR. RZ æqualibus, item RM. RO. transeat per Angulum ad R. & Polum A. basium YZ. MO. circulus VRAG. eruntque Anguli ad V. & G. Recti, §. 6. Ergo in Rectangulis VRY. VRZ. GRM. GRO. Anguli ad Y. Z. eiusdem speciei cum latere opposito VR. Quadrante minores existent, vti latera YR. RZ. & Anguli ad M. O. eiusdem speciei cum RG. maiores Quadrante GA. (§. 19.) veluti latera RM. RO.

23 *In quovis Triangulo Obliquangulo, si Anguli ad basim eiusdem speciei sint; Perpendicularis ab Angulo in basim intra Triangulum cadet, ac erit eiusdem speciei cum Anguli: si verò ij diversæ sint speciei, extra cadet, & Anguli Externi speciem servabit.*

In Triangulo ABC. cadat Perpendicularis AD. alteri Angulorum Acutorum opposita, sitque B. ergo quia AD. latus est Anguli Recti, eiusdem speciei erit cum Angulo ABC. qui minor est Quadrante, §. 19. Ergo in Rectangulo ADC. Angulus C. oppositus lateri DA. erit Acutus (§. 19.) Ergo AD. opponitur Angulo Interno Acuto BCA. & non Externo Obtuso ACP. & cadit intra Triangulum, & est AD. minor Quadrante, vt B. & C. In Triangulo RMO. si Anguli M. O. sint Obtusi, erit RG. opposita M. maiori Quadrante: ergo etiam opponitur Angulo Obtuso O. itaque cadit inter O. & M. §. 19. In Triãgulo ROZ. Perpẽdicularis RV. opponitur Angulo Acuto ROZ. & ita minor est Quadrante, §. 19. Ergo opponitur Angulo Externo Acuto RZV. & non Interno Obtuso RZO. §. 19. ergo extra cadit. E contra Perpendicularis RG. quæ opponitur Angulo Externo Obtuso ROG. erit Quadrante maior.

24 *In Obliquangulo inæquales Angulos ad basim habenti, si Acuti extiterint, maius segmentum basis, vel Anguli Verticalis, contermínum erit maiori lateri, & è contra si Anguli fuerint Obtusi.*

In Triangulo YRZ. perpendicularis RV. incidit in basim YVZ. ergo quia latus RZ. maius supponitur, longius à Perpendiculo distabit (§. 10.) ergo Segmentum ZV. maius est Segmento YV. & Angulus ZRV. maior quàm VRY. (§. 10.) Viceversa in Triangulo MRO. in quo Anguli ad M. O. Obtusi sunt, si à Semicirculis æqualibus ZRM. YRO. auferantur Segmenta inæqualia ZR. YR. inæqualia manebunt RO. RM. eritque RM. minus quàm RO. igitur Angulus MRG. æqualis VRZ. maior est quam Angulus GRO. æqualis VRY. Segmentum verò MG. æquale VZ. maius est quam GO. æquale YV.

25 *In Obliquangulo duos Angulos Acutos habenti, latus minori oppositum minus est Quadrante; si verò duos Angulos Obtusos habuerit, latus maiori subtensum maius est Quadrãte.*

In Obliquangulo RYZ. duo Anguli ad Y. Z. Acuti sunt, & Y. maior Z. ergo RZ. maius est RY. (§. 10.) igitur perpendicularis RV. facit Angulum YRV. minorem ZRV. (§. 24.) cum autem YRZ. minor sit duobus Rectis, existet YRV. Acutus recto minor: ergo quia in Rectan-

gulo *RVY*. Anguli *YRV*. *VYR*. eiusdem speciei sunt Acuti, erit Hypothenusa *RY*. Quadrante minor (§. 20.) igitur latus *YR*. minori Angulo *RZV*. oppositum Quadrante minus est. Viceversa in Triangulo *MRO*. quod Angulos ad M. O. habet Obtusos, latus maius *RO*. maius Quadrante existet, est enim complementum lateris *YR*. Quadrante minoris.

26 *In Triangulo Acutangulo vnumquodque latus singillatim Quadrante minus est.*

In Triangulo ABC. perpendicularis AD. intra cadit, cum Anguli ad B. & C. Acuti sint (§. 23.) ergo quia BAC etiam est Acutus, erit DAC. Acutus: igitur in Rectãgulo ADC. cum Anguli CAD. DCA. eiusdem speciei sint; Hypothenusa AC. Quadrante minor erit. Idem demonstrabitur de AB. si verò Perpendicularis à puncto C. ad BA. procedat, ostendentur quoque CA. CB. Quadrante minora: igitur vnumquodque latus Quadrante minus est.

27 *In Obtusangulo si tria latera Quadrante maiora existant, tres Anguli Obtusi erunt, non verò è contra.*

In Triangulo *RMO*. tria latera *MR*. *RO*. *OM*. Quadrante maiora sunt: ergo in tribus Polis A. B. C. Triangulum ABC. constituitur, cuius Anguli complementa sunt laterum primi (§. 15.) ergo Triangulum ABC. Acutangulum est: igitur eius latera AB. BC. CD. Quadrante minora existunt (§. 26.) ergo illorum complementa quæ sunt Anguli ad *R*. M. O. (§. 15.) Quadrante maiora sunt, atque adeò Anguli Obtusi existunt. Non è contra, tria enim latera Quadrante minora vnum Angulum Obtusum habere possunt: ergo Polorum Triangulum tres Angulos Obtusos habebit, latus verò Quadrante minus, quia ex complementis conflatur. (§. 15.)

CA-

CAPVT QVARTVM.

DEMONSTRATIONES AD TRIANGVLA Sphærica Rectangula.

28 PEculiaris laterum, & Angulorum vnius Trianguli solutio in partium proportione nititur, qua demonstrata ad harũ cognitionem facilè ad modum pervenitur. Claritati consulens Rectanguli proportionem hoc 4. capite ostendam, in 5. verò Obliquanguli, & in 6. privatam trium laterum, vel Angulorum rationem demonstrabo. In Triangulis Rectangulis latus Angulo Recto subtensum Hypothenusa est, ex lateribus Angulum Rectum includentibus alterum basis est, alterum Perpendiculum. Basis est latus, quod cum Hypothenusa Angulum vnum complectitur, latus verò oppositum illi Angulo Perpendiculum erit: vndè quodlibet est basis respectu Anguli contermini, & Perpendiculum respectu oppositi.

29 PROPOSITIO I.

In Triangulis Rectangulis eundem Angulum Acutum ad basim habentibus, Hypothenusarum Sinus, Perpendicularium Sinibus proportionales sunt. Fig. 2.

Sit NCOA. Sphæræ octava pars, eius centrum A. & NE. CO. ON. Quadrantes ad Angulos Rectos, eritque N. Polus OC. & C. Polus NO. & O. Polus NC. concipiantur ex Polis N. & O. quilibet alij Quadrantes NG. OR. se adinvicem Secantes in I. & cum Anguli OCN. NGO. Recti sint (§§. 6.) erunt duo Triangula RCO. IGO. Rectangula eundem Angulum Acutum IOG. ROC. ad bases habentia. Ex puncto R. cadat Recta RB. Perpendicularis ad communem Sectionem AC. eritque Sinus Arcus RC. & Perpendicularis ad planum AOC. (23. P.) Perpendicularis IH. ad communem

Sectionem AG. Sinus erit Arcus I G. & in plano ORA. est RA. Radius, & Sinus Quadrantis OR. tùm I P. Perpendicularis ad communem Sectionem OA. Sinus est Arcus OI. Dico Sinus Hypothenusarum OR. OI. proportionales esse Sinibus Perpendiculorum RC. IG. hoc est Rectam AR. esse ad P I. vt Recta RB. ad I H.

30 *Demonstratio.* RB. I H. quia Perpendiculares sunt ad planum AOC. parallelæ erunt (2.l.11.) tùm RA. I P. cum eodem plano AOR. sint, & Perpendiculares ad OA. parallelæ quoque erunt inter se (2.l.1.) ergo Anguli ARB. PIH. ex Rectis parallelis compositi, paralleli erunt, & æquales (3.l.11.) & quia Anguli RBA. IH P. Recti æquales sunt, erunt RAB. I PH. etiam æquales, (3.l.1.) & Triangula ARB. P I H. Æquiangula: ergo latera proportionalia sunt. (2.l.6.)

		Proportio.	
Vt	AR.	*Sinus Hypothenusæ.*	OR.
ad	RB.	*Sinum Perpendiculi.*	RC.
ita	PI.	*Sinus Hypothenusæ.*	OI.
ad	IH.	*Sinum Perpendiculi.*	IG.

Ergo etiam alternando, & invertendo, &c.

31 PROPOSITIO II.

In ijsdem Triangulis Sinus basium proportionales sunt Tangentibus Perpendiculorum. Fig. 2.

In planis ANC. ANG. sint CE. GL. Perpendiculares in Radios AC. AG. & erit CE. Tangens Perpendiculi RC. & GL. Tangens Perpendiculi I G. (l.1.§.12.) quia autem IH. LG. in eodē insunt plano, & Perpendiculares sunt ad GA. erunt ad invicem parallelæ (2.l.1.) vti etiam RB. EC. ergo CE. GL. parallelæ sunt (2.l.11.) ducta verò GF. Perpendiculari ad OA. erunt CA. GF. parallelæ (2.l.1.) & CA. Sinus Quadrantis OC. & GF. Si-

Sinus Arcus OG. (l.1.§.11.) & cum Anguli ACE. FGL Recti æquales sint, & paralleli, erunt quoque plana FGL ACE. parallela; quia autem secantur plano ORA. communes Sectiones AE. FL. parallelæ sunt, & insuper Anguli ad A.F. & E.L. paralleli æquales, quæ omnia constāt ex (3.l.11.) ergo Triangula ACE. FGL. Æquiangula sunt, vt anteà, & illorum Homologa latera proportionalia. (2.l.6.)

32

		Proportio.	
Vt	AC.	*Sinus Basis.*	OC.
ad	CE.	*Tangentem Perpendiculi.*	RC.
ita	FG.	*Sinus Basis.*	OG.
ad	GL.	*Tangentem Perpendiculi.*	IG.

Ergo alternando quoque, & invertendo, &c. (4.l.5.)

CAPVT QVINTVM.

DEMONSTRATIONES AD TRIANGVLA Sphærica Obliquangula.

33 DEmonstrationes sequentes Obliquangulorum solutioni inserviunt, quando duo latera, & vnum Angulum nota dantur, vel è contra. Præcedentibus nituntur, & illarum sunt Consectaria.

34 PROPOSITIO I.

In quolibet Triangulo Sinus laterum proportionales sunt Sinibus Angulorum oppositorum. Fig. 1.

Sit Triangulum A B C. productis lateribus B A Q. CAS. BCP. CBN. vsque ad Quadrantem, erit Q P. mensura Anguli B. & NS. Anguli C. Dico Sinum B A. ad Sinum Anguli oppositi C. qui est NS. ita se habere, vt Sinus AC. ad Sinum B. qui est Q P. Ex Angulo A. cadat Perpendiculum AD. Triangula Rectangula CSN. CAD. Angulum ACB. communem habent, & Triangu-

la BQP. BAD. communem quoque habent Angulum ABC. ergo Sinus Hypothenusarum proportionales sunt Sinibus Perpendiculorum, §. 29.

35

Proportio 1.	*Proportio 2.*
vt CS. *Sinus totus, qui est BQ.*	BQ. *Sinus totus, qui est CS.*
ad SN. *Sinum ACB.*	QP. *Sinum ABC.*
ita CA. *Sinus lateris.*	BA. *Sinus lateris.*
ad AD. *Sinum Perpendiculi.*	AD. *Sinum Perpendiculi.*

Rectangulum sub medijs æquatur Rectangulo sub extremis (1.l.6.) extrema verò sunt eadem in duabus proportionibus: ergo Rectangulum SN. CA. æquale est Rectangulo sub Sinu toto, & Perpendiculo AD. Rursus Rectangulum QP. BA. æquale est Rectangulo sub Sinu toto, & Perpendiculo AD. igitur Rectangulum sub medijs SN. CA. æquatur Rectangulo sub alijs medijs QP. BA. ergo latera reciprocè proportionalia sunt (1.l.6.) vt Sinus SN. ad Sinum QP. ita Sinus BA. ad Sinum CA. & alternando, vt Sinus SN. Anguli C. ad Sinum lateris eius oppositi BA. ita Sinus QP. Anguli B. ad Sinum sui lateris oppositi AC.

36 PROPOSITIO II.

In quocumque Triangulo ſ. ab vno Angulo Perpendiculum cadat, efficiet cum lateribus duos Angulos Verticales, & eorum Sinus 1. Sinibus 2. Angulorum ad baſim proportionales erunt.

Fig. 1.

In Triangulo ABC. Perpendiculum est AD. Anguli verò Verticales BAD. DAC. quorum mensuræ HG. GI. & ablato GO. à Quadrantibus æqualibus HO. GF. remanet FO. æqualis GH. & insuper EM. æqualis GI. item OP. complementum est PQ. mensuræ ABC. & MN. complementum NS. mensuræ ACB. ergo in Rectangulis ENM. FPO. quibus Anguli ad N. P. Recti sunt, & æquales Acuti E. F. (§. 7.) Sinus Hypothenusarum, Perpendiculorum Sinibus proportionales existent. §. 29.

Pro-

Proportio.

Vt *Sinus EM. quod est GI. vel CAD. Verticalis.*
ad *Sinum MN. qui est 2. NS. vel ACB. ad Baſim.*
ita *Sinus FO. qui est GH. vel BAD. Verticalis.*
ad *Sinum OP. qui est 2. PQ. vel ABC. ad Baſim.*

PROPOSITIO III.

Item sunt proportionales Sinus 2. Angulorum Verticalium Tangentibus ſecundis laterum. Fig. 1.

In eodem Triangulo ABC. est FI. complementum IG. mensuræ CAD. & IC. complementum CA. & EH. Arcus HG. mensuræ Anguli BAD. & HB. Arcus BA. ergo ex §. 31. Sinus baſium proportionales sunt Tangentibus Perpendiculorum, cum Anguli ad E. F. ijdem sint §. 7.

Proportio ex §. 31.

Vt *Sinus FI. qui 2. est IG. vel CAD. Anguli Verticalis.*
ad *Tangentem IC. quæ 2. est lateris CA.*
ita *Sinus EH. qui 2. est HG. vel BAD. Ang. Verticalis*
ad *Tangentem HB. quæ 2. est lateris BA.*
& proportionales sunt etiam alternando, invertendo, &c.

38 PROPOSITIO IV.

Sinus 2. laterum proportionales ſunt Sinibus 2. Segmentorum, qvæ à Perpendiculo in baſi fiunt. Fig. 1.

In eodem Triangulo ABC. baſis Segmenta sunt BD. CD. ſiquidem perpetuò ſumuntur ab Angulo baſis, vſque ad Perpendiculum, licèt hoc cadat extra. Deinde EB. complementũ est BD. & HB. ipſius BA. rursus FC. complemennũ est CD. & IC. ipſius CA. Anguli verò ad I. H. Recti, & ad F. E. ijdem, vel æquales (§. 7.) ergo ex §. 29. proportionales sunt Sinus Hypothenusarum Sinibus Perpendiculorum in Rectangulis EBH. FCI.

Proportio §.29.

Vt *Sinus EB. qui est 2. Segmenti.* BD.
ad *Sinum BH. qui est 2. lateris.* BA.
ita *Sinus FC. qui est 2. Segmenti.* CD.
ad *Sinum CI. qui est 2. lateris.* CA.
Itemq; proportionales sunt alternando, invertendo, &c.

39 PROPOSITIO V.

Sinus 1. Segmentorum proportionales existunt Tangentibus 2. Angulorum ipsis conterminorum ad basim. Fig. 1.

In ipsomet Triangulo ABC. subducto DP. ex Quadrantibus BP. DF. relinquitur FP. æqualis Segmento BD. & EN. Segmento DC. atque OP. complementum est PQ. mensuræ ABC. & MN. complemẽtum NS. mensuræ ACB. Anguli ad N. P. Recti sunt (§. 6.) & E. F. æquales, vel ijdem (§. 7.) ergo in Rectangulis ENM. FPO. proportionales sunt Sinus basium Tangentibus Perpendiculorum, ex §. 31.

Proportio §. 31.

Vt *Sinus FP. qui est Segmentum* BD.
ad *Tangentem PO. quæ est 2. QP. vel Ang.* ABD.
ita *Sinus EN. qui est Segmentum* DC.
ad *Tangentem NM. quæ est 2. NS. vel Ang.* ACB.
Atque etiam proportionales sunt alternando, invertendo, &c.

40 PROPOSITIO VI.

Tangentes Angulorum Verticalium proportionales sunt Tangentibus Segmentorum basis. Fig. 1.

Per §. 31. Sinus AG. ad Sinũ AD. est vt Tangens GH. ad Tangentem DB. & vt Sinus AG. ad Sinum AD. ita etiam Tangens GI. ad Tangentem DC. ergo proportionales quoque erunt ex. (1. l. 5.)

GH. *Tangens* BAD.
BD. *Tangens Segmenti.*
GI. *Tangens* CAD.
DC. *Tangens Segmenti.*
Ergo etiam alternando, & invertendo, &c. CA-

CAPVT SEXTVM.

DEMONSTRATIO AD TRIA LATERA, vel tres Angulos.

41 PROPOSITIO I.

Sinus Semisummæ, & Semidifferentiæ quorumlibet duorum Arcuum, medij proportionales sunt inter Radium, & Semidifferentiam Sinuum Versorum eorundem. Fig. 3.

In circulo ZHF. sint Arcus EP. PC. & EC. duorum summa: & sumpta PY. æquali EP. erit CY. differentia *EP. PC.* Radius *XP.* Perpendicularis est EY. (2. l. 3.) & *BP.* Sinus Versus Arcus *EP.* cumque CR. Perpendicularis sit *XP.* etit *PR.* Sinus Versus *PC.* & BR. vel CT. ipsi parallela erit differentia Sinuum Versorum *BP. PR.* quia autem XO. Perpendicularis est EC. eam bifariam secabit in O. ac pariter Arcum EC. (2. l. 3.) Angulus verò EXO. erit Semisumma Arcuum *EP. PC.* & EO. Sinus Semisummæ (l. 1. §. 8.) atque XK. Perpendicularis CY. Semisummam bifariam secabit, eritq; CK. Sinus Semidifferentiæ CY. dico EO. & CK. medios esse inter EX. CL.

42 *Demonstr.* Anguli EXO. EYC. æquales sunt, vt pote semisses Arcus *EPC.* (3. l. 3.) quia verò CO. semisis est CE. vti CK. semisis CY. erunt EY. OK. parallelæ, (2. l. 6.) atque CL. semisis CT. & Angulus OKC. æqualis EYC. & EXO. (2. l. 1.) porrò Anguli EOX. CLK. Recti sunt: ergo Triãgula XEO. KCL. Æquiangula sunt (3. l. 1.) & latera Homologa proportionalia. (2. l. 6.)

Proportio.

Vt EX. *Radius.*
ad EO. *Sinum Semisummæ EP. PC.*
ita CK. *Sinus Semidifferentiæ inter EP. PC.*
ad CL. *Semidifferentiam Sinuum Versorum BP. PR.*

Consect. Cuiusvis Trianguli ECY. circulo inscripti laterum dimidia OC. CK. media sunt inter EX. Radium, & CL. dimidium perpendiculi CT.

43 PROPOSITIO II.

In quovis Triangulo Sphærico proportionales sunt.

Rectangulum Sinuum laterum.
ad *Quadratum Radij.*
vt *Differentia Sinuum Versorum Basis, & differentia laterum.*
ad *Sinum Versum Anguli Verticalis.*

Sit in *Fig.* 3. Triangulum SZP. in superficie Sphæræ ZHD. Assumantur PE. PY. æquales Basi PS. sitque ZC. æqualis lateri ZS. & erit PC. differentia laterum ZS. ZP. eius verò Sinus Rectus CR. Sinus autem Versus RP. cõnexa EY. secabitur bifariam in B. (2. l. 3.) atque est BP. Sinus Versus Basis PS. vel PE. & BR. differentia Sinuum Versorum BP. RP. cuius semisis CL. vt anteà: at PV. CI. Sinus sunt laterũ ZP. ZC. & continuato Arcu ZSG. est HG. Sinus Versus Anguli Verticalis SZC. existente Radio XH. & CS. Sinus Versus eiusdem Anguli existente Radio CI.

Demonstratio. VPX. XAI. similia sunt, item SAB. SCT. (2. l. 6.) & insuper IAX. SAB. quia Angulus SAB. communis est; Anguli verò ad B. I. Recti: ergo ASB. AXI. Æquiangula sunt (3. l. 1.) ergo vniversa quatuor Triangula SAB. SCT. VPX. IAX. similia sunt inter se, (4. l. 6.) & latera proportionalia. (2. l. 6.)

Vt	CT.	*Chordæ quoque, & Sinus*	*Sinus Versus*	CS.
ad	CS.	*eiusdem Anguli in diver-*	*Sinus Versus*	HG.
ita	PV.	*sis circulis, proportionales*	*Radius*	CI.
ad	PX.	*sunt Radis* (5. l. 6.) *ergo.*	*Radius*	XI.

Quia

Quia verò Rectangula rationem habent compositam ex lateribus (1. l. 6.) quæ ex lateribus proportionalibus constant, erunt etiam proportionalia, atque adeò proportionalia sunt sequentia.

Rum	CT. CS.	*Et quia CT. CS. & CS.*	Rum	CT. CS.
Rum	CS. HG.	*HG. eandem habent al-*	Rum	CS. HG.
Rum	PV. CI.	*titudinem CS. erunt in-*	*Basis*	CT.
Rum	PX. XH	*ter se vt Bases.* (1. l. 6.)	*Basis*	HG.

Ergo per 1. l. 5. erunt etiam proportionales.

Rum *Sinuum PV. CI. laterum ZP. ZC.*
Rum *vel Quadratum Radiorum æqualium PX. XH.*
CT. Differentia Sinuum Vers. Basis, & differentiæ laterum.
HG. Sinus Versus Anguli Verticalis SZP.

44 PROPOSITIO III.

In quovis Triangulo Sphærico Sinus vnius lateris ad Sequentem 2. alterius est, vt differentia Sinuum Versorum Basis, & differentiæ laterum ad Sinum Versum Anguli Verticalis.

Sit Y. Secãs 2. lateris ZC. quia Rum *PV CI.* ad Qum XH est in ratione composita PV. ad XH. & CI. ad XH. (1. l. 6) vel XH. ad Y. (*f.* 21. l. 1.) Ergo Rum *PV. CI.* ad Qum XH. est vt *PV.* ad Y. sed Rum *PV. CI.* ad Qum XH. est vt CT. ad HG. (*f.* 43.) Ergo vt *PV.* ad Y. ita CT. ad HG. quod &c.

45 PROPOSITIO IV.

In quolibet Triangulo Sphærico proportionalia sunt.

1. *Rectangulum ex Sinibus laterum includentium Angulum.*
2. *Ad Quadratum Radij.*
3. *Vt Rectangulum sub Sinibus semisummæ, & semidifferentiæ Basis, & differentiæ laterum.*
4. *Ad Quadratum Sinus Semianguli Verticalis.*

In

In eadem *Fig.* 3. & Triangulo SZP. concipiantur omnia, quæ anteà, & quia PC. est differentia laterum, & PE. PY. æquales existunt Basi PS. erit EC. summa Basis, & differentiæ laterum, & EO. Sinus Semisummæ: CY. verò differentia Basis PY. & differentiæ laterum PC. tum CK. Sinus Semidifferentiæ 2. Consideretur modò Semicirculus F D H. perpendicularis ad planum F Z H. & sumpta H D. mensura Anguli P Z S. perpendicularis D G. quæ determinat Sinum Versum G H. cadet in G. quare signum G duo refert puncta, alterum in plano, alterum verò in superficie Sphęræ, quod est ipsum D. idem dico de puncto S. iuncta D H. chorda Arcus D H. vel Anguli S Z P. bifariam secabitur à perpendiculari X M. (2. l. 3.) & M H. Sinus erit Semianguli S Z P. ex lib. 1. §. 17. insistat verò M N. ad Angulos Rectos Radio X H. erit H N. semisis H G. veluti H M. rectæ H D. (2. l. 6.) quibus suppositis.

46 *Demonstratio.* Vt C T. ad H G. ita illarum semisses C L. ad H N. (5. l. 5.) ergo quia Rectangulum sub P V. C I. ad Rectangulũ sub P X. H X. est, vt C T. ad H G. ex §. 43. & Rectangulum sub C L. H X. est ad Rectangulum sub H N. H X. cum sint sub eadem altitudine, vt Basis C L. ad H N. (1. l. 6.) hoc est vt C T. ad H G. erunt quoq; Rectangula inter se proportionalia. (1. l. 5.)

Rum P V. C I.	Quia verò Sinus O C. C K. laterum,
ad *Qum P X. H X.*	medij sunt inter Radium H X. & C L.
vt *Rum C L. H X.*	Semidifferentiam Sinuum Versorum
ad *Rum H N. H X.*	(§. 41.) Rectangulũ O C. C K. æquabitur Rectangulo sub C L. H X. (1. l. 6.) Rursus in Triangulo Rectangulo X M H. est H M. media inter H N. H X. (3. l. 6.) & Quadratum H M. æquale Rectãgulo H N. H X. (1. l. 6.) ergo in proportione antecedenti si in locum Rectangulorum sub C L. H X. & sub H N. H X. substituamus ipsis æqualia videlicèt Rectangulum sub O C. C K. & Quadratum H M. erunt quoque proportionalia. (1. l. 5.)

Pro-

Proportio vltima.

Rum P V. C I. Sinuum laterum Z P. Z C.
ad Qum P X. H X. Radij, vel Radiorum æqualium.
Rum O C. C K. Sinuum Semisummæ, & Semidifferentiæ 2.
ad Qum H M. H M. Sinus Semianguli Verticalis S Z P.

CAPVT SEPTIMVM.

DEMONSTRATIONES SINGVLARES AD Triangula Sphærica.

47 THeoremata sequentia Triangulis Sphæricis resolvendis necessaria non sunt, cũ sufficiant Theoremata, capitum 4. 5. & 6. Illa tamen prætermittere nolui, studiosus enim varietate oblectatur. Habent nonulla specialem convenientiam in privatos casus, alia verò operationes faciliores reddunt, vel saltem Mathematicarum fœcunditatem cõfirmant, quæ per tot media diversa metam destinatam attingunt.

48 PROPOSITIO I.

Summa Tangentium primarum, vel secundarum duorum Arcuum Quadrante minorum, ita se habet ad differentiam earundem, vt Sinus summæ Arcuum ad Sinum differentiæ eorundem. Summa verò primarum ad summam secundarum, vt ad differentiæ. Fig. 4.

Sint Arcus G C. G B. illorum differentia C B. sit F G H. perpendicularis ad Radium A G. & G R. æqualis G B. erit R C. summa Arcuum B G. G C. & G D. Tangens G C. & G H. G F. Tangentes Arcuum æqualium G B. G R. ergo H D. est summa Tangentium Arcuum R G. G C. & D F. differentia Tangentiũ G C. G B. & Anguli ad F. H. æquales (5. l. 1.) in Triangulo A D H. latera Sinibus Angulorũ oppositorum proportionalia sunt. (ex lib. 2. §. 10.)

Del P. I. Zaragosà. *Pro-*

49

Propertio 1.			*Proportio 2.*
Latus AD.	*Etiam in Triangulo*		*Latus* AD.
Sinus H.	*ADF. proportio-*		*Sinus* F. *vel* H.
Latus DH.	*nales sunt.*		*Latus* DF.
Sinus HAD.			*Sinus* DAF.

Ergo (1.l.5.) adinvicem quoque proportionales sunt.

Proportio vltima.

Latus DH. *summa Tangentium*	GD.	GH.
Sinus HAD. *summa Arcuum*	GC.	GR.
Latus DF. *differentia Tangentium*	GF.	GD.
Sinus DAF. *differentia Arcuum.*	GC.	GB.

Proportionales etiam sunt alternando, & invertêdo, &c.

Idem demonstratur de Tangentibus 2. collatis cum summa, & differentia complementorum: ergo quia summa complementorum eundem Sinum habet, quem summa Arcuum, cum illorum complementa sint ad Semicirculum, & differentia eadem. (l.1. §.16.) Idem concludetur de Tangentibus 2. quoad summam, & differentiam Arcuum, itemque quoad 1.

50 PROPOSITIO II.

Si Tangentes secundæ, vel primæ laterum Trianguli Sphærici æqualem Angulum comprehendant; Recta Perpendicularis Angulos Verticales efficiet æquales Angulis Perpendiculi Sphærici. Fig. 5.

Sit Triangulum Sphæricum BAC. & EF. Tangens 2. AC. & EG. Tangens 2. AB. Angulus verò FEG. æquales BAC. sit EO. perpendicularis, & AD. perpendiculum Sphæricum: Dico Angulos FEO. OEG. æquales esse BAD. DAC. Anguli enim ad O. Recti sunt; Angulus verò ad F. complementum FEO. & ad G. complementum OEG. (3.l.1.) & per 3. prop. §. 37. proportionales sunt.

Pro-

Proportio 1.		*Proportio 2.*
Tangens 2. BA.	& per l.	*Latus* EG. *Tangens 2.* BA.
Tangens 2. AC.	2. §.10.	*Latus* EF. *Tangens 2.* AC.
Sinus 2. BAD.		*Sinus* F. *qui est 2.* FEO.
Sinus 2. DAC.		*Sinus* G. *qui est 2.* OEG.

Ergo existentibus æqualibus Angulis FEG. BAC. æquales quoque sunt FEO. BAD. & OEG. DAC. idem demonstrabitur de Tangentibus 1. cum reciprocæ sunt 2. per lib. 1. §. 27.

51 PROPOSITIO III.

In quocumque Triangulo Sphærico, cuius latera sunt eiusdem speciei, Sinus summæ laterum, ita se habet ad Sinum differentiæ eorundem, vt Tangens 2. Semianguli Verticalis ad Tangentem 1. Semidifferentiæ Angulorum Verticalium, qui à perpendiculo fiunt. Fig. 5.

In ijsdem Triangulis BAC. FEG. proportionales sunt.

Proportio 1. per lib. 2. §. 11.	*Proportio 2. §. 48.*
Summa EF. EG. *Tang. 2.* AC. AB.	*Summa Tang. 2.* AC. AB.
Differentia earundem.	*Differentia earundem.*
Tangens semissis summæ F. & G.	*Sinus summæ* AC. AB.
Tangens semissis differentiæ F. & G	*Sinus eorum differentiæ.*

Ergo proportionales quoque sunt. (1.l.5.)

Sinus summæ Arcuum	AC. AB.
Sinus differentiæ	AC. AB.
Tangens $\frac{1}{2}$. *summæ* F. & G. *quæ est 2.* $\frac{1}{2}$. FEG. *vel* $\frac{1}{2}$. BAC.	
Tangens $\frac{1}{2}$. *differentiæ* F. & G. *quæ eadem est quam* FEO. & OEG. (l.1.§.16.) *vel* BAD. DAC. *per 2. prop.* §. 50.	

52 PROPOSITIO IV.

In quolibet Triangulo Sphærico, cuius Anguli suprà Basim sunt eiusdem speciei, Sinus summæ Angulorum, ad Sinum differentiæ eorundem, est vt Tangens Semibasis ad Tangentem Semidifferentiæ Segmentorum. Fig. 1.

Quia in Polis Trianguli ABC. fit RMO. in quo omnia sunt alterius complementa (§. 14.) sed ex §. 51. proportionales sunt, vt Sinus summæ laterum MR. RP. vel summæ Angulorum C. & B. ad differentiam eorundem; ita Tangens 2. Semianguli NRP. vel NDP. hoc est Tangens 1. Semibasis BC. ad Tangentē Semidifferentiæ Angulorum NRD. DRP. vel Arcuum ND. DP. hoc est BD. DC. Ergo constat propositum, quod, &c.

53 PROPOSITIO V.

Datis tribus lateribus Trianguli Sphærici, vnum latus, & Basim habentis Quadrante minora, datur aliud Triangulum Planum cum æquali Angulo Basi opposito. Fig. 6.

Sit Triangulo ABC. Angulus A. latus AB. & Basis opposita BC. & sint Arcus AB. BC. Quadrante minores, productis AB. AC. eò vsque secentur Semicirculi in D. erit AD. communis Sectio, & cōcepto plano AHZ perpendiculari communi Sectioni AD. erit AHZ. perpendiculare planis circulorum DCA. ABD. (3. l. 11.) & AH. AZ. illorum communes Sectiones perpendiculares DA. & Angulus ZAH. planorum inclinatio est (23. P.) ergo æqualis BAC. (§. 4.) ex puncto B. tanquam Polo, Arcu BC. describatur Semicirculus FCE. & quia DBA. transit per eius Polum, erit ipsi perpendicularis (§. 6.) Arcus AE. est summa laterum AB. & Basis BC. & AG. illorum differentia; ductis DEH. DFG. in

in plano DEHA. & DCZ. in plano DCZA. connectantur AE. FE.

Demonstratio. Cum AE. perpendicularis sit DH. (3. l. 3.) Anguli DAE. DHA. æquales erunt (3. l. 6.) DAF. DFE. æquales sunt; insistūt enim eidē Arcui DE. (3. l. 3.) ergo DFE. DHG. æquantur, cum verò GDH. communis sit, æquales quoque erunt DGH. DEF. (3. l. 1.) diuisa GH. bifariam in X. & descripto Semicirculo GZH. qui plana GZH. FGE. perpendicularia existunt DHG. & Sectiones FE. GH. subcontrariæ, Recta DZ. secabit circulum ECF. in C. vbi secatur à plano DCA. (5. p. l. 1. Apollonis) Angulus ADE. semissis est AE. summæ lateris AB. & Basis BC. (3. l. 3.) & FDA semissis AG. eorundem differentiæ, CAD. verò semissis lateris AC. & quia HA. ZA. perpendiculares sunt Diametro communi AD. erit AH. Tangens Semisummæ, & AG. Tangens Semidifferentiæ, & AZ. Tangens Semilateris AC. & GH. differentia Tangentium, at GX. XZ. XH. Semidifferentia Tangentium, Semidifferentia autem cum parte minori AG. Semisummam AX. conficit (l. 2. §. 12.) ergo in Triangulo Plano cognita sunt tria latera, AZ. Tangens Semilateris maioris; AC. & AX. Semisumma Tangentium Semisummæ, & Semidifferentiæ Basis, & lateris minoris: & demum XZ. Semidifferentia earundem Tangentium; Angulus verò XAZ. æqualis est Sphærico CAB.

ergo constat propositum,

&c.

54 PROPOSITIO VI.

In quocumque Triangulo Spherico habente duo latera Quadrante minora, Tangens Semibasis ita se habet ad Tangentem Semisummæ laterum, vt Tangens Semidifferentiæ laterum ad Tangentem Semidifferentiæ Segmentorum Basis. Fig. 6.

Sit Triangulum ABC. latera AB. BC. Quadrante minora, & AC. Basis: reliqua omnia vt in 5. *prop.* acta Recta DOR. secabit Semicirculum GZH. in R. vbi secatur à communi Sectione AZ. eritque AR. Tangens ADR. semissis differentiæ Segmentorum AO, nam cum BOC. Isosceles sit, perpendiculum BI. secabit æquales IC. OI. (5. 10.) Segmenta Basis sunt AI. IC. quare AO. differentia est Segmentorum, quibus suppositis, Rectæ AH. AZ. circulum GZH. secant: ergo proportionales sunt (6. l. 6.)

Proportio.	
AZ. *Tangens Semibasis*	AC.
AH. *Tangens Semisummæ*	AE.
AG. *Tangens Semidifferentiæ laterum*	AF.
AR. *Tangens Semidifferentiæ Segmentorum*	AO.

Et etiam alternando, & invertendo, &c.

Neperus hac proportione Trigonometriam ditavit.

55 PROPOSITIO VII.

In Triangulo Rectangulo si Hypothenusa, & perpendiculum minores Quadrante existant; Tangens Semibasis media erit inter Tangentes Semisummæ, & Semidifferentiæ Hypothenusæ & perpendiculi. Fig. 6.

Consectarium est antecedentis: perpendiculum enim cadit in extremum Basis, & Basis tota differentia est Segmentorum: ergo vt Tangens Semibasis ad Tangentem Semisummæ Hypothenusæ, & perpendiculi, ita Tangens Semidifferentiæ ad Tangentem Semidifferentiæ Segmentorum, quæ eadem est Semibasis.

CA-

CAPVT OCTAVVM.

RESOLVTIO TRIANGVLI SPHERICI Rectanguli.

56 ANgulus Rectus supponitur perpetuò notus, reliqua verò data, vel quæsita lineola, vel punctis denotantur, vti in Trigonometria Plana. Maioris perspicuitatis gratia, termini Trianguli hunc ordinem servabunt. 1. Hypothenusa. 2. Latus conterminum. 3. Latus oppositum. 4. Angulus conterminus. 5. Angulus oppositus. Datis iuxta ordinem 1. & 2. tùm 1. & 3. &c. exquiruntur quoque secundum ordinem reliqui.

57 In omni proportione disponuntur termini, vt in Trigonometria Plana, & pro primo Logarithmo eius complementum assumitur, trium autem summa multata Radio quartum exhibet. Radius demitur vnitate ad sinistram in additione omissa, vti monuimus *lib. 1. §. 119.* ita vt si omnes tres termini addantur, semper ad sinistram ante punctum characteristicam dividens; provenient duæ litteræ, quarum prima, si futura sit vnitas, non oportet scribi: si verò futura sit 2. apponitur 1. plus enim ascendere nequit, auferre tamen hanc vnitatem, idem est ac demere Radium. Quando Logarithmus sit Tangentis Radio maioris, sumetur complementum vsque ad duplum Radium, & detrehentur 2. ex summa, quod dupli Radij subtractioni æquiualet. Hoc monitum in posterum retinere operæ pretium erit.

58 Omnes resolutiones à *Fig.* 1. promanare debent, & in qualibet duo Triangula constituuntur cum Angulo communi BEH. DEG. latera HB. GD. Angulo communi opposita perpendicula sunt, latera verò inter Angulum communem, & Rectum Bases existunt EH. EG. Arcus oppositi Angulo Recto sunt Hypothe-

nu-

nusæ EB. ED. idem est in Triangulis DEG. CEI. itavt Triangulum alterum, veluti DEG. Hypothenusam, & Basim habeat semper Quadrantes, vti DE. GE. quod principale voco, alterum verò proportionale, sive minus sit veluti EBH. sive maius vt CEI.

59 Quoties in Triangulo proportionali nota est, vel quæsita Hypothenusa, ratio erit Sinus ad Sinum per §. 29. Si verò Hypothenusa in proportione non insit, Basis autem Trianguli proportionalis nota sit, ratio erit Sinus ad Tangentem, at si Basis ignota existat, ratio erit Tangentis ad Sinum per §. 31. & tandem ratio incipere semper debet à Triangulo in quo binæ res cognitæ dantur, Hypothenusa, & Perpendiculum, vel Basis, & Perpendiculum, atque etiam prima sit oportet eiusdem speciei cum tertiino cognito alterius Trianguli.

60 Quatuor sunt Triangula principalia cum suis proportionalibus, primum DEG. BEH. secundum HAG. BAD. tertium QBP. ABD. quartum DRP. ARQ. Si in primo terminos haud reperiam sufficientes resolutioni, transibo ad secundum, vel tertium, vel quartum, in quorum vno offendentur, consideratis lateribus, & mensuris Angulorum cum suis complementis, vt in Triangulo BEH. est BD. complementum EB. & HG. complementum EH. & BA. complementum BH. DG. verò mensura Anguli BEH. & DA. ipsius complementum, &c.

Ista rectius percipientur in ipsa praxi ad solutionem sequentium Problematum adhibita.

PRO-

61 PROBLEMA I.

Data Hypothenusa, & altero latere.

1. *Invenire reliquum latus.*
2. *Angulum conterminum.*
3. *Angulum oppositum.*

I. INVENIRE RELIQVVM LATVS. Fig. 1.

IN Triangulo BEH. datur Hypothenusa EB. 50. *grad.* 20. *m.* & latus HB. 30. *gr.* 25. *min.* inquiritur reliquum latus EH. vel eius complementum HG. quia BD. complementum est Hypothenusæ EB. & BA. complementum perpendiculi BH. in Triangulis ABD. AHG. sufficientes terminos habeo per §. 29. vt Sinus novæ Hypothenusæ AB. ad Sinum Quadrantis AH. ita Sinus perpendiculi BD. ad Sinum perpendiculi HG. ergo respectu habito ad Triangulum EBH. ordinabitur sequens proportio.

Proportio.		*Gradus.*	*Logarithmi.*
AB.	*Sinus 2. perp. BH.*	30.25.*m.*	CL. 0.0643082
AH.	*Sinus totus, vel Radius.*	90.00.*m.*	10.0000000
BD.	*Sin. 2. Hypothenusæ EB.*	50.20.*m.*	9.8050385
HG.	*Sinus 2. Basis EH.*	42.15.*m.*	9.8693467

62 *II. INVENIRE ANGVLVM CONTERMINVM.*

In eodem Triangulo BEH. datis Hypothenusa EB. & latere BH. quæritur Angulus EBH. conterminus lateri BH. eius mensura est PQ. complementum verò QR. & quoniam HA. BQ. ED. BP. Quadrantes existunt; est AQ. æqualis BH. & DP. EB. ergo in Triangulis RPD. RQA. proportionales sunt per §. 31. Sinus Basis RQ. ad Tangentem perpendiculi QA.

vt Sinus totus RP. ad Tangentem PD. & respectu Trianguli EBH. invertendo.

Proportio §.31.		*Gradus.*	*Logarithmi.*
DP. *Tangens Hypoth.*	EB.	50.20.*m.* CL.	9.9184198
AQ. *Tangens Perpend.*	BH.	30.25.*m.*	9.7687029
PR. *Sinus totus, vel Radius.*		90.00.*m.*	10.0000000
QR. *Sinus 2. QP. vel Ang.*	EBH.	60.53.*m.*	9.6871227

Ablatus est numerus binarius 2. ex summa, quia complementum Logarithmicum assumptum est ad duplum Radium, §.57.

III. REPERIRE ANGVLVM OPPOSITVM.

63 In eodem Triangulo EBH. datis EB. BH. quæritur Angulus BEH. lateri BH. oppositus: mensura Anguli est DG. itaque in Triangulis EBH. EDG. proportionem habemus.

Proportio §.29.		*Gradus.*	*Logarithmi.*
Sinus Hypoth.	EB.	50.20.*m.* CL.	0.1136384
Sinus Perpend.	BH.	30.25.*m.*	9.7043947
Sin. totus, vel Rad.	ED.	90. 0.*m.*	10.0000000
Sinus DG. Anguli.	BEH.	41. 7.*m.*	9.8180331

64 Eadem operatio fit quãdo partes datæ Quadrante maiores existunt, habẽt enim eosdem Sinus, & Tangentes, quàm minores, veluti si Triangulum sit BFX. Angulus ad X. Rectus, Hypothenusa BF. 129. 40. latus BX. 149. 35. disponentur termini.

Proportio §.29.		*Gradus.*	*Logarithmi.*
Sinus Hypoth.	BF.	129.40.*m.* CL.	0.1136384
Sinus Perpendiculi.	BX.	149.35.*m.*	9.7043947
Sin. totus, vel Rad.	FD.	90. 0.*m.*	10.0000000
Sinus DV. Anguli.	BFX.	138.53.*m.*	9.8180331

Sumitur Angulus Obtusus, vt latus oppositum, §.19.

PRO-

65 PROBLEMA II.

Data Hypothenusa, & Angulo vno.

1. *Reperire latus conterminum.*
2. *Latus Angulo oppositum.*
3. *Reliquum Angulum.*

I. INVENIRE LATVS CONTERMINVM.

In Triangulo EBH. datur Hypothenusa EB. 65.*m.* 45. & Angulus EBH. 61.*m.* 35. investigatur latus BH. Angulo dato conterminum. In Triangulis RDP. RAQ. cum ED. BP. HA. BQ. Quadrantes existant, erit DP. æqualis Hypothenusæ EB. & AQ. perpendiculo BH. & RQ. complemento QP. mensuræ EBH. ergo per cap. 4. §.31. proportionales sunt. Sinus totus RP. ad Sinum RQ. vt Tengens DP. ad Tangentem AQ. & quoad Triangulum EBH. est.

Proportio §.31.	*Gradus.*	*Logarithmi.*
Sinus totus, vel Rad. RP.	90.00. CL.	0.0000000
Sinus 2. EBH. qui est RQ.	61.35.	9.6774975
Tang. Hypoth. DP. *vel* EB.	63.45.	10.3070250
Tang. lateris AQ *vel* BH.	43.59.	9.9845225

66. *II. INVENIRE LATVS OPPOSITVM.*

In Triangulo BEH. datur Hypothenusa EB. 52. 33. Angulus BEH. 40 58. quæritur latus oppositum BH. in Triãgulis EDG. EDH. invenitur proportio cap. 4. §. 29.

Proportio §.29.	*Gradus.*	*Logarithmi.*
Sinus totus, vel Rad. ED.	90. 0. CL.	0.0000000
Sinus DG. Anguli BEH.	40.58.	9.8166521
Sinus Hypoth. EB.	52.33.	9.8997572
Sinus lateris oppos. BH.	31.22.	9.7164093

67 *III. INVENIRE RELIQVVM ANGVLVM.*

In Triangulo EBH. datis Hypothenusa EB. 63. 45. Angulo EBH. 61. 35. exquiritur reliquus Angulus BEH. proportio invenietur in Triangulis BPQ. BDA.

Proportio §. 31.			*Logarithmi.*
BP. Sinus totus.		90. 0.	CL. 0.0000000
BD. Sinus 2. Hypoth.	*EB.*	63. 45.	9.6457058
PQ. Tangens Anguli	*EBH.*	61. 35.	10.2667433
DA Tang. 2. GD. vel Ang. BEH.		50. 44.	9.9124491

68 PROBLEMA III.

Datis duobus lateribus.

1. *Invenire Hypothenusam.*
2. *Quemlibet Angulum.*

I. REPERIRE HYPOTHENVSAM.

In Triangulo BEH. dantur latus EH. 59. 22. latus verò HB. 33. 44. quæritur Hypothenusa EB. in Triangulis AHG. ABD. invenietur proportio.

Proportio.		*Gradus.*	*Logarithmi.*
AH Sinus totus		90. 00.	CL. 0.0000000
AB. Sinus 2. lateris	*BH.*	33. 44.	9.9199307
HG. Sinus 2. lateris	*EH.*	59. 22.	9.7071801
BD. Sinus 2. Hypoth.	*EB.*	64. 56.	9.6271108

69 *II. INVENIRE QVEMLIBET ANGVLVM.*

Datis ijsdem investigatur Angulus BEH. oppositus BH. ratio reperitur in Triangulis EDG. EBH.

Proportio §. 31.	*Gradus.*	*Logarithmi.*
Sinus EH. lateris conterm.	59. 22.	CL. 0.0652765
Sinus totus EG.	90. 00.	10.0000000
Tangens HB. lateris oppositi	33. 44.	9.8246190
Tangens GD. Ang. HEB.	37. 49.	9.8898955

Pro Angulo EBH. vt Sinus BH. ad Sinum totum, sic Tangens lateris oppositi HE. ad Tangentē Anguli EBH

PRO-

70 PROBLEMA IV.

Dato vno latere, & Angulo contermino.

1. *Invenire Hypothenusam.*
2. *Latus oppositum.*
3. *Reliquum Angulum.*

I. INVENIRE HYPOTHENVSAM.

Latus EH. sit 67. 51. Angulus conterminus BEH. 28. 22. quæritur Hypothenusa EB. reperietur in Triangulis AHG. ABD.

Proportio §. 31.	*Gradus.*	*Logarithmi.*
AG. Sinus totus, vel Radius.	90. 00.	CL. 0.0000000
AD. Sin. 2. GD. vel Ang. BEH.	28. 22.	9.9444457
GH. Tangens 2. lateris EH.	67. 51.	9.6096742
DB. Tangens 2. Hypoth. EB.	70. 18.	9.5541199

71 *II. INVENIRE LATVS OPPOSITVM.*

Datis ijsdem indagatur HB. in Triangulis EGD. EHB.

Proportio §. 31.	*Gradus.*	*Logarithmi.*
EG. Sinus totus	90. 00.	CL. 0.0000000
EH. Sinus lateris conterm.	67. 51.	9.9667047
DG. Tangens Anguli BEH.	28. 22.	9.7323506
HB. Tangens lateris oppositi	26. 34.	9.6990553

72 *III. INVENIRE RELIQVVM ANGVLVM.*

Datis latere HB. 37. 21. Angulo contermino HBE. 72. 25. indagatur reliquus Angulus BEH. in Triangulis BQP. BAD. reperietur proportio, cap. 4. p. 1. §. 29.

Proportio §. 29.	*Gradus.*	*Logarithmi.*
BQ. Sinus totus	90. 00.	CL. 0.0000000
BA. Sinus 2. lateris BH.	37. 21.	9.9003367
QP. Sinus Anguli EBH.	72. 25.	9.9792198
AD. Sin. 2. DG. vel BEH.	40. 44.	9.8795565

73 PROBLEMA V.

Dato vno latere, & Angulo oppoſito.

1. *Invenire Hypothenuſam.*
2. *Reliquum latus.*
3. *Reliquum Angulum.*

I. INVENIRE HYPOTHENVSAM.

In Triangulo EBH. datur Angulus BEH. 32. 54. latus oppoſitum HB. 23. 17. quæritur Hypothenuſa EB. ratio invenietur in Triangulis EDG. EBH. §. 29.

Proportio §. 29.	*Gradus.*		*Logarithmi.*
DG. Sinus Anguli BEH.	32. 54.	CL.	0. 2650607
HB. Sinus lateris dati	23. 17.		9. 5969029
DE. Sinus totus	90. 00.		10. 0000000
BE. Sinus Hypothenuſæ	46. 42.		9. 8619636

74 *II. INVENIRE RELIQVVM LATVS.*

Datis ijſdem inveſtigatur HE. in Triangulis EDG. EBH.

Proportio §. 31.	*Gradus.*		*Logarithmi.*
DG. Tangens Anguli BEH.	32. 54.	CL.	0. 1891435
BH. Tangens lateris oppoſ.	23. 17.		9. 6337940
EG. Sinus totus, vel Radius	90. 00.		10. 0000000
EH. Sinus alterius lateris	41. 42.		9. 8229381

75 *III. INVENIRE RELIQVVM ANGVLVM.*

Datis ijſdem indagatur Angulus EBH. in BQP. BAD.

Proportio §. 29.	*Gradus*		*Logarithmi.*
BA. Sinus 2. lateris BH.	23. 17.	CL.	0. 0368918
BQ. Sinus totus, vel Radius	90. 00.		10. 0000000
AD. Sinus 2. DG. vel BEH.	32. 54.		9. 9240827
QP. Sinus 1. QP. vel EBH.	66. 4.		9. 9609745

PRO-

76 PROBLEMA VI.

Datis duobus Angulis.

1. *Invenire Hypothenuſam.*
2. *Invenire quodlibet latus.*

I. INVENIRE HYPOTHENVSAM.

Datis BEH. & EBH. quæritur EB. in BQP. BAD.

Proportio §. 31.	*Gradus.*		*Logarithmi.*
QP. Tangens Anguli EBH.	60. 18.	CL.	9. 7561718
AD. Tangens 2. Anguli BEH.	45. 30.		9. 9924197
BP. Sinus totus, vel Radius	90. 00.		10. 0000000
BD. Sinus 2. Hypothenuſ. EB.	55. 54.		9. 7485915

Ex quolibet Angulo ſumi poteſt Tangens 1. & ex reliquo 2. vti videre eſt in Triangulis FDG. FPO.

Proportio §. 31.	*Gradus.*		*Logarithmi.*
DG. Tangens 1. Anguli BEH.	45. 30.	CL.	9. 9924197
PO. Tang. 2. PQ. vel Ang. EBH.	60. 18.		9. 7561718
DF. Sinus totus, vel Radius	90. 00.		10. 0000000
PF. Sin. 2. DP. vel Hypoth. EB.	55. 54.		9. 7485915

77 *II. INVENIRE QVODLIBET LATVS.*

Datis ijſdem, quæritur BH. in Triangulis BQP. BAD.

Proportio §. 29.	*Gradus.*		*Logarithmi.*
QP. Sinus Anguli conterm. EBH.	60. 18.	CL.	0. 0611645
AD. Sinus 2. Anguli oppoſiti BEH.	45. 30.		9. 8456618
BQ. Sinus totus, vel Radius	90. 00.		10. 0000000
BA. Sinus 2. lateris BH.	36. 12.		9. 9068263

Et EH. in Triangulis FGD. FOP.

Proportio §. 29.	*Gradus.*		*Logarithmi.*
GD. Sinus Anguli conterm. BEH.	45. 30.	CL.	0. 1467579
OP. Sin. 2. Ang. opp. PQ. vel EBH.	60. 18.		9. 6950074
GF. Sinus totus, vel Radius	90. 00.		10. 0000000
OF. Sinus 2. OG. qui eſt EH.	46. 00.		9. 8417653

PRO-

78 PROBLEMA VII.
De Triangulis Quadrantalibus.

Triangulum Quadrantale est, quod vnum latus Quadrantem habet *gr.* 90. neque Rectangulum est, resolvitur tamen, vt Rectangula commutatis lateribus in Angulos, & Angulis in latera, cum enim in Polis efficiatur aliud, cuius Anguli complementa sunt laterum, latera verò Angulorum, §. 15. prodit Triangulum vnum Rectangulum, & quia complementa ad Semicirculum eosdem Sinus, & Tangentes habent; sufficit latera in Angulos convertere, & Angulos in latera. Sit pro exemplo Triangulum EBA. sitque EB. 55. 54. BA. verò 53. 48. & EA. Quadrans 90. 0. indagatur Angulus EAB. maiori lateri oppositus: permutatis lateribus in Angulos; suppono maius latus exquiri, vti in operatione præcedenti.

Proportio.	*Gradus.*		*Logarithmi.*
Sinus B A. lateris conterm.	53.48.	CL.	0.0931478
Sinus 2. B E. lateris oppos.	55.54.		9.7486833
Radius	90.00.		10.0000000
Sinus 2. Anguli EAB.	46.00.		9.8418311

79 *Observationes generales.*

In efformatione Rectangulorum observetur, in Angulis Acutis duo simul maiores semper esse *gr.* 90. Obtusos verò 180. minores. Vnumquodque latus Angulo Acuto, sibi opposito minus; Obtuso verò opposito maius. Latera sequi speciem Angulorum oppositorum, Hypothenusam minorem Quadrante existere, si Anguli Obliqui eiusdem speciei sint, maiorem tamen si diversæ. Observentur partes, quæ Obtusæ, vel Acutæ prodire debent; maximè in Quadrantalibus, facta commutatione laterum in Angulos, & Angulorum in latera solvantur Quadrantalia per Problema ad quod pertinent, veluti Rectangula.

CA-

CAPVT NONVM.
RESOLVTIO OBLIQVANGVLORVM Sphæricorum.

80 PRoblemata Obliquangula sunt sex, ad tres species revocata.

Species 1. Datis tribus partibus alternis invenire reliquas.
Species 2. Datis duabus partibus alternis cum intermedia.
Species 3. Datis duabus partibus alternis cum vna opposita.

Prima species vnicum habet Problema, secunda duo, tertia verò tria, quæ omnia sex conficiunt. Partes alternas voco, quæ vnam intermediam habent, veluti latera, quæ vnum Angulum habent intermedium; & Anguli, quibus intermedium est vnum latus: quare datæ partes alternæ latera, vel Anguli esse possunt.

SPECIES PRIMA.
PROBLEMA I.
Datis tribus partibus alternis.
Invenire quamlibet partem oppositam.

E. Datis tribus lateribus. Reperire quemlibet Angulum.

81 In Triangulo ABC. notis tribus lateribus, indagatur Angulus BAC. praxis oritur ex §. 45. dispositio eadem quàm *lib.* 1. §. 37. atque optimum præceptum est.

Dispositio practica.	*Gradus.*		*Logarithmi.*
1. *AB. Latus maius includens.*	55. 30.	CL.	0.0840062
2. *AC. Latus minus includens.*	54. 19.	CL.	0.0903085
3. *Differentia laterum.*	1. 11.		
4. *BC. Latus oppositum Angulo*	40. 10.		
5. *Summa* 3. & 4.	41. 21.		
6. *Differentia* 3. & 4.	38. 59.		
7. *Semisumma semissis* 5.	20. 40½.		9.5479125
8. *Semidifferentia semissis* 6.	19. 29½.		9.5233168
9. *Summa* 4. *Logarithmorum.*			19.2455449
10. *Eius semissis Sinus est.*	24. 48½.		9.6227720
11. *Arcus duplus est Ang. BAC.*	49. 37.		

D. Ai-

82 *DATIS TRIBVS ANGVLIS.*

Invenire quodlibet latus.

In Triangulo ABC. notis tribus Angulis ad A. B. C. inveſtigatur latus BC. ſummatur complementum ad Semicirculum quorumlibet duorum Angulorum includentium, in cœteris eodem modo operandum eſt in §. 81.

Diſpoſitio.	*Gradus.*	*Logarithmi.*
1. *Complementum Ang. ACB.*	103.20.	CL. 0.0118671
2. *Angulus conterminus ABC.*	73.33.	CL. 0.0181509
3. *Differentia* 1. & 2.	29.47.	
4. *Angul. CAB. lateri oppoſitus*	49.40.	
5. *Summa* 3. & 4.	79.27	
6. *Differentia* 3. & 4.	19.53.	
7. *Semiſumma, ſemiſsis* 5.	39.43½.	9.8055718
8. *Semidifferentia ſemiſsis* 6.	9.56½.	9.2371551
9. *Summa* 4. *Logarith.*		19.0727443
10. *Eius ſemiſsis eſt Sinus*	20. 6½.	9.5363721
11. *Eius duplum eſt latus BC.*	40.13.	

83 Ratio praxis eſt, quia ſunt proportionalia, §. 45

Rect. Sinuum later.	*AB.* 55. 30.		9.9159933
	AC. 54. 19.		9.9096915
Quadratum Radij			2.0000000
Rectang. Sinuum	*Semiſum.* 20. 40½.		9.5479125
	Semidiff. 19. 29½.		9.5233168
Quadratum Sinus Semianguli			19.2455440

Si ergo Logarithmi 3. 4. 5. in vnam ſummam colligantur, & ab ipſis auferatur Logarithmorum 1. & 2. ſumma: remanebit Logarithmus Quadrati Sinus Semianguli, ex *lib.* 1. §. 118. ergo ex §. 119. Si ſummantur complementa Lo-

Logarithmica 1. & 2. ſumma 1. 2. 3. 4. 5. minus duplo Radio, quia duo complemeta ad Radium ſumpta ſunt, dabit Logarithmum ſextum: cum ergo in praxi præcedenti duplus Radius, qui auferendus erat, ommiſſus ſit, ſumma quatuor priorum dat Logarithmum Quadrati quæſitum: & illius dimidium erit Logarithmus Radicis quadratæ, ex §. 123. *lib.* 1.

84 *ALITER EX NEPERO*, §. 54.

1. *Baſis BC. opp. Ang. A.*	40.10.	*Datis 3. lateribus*
2. *Latus AB.*	55.30.	*AB. AC. CB. quæ.*
3. *Latus AC.*	54.19.	*ritur Angulus B.*
4. *Summa* 2. & 3.	109.49.	
5. *Differentia* 2. & 3.	1.11.	*Logarithmi*
6. *Semiſsis* 1. *Tangent.*	20. 5.	CL. 0.4369721
7. *Semiſsis* 4. *Tangens.*	54.54½.	10.1532960
8. *Semiſsis* 5. *Tangens.*	0.35½.	8.0139699
9. *Semidiffer. Segm. Tang.*	2.18.	8.6042380
10. *Summa* 6. & 9. *eſt BD.*	22.23.	*Segm. maius.*

Tandem in Triangulo ABD. invenietur Ang. ABD. 73.33. ex §. 62. Hæc praxis exigit vt Semiſumma ſit Quadrante minor ex demonſtratis, §. 54.

SPECIES SECVNDA.

PROBLEMA II.

Datis duabus partibus alternis cum intermedia.

Invenire reliquam alternam.

85 Problema iſtud, & inſuper tria ſequentia binas operationes depoſcunt, prima pertinet ad Segmentum Baſis, vel Anguli Verticalis.

In Triangulo BAC. perpendicularis ſemper procidere debet ab vno latere noto AC. in alterum CB. itavt ambo notum Angulũ includant ACB. quo in Rectangulo ACD

præter Angulum Rectum ad D. binæ res innotescant, Hypothenusa AC. & Angulus ACD.

Pro Segmento DC. §. 65.			*Logarithmi.*
Sinus totus.	90.00.	CL.	0.0000000
Sinus 2. Anguli ACD.	76.40.		9.3628892
Tangens lateris AC.	54.19.		10.1437958
Tangens Segment. CD.	17.48.		9.5066850
Pro Angulo CAD. §. 67.			
Sinus totus.	90.00.	CL.	0.0000000
Sinus 2. lateris AC.	54.19.		9.7658956
Tangens Anguli ACB.	76.40.		10.6252430
Tangens 2. Ang. CAD.	22. 7.		10.3911392

Si AC. *gr.* 90. maior extiterit erunt CD. & CAD. 90. maiores, modò Angulus ACD. Acutus sit, minores verò si fuerit Obtusus.

I. DATIS 2. LATERIBVS, ET ANGVLO MEDIO.

86 *Invenire reliquum latus.*

In Triangulo ABC. notis CA. CB. & Angulo ACB. quæritur latus AB. 1. Reperitur CD. per §. 85.

Segm. inventum CD. est	17.48.	*Si Perpendiculū intra cadat auferetur sem per; si verò extra addetur, si Angulus datus sit Obtusus ACB. demetur verò si sit Acutus.*
In Triangul. ABC. est BC.	40.12.	
Differentia CD. BC. est BD.	22.24.	
Segment. inventum CD. est	17.48.	
In Triangulo AbC. est bC.	4.36.	
Summa Cb. CD. est Db.	22.24.	

Ergo invenitur latus AB.

II. Operatio §. 38.			*Logarithmi.*
Sinus 2. Segment. DC.	17.48.	CL.	0.0213040
Sinus 2. Segm. DB. vel Db.	22.24.		9.9659284
Sinus 2. lateris AC.	54.19.		9.7658956
Sinus 2. lateris AB.	55.30.		9.7531280

Latus AB. sequitur speciem Segmenti D*b*. vel BD.

87 *Regulæ ad Perpendiculum spectantes.*

Si Anguli ad B. C. eiusdem speciei sint, cadet intra, si verò diversæ extra, quia autem de specie Angulorū haud semper constat, has regulas servare oportet.

Regula 1. Si Angulus notus ad C. Acutus sit, latera verò *gr.* 90. minora, vel alterum plus, alterum minus, & demittatur perpendiculum in latus maius cadet intra; si tamen latera singula *gr.* 90. maiora existant, cadet in minus extra.

Regula 2. Si Angulus notus ad C. Obtusus sit, latera verò *gr.* 90. minora, vel alterum plus, alterum minus, cadet in maius extra: si autem maiora cadet intra. In *Fig.* 1. reperientur Triangula omnium specierum, cuius meditatio omnibus præceptis erit præstantior.

II. DATIS DVOBVS ANGVLIS, ET LATERE MEDIO.

88 *Invenire reliquum latus.*

In Triangulo ABC. cognitis Angulis CAB. BCA. & latere AC. investigatur ABC. 1. Reperietur Angulus CAD. §. 85.

Angulus CAD. inventus est	22. 7.	*Si Perpendiculum cadat intra, demetur sem per; si verò extra addetur, si tamen Angulus datus ACb. Obtusus existat: auferetur verò, si Acutus sit.*
In Triāg. BAC. est Ang. BAC	49.40.	
Diff. BAC. CAD. est DAB.	27.33.	
Angulus inventus CAD. est	22. 7.	
In Triang. CAb. est Ang. CAb.	5.26.	
Summa CAb. CAD. est DAb.	27.33.	

Ergo invenietur Angulus ABC.

II. Operatio §. 36.	*Gradus.*		*Logarithmi.*
Sinus Segmenti CAD.	22.07.	CL.	0.4242422
Sinus Segm. bAD. vel BAD.	27.33.		9.6651328
Sinus 2. Ang. ACB. vel ACb.	76.40.		9.3628892
Sinus 2. Ang. ABC. vel AbC.	73.33.		9.4522642

Angulus ABC. sequitur speciem BAD.

PROBLEMA III.

Datis duabus partibus alternis cum intermedia.

Invenire quamlibet oppositarum.

I. DATIS 2. LATERIBVS, ET ANGVLO MEDIO.

89 *Invenire quemlibet Angulorum.*

Perpendicularis cadit ab Angulo ignoto, qui non quæritur, CA. CB. & BCA. datæ sunt, investigatur Angulus ABC. 1. Reperietur Segmentum CD. per §. 85. & est 17. 48.

Segmentum CD. inventum est	17. 48.	*Additio, vel*
In Triang. ABC. est latus BC.	40. 12.	*subtractio fit*
Different. CD. BC. est BD.	22. 24.	*vti in §. 86.*
In Triangulo AbC. latus Cb.	4. 36.	
Summa CD. Cb. est Db,	22. 24.	

Ergo reperietur Angulus ABC. vel AbC.

II. Operatio §. 39.	*Gradus*	*Logarithmi.*
Sinus Segmenti CD.	17. 48. CL.	0. 5147113
Sinus Segmenti Db. vel BD.	22. 24.	9. 5810052
Tangens 2. Ang. ACB. vel ACb.	76. 40.	9. 3747563
Tangens 2. Ang. ABC. vel AbC.	73. 33.	9. 4704728

II. DATIS 2. ANGVLIS, ET LATERE MEDIO.

Invenire quodlibet latus oppositum.

90 Perpendicularis cadit in latus ignotum, quod nô quæritur CAB. BCA. AC. datæ sunt investigatur latus AB. 1. Reperietur Angulus CAD. §. 85. & DAb. vel BAD. §. 88.

II. Operatio §. 36.		*Logarithmi.*
Sinus 2. Anguli CAD.	22. 7. CL.	0. 0331924
Sinus 2. Anguli DAb. vel BAD.	27. 33.	9. 9477314
Tangens 1. lateris AC.	54. 19.	9. 8562042
Tangens 2. lateris AB.	55. 30.	9. 8371280

SPE-

SPECIES TERTIA.

PROBLEMA IV.

Datis duabus partibus alternis, & vna opposita.

Invenire reliquam partem alternam.

I. DATIS DVOBVS LATERIBVS, ET ALTERO Angulo opposito.

Invenire reliquum latus.

91 Cognitis CA. BA. BCA. quæritur BC. perpendicularis cadit in latus quæsitum. 1. Reperietur CD. §. 85. quæ est 17. 48. *m.* mox Db. vel BD.

II. Operatio §. 38.	*Gradus.*	*Logarithmi.*
Sinus 2. lateris AC.	54. 19. CL.	0. 2341043
Sinus 2. lateris AB.	55. 30.	9. 7531280
Sinus 2. Segm. CD.	17. 48.	9. 9786959
Sinus 2. Segm. Db. vel BD.	22. 24.	9. 9659282
Summa CD. BD. est BC.	40. 12. *in ABC.*	
Differens CD. Db. est Cb.	4. 36. *in ACb.*	

Additio, vel subtractio, fit vt in §. 86. Segmentum BD. sequitur speciem lateris contermini AB.

II. DATIS DVOBVS ANGVLIS, ET VNO latere opposito.

Invenire reliquum Angulum.

92 Notis AC. CBA. ACB. quæritur BAC. perpendicularis cadit ab Angulo quæsito. 1. Reperietur Angulus CAD. §. 85. qui est 22. 7. *m.* moxque DAb. vel BAD.

II. Operatio §. 36.	*Gradus.*	*Logarithmi.*
Sinus 2. Anguli ACB.	76. 40. CL.	0. 6371108
Sinus 2. Ang. ABC. vel AbC.	73. 33.	9. 4520602
Sinus Anguli CAD.	22. 7.	9. 5757577
Sinus Ang. DAb. vel BAD.	27. 33.	9. 6649287
Sum. CAD. & DAB. est BAC.	49. 40. *in ABC.*	
Differ. CAD. & DAb. est CAb.	5. 26. *in ACb.*	

Additio, vel subtractio fit vti in §. 88. Angulus DAB. sequitur speciem Segmenti BD.

PRO-

PROBLEMA V.

Datis duabus partibus alternis, & vna oppoſita.

Invenire intermediam.

I. DATIS DVOBVS LATERIBVS, ET Angulo oppoſito.

Invenire Angulum intermedium.

93 Cognitis CA. AB. BCA. quæritur BAC. perpendicularis cadit ab Angulo quæſito. 1. Reperietur CAD. §. 85.

II. Operatio §. 37.		*Logarithmi.*
Tangens 2. lateris AC.	54.19. CL.	0.1437957
Tangens 2. lateris AB.	55.30.	9.8371343
Sinus 2. Anguli CAD.	22. 7.	9.9668075
Sinus 2. Anguli DAb. vel BAD.	27.33.	9.9477375
Summa DAC. BAD. eſt BAC.	49.40. *in ABC.*	
Differ. CAD. DAb. eſt CAb.	5.26. *in ACb.*	

Additio, vel ſubtractio, fit vt in §. antecedenti, vel §. 88.

II. DATIS DVOBVS ANGVLIS, ET VNO latere oppoſito.

Invenire latus intermedium.

94 Cognitis CBA. ACB. AC. quæritur BC. perpendicularis cadit in latus quæſitum. 1. Reperietur Segmentum DC. §. 85.

II. Operatio §. 39.	*Gradus.*	*Logarithmi.*
Tang. 2. Ang. ACB. vel ACb.	76.40. CL.	0.6252437
Tang. 2. Ang. ABC. vel AbC.	73.33.	9.4702112
Sinus Segmenti CD.	17.48.	9.4852887
Sinus Segm. Db. vel BD.	22.23.	9.5807436
Summa CD. BD. eſt BC.	40.11. *in ABC.*	
Differentia CD. Db. eſt Cb.	4.35. *in AbC.*	

Additio, & ſubtratio fit vti in §. 86. & 91. &c.

PRO-

PROBLEMA VI.

Datis duabus partibus alternis, & vna oppoſita.

Invenire alteram oppoſitam.

I. DATIS DVOBVS LATERIBVS, ET ALTERO Angulo oppoſito.

Invenire reliquum Angulum oppoſitum.

95 Cognitis AB. 55. 30. CB. 40. 10. & ACB. 76. 40. quæritur Angulus BAC.

Proportio §. 34.		*Gradus.*		*Logarithmi.*
Sinus lateris	*AB.*	55.30.	CL.	0.0840063
Sinus Anguli	*BCA.*	76.40.		9.9881329
Sinus lateris	*CB.*	40.10.		9.8095686
Sinus Anguli	*BAC.*	49.36.		9.8817078

II. DATIS DVOBVS ANGVLIS, ET VNO latere oppoſito.

Invenire reliquum latus oppoſitum.

Cognitis BCA. 40. 10. BAC. 49. 36. & BA. 55. 30. quæritur latus BC.

Proportio §. 34.		*Gradus.*		*Logarithmi.*
Sinus Anguli	*BCA.*	40.10.	CL.	0.1904314
Sinus lateris	*AB.*	55.30.		9.9159936
Sinus Anguli	*BAC.*	49.36.		9.8816917
Sinus lateris	*BC.*	76.40.		9.9881167

In his duabus reſolutionibus animadverti debet num latus, vel Angulus, qui egreditur maior, vel minor Quadrante exiſtat.

Del P. I. Zaragoſa.

RA-

RATIO ALIA SOLVENDI PROBLEMATA 2. 3. 4. 5.

96 Quando partes alternæ Anguli sunt, redigi possunt ad latera, & è contra, sumendo semper complementum vnius, quæ neque quæsita, neque notæ alteri opponatur: veluti in *Fig.* 1. in Triangulo ROZ. Cognitis Angulis RZO. 125. 41. ROZ. 55. 30. RZ. 22. 7. quæritur ZO.

Fiat reductio sequenti modo.

Ang. RZO.	125. 41.	*Comp.*	*in latus AC.*	54. 19.
Ang. ROZ.	55. 30.		*in latus BA.*	55. 30.
Latus RZ.	22. 7.		*in Ang. ACB.*	22. 7.

Et in Triangulo ABC. invenietur Angulus BAC. 49. 40. per §. 93. qui æqualis est lateri ZO. per §. 13. Viceversa in Triangulo YRM. cognitis YR. RM. RMY. quæritur YRM. fiat reductio vt anteà.

Latus RM.	103. 20.	*Comp.*	*in Ang. ACB.*	76. 40.
Latus YR.	73. 33.		*in Ang. ABC.*	73. 33.
Ang. RMY.	54. 19.		*in latus AC.*	54. 19.

Et in Triangulo ABC. reperietur latus BC. 40. 1. per §. 94. estque Angulus YRM. per §. 13. Idem dicas de Problematibus 2. 3. 4. & 5. itaque binas solutiones singula habent.

CA-

CAPVT DECIMVM.

SINGVLARES ALIQVÆ SPHÆRICORVM resolutiones explicantur.

PROBLEMA I.

Pro Rectangulis ex Nepero.

97 CElebris est Neperi regula pro Rectangulis Sphæricis, quæ in hoc opere ommittenda non fuit.

Sit Triangulum Sphæricum Rectangulum EBH. in *Fig.* 7. respondens nostro Triangulo EBH. *Fig.* 1. describatur quodlibet Pentagonum; & in parte superiori collocetur Hypothenusa *e b.* deinde Anguli *e. b.* tandem latera *b. bb.* sed partium superiorum, nempè Hypothenusæ, & Angulorum sumuntur complementa, quæ signantur hac nota ○. vt in Figura apparet. Pro Angulo Recto sumitur semper in proportione Sinus totus, & ideò nulla ipsius fit mentio in *Fig.* 7.

98 Quælibet pars duas aliàs habet vicinas, & duas remotas: si enim sumatur Angulus *e.* partes vicinæ erunt Hypothenusa *e b.* & latus *e b.* remotæ verò *b.* & *bb.* Si autem assumatur *eb.* vicinæ sunt *e. b.* remotæ *eb. bb.* & sic de reliquis. Quibus positis.

99 *Regula Neperi.*

Pro vicinis.		*Pro remotis.*
Vt	*Tangens vicinæ.*	Vt *Sinus 2. remotæ.*
ad	*Sinum mediæ.*	ad *Sinum mediæ.*
ita	*Sinus totus.*	ita *Sinus totus.*
ad	*Tang. vicinæ reliquæ.*	ad *Sinum 2. reliq. remot.*

VNDE NOSTRA REGVLA.

Radius, & Sinus cuiuslibet partis medij sunt inter Tangentes vicinarum, & inter Sinus 2. remotarum. Et nè inter Sinum 2. & Tangentem æquivocatio subrepat: hoc carmine continentur.

Tangens vicinæ, amotæ Sinus esto secundus.

100 *Praxis regulæ.*

In Triangulo EBH. data sit Hypothenusa EB. 50. 20. latus BH. 30. 25. quæritur latus EH. Quoniam *eb.* media est inter remotas *bb. eb.* erunt Radius, & Sinus *eb.* nempè complementi Hypothenusæ medij inter Sinum 2. *bh. be.* (§. 99.) ergo erunt reciprocæ. (1. l. 6.)

Proportio.			*Logarithm.*
Vt *Sin.* 2. bh. *vel BH.*	30. 25.	CL.	0.0643081
ad *Radium.*			10.0000000
ita *Sin.* eb. *vel* 2. *EB.*			9.8050385
ad *Sinum* 2. eh. *vel EH.*			9.8693467

101 *Ejsdem datis quæritur Ang.* b.

Quia *b.* media est inter vicinas *eb. bh.* erunt Radius, & Sinus *b.* vel 2. B. medij inter Tangétem *eb. bh.* ergo erunt reciprocæ. (1. l. 6.)

Proportio.			*Logarithm.*
Vt *Radius.*		CL.	0.0000000
ad *Tang.* eb. *vel* 2. *EB.*	50. 20.		9.9184198
ita *Tang.* bh. *vel BH.*	30. 25.		9.7687029
ad *Sin.* b. *vel* 2. *B.*	60. 53.		9.6871227

102 *Ejsdem datis quæritur Ang.* e.

Quia *bb.* media est inter remotas *e. eb.* erit Rectangul. Radij, & Sinus *bb.* æquale Rectangulo Sinuum 2. *e.* & *eb.* (§. 99.) ergo, & reciprocæ. (1. l. 6.)

Pro-

Proportio.			*Logarithm.*
Vt *Sin. EB. vel* 2. eb.	50. 20.	CL.	0.1136384
ad *Radium.*	90. 0.		10.0000000
ita *Sin. BH. vel* bh.	30. 25.		9.7043947
ad *Sin. E. vel* 2. e.	41. 7.		9.8180331

Eadem omninò est praxis in omnibus, vndè patet primum terminum proportionis esse Radium, quoties quæritur media, vel esse extremam, si quæratur alia extrema.

103 *Demonstratio regulæ.*

Neperus regulam suam adduxit absque demonstratione, quæ tamen ex nostra *Fig.* 1. facilè demonstrari poterit. Quoties enim quæritur extrema, vel media inter remotas, eadem est proportio Neperi, & nostra, vt patet in exemplis 1. & 3. Vndè nulla alia indiget demonstratione præter adductam in superioribus.

104 Quando verò quæritur media inter extremas vicinas, vt in exemplo 2. talis est demonstratio.

Proport. 1.		*Proport.* 2.		*Proport.* 3.
Tang. EB.	Ex §. 99.	*Tang. EB.*	Ex lib. 1. §. 20.	*Radius.*
Radius.		*Radius.*		*Tang.* 2. *EB.*
Tang. BH.		*Radius.*		*Tang. BH.*
Sin. 2. *B.*		*Tang.* 2. *EB.*		*Sin.* 2. *B.*

Ergo (1. l. 6.)

Constat ergo Neperi proportio, eademque est in alijs demonstratio.

105 *QVADRANTALIA.*

Solventur etiam ex regula Neperi, si prius convertantur latera in Angulos, & Anguli in latera, prout dictum fuit §. 78. Quod specialem difficultatem non habet, ideòque exemplum ommittitur.

PROBLEMA II.

Pro Rectangulis ex data Basi, & summa, vel differentia, *Hypothenus. & Perpend.*

106 *I. DATA SVMMA.* Fig. 1.

In Triangulo EBH. data sit Basis EH. 59. 22. & summa EB. BH. 98. 40. quæruntur determinatæ EB. & BH. oportet autem partes esse singillatim Quadrante minores, ex §. 55.

Proportio ex §. 55.			*Logarithm.*
Vt *Tang. Semisummæ.*	49. 20.	CL.	9.9340559
ad *Tang. Semibasis.*	29. 41.		9.7558783
ita *Tang. Semibasis.*	29. 41.		9.7558783
ad *Tang. Semidiffer.*	15. 36.		9.4458125
Hypoth. summa 1. & 4.	64. 56.		
Perpend. differ. 1. & 4.	33. 44.		

Quibus cognitis reliqua innotescent, ex cap. 8.

107 *II. DATA DIFFERENTIA.* Fig. 1.

In eodem Triangulo EBH. data sit Basis EH. 59. 22. & differentia Hypothenusæ, & perpendiculi 31. 12. quæruntur determinatæ EB. BH. quia ex eodem §. 55. Tangens Semibasis media est inter Tangentes Semisummæ, & Semidifferentiæ, erit invertendo rationem præcedentem.

Proportio ex §. 55.			*Logarithm.*
Vt *Tange. Semidiffer.*	15. 36.	CL.	0.5540767
ad *Tang. Semibasis.*	29. 41.		9.7558783
ita *Tang. Semibasis.*	29. 41.		9.7558783
ad *Tang. Semisumma.*	49. 20.		10.0658338
Hypoth. summa 1. & 4.	64. 56.		
Perpend. differ. 1. & 4.	33. 44.		

Reliqua ergo innotescent pariter, ex cap. 8.

PRO-

PROBLEMA III.

In Obliquangulis Sphæricis vno actu.

Ex duabus alternis, & media.

Invenire Segmenta mediæ.

108 *I. SEGMENTA BASIS.* Fig. 1.

In Triangulo ABC. datæ sint partes alternæ Anguli B. C. & media BC. sit Angulus B. 40. 30. & Ang. C. 48. 50. Basis verò BC. 64. 8. in quam cadat perpend. AD. quæruntur Segm. BD. DC. proportio sumenda est, ex §. 52.

Proportio §. 52.			*Logarithm.*
Vt *Sin. summæ Ang.*	89. 20.	CL.	0.0000293
ad *Sin. differ. Ang.*	8. 20.		9.1611638
ita *Tang. Semibasis.*	32. 4.		9.7969130
ad *Tang. Semidiffer. Segm.*	5. 11. 20.		8.9581061
Summa 3. & 4. est BD.	37. 15. 20.		
Differ. 3. & 4. est DC.	26. 52. 40.		

109 *II. SEGMENTA ANGVLI.* Fig. 1.

In eodem Triangulo ABC. sint datæ alternæ AB. 48. 50. AC. 40. 30. & Angulus comprehensus BAC. 115. 52. ex quo cadat perpendiculum AD. & quæruntur Segmenta BAD. DAC.

Proportio §. 51.			*Logarithm.*
Vt *Sin. summ. later.*	89. 20.	CL.	0.0000293
ad *Sin. differ. later.*	8. 20.		9.1611638
ita *Tang. 2. Semiang.*	57. 56.		9.7969130
ad *Tang. Semidiffer. Segm.*	5. 11. 20.		8.9581061
Summa 3. & 4. est BAD.	63. 7. 20.		
Differ. 3. & 4. est DAC.	52. 44. 40.		

Huius praxis insignem vsum pro directionibus videre licebit in Trigonometria ingeniosissimi Cavalerij, pag. 56 quem in Trigonometria applicata breviter exponam.

Del P. I. Zaragoçà.

PRO-

PROBLEMA IV.

Data media Segmentis, & ſumma alternarum.
Invenire alternas.

I. LATERA INCLVDENTIA.

110 In Triangulo ABC. datur Ang. ABC. 115. 52. & illius Segmenta, nempè DAB. 62. 20. & CAD. 53. 32. & ſumma laterum includentium 89. 20. quæruntur determinata latera AB. AC. ſumitur ratio ex eodem §. 51.

Proportio §. 51.			*Logarithm.*
Vt *Tang. 2. Semiang.*	57. 56.	CL.	0. 2030869
ad *Tang. Semidiff. Segm.*	4. 24.		8. 8861849
ita *Sin. ſumm. later.*	89. 20.		9. 9999706
ad *Sin. differ. later.*	7. 3. 10.		9. 0892424
Summa 3. & 4.	96. 23. 10.		
Eius dimidium eſt AB.	48. 11. 35.	*Oportet latera eſſe eiuſdem ſpeciei.*	
Differ. 3. & 4.	82. 16. 50.		
Eius dimidium eſt AC.	41. 8. 25.		

II. ANGVLI INCLVDENTES.

111 In Triangulo ABC. data ſit Baſis BC. 64. 8. ipſius Segmenta BD. 36. 28. DC. 27. 40. & ſumma Angulorum includentium 89. 20. quæruntur determinati Anguli B. & C. ratio ſumitur ex §. 52.

Proportio §. 52.			*Logarithm.*
Vt *Tang. Semibaſis.*	32. 4.	CL.	0. 2030869
ad *Tang. Semidiff. Segm.*	4. 24.		8. 8861849
ita *Sin. ſumm. Ang.*	89. 20.		9. 9999706
ad *Sin. differ. Ang.*	7. 3. 10.		9. 0892424
Semiſumma 3. & 4. *eſt C.*	48. 11. 35.		
Semidiffer. 3. & 4. *eſt B.*	41. 8. 25.		

Debent etiam Anguli comprehendentes eſſe eiuſdem ſpeciei, ex §. 51. & 52.

PRO-

PROBLEMA V.

Data media, Segmentis, & differentia alternarum.
Invenire alternas.

I. LATERA INCLVDENTIA.

112 In Triangulo ABC. datur Ang. BAC. 115. 52. & illius Segmenta BAD. 62. 20. & DAC. 53. 32. differentia verò laterum includentium AB. AC. 7. 3. 10. quæruntur determinata latera AB. AC.

Proportio ex §. 51.			*Logarithm.*
Vt *Tang. Semidiffer. Segm.*	4. 24.	CL.	1. 1138151
ad *Tang. 2. Semiang. BAC.*	57. 56.		9. 7969130
ita *Sin. differ. later.*	7. 3. 10.		9. 0892424
ad *Sin. ſumm. later.*	89. 20.		9. 9999705
Semiſumma 3. & 4. *eſt AB.*	48. 11. 35.		
Semidiffer. 3. & 4. *eſt AC.*	41. 8. 25.		

II. ANGVLI INCLVDENTES.

113 In eodem Triangulo ABC. datur Baſis BC. 64. 8. ipſius Segmenta BD. 36. 28. & DC. 27. 40. & differentia Angulorum includentium B. C. 7. 3. 10. quæruntur determinati Anguli B. C.

Proportio §. 52.			*Logarithm.*
Vt *Tang. Semidiffer. Segm.*	4. 24.	CL.	1. 1138151
ad *Tang. Semibaſis.*	32. 4.		9. 7969130
ita *Sin. differ. Ang.*	7. 3. 10.		9. 0892424
ad *Sin. ſumm. Ang.*	89. 20.		9. 9999705
Semiſumma 3. & 4. *eſt C.*	48. 11. 35.		
Semidiffer. 3. & 4. *eſt B.*	41. 8. 25.		

Vtraque ratio iſtius Problematis inverſa eſt præcedentis, & in vtraque reſolutione partes quæſitæ eiuſdem ſpeciei debent eſſe.

Del P. I. Zaragoçà.

PRO-

PROBLEMA VI.

Datis alternis, & differentia Segmentorum mediæ. *Invenire mediam.*

I. BASIM INCLVSAM.

114 In Triangulo ABC. dati sunt Ang. B. 41. 8. 25. & C. 48. 11. 35. differentia verò Segmentorum BD. DC sit 8. 48. quæritur Basis BC. ex §. 52.

Proportio.		*Logarithm.*
Vt *Sinus differ. Angul.*	7. 3. 10. CL.	0.9107575
ad *Sin. summæ Ang.*	89.20.	9.9999706
ita *Tang. Semidiff. Segm.*	4.24.	8.8861849
ad *Tang. Semibasis.*	32. 4.	9.7969130
istius duplum est BC.	64. 8.	

II. ANGVLVM INCLVSVM.

115 In Triangulo ABC. data sint latera AB. AC. & sit AC. 41. 8. 25. & AB. 48. 11. 35. cadat ex Angulo BAC. perpendiculum AD. & differentia Segmentorum BAD. DAC. sit 8. 48. quæritur Angulus comprehensus BAC.

Proportio ex §. 51.		*Logarithm.*
Vt *Sin. differ. later.*	7. 3. 10. CL.	0.9107575
ad *Sin. Summæ later.*	89.20.	9.9999706
ita *Tang. Semidiff. Segm.*	4.24.	8.8861849
ad *Tang. 2. Semianguli.*	57.56.	9.7969130
istius duplum est BAC.	115.52.	

Vltima hæc quatuor Problemata, nempè 3. 4. 5. & 6. orta sunt ex Theorematibus adductis, §. 51. & 52. huius libri, quæ contemnenda non sunt, licèt ad communes resolutiones non conducant.

CA-

CAPVT VNDECIMVM.

TRIANGVLORVM SOLVTIONES SINE Logarithmis explicantur.

116 Licèt in hac Trigonometria nullus sit absolutorum Sinum, Tangentium, & Secantium vlus, libet hic modum exponere, quo sine Logarithmis per absolutorum Canonem perficiantur, & addere compendia, quæ ad facilitandas operationes conducunt.

REGVLA VNIVERSALIS.

117 *In omni proportione superius adducta, multiplicandi sunt termini secundus, & tertius: & productus ex multiplicatione dividendus per primum, quotiens dabit quartum terminum quæsitum.*

Exemplum proportionis §. 61.

Proportio ex §. 29.		*Num. absoluti.*
Sin. 2. perp. BH.	30.25.*m.*	86236
Radius.		100000
Sin. 2. Hypoth. EB.	50.20.*m.*	63832
Sin. 2. Basis EH.	42.15.*m.*	74019

Ducatur 63832. in radium 100000. & productus erit 6383200000. quo diviso per primum terminum 86236. erit quotiens 74019. & est quartus terminus iuxta qualitatem proportionis, nempè *sin. 2. gr. 42. 15. m.* vt in §. 61. Eadem est omninò praxis in omnibus.

Reductio Radij in primum locum.

118 Quando Radius in proportione secundum, vel tertium locum occupat, vt evitetur divisio, reducetur ad primum, & primus fiet secundus, vel tertius hac arte.

Pro Sinu 1. substituatur Secans 2. pro Sinu 2. Secans 1. pro Tangente 1. Tangens 2. & pro Tangente 2. Tangens 1.

119 *Exemplum reductionis.*

Proportio ex §.117.	*Reductio.*	*Numeri.*
Sinus 2. perpend. 30.25.	*Radius.*	100000
Radius.	*Secans 2. perpend.*	115959
Sinus 2. Hypoth.	*Sinus 2. Hypoth.*	63832
Sinus 2. Basis.	*Sinus 2. Basis.*	74018

Ducendo igitur 115959. per 63832. erit productum 7401894888. quo diviso per Radium 100000. delendo, scilicèt ad dexteram tot litteras, quod cyphras habet Radius: quæ hìc sunt 5. remanet Quotiens 74018. nempè *sin. 2. gr.* 42. 15. vt anteà hac reductione evitabitur in calculo molestia divisionis.

Demonstratio huius reductionis.

Oritur ex §§. 20. & 21. *lib.* 1. Etenim quia Radius medius est inter Sinum 1. & Secantem 2. tùm inter Sinum 2. & Secantem 1. & etiam inter Tangentem 1. & 2. servatur eadem ratio, vt Sinus 2. perpendiculi ad Radium, ita Radius ad Secantem 1. sed vt Sinus 2. perpend. ad Radium: ita Sin. 2. Hypoth. ad Sin. 2. Basis, ex §. 61. Ergo vt Radius ad Sec. 1. perpend. ita Sinus 2. Hypoth. ad Sinum 2. Basis (1. l. 5.) Eadem est demonstratio de Sinu 1. & Secante 2. similiter de Tangente 1. & 2. vel de 2. & 1. quod, &c.

Quando Radius non est in proportione.

120 Pro termino primo sumitur Secans, vel Tangès oppositæ, vt in §. 118. multiplicatur deinde hæc in secundum, & ex producto delentur ad dexteram tot litteræ, quot cyphras habet Radius: reliquæ verò multiplicantur in tertium; & delentur iterum litteræ: & remanet quartus terminus iuxta qualitatem proportionis, hac arte divisio, quæ prolixior, & molestior esse solet ad faciliorem multiplicationem reducitur. Exemplum sit in proportione §. 95.

121 *Proportio.* *Reductio.* *Numeri.*

Sin. lateris AB.	55.30.	*Sec. 2. AB.*	121340.
Sin. lateris BC.	40.10.	*Sin. BC.*	64501.
Sin. Ang. ACB.	76.40.	*Sin. ACB.*	97304.
Sin. Ang. BAC.	49.36.	*Sin. BAC.*	76154.

Multipl. 121340. in 97304. erit productũ 11806867360. & ablatis 5. litteris remanet 118068. hoc residuo ducto in tertium terminum 64501. oritur 7615504068. & ablatis 5. litteris remanet 76154. quartus terminus, hoc est Sinus quæsitus Anguli BAC. 49. 36.

Demonstratio praxis præcedentis.

122 Sint proportionales A. *ad* B. vt C. *ad* D. Si A. fuerit *Sin.* 1. cuiuslibet Arcus sumatur E. *Secans* 2. vel è contra. Si verò sit A. Tang. 1. sumatur E. Tang. 2. vel è contra: terminis B. C. D. quicumque sint immutatis: cum ergo R. radius medius sit inter A. & E. (§. 20. & 21. lib. 1.) si fiat vt R. ad E. ita B. ad I. erit vt A. ad R. ita B. ad I. (1. l. 5.) & alternando vt A. ad B. ita R. ad I. (4. l. 5.) sed vt A. ad B. ita C. ad D. ex Hypothesi. Ergo vt R. ad I. ita C. ad D. quod, &c.

A. R. E.
B. I.
C.
D.

123 *Hinc praxis.* Quia R. ad E. Secantem est, vt R. ad I. inventum primum: si ducatur E. in B. & ex producto auferantur 5. litteræ, provenit I. ex §. 119. Quia verò est etiam vt R. ad I. ita C. ad D. si ducatur I. inventum primum in C. tertium terminum; & auferantur ex producto 5. litteræ, provenit D. ex §. 119. constat ergo praxis, &c.

Pro Triangulis Planis.

124 In Triangulis Planis si Radius sit in proportione, & primus terminus fuerit Sinus, vel Tangens, vt in §§. 25. 27. 30. lib. 2. observatur omninò regula, §. 118. sumendo Secantem, vel Tangentem oppositam.

125 Si autem primus terminus fuerit linea, vt in §§. 26. & 29. lib. 2. addantur ipsi cyphræ, vt numerus tot

litteras habeat, quot cyphras Radius, & quæratur numerus inter Sinus; & eius loco substituatur Secans 2. illius Sinus; & fiat operatio vt in §. 119. exemplum sit in proportione, §. 26. lib. 2.

Proportio.		*Reductio.*	*Numeri.*
Hypoth. BA.	450.00.	*Radius.*	100000
Latus BC.	345.00.	*Sec. 2. Hypoth.*	222173
Radius.	1000.00.	*Latus BC.*	34500
Sin. Ang. A.	50. 2.	*Sin. Ang. A.*	76649

126 Quia Hypothenusa 450. tres litteras habet addantur 00. vt 45000. tot litteras habeat, quot cyphras Radius. Quæro numerum hunc inter Sinus, & invenio esse Sinum gr. 26. 45. & eius Secantem 2. esse 222173. duco igitur 222173. in terminum secundum 345. additis etiam 2. cyphris, vt sit 34500. & ex producto 7664967500. deleo 5. litteras, & remanet Sinus 76649. Anguli A. 50. 2. *Demonstratio* est ipsa §. 119. Quia Radius est medius inter Hypothenusam 45000. & Secãtem 2. assumptam 222173 & 450. ad 345. est etiam vt 45000. ad 34500. constat igitur praxis.

Si Radius non sit in proportione.

127 Et primus terminus fuerit Sinus, vel Tangens observatur omninò regula, §. 120. vt in proportione §. 31 lib. 2. Si autem primus terminus fuerit linea, vt in §. 32 34. 37. lib. 2. additis cyphris quæritur inter Sinus, & substituitur Secans 2. prout in §. 125. quæ ducitur in secundum terminum, & deletis 5. litteris residuum ducitur in tertium: deletis iterum 5. litteris remanet quartus terminus quæsitus. Exemplum sit in proportione lib. 2. §. 34.

Proportio.		*Reductio.*	*Numeri.*
Summa later.	700.00.	*Secans 2.*	142841
Differ. later.	100.00.	*Differ. later.*	10000
Tang. Semisum.	59.22.	*Tang. Semisum.*	168866
Tang. Semidiffer.	13.34.	*Tang. Semidiff.*	24120

In

In Sinu 70000. invenio Secantem 142841. hac ducta in differentiam laterum 100. vel additis 2. cyphris 10000. dat 1428410000. ablatis 5. litteris remanet 14284. hoc residuo ducto in Tangentẽ 168866. prodit 2412081944. ablatis 5. litteris remanet 24120. Tangens Semidiffer. 13.34. vt in lib. 2. §. 34.

128 *Demonstratio.* Facilis est, quia 70000. ad 10000. est vt 700. ad 100. servant primus, & secundus terminus eandem rationem: deinde quia Radius medius est inter Sinum 70000. & Secantem secũdam 142841. instauratur, omninò demonstratio §. 122. constat ergo praxis. Quod erat, &c.

Compendium multiplicationis per inversionem.

129 Quia in præcedentibus operationibus abijciendæ sunt ex producto 5. litteræ, ommitti illæ possunt in ipsa multiplicatione, per inversionẽ multiplicatoris, scribendo ipsum inverse sub quantitate multiplicanda; sit exemplum in proportione §. 76.

Proportio.		*Reductio.*		*Numeri.*
Tang. Ang. B.	60.18.	*Radius.*	90.00.	100000
Tang. 2. Ang. E.	45.30.	*Tang. 2. B.*	60.18.	57038
Radius.	90.00.	*Tang. 2. E.*	45.30.	98269
Sin. 2. EB.	55.54.	*Sin. 2. EB.*	55.54.	56050

Multiplicandus est 57038. per 98269.

Modus communis.

57038
98269

5 | 13343
34 | 2228
114 | 076
4563 | 04
51334 | 2
56050 | 67222

Modus inversus.

Multiplicandus 57038
Multiplicator inversus. 96289

51334 | 2
4562 | 4
114 | 0
34 | 2
4.5

Productus. 56049

Del P. I. Zaragoça.

Ex

Ex modo communi apparet dimidiam operationem, quæ ad dexteram est, inutilem esse cum delendæ sint 5. vltimæ litteræ: si ergo multiplicator 98269. inverse scribatur 96289. & quæ vis littera multiplicet tantum superiorem correspondentem, & reliquas ad sinistram, & omnes multiplicationes perpendiculariter sub vltima littera scribantur: summa dabit quartum quæsitum, vt apparet; vltima ergo littera multiplicatoris 9. ducitur in totam quantitatem 57038. penultima 8. ducitur in 5703. ante penultima 2. in 570. & 6. in 57. at verò 9. tantum in 5.

130 Inversio fieri potest cuiusvis numeri ex multiplicandis, vt in eodem exemplo numeri sunt 98269. & 57038. facta huius inversione 83075. fiet multiplicatio, vt in exemplo apparet. Quando autem plures litteræ sunt in vno, quam in alio fiat inversio minoris: aliquando vltimæ etiam litteræ ad dexteram colligendæ sunt in summam, quod ipsa praxis ostendit.

Exemplum.	
98269	
Inuers. 83075	
49134	5
6878	4
29	4
7	3
Pro Tabularum constructione. 56049	

131 Occurrit sæpiùs in Tabularum constructione eundem numerum in alios ducere, vt si Tabula declinationum solis construenda sit, quia proportio est, vt Radius ad Sinum maximæ declinationis 23. 30. ita Sinus distantiæ ab Æquinoctio ad Sinum declinationis; in qua proportione multiplicandus semper est Sinus 23. 30. per Sinum distantiæ: sumatur ergo Sinus, *grad.* 23. 30. nempè 39875. & illius duplum, triplum, quadruplum, &c. Et ad sinistram apponantur numeri 1. 2. 3. &c. vt apparet, & monitum fuit in Arithmetica, lib. 1. §. 14. Et vt omnes lineæ habeant æqualem litterarum numerum addatur cyphra prioribus ad sinistram, vt in exemplo.

Sin. 23. 30.	
1 ~	039875
2 ~	079750
3 ~	119625
4 ~	159500
5 ~	199375
6 ~	239250
7 ~	279125
8 ~	319000
9 ~	358875

Sit

132 Sit ergo inquirenda declinatio gr. 15. Arietis: distantia ab Æquinoctio est gr. 15. huius Sinus 25881. scribatur perpendiculariter, vt vides. Quia ergo prima littera est 2. assumo ex tabella superiore lineam secundam; & scribo illam è regione ipsius 2. Deinde secundus numerus est 5. assumo lineam quintam, quæ scribitur relinquendo vnum spatium vacuum, & in tertia duo, &c. Similiter in secunda linea ommittitur vna littera ad dexteram, in tertia duo, &c. Prodit ergo 10319. ferè 10320. Sinus gr. 5. 55. declinatio quæsita, & sic de reliquis.

Operatio.	
2 ~	07975,0
5 ~	19937
8 ~	3190
8 ~	31,9
1 ~	0,3
Sin.	1031919

133 *RESOLVTIO TRIANGVLI.*

Ex datis 3. lateribus, vel 3. Angulis.

Praxis per numeros absolutos sumitur, ex §. 44. sit in fig. 1. Triangulum ABC. latus AC. 100. 15. latus AB. 85. 30. Differentia laterum 14. 45. Basis BC. 40. 25. quæritur Ang. BAC. sumatus *Sinus Versus*, Basis, & differentiæ laterum, & eorum differentia; ergo ex §. 44.

Sinus Versus Basis BC.	23865.
Sinus Vers. differ. later.	3295.
Differ. Sinuum Vers.	20570

Proportio.	*Reductio §. 127.*	*Numeri.*
Sin. lat. AB.	*Sec. 2. lat. AB.*	100309
Sec. 2. lat. AC.	*Sec. 2. lat. AC.*	101622
Differ. Sin. Vers.	*Differ. Sin. Vers.*	20570
Sin. Vers. Ang. A.	*Sin. Vers. Ang. A.*	20367

134 Si ergo multiplicetur 100309. per 101622. inverse fit 101934. Si hoc productum iterum multiplicetur per 20570. inverse fit 20967. & est Sinus Versus Anguli BAC. *grad.* 37. 47. Si dati fuerint tres Anguli, & quæratur quodlibet latus, sumitur complementum ad 180. vnius Anguli ex includẽtibus latus quæsitum, in reliquo fit eadem operatio iuxta dicta, §. 82.

Praxis. 100309
Inverſ. 226101
100309
1003
600
20
2
10193|4
Inverſ. 0750|2
20386|8
509|5
70|7
Sin.Verſ. 20967

ALITER PER RECTILINEA, ex §. 53.

135 Quia in *Fig.* 6 Angulus Planus X A Z. æqualis est Sphærico B A C. & in Triangulo Plano Rectilineo innotescunt A Z. Tangens Semilateris AC. & AXH. vel AXZ. Tangens Semisummæ AB. BC. & AG. Tangens Semidifferentiæ AB. BC. invenietur Angulus XAZ. qui est ABC. ex lib. 2. §. 37. sed quia operatio, licèt non iniucunda, compendium nullum affert, libens illam ommitto.

FINIS.

CANON TRIGONOMETRICVS.

CONTINENS

LOGARITHMOS, SINVVM, ET TANGENTIVM, ad singula scrupula totius Semicirculi.

Radij Logarithmo, 10.0000000.

MATRITI.

Apud Bernardum à Villa-Diego.

ANNO M.DC.LXXII.

In sequenti canone Trigonometrico numeri oppositi, nempe superior ad sinistram & inferior ad dexteram cuiuslibet paginæ, sunt invicem complementa ad quadrantem: superior verò, & inferior vniuscuiusque columnæ sunt invicem complementa ad semicirculum.

Secantium Logarithmi ommissi sunt duplicem ob causam: prima est, quoniam in Trigonometria nostra nullus secantium est vsus; secunda verò, quia earum Logarithmi summa cum facilitate ex sinuum Logarithmis erui possunt hac arte.

Regula pro secantium Logarithmis.

Sumatur complementum Logarithmicum sinus secundi, & præposita vnitate ad sinistram habetur secantis Logarithmus. Exempli gratia; quæritur secans Logarithmica *grad.* 5. 10. *min.* Sinus secundus illius est 9.9982318. huius complementum auferendo singulos numeros ex 9. est 0.0017681. & anteposita vnitate erit quæsitus, 10.0017681. Logarithmus secantis, graduum nempè 5. 10. *min.*

0	*Sinus.*	*Tangens.*	
0	0.0000000	0.0000000	60
1	6.4637261	6.4637261	59
2	6.7647561	6.7647562	58
3	6.9408473	6.9408475	57
4	7.0657860	7.0657863	56
5	7.1626960	7.1626964	55
6	7.2418771	7.2418778	54
7	7.3088239	7.3088248	53
8	7.3668157	7.3668169	52
9	7.4179681	7.4179696	51
10	7.4637255	7.4637273	50
11	7.5051181	7.5051203	49
12	7.5429065	7.5429091	48
13	7.5776684	7.5776715	47
14	7.6098530	7.6098566	46
15	7.6398160	7.6398201	45
16	7.6678445	7.6678492	44
17	7.6941733	7.6941786	43
18	7.7189966	7.7190026	42
19	7.7424775	7.7424841	41
20	7.7647537	7.7647610	40
21	7.7859427	7.7859508	39
22	7.8061458	7.8061547	38
23	7.8254507	7.8254604	37
24	7.8439338	7.8439444	36
25	7.8616623	7.8616738	35
26	7.8786953	7.8787077	34
27	7.8950854	7.8950988	33
28	7.9108793	7.9108938	32
29	7.9261190	7.9261344	31
30	7.9408419	7.9408584	30
31	7.9550819	7.9550996	29
32	7.9688698	7.9688886	28
33	7.9822334	7.9822534	27
34	7.9951980	7.9952192	26
35	8.0077867	8.0078092	25
36	8.0200207	8.0200445	24
37	8.0319195	8.0319446	23
38	8.0435009	8.0435274	22
39	8.0547814	8.0548094	21
40	8.0657763	8.0658057	20
41	8.0764997	8.0765306	19
42	8.0869646	8.0869970	18
43	8.0971832	8.0972172	17
44	8.1071669	8.1072025	16
45	8.1169262	8.1169634	15
46	8.1264710	8.1265099	14
47	8.1358104	8.1358510	13
48	8.1449532	8.1449956	12
49	8.1539075	8.1539516	11
50	8.1626808	8.1627267	10
51	8.1712804	8.1713282	9
52	8.1797129	8.1797626	8
53	8.1879848	8.1880364	7
54	8.1961020	8.1961556	6
55	8.2040703	8.2041259	5
56	8.2118949	8.2119526	4
57	8.2195811	8.2196408	3
58	8.2271335	8.2271953	2
59	8.2345568	8.2346208	1
60	8.2418553	8.2419215	0
			179

90	*Sinus.*	*Tangens.*	
0	10.0000000	Infinita.	60
1	9 9999999	13.5362739	59
2	9.9999999	13.2352438	58
3	9.9999998	13.0591525	57
4	9.9999997	12.9342237	56
5	9.9999995	12.8373036	55
6	9.9999993	12.7581222	54
7	9.9999991	12.6911752	53
8	9 9999988	12.6331831	52
9	9.9999985	12.5820304	51
10	9.9999982	12.5362727	50
11	9.9999978	12.4948797	49
12	9.9999974	12.4570909	48
13	9.9999969	12.4223285	47
14	9.9999964	12.3901424	46
15	9.9999959	12.3601799	45
16	9.9999953	12.3321508	44
17	9.9999947	12.3058214	43
18	9.9999940	12.2809974	42
19	9.9999934	12.2575159	41
20	9.9999927	12.2352390	40
21	9.9999919	12.2140492	39
22	9.9999911	12.1938453	38
23	9.9999903	12.1745396	37
24	9.9999894	12.1560556	36
25	9.9999885	12.1383262	35
26	9.9999876	12.1212923	34
27	9.9999866	12.1049012	33
28	9.9999856	12.0891062	32
29	9.9999845	12.0738656	31
30	9.9999835	12.0591416	30
31	9.9999823	12.0449004	29
32	9.9999812	12 0311114	28
33	9.9999800	12.0177466	27
34	9.9999788	12.0047808	26
35	9.9999775	11.9921908	25
36	9.9999762	11.9799555	24
37	9.9999748	11.9680554	23
38	9.9999735	11.9564726	22
39	9.9999721	11.9451906	21
40	9.9999706	11.9341943	20
41	9.9999691	11.9234694	19
42	9.9999676	11.9130030	18
43	9.9999660	11.9027828	17
44	9.9999644	11.8927975	16
45	9.9999628	11 8830376	15
46	9.9999611	11.8734901	14
47	9.9999594	11.8641490	13
48	9.9999577	11.8550044	12
49	9.9999559	11.8460484	11
50	9.9999541	11.8372733	10
51	9.9999522	11.8286718	9
52	9.9999503	11.8202374	8
53	9.9999484	11.8119636	7
54	9.9999464	11.8038444	6
55	9.9999444	11.7958741	5
56	9.9999424	11.7880474	4
57	9.9999403	11.7803592	3
58	9.9999382	11.7728047	2
59	9.9999360	11.7653792	1
60	9.9999338	11.7580785	0
		32	89

1	Sinus.	Tangens.	
0	8.2418553	8.2419215	60
1	8.2490332	8.2491015	59
2	8.2560943	8.2561649	58
3	8.2630423	8.2631153	57
4	8.2698810	8.2699563	56
5	8.2766136	8.2766912	55
6	8.2832434	8.2833234	54
7	8.2897734	8.2898559	53
8	8.2962067	8.2962917	52
9	8.3025460	8.3026335	51
10	8.3087941	8.3088842	50
11	8.3149536	8.3150462	49
12	8.3210269	8.3211221	48
13	8.3270163	8.3271143	47
14	8.3329243	8.3330249	46
15	8.3387529	8.3388563	45
16	8.3445043	8.3446105	44
17	8.3501805	8.3502895	43
18	8.3557835	8.3558953	42
19	8.3613150	8.3614297	41
20	8.3667769	8.3668945	40
21	8.3721710	8.3722915	39
22	8.3774988	8.3776223	38
23	8.3827620	8.3828886	37
24	8.3879622	8.3880918	36
25	8.3931008	8.3932336	35
26	8.3981793	8.3983152	34
27	8.4031990	8.4033381	33
28	8.4081614	8.4083037	32
29	8.4130676	8.4132132	31
30	8.4179190	8.4180679	30
31	8.4227168	8.4228690	29
32	8.4274621	8.4276176	28
33	8.4321561	8.4323150	27
34	8.4367999	8.4369622	26
35	8.4413944	8.4415603	25
36	8.4459409	8.4461103	24
37	8.4504402	8.4506131	23
38	8.4548934	8.4550699	22
39	8.4593013	8.4594814	21
40	8.4636649	8.4638486	20
41	8.4679850	8.4681725	19
42	8.4722626	8.4724538	18
43	8.4764984	8.4766933	17
44	8.4806932	8.4808920	16
45	8.4848479	8.4850505	15
46	8.4889632	8.4891696	14
47	8.4930398	8.4932502	13
48	8.4970784	8.4972928	12
49	8.5010798	8.5012982	11
50	8.5050447	8.5052671	10
51	8.5089736	8.5092001	9
52	8.5128673	8.5130978	8
53	8.5167264	8.5169610	7
54	8.5205514	8.5207902	6
55	8.5243430	8.5245860	5
56	8.5281017	8.5283490	4
57	8.5318281	8.5320797	3
58	8.5355228	8.5357787	2
59	8.5391863	8.5394466	1
60	8.5428192	8.5430838	0

91	Sinus.	Tangens.	
0	9.9999338	11.7580785	60
1	9.9999316	11.7508985	59
2	9.9999294	11.7438351	58
3	9.9999271	11.7368847	57
4	9.9999247	11.7300437	56
5	9.9999224	11.7233088	55
6	9.9999200	11.7166766	54
7	9.9999175	11.7101441	53
8	9.9999150	11.7037083	52
9	9.9999125	11.6973665	51
10	9.9999100	11.6911158	50
11	9.9999074	11.6849538	49
12	9.9999047	11.6788779	48
13	9.9999021	11.6728857	47
14	9.9998994	11.6669751	46
15	9.9998966	11.6611437	45
16	9.9998939	11.6553895	44
17	9.9998911	11.6497105	43
18	9.9998882	11.6441047	42
19	9.9998853	11.6385703	41
20	9.9998824	11.6331055	40
21	9.9998794	11.6277085	39
22	9.9998764	11.6223777	38
23	9.9998734	11.6171114	37
24	9.9998703	11.6119082	36
25	9.9998672	11.6067664	35
26	9.9998641	11.6016848	34
27	9.9998609	11.5966619	33
28	9.9998577	11.5916963	32
29	9.9998544	11.5867868	31
30	9.9998512	11.5819321	30
31	9.9998478	11.5771310	29
32	9.9998445	11.5723824	28
33	9.9998411	11.5676850	27
34	9.9998376	11.5630378	26
35	9.9998342	11.5584397	25
36	9.9998306	11.5538897	24
37	9.9998271	11.5493869	23
38	9.9998235	11.5449301	22
39	9.9998199	11.5405186	21
40	9.9998162	11.5361514	20
41	9.9998125	11.5318275	19
42	9.9998088	11.5275462	18
43	9.9998050	11.5233067	17
44	9.9998012	11.5191080	16
45	9.9997974	11.5149495	15
46	9.9997935	11.5108304	14
47	9.9997896	11.5067498	13
48	9.9997856	11.5027072	12
49	9.9997817	11.4987018	11
50	9.9997776	11.4947329	10
51	9.9997736	11.4907999	9
52	9.9997695	11.4869022	8
53	9.9997653	11.4830390	7
54	9.9997612	11.4792098	6
55	9.9997570	11.4754140	5
56	9.9997527	11.4716510	4
57	9.9997484	11.4679203	3
58	9.9997441	11.4642213	2
59	9.9997398	11.4605534	1
60	9.9997354	11.4569162	0

2	Sinus.	Tangens.	
0	8.5428192	8.5430838	60
1	8.5464218	8.5466909	59
2	8.5499948	8.5502683	58
3	8.5535386	8.5538166	57
4	8.5570536	8.5573362	56
5	8.5605404	8.5608276	55
6	8.5639994	8.5642912	54
7	8.5674310	8.5677275	53
8	8.5708357	8.5711368	52
9	8.5742139	8.5745197	51
10	8.5775660	8.5778766	50
11	8.5808923	8.5812077	49
12	8.5841933	8.5845136	48
13	8.5874694	8.5877945	47
14	8.5907209	8.5910509	46
15	8.5939483	8.5942832	45
16	8.5971517	8.5974917	44
17	8.6003317	8.6006767	43
18	8.6034886	8.6038386	42
19	8.6066226	8.6069777	41
20	8.6097341	8.6100943	40
21	8.6128235	8.6131889	39
22	8.6158910	8.6162616	38
23	8.6189369	8.6193127	37
24	8.6219616	8.6223427	36
25	8.6249653	8.6253518	35
26	8.6279484	8.6283402	34
27	8.6309111	8.6313083	33
28	8.6338537	8.6342563	32
29	8.6367764	8.6371845	31
30	8.6396796	8.6400931	30
31	8.6425634	8.6429825	29
32	8.6454282	8.6458528	28
33	8.6482742	8.6487044	27
34	8.6511016	8.6515375	26
35	8.6539107	8.6543522	25
36	8.6567017	8.6571490	24
37	8.6594748	8.6599279	23
38	8.6622303	8.6626891	22
39	8.6649684	8.6654331	21
40	8.6676893	8.6681598	20
41	8.6703932	8.6708697	19
42	8.6730804	8.6735628	18
43	8.6757510	8.6762393	17
44	8.6784052	8.6788996	16
45	8.6810433	8.6815437	15
46	8.6836654	8.6841719	14
47	8.6862718	8.6867844	13
48	8.6888625	8.6893813	12
49	8.6914379	8.6919629	11
50	8.6939980	8.6945292	10
51	8.6965431	8.6970806	9
52	8.6990734	8.6996172	8
53	8.7015889	8.7021390	7
54	8.7040899	8.7046465	6
55	8.7065766	8.7071395	5
56	8.7090490	8.7096185	4
57	8.7115075	8.7120834	3
58	8.7139520	8.7145345	2
59	8.7163829	8.7169719	1
60	8.7188002	8.7193958	0

92	Sinus.	Tangens.	
0	9.9997354	11.4569162	60
1	9.9997309	11.4533091	59
2	9.9997265	11.4497317	58
3	9.9997220	11.4461834	57
4	9.9997174	11.4426638	56
5	9.9997128	11.4391724	55
6	9.9997082	11.4357088	54
7	9.9997036	11.4322725	53
8	9.9996989	11.4288632	52
9	9.9996942	11.4254803	51
10	9.9996894	11.4221234	50
11	9.9996846	11.4187923	49
12	9.9996798	11.4154864	48
13	9.9996749	11.4122055	47
14	9.9996700	11.4089491	46
15	9.9996650	11.4057168	45
16	9.9996601	11.4025083	44
17	9.9996550	11.3993233	43
18	9.9996500	11.3961614	42
19	9.9996449	11.3930223	41
20	9.9996398	11.3899057	40
21	9.9996345	11.3868111	39
22	9.9996294	11.3837384	38
23	9.9996241	11.3806873	37
24	9.9996189	11.3776573	36
25	9.9996136	11.3746482	35
26	9.9996082	11.3716598	34
27	9.9996028	11.3686917	33
28	9.9995974	11.3657437	32
29	9.9995919	11.3628155	31
30	9.9995865	11.3599059	30
31	9.9995809	11.3570175	29
32	9.9995753	11.3541472	28
33	9.9995697	11.3512956	27
34	9.9995641	11.3484625	26
35	9.9995584	11.3456478	25
36	9.9995527	11.3428510	24
37	9.9995469	11.3400721	23
38	9.9995411	11.3373109	22
39	9.9995353	11.3345669	21
40	9.9995295	11.3318402	20
41	9.9995236	11.3291303	19
42	9.9995176	11.3264372	18
43	9.9995116	11.3237607	17
44	9.9995056	11.3211004	16
45	9.9994996	11.3184563	15
46	9.9994935	11.3158281	14
47	9.9994874	11.3132156	13
48	9.9994812	11.3106187	12
49	9.9994750	11.3080371	11
50	9.9994688	11.3054708	10
51	9.9994625	11.3029194	9
52	9.9994562	11.3003828	8
53	9.9994498	11.2978610	7
54	9.9994435	11.2953535	6
55	9.9994370	11.2928605	5
56	9.9994306	11.2903815	4
57	9.9994241	11.2879166	3
58	9.9994176	11.2854655	2
59	9.9994110	11.2830281	1
60	9.9994044	11.2806042	0

3	Sinus.	Tangens.	
0	8.7188002	8.7193958	60
1	8.7212040	8.7218063	59
2	8.7235946	8.7242035	58
3	8.7259721	8.7265877	57
4	8.7283366	8.7289589	56
5	8.7306882	8.7313174	55
6	8.7330272	8.7336631	54
7	8.7353535	8.7359964	53
8	8.7376675	8.7383172	52
9	8.7399691	8.7406258	51
10	8.7422586	8.7429222	50
11	8.7445360	8.7452067	49
12	8.7468015	8.7474792	48
13	8.7490553	8.7497400	47
14	8.7512973	8.7519692	46
15	8.7535278	8.7542269	45
16	8.7557469	8.7564531	44
17	8.7579546	8.7586681	43
18	8.7601512	8.7608719	42
19	8.7623366	8.7630647	41
20	8.7645111	8.7652465	40
21	8.7666747	8.7674175	39
22	8.7688275	8.7695777	38
23	8.7709697	8.7717274	37
24	8.7731014	8.7738665	36
25	8.7752226	8.7759952	35
26	8.7773334	8.7781136	34
27	8.7794340	8.7802218	33
28	8.7815244	8.7823199	32
29	8.7836048	8.7844079	31
30	8.7856753	8.7864861	30
31	8.7877359	8.7885544	29
32	8.7897867	8.7906130	28
33	8.7918278	8.7926620	27
34	8.7938594	8.7947014	26
35	8.7958814	8.7967313	25
36	8.7978941	8.7987519	24
37	8.7998974	8.8007632	23
38	8.8018915	8.8027653	22
39	8.8038764	8.8047583	21
40	8.8058523	8.8067422	20
41	8.8078192	8.8087172	19
42	8.8097772	8.8106834	18
43	8.8117264	8.8126407	17
44	8.8136668	8.8145894	16
45	8.8155985	8.8165294	15
46	8.8175217	8.8184608	14
47	8.8194363	8.8203838	13
48	8.8213425	8.8222984	12
49	8.8232404	8.8242046	11
50	8.8251299	8.8261026	10
51	8.8270112	8.8279924	9
52	8.8288844	8.8298741	8
53	8.8307495	8.8317478	7
54	8.8326066	8.8336134	6
55	8.8344557	8.8354712	5
56	8.8362969	8.8373211	4
57	8.8381304	8.8391633	3
58	8.8399561	8.8409977	2
59	8.8417741	8.8428245	1
60	8.8435845	8.8446437	0

93	Sinus.	Tangens.	
0	9.9994044	11.2806042	60
1	9.9993978	11.2781937	59
2	9.9993911	11.2757965	58
3	9.9993844	11.2734123	57
4	9.9993776	11.2710411	56
5	9.9993708	11.2686826	55
6	9.9993640	11.2663369	54
7	9.9993572	11.2640036	53
8	9.9993503	11.2616828	52
9	9.9993433	11.2593742	51
10	9.9993364	11.2570778	50
11	9.9993293	11.2547933	49
12	9.9993223	11.2525208	48
13	9.9993152	11.2502600	47
14	9.9993081	11.2480108	46
15	9.9993009	11.2457731	45
16	9.9992938	11.2435469	44
17	9.9992865	11.2413319	43
18	9.9992793	11.2391281	42
19	9.9992720	11.2369353	41
20	9.9992646	11.2347535	40
21	9.9992572	11.2325825	39
22	9.9992498	11.2304223	38
23	9.9992424	11.2282726	37
24	9.9992349	11.2261335	36
25	9.9992274	11.2240048	35
26	9.9992198	11.2218864	34
27	9.9992122	11.2197782	33
28	9.9992046	11.2176801	32
29	9.9991969	11.2155921	31
30	9.9991892	11.2135139	30
31	9.9991815	11.2114456	29
32	9.9991737	11.2093870	28
33	9.9991659	11.2073380	27
34	9.9991580	11.2052986	26
35	9.9991501	11.2032687	25
36	9.9991422	11.2012481	24
37	9.9991342	11.1992368	23
38	9.9991262	11.1972347	22
39	9.9991182	11.1952417	21
40	9.9991101	11.1932578	20
41	9.9991020	11.1912828	19
42	9.9990938	11 1893166	18
43	9.9990856	11.1873593	17
44	9.9990774	11.1854106	16
45	9.9990691	11 1834706	15
46	9.9990608	11.1815392	14
47	9.9990525	11.1796162	13
48	9.9990441	11.1777016	12
49	9.9990357	11.1757954	11
50	9.9990273	11.1738974	10
51	9.9990188	11.1720076	9
52	9.9990103	11.1701259	8
53	9.9990017	11.1682522	7
54	9.9989931	11.1663866	6
55	9.9989845	11.1645288	5
56	9.9989758	11.1626789	4
57	9.9989671	11.1608367	3
58	9.9989584	11.1590023	2
59	9.9989496	11.1571755	1
60	9.9989408	11.1553563	0

4	Sinus.	Tangens.	
0	8.8435845	8.8446437	60
1	8.8453874	8.8464554	59
2	8.8471827	8.8482597	58
3	8.8489707	8.8500566	57
4	8.8507512	8.8518461	56
5	8.8525245	8.8536283	55
6	8.8542905	8.8554034	54
7	8.8560493	8.8571713	53
8	8.8578010	8.8589321	52
9	8.8595457	8.8606859	51
10	8.8612833	8.8624327	50
11	8.8630139	8.8641725	49
12	8.8647376	8.8659055	48
13	8.8664545	8.8676317	47
14	8.8681646	8.8693511	46
15	8.8698680	8.8710638	45
16	8.8715646	8.8727699	44
17	8.8732546	8.8744694	43
18	8.8749381	8.8761623	42
19	8.8766150	8.8778487	41
20	8.8782854	8.8795286	40
21	8.8799493	8.8812022	39
22	8.8816069	8.8828694	38
23	8.8832581	8.8845303	37
24	8.8849031	8.8861850	36
25	8.8865418	8.8878334	35
26	8.8881743	8.8894757	34
27	8.8898007	8.8911119	33
28	8.8914209	8.8927420	32
29	8.8930351	8.8943660	31
30	8.8946433	8.8959842	30
31	8.8962455	8.8975963	29
32	8.8978418	8.8992026	28
33	8.8994322	8.9008030	27
34	8.9010169	8.9023977	26
35	8.9025955	8.9039866	25
36	8.9041685	8.9055697	24
37	8.9057358	8.9071472	23
38	8.9072975	8.9087190	22
39	8.9088535	8.9102853	21
40	8.9104039	8.9118460	20
41	8.9119487	8.9134012	19
42	8.9134881	8.9149509	18
43	8.9150219	8.9164952	17
44	8.9165504	8.9180340	16
45	8.9180734	8.9195675	15
46	8.9195911	8.9210957	14
47	8.9211034	8.9226186	13
48	8.9226105	8.9241363	12
49	8.9241123	8.9256487	11
50	8.9256089	8.9271560	10
51	8.9271003	8.9286581	9
52	8.9285866	8.9301552	8
53	8.9300678	8.9316471	7
54	8.9315439	8.9331340	6
55	8.9330150	8.9346160	5
56	8.9344811	8.9360929	4
57	8.9359422	8.9375650	3
58	8.9373983	8.9390321	2
59	8.9388496	8.9404944	1
60	8.9402960	8.9419518	0

94	Sinus.	Tangens.	
0	9.9989408	11.1553563	60
1	9.9989319	11.1535446	59
2	9.9989230	11.1517403	58
3	9.9989141	11.1499434	57
4	9.9989052	11.1481539	56
5	9.9988962	11.1463717	55
6	9.9988871	11.1445966	54
7	9.9988780	11.1428287	53
8	9.9988689	11.1410679	52
9	9.9988598	11.1393141	51
10	9.9988506	11 1375673	50
11	9.9988414	11.1358275	49
12	9.9988321	11.1340945	48
13	9.9988228	11.1323683	47
14	9.9988135	11.1306489	46
15	9.9988041	11.1289362	45
16	9.9987947	11.1272301	44
17	9.9987853	11.1255306	43
18	9.9987758	11.1238377	42
19	9.9987663	11.1221513	41
20	9.9987567	11.1204714	40
21	9.9987471	11.1187978	39
22	9.9987375	11.1171306	38
23	9.9987278	11.1154697	37
24	9.9987181	11.1138150	36
25	9.9987084	11.1121666	35
26	9.9986986	11.1105243	34
27	9.9986888	11.1088881	33
28	9.9986790	11.1072580	32
29	9.9986691	11.1056340	31
30	9.9986591	11.1040158	30
31	9.9986492	11.1024037	29
32	9.9986392	11.1007974	28
33	9.9986292	11.0991970	27
34	9.9986191	11.0976023	26
35	9.9986090	11.0960134	25
36	9.9985988	11.0944303	24
37	9.9985886	11.0928528	23
38	9.9985784	11.0912810	22
39	9.9985682	11.0897147	21
40	9.9985579	11.0881540	20
41	9.9985475	11.0865988	19
42	9.9985372	11.0850491	18
43	9.9985268	11.0835048	17
44	9.9985163	11.0819660	16
45	9.9985058	11.0804325	15
46	9.9984953	11.0789043	14
47	9.9984848	11.0773814	13
48	9.9984742	11.0758637	12
49	9.9984636	11.0743511	11
50	9.9984529	11.0728440	10
51	9.9984422	11.0713419	9
52	9.9984315	11.0698448	8
53	9.9984207	11.0683529	7
54	9.9984099	11.0668660	6
55	9.9983990	11.0653840	5
56	9.9983881	11.0639071	4
57	9.9983772	11.0624350	3
58	9.9983663	11.0609679	2
59	9.9983553	11.0595056	1
60	9.9983442	11.0580482	0

5	Sinus.	Tangens.	
0	8.9402960	8.9419518	60
1	8.9417376	8.9434044	59
2	8.9431743	8.9448523	58
3	8.9446063	8.9462954	57
4	8.9460335	8.9477338	56
5	8.9474561	8.9491676	55
6	8.9488739	8.9505967	54
7	8.9502871	8.9520211	53
8	8.9516957	8.9534410	52
9	8.9530996	8.9548564	51
10	8.9544991	8.9562672	50
11	8.9558940	8.9576735	49
12	8.9572843	8.9590754	48
13	8.9586703	8.9604728	47
14	8.9600517	8.9618659	46
15	8.9614288	8.9632545	45
16	8.9628014	8.9646386	44
17	8.9641697	8.9660188	43
18	8.9655337	8.9673944	42
19	8.9668934	8.9687658	41
20	8.9682487	8.9701330	40
21	8.9695999	8.9714959	39
22	8.9709468	8.9728547	38
23	8.9722895	8.9742092	37
24	8.9736280	8.9755597	36
25	8.9749624	8.9769060	35
26	8.9762926	8.9782483	34
27	8.9776188	8.9795865	33
28	8.9789408	8.9809206	32
29	8.9802589	8.9822507	31
30	8.9815729	8.9835769	30
31	8.9828829	8.9848991	29
32	8.9841889	8.9862173	28
33	8.9854910	8.9875317	27
34	8.9867891	8.9888421	26
35	8.9880834	8.9901487	25
36	8.9893737	8.9914514	24
37	8.9906602	8.9927503	23
38	8.9919429	8.9940454	22
39	8.9932217	8.9953367	21
40	8.9944968	8.9966243	20
41	8.9957681	8.9979081	19
42	8.9970356	8.9991883	18
43	8.9982994	9.0004647	17
44	8.9995595	9.0017375	16
45	9.0008160	9.0030066	15
46	9.0020687	9.0042721	14
47	9.0033179	9.0055340	13
48	9.0045634	9.0067924	12
49	9.0058053	9.0080471	11
50	9.0070436	9.0092984	10
51	9.0082784	9.0105461	9
52	9.0095096	9.0117903	8
53	9.0107374	9.0130310	7
54	9.0119616	9.0142682	6
55	9.0131823	9.0155021	5
56	9.0143996	9.0167325	4
57	9.0156135	9.0179594	3
58	9.0168239	9.0191831	2
59	9.0180309	9.0204033	1
60	9.0192346	9.0216202	0

95	Sinus.	Tangens.	
0	9.9983442	11.0580482	60
1	9.9983332	11.0565956	59
2	9.9983220	11.0551477	58
3	9.9983109	11.0537046	57
4	9.9982997	11.0522662	56
5	9.9982885	11.0508324	55
6	9.9982772	11.0494033	54
7	9.9982660	11.0479789	53
8	9.9982546	11.0465590	52
9	9.9982433	11.0451436	51
10	9.9982318	11.0437328	50
11	9.9982204	11.0423265	49
12	9.9982089	11.0409246	48
13	9.9981974	11.0395272	47
14	9.9981859	11.0381341	46
15	9.9981743	11.0367455	45
16	9.9981626	11.0353612	44
17	9.9981510	11.0339812	43
18	9.9981393	11.0326056	42
19	9.9981275	11.0312342	41
20	9.9981158	11.0298670	40
21	9.9981040	11.0285041	39
22	9.9980921	11.0271453	38
23	9.9980802	11.0257908	37
24	9.9980683	11.0244403	36
25	9.9980563	11.0230940	35
26	9.9980443	11.0217517	34
27	9.9980323	11.0204135	33
28	9.9980202	11.0190794	32
29	9.9980081	11.0177493	31
30	9.9979960	11.0164231	30
31	9.9979838	11.0151009	29
32	9.9979716	11.0137827	28
33	9.9979593	11.0124683	27
34	9.9979470	11.0111579	26
35	9.9979347	11.0098513	25
36	9.9979223	11.0085486	24
37	9.9979099	11.0072497	23
38	9.9978975	11.0059546	22
39	9.9978850	11.0046633	21
40	9.9978725	11.0033757	20
41	9.9978599	11.0020918	19
42	9.9978473	11.0008117	18
43	9.9978347	10.9995353	17
44	9.9978220	10.9982625	16
45	9.9978093	10.9969934	15
46	9.9977966	10.9957279	14
47	9.9977838	10.9944660	13
48	9.9977710	10.9932076	12
49	9.9977582	10.9919529	11
50	9.9977453	10.9907016	10
51	9.9977323	10.9894539	9
52	9.9977194	10.9882097	8
53	9.9977064	10 9869690	7
54	9.9976933	10.9857318	6
55	9.9976803	10.9844979	5
56	9.9976672	10.9832675	4
57	9.9976540	10.9820406	3
58	9.9976408	10.9808169	2
59	9.9976276	10.9795967	1
60	9.9976143	10.9783798	0

6	Sinus.	Tangens.	
0	9.0192346	9.0216202	60
1	9.0204348	9.0228338	59
2	9.0216318	9.0240441	58
3	9.0228254	9.0252510	57
4	9.0240157	9.0264548	56
5	9.0252027	9.0276552	55
6	9.0263865	9.0288524	54
7	9.0275669	9.0300464	53
8	9.0287442	9.0312373	52
9	9.0299182	9.0324249	51
10	9.0310890	9.0336093	50
11	9.0322567	9.0347906	49
12	9.0334212	9.0359688	48
13	9.0345825	9.0371439	47
14	9.0357407	9.0383159	46
15	9.0368958	9.0394848	45
16	9.0380477	9.0406506	44
17	9.0391966	9.0418134	43
18	9.0403424	9.0429731	42
19	9.0414852	9.0441299	41
20	9.0426249	9.0452836	40
21	9.0437617	9.0464343	39
22	9.0448954	9.0475821	38
23	9.0460261	9.0487270	37
24	9.0471538	9.0498689	36
25	9.0482786	9.0510078	35
26	9.0494005	9.0521439	34
27	9.0505194	9.0532770	33
28	9.0516354	9.0544074	32
29	9.0527485	9.0555349	31
30	9.0538588	9.0566595	30
31	9.0549661	9.0577813	29
32	9.0560705	9.0589002	28
33	9.0571723	9.0600164	27
34	9.0582711	9.0611297	26
35	9.0593672	9.0622403	25
36	9.0604604	9.0633482	24
37	9.0615509	9.0644533	23
38	9.0626386	9.0655556	22
39	9.0637235	9.0666553	21
40	9.0648057	9.0677522	20
41	9.0658852	9.0688465	19
42	9.0669619	9.0699381	18
43	9.0680360	9.0710270	17
44	9.0691074	9.0721133	16
45	9.0701761	9 0731969	15
46	9.0712421	9.0742779	14
47	9.0723055	9.0753563	13
48	9.0733663	9.0764321	12
49	9.0744244	9.0775053	11
50	9.0754799	9.0785760	10
51	9.0765329	9.0796441	9
52	9.0775832	9.0807096	8
53	9.0786310	9.0817726	7
54	9.0796762	9.0828331	6
55	9.0807189	9.0838911	5
56	9.0817590	9.0849466	4
57	9.0827966	9.0859996	3
58	9.0838317	9.0870501	2
59	9.0848643	9.0880981	1
60	9.0858945	9.0891438	0

96	Sinus.	Tangens.	
0	9.9976143	10.9783798	60
1	9.9976011	10.9771662	59
2	9.9975877	10.9759559	58
3	9.9975743	10.9747490	57
4	9.9975609	10.9735452	56
5	9.9975475	10.9723448	55
6	9.9975340	10.9711476	54
7	9.9975205	10.9699536	53
8	9.9975069	10.9687627	52
9	9.9974933	10.9675751	51
10	9.9974797	10.9663907	50
11	9.9974660	10.9652094	49
12	9.9974523	10.9640312	48
13	9.9974386	10.9628561	47
14	9.9974248	10.9616841	46
15	9.9974110	10.9605152	45
16	9.9973971	10.9593494	44
17	9.9973833	10.9581866	43
18	9.9973693	10.9570269	42
19	9.9973554	10.9558701	41
20	9.9973414	10.9547164	40
21	9.9973273	10.9535657	39
22	9.9973132	10.9524179	38
23	9.9972991	10.9512730	37
24	9.9972850	10.9501311	36
25	9.9972708	10.9489922	35
26	9.9972566	10.9478561	34
27	9.9972423	10.9467229	33
28	9.9972280	10.9455926	32
29	9.9972137	10.9444651	31
30	9.9971993	10.9433405	30
31	9.9971849	10.9422187	29
32	9.9971704	10.9410998	28
33	9.9971559	10.9399836	27
34	9.9971414	10.9388703	26
35	9.9971268	10.9377597	25
36	9.9971122	10.9366518	24
37	9.9970976	10.9355467	23
38	9.9970829	10.9344444	22
39	9.9970682	10.9333447	21
40	9.9970535	10.9322478	20
41	9.9970387	10.9311535	19
42	9.9970239	10.9300619	18
43	9.9970090	10.9289730	17
44	9.9969941	10.9278867	16
45	9.9969792	10.9268031	15
46	9.9969642	10.9257221	14
47	9.9969492	10.9246437	13
48	9.9969342	10.9235679	12
49	9.9969191	10.9224947	11
50	9.9969040	10.9214240	10
51	9.9968888	10.9203559	9
52	9.9968736	10.9192904	8
53	9.9968584	10.9182274	7
54	9.9968431	10.9171669	6
55	9.9968278	10.9161089	5
56	9 9968125	10.9150534	4
57	9.9967971	10.9140004	3
58	9.9967817	10.9129499	2
59	9.9967662	10.9119019	1
60	9.9967507	10.9108562	0

7	Sinus.	Tangens.	
0	9.0858945	9.0891438	60
1	9.0869211	9.0901869	59
2	9.0879473	9.0912277	58
3	9.0889700	9.0922660	57
4	9.0899903	9.0933020	56
5	9.0910082	9.0943355	55
6	9.0920237	9.0953667	54
7	9.0930367	9.0963955	53
8	9.0940474	9.0974219	52
9	9.0950556	9.0984460	51
10	9.0960615	9.0994678	50
11	9.0970651	9.1004872	49
12	9.0980662	9.1015044	48
13	9.0990651	9.1025192	47
14	9.1000616	9.1035317	46
15	9.1010558	9.1045420	45
16	9.1020477	9.1055500	44
17	9.1030373	9.1065557	43
18	9.1040246	9.1075591	42
19	9.1050096	9.1085604	41
20	9.1059924	9.1095594	40
21	9.1069729	9.1105562	39
22	9.1079512	9.1115508	38
23	9.1089272	9.1125431	37
24	9.1099010	9.1135333	36
25	9.1108726	9.1145213	35
26	9.1118420	9.1155072	34
27	9.1128092	9.1164909	33
28	9.1137742	9.1174724	32
29	9.1147370	9.1184518	31
30	9.1156977	9.1194291	30
31	9.1166562	9.1204043	29
32	9.1176125	9.1213773	28
33	9.1185667	9.1223482	27
34	9.1195188	9.1233171	26
35	9.1204688	9.1242839	25
36	9.1214167	9.1252486	24
37	9.1223624	9.1262112	23
38	9.1233061	9.1271718	22
39	9.1242477	9.1281303	21
40	9.1251872	9.1290868	20
41	9.1261246	9.1300413	19
42	9.1270600	9.1309937	18
43	9.1279934	9.1319442	17
44	9.1289247	9.1328926	16
45	9.1298539	9.1338391	15
46	9.1307812	9.1347835	14
47	9.1317064	9.1357260	13
48	9.1326297	9.1366665	12
49	9.1335509	9.1376051	11
50	9.1344702	9.1385417	10
51	9.1353875	9.1394764	9
52	9.1363028	9.1404092	8
53	9.1372161	9.1413400	7
54	9.1381275	9.1422689	6
55	9.1390370	9.1431959	5
56	9.1399445	9.1441210	4
57	9.1408501	9.1450442	3
58	9.1417537	9.1459655	2
59	9.1426555	9.1468850	1
60	9.1435553	9.1478025	0

97	Sinus.	Tangens.	
0	9.9967507	10.9108562	60
1	9.9967352	10.9098131	59
2	9.9967196	10.9087723	58
3	9.9967040	10.9077340	57
4	9.9966884	10.9066980	56
5	9.9966727	10.9056645	55
6	9.9966570	10.9046333	54
7	9.9966412	10.9036045	53
8	9.9966254	10.9025781	52
9	9.9966096	10.9015540	51
10	9.9965937	10.9005322	50
11	9.9965778	10.8995128	49
12	9.9965619	10.8984956	48
13	9.9965459	10.8974808	47
14	9.9965299	10.8954683	46
15	9.9965138	10.8954580	45
16	9.9964977	10.8944500	44
17	9.9964816	10.8934443	43
18	9.9964655	10.8924409	42
19	9.9964493	10.8914396	41
20	9.9964330	10.8904406	40
21	9.9964167	10.8894438	39
22	9.9964004	10.8884492	38
23	9.9963841	10.8874569	37
24	9.9963677	10.8864667	36
25	9.9963513	10.8854787	35
26	9.9963348	10.8844928	34
27	9.9963183	10.8835091	33
28	9.9963018	10.8825276	32
29	9.9962852	10.8815482	31
30	9.9962686	10.8805709	30
31	9.9962519	10.8795957	29
32	9.9962352	10.8786227	28
33	9.9962185	10.8776518	27
34	9.9962017	10.8766829	26
35	9.9961849	10.8757161	25
36	9.9961681	10.8747514	24
37	9.9961512	10.8737888	23
38	9.9961343	10.8728281	22
39	9.9961174	10.8718697	21
40	9.9961004	10.8709132	20
41	9.9960834	10.8699587	19
42	9.9960663	10.8690063	18
43	9.9960492	10.8680558	17
44	9.9960321	10.8671074	16
45	9.9960149	10.8661609	15
46	9.9959977	10.8652165	14
47	9.9959804	10.8642740	13
48	9.9959631	10.8633335	12
49	9.9959458	10.8623949	11
50	9.9959284	10.8614583	10
51	9.9959111	10.8605236	9
52	9.9958936	10.8595908	8
53	9.9958761	10.8586600	7
54	9.9958586	10.8577311	6
55	9.9958411	10.8568041	5
56	9.9958235	10.8558790	4
57	9.9958059	10.8549558	3
58	9.9957882	10.8540345	2
59	9.9957705	10.8531150	1
60	9.9957528	10.8521975	0

8	Sinus.	Tangens.	
0	9.1435553	9.1478025	60
1	9.1444532	9.1487182	59
2	9.1453493	9.1496321	58
3	9.1462435	9.1505441	57
4	9.1471358	9.1514543	56
5	9.1480262	9.1523627	55
6	9.1489149	9.1532692	54
7	9.1498015	9.1541739	53
8	9.1506864	9.1550769	52
9	9.1515694	9.1559780	51
10	9.1524507	9.1568773	50
11	9.1533301	9.1577748	49
12	9.1542076	9.1586706	48
13	9.1550834	9.1595646	47
14	9.1559574	9.1604569	46
15	9.1568296	9.1613473	45
16	9.1577000	9.1622361	44
17	9.1585686	9.1631231	43
18	9.1594354	9.1640083	42
19	9.1603005	9.1648919	41
20	9.1611639	9.1657737	40
21	9.1620254	9.1666538	39
22	9.1628853	9.1675322	38
23	9.1637434	9.1684089	37
24	9.1645998	9.1692839	36
25	9.1654544	9.1701572	35
26	9.1663074	9.1710288	34
27	9.1671586	9.1718989	33
28	9.1680081	9.1727672	32
29	9.1688559	9.1736338	31
30	9.1697021	9.1744988	30
31	9.1705465	9.1753622	29
32	9.1713893	9.1762239	28
33	9.1722305	9.1770840	27
34	9.1730699	9.1779425	26
35	9.1739077	9.1787993	25
36	9.1747439	9.1796546	24
37	9.1755784	9.1805082	23
38	9.1764112	9.1813602	22
39	9.1772425	9.1822106	21
40	9.1780721	9.1830595	20
41	9.1789001	9.1839068	19
42	9.1797265	9.1847525	18
43	9.1805512	9.1855966	17
44	9.1813744	9.1864392	16
45	9.1821960	9.1872802	15
46	9.1830160	9.1881196	14
47	9.1838344	9.1889575	13
48	9.1846512	9.1897939	12
49	9.1854665	9.1906287	11
50	9.1862802	9.1914621	10
51	9.1870923	9.1922939	9
52	9.1879029	9.1931241	8
53	9.1887120	9.1939529	7
54	9.1895195	9.1947802	6
55	9.1903254	9.1956059	5
56	9.1911299	9.1964302	4
57	9.1919328	9.1972530	3
58	9.1927342	9.1980743	2
59	9.1935341	9.1988941	1
60	9.1943324	9.1997125	0

98	Sinus.	Tangens.	
0	9.9957528	10.8521975	60
1	9.9957350	10.8512818	59
2	9.9957172	10.8503679	58
3	9.9956993	10.8494559	57
4	9.9956815	10.8485457	56
5	9.9956635	10.8476373	55
6	9.9956456	10.8467308	54
7	9.9956276	10.8458261	53
8	9.9956095	10.8449231	52
9	9.9955915	10.8440220	51
10	9.9955734	10.8431227	50
11	9.9955552	10.8422252	49
12	9.9955370	10.8413294	48
13	9.9955188	10.8404354	47
14	9.9955005	10.8395431	46
15	9.9954822	10.8386527	45
16	9.9954639	10.8377639	44
17	9.9954455	10.8368769	43
18	9.9954271	10.8359917	42
19	9.9954087	10.8351081	41
20	9.9953902	10.8342263	40
21	9.9953717	10.8333462	39
22	9.9953531	10.8324678	38
23	9.9953345	10.8315911	37
24	9.9953159	10.8307161	36
25	9.9952972	10.8298428	35
26	9.9952785	10.8289711	34
27	9.9952597	10.8281011	33
28	9.9952409	10.8272328	32
29	9.9952221	10.8263662	31
30	9.9952033	10.8255012	30
31	9.9951844	10.8246378	29
32	9.9951654	10.8237761	28
33	9.9951464	10.8229160	27
34	9.9951274	10.8220575	26
35	9.9951084	10.8212007	25
36	9.9950893	10.8203454	24
37	9.9950702	10.8194918	23
38	9.9950510	10.8186398	22
39	9.9950318	10.8177894	21
40	9.9950126	10.8169405	20
41	9.9949933	10.8160932	19
42	9.9949740	10.8152475	18
43	9.9949546	10.8144034	17
44	9.9949352	10.8135608	16
45	9.9949158	10.8127198	15
46	9.9948964	10.8118804	14
47	9.9948769	10.8110425	13
48	9.9948573	10.8102061	12
49	9.9948377	10.8093713	11
50	9.9948181	10.8085379	10
51	9.9947985	10.8077061	9
52	9.9947788	10.8068759	8
53	9.9947591	10.8060471	7
54	9.9947393	10.8052198	6
55	9.9947195	10.8043941	5
56	9.9946997	10.8035698	4
57	9.9946798	10.8027470	3
58	9.9946599	10.8019257	2
59	9.9946399	10.8011059	1
60	9.9946199	10.8002875	0

9	Sinus.	Tangens.	
0	9.1943324	9.1997125	60
1	9.1951293	9.2005294	59
2	9.1959247	9.2013449	58
3	9.1967186	9.2021588	57
4	9.1975110	9.2029714	56
5	9.1983019	9.2037825	55
6	9.1990913	9.2045922	54
7	9.1998793	9.2054004	53
8	9.2006658	9.2062072	52
9	9.2014509	9.2070126	51
10	9.2022345	9.2078165	50
11	9.2030167	9.2086191	49
12	9.2037974	9.2094203	48
13	9.2045766	9.2102200	47
14	9.2053545	9.2110184	46
15	9.2061309	9.2118153	45
16	9.2069059	9.2126109	44
17	9.2076795	9.2134051	43
18	9.2084516	9.2141980	42
19	9.2092224	9.2149894	41
20	9.2099917	9.2157795	40
21	9.2107597	9.2165683	39
22	9.2115263	9.2173556	38
23	9.2122914	9.2181417	37
24	9.2130552	9.2189264	36
25	9.2138176	9.2197097	35
26	9.2145787	9.2204917	34
27	9.2153384	9.2212724	33
28	9.2160967	9.2220518	32
29	9.2168536	9.2228298	31
30	9.2176092	9.2236065	30
31	9.2183635	9.2243819	29
32	9.2191164	9.2251561	28
33	9.2198680	9.2259289	27
34	9.2206182	9.2267004	26
35	9.2213671	9.2274706	25
36	9.2221147	9.2282395	24
37	9.2228609	9.2290071	23
38	9.2236059	9.2297735	22
39	9.2243495	9.2305386	21
40	9.2250918	9.2313024	20
41	9.2258328	9.2320650	19
42	9.2265725	9.2328262	18
43	9.2273110	9.2335863	17
44	9.2280481	9.2343451	16
45	9.2287839	9.2351026	15
46	9.2295185	9.2358589	14
47	9.2302518	9.2366139	13
48	9.2309838	9.2373678	12
49	9.2317145	9.2381203	11
50	9.2324440	9.2388717	10
51	9.2331722	9.2396218	9
52	9.2338992	9.2403708	8
53	9.2346249	9.2411185	7
54	9.2353494	9.2418650	6
55	9.2360726	9.2426103	5
56	9.2367946	9.2433543	4
57	9.2375153	9.2440972	3
58	9.2382349	9.2448389	2
59	9.2389532	9.2455794	1
60	9.2396702	9.2463188	0

99	Sinus.	Tangens.	
0	9.9946199	10.8002875	60
1	9.9945999	10.7994706	59
2	9.9945798	10.7986551	58
3	9.9945597	10.7978412	57
4	9.9945396	10.7970286	56
5	9.9945194	10.7962175	55
6	9.9944992	10.7954078	54
7	9.9944789	10.7945996	53
8	9.9944587	10.7937928	52
9	9.9944383	10.7929874	51
10	9.9944180	10.7921835	50
11	9.9943975	10.7913809	49
12	9.9943771	10.7905797	48
13	9.9943566	10.7897800	47
14	9.9943361	10.7889816	46
15	9.9943156	10.7881847	45
16	9.9942950	10.7873891	44
17	9.9942743	10.7865949	43
18	9.9942537	10.7858020	42
19	9.9942330	10.7850106	41
20	9.9942122	10.7842205	40
21	9.9941914	10.7834317	39
22	9.9941706	10.7826444	38
23	9.9941498	10.7818583	37
24	9.9941289	10.7810736	36
25	9.9941079	10.7802903	35
26	9.9940870	10.7795083	34
27	9.9940659	10.7787276	33
28	9.9940449	10.7779482	32
29	9.9940238	10.7771702	31
30	9.9940027	10.7763935	30
31	9.9939815	10.7756181	29
32	9.9939603	10.7748439	28
33	9.9939391	10.7740711	27
34	9.9939178	10.7732996	26
35	9.9938965	10.7725294	25
36	9.9938752	10.7717605	24
37	9.9938538	10.7709929	23
38	9.9938324	10.7702265	22
39	9.9938109	10.7694614	21
40	9.9937894	10.7686976	20
41	9.9937679	10.7679350	19
42	9.9937463	40.7671738	18
43	9.9937247	10.7664137	17
44	9.9937030	10.7656549	16
45	9.9936813	10.7648974	15
46	9.9936596	10.7641411	14
47	9.9936378	10.7633861	13
48	9.9936160	10.7626322	12
49	9.9935942	10.7618797	11
50	9.9935723	10.7611283	10
51	9.9935504	10.7603782	9
52	9.9935285	10.7596292	8
53	9.9935065	10.7588815	7
54	9.9934844	10.7581350	6
55	9.9934624	10.7573897	5
56	9.9934403	10.7566457	4
57	9.9934181	10.7559028	3
58	9.9933959	10.7551611	2
59	9.9933737	10.7544206	1
60	9.9933515	10.7536812	0

10	Sinus.	Tangens.	
0	9.2396702	9.2463188	60
1	9.2403861	9.2470569	59
2	9.2411007	9.2477939	58
3	9.2418141	9.2485297	57
4	9.2425264	9.2492643	56
5	9.2432374	9.2499978	55
6	9.2439472	9.2507301	54
7	9.2446558	9.2514612	53
8	9.2453632	9.2521912	52
9	9.2460695	9.2529200	51
10	9.2467746	9.2536477	50
11	9.2474784	9.2543743	49
12	9.2481811	9.2550997	48
13	9.2488827	9.2558240	47
14	9.2495830	9.2565472	46
15	9.2502822	9.2572692	45
16	9.2509803	9.2579901	44
17	9.2516772	9.2587099	43
18	9.2523729	9.2594285	42
19	9.2530675	9.2601461	41
20	9.2537609	9.2608625	40
21	9.2544532	9.2615779	39
22	9.2551444	9.2622921	38
23	9.2558344	9.2630053	37
24	9.2565233	9.2637173	36
25	9.2572110	9.2644283	35
26	9.2578977	9.2651382	34
27	9.2585832	9.2658470	33
28	9.2592676	9.2665547	32
29	9.2599509	9.2672613	31
30	9.2606330	9.2679669	30
31	9.2613141	9.2686714	29
32	9.2619941	9.2693749	28
33	9.2626729	9.2700772	27
34	9.2633507	9.2707786	26
35	9.2640274	9.2714788	25
36	9.2647030	9.2721780	24
37	9.2653775	9.2728762	23
38	9.2660509	9.2735733	22
39	9.2667232	9.2742694	21
40	9.2673945	9.2749644	20
41	9.2680647	9.2756584	19
42	9.2687338	9.2763514	18
43	9.2694019	9.2770434	17
44	9.2700689	9.2777343	16
45	9.2707348	9.2784242	15
46	9.2713997	9.2791131	14
47	9.2720635	9.2798009	13
48	9.2727263	9.2804878	12
49	9.2733880	9.2811736	11
50	9.2740487	9.2818585	10
51	9.2747083	9.2825423	9
52	9.2753669	9.2832251	8
53	9.2760245	9.2839070	7
54	9.2766811	9.2845878	6
55	9.2773366	9.2852677	5
56	9.2779911	9.2859466	4
57	9.2786445	9.2866245	3
58	9.2792970	9.2873014	2
59	9.2799484	9.2879773	1
60	9.2805988	9.2886523	0

100	Sinus.	Tangens.	
0	9.9933515	10.7536812	60
1	9.9933292	10.7529431	59
2	9.9933068	10.7522061	58
3	9.9932845	10.7514703	57
4	9.9932621	10.7507357	56
5	9.9932396	10.7500022	55
6	9.9932171	10.7492699	54
7	9.9931946	10.7485388	53
8	9.9931720	10.7478088	52
9	9.9931494	10.7470800	51
10	9.9931268	10.7463523	50
11	9.9931041	10.7456257	49
12	9.9930814	10.7449003	48
13	9.9930587	10.7441760	47
14	9.9930359	10.7434528	46
15	9.9930131	10.7427308	45
16	9.9929902	10.7420099	44
17	9.9929673	10.7412901	43
18	9.9929444	10.7405715	42
19	9.9929214	10.7398539	41
20	9.9928984	10.7391375	40
21	9.9928753	10.7384221	39
22	9.9928522	10.7377079	38
23	9.9928291	10.7369947	37
24	9.9928059	10.7362827	36
25	9.9927827	10.7355717	35
26	9.9927595	10.7348618	34
27	9.9927362	10.7341530	33
28	9.9927129	10.7334453	32
29	9.9926895	10.7327387	31
30	9.9926661	10.7320331	30
31	9.9926427	10.7313286	29
32	9.9926192	10.7306251	28
33	9.9925957	10.7299228	27
34	9.9925722	10.7292214	26
35	9.9925486	10.7285212	25
36	9.9925250	10.7278220	24
37	9.9925013	10.7271238	23
38	9.9924776	10.7264267	22
39	9.9924539	10.7257306	21
40	9.9924301	10.7250356	20
41	9.9924063	10.7243416	19
42	9.9923824	10.7236486	18
43	9.9923585	10.7229566	17
44	9.9923346	10.7222657	16
45	9.9923106	10.7215758	15
46	9.9922866	10.7208869	14
47	9.9922626	10.7201991	13
48	9.9922385	10.7195122	12
49	9.9922144	10.7188264	11
50	9.9921902	10.7181415	10
51	9.9921660	10.7174577	9
52	9.9921418	10.7167749	8
53	9.9921175	10.7160930	7
54	9.9920932	10.7154122	6
55	9.9920689	10.7147323	5
56	9.9920445	10.7140534	4
57	9.9920201	10.7133755	3
58	9.9919956	10.7126986	2
59	9.9919711	10.7120227	1
60	9.9919466	10.7113477	0

11	Sinus.	Tangens.	
0	9.2805988	9.2886523	60
1	9.2812483	9.2893263	59
2	9.2818967	9.2899993	58
3	9.2825441	9.2906713	57
4	9.2831905	9.2913424	56
5	9.2838359	9.2920126	55
6	9.2844803	9.2926817	54
7	9.2851237	9.2933500	53
8	9.2857661	9.2940172	52
9	9.2864076	9.2946836	51
10	9.2870480	9.2953489	50
11	9.2876875	9.2960134	49
12	9.2883260	9.2966769	48
13	9.2889636	9.2973395	47
14	9.2896001	9.2980011	46
15	9.2902357	9.2986618	45
16	9.2908704	9.2993216	44
17	9.2915040	9.2999804	43
18	9.2921367	9.3006383	42
19	9.2927685	9.3012954	41
20	9.2933993	9.3019514	40
21	9.2940291	9.3026066	39
22	9.2946580	9.3032609	38
23	9.2952859	9.3039143	37
24	9.2959129	9.3045667	36
25	9.2965390	9.3052183	35
26	9.2971641	9.3058689	34
27	9.2977883	9.3065187	33
28	9.2984116	9.3071675	32
29	9.2990339	9.3078155	31
30	9.2996553	9.3084626	30
31	9.3002758	9.3091088	29
32	9.3008953	9.3097541	28
33	9.3015140	9.3103985	27
34	9.3021317	9.3110421	26
35	9.3027485	9.3116848	25
36	9.3033644	9.3123266	24
37	9.3039794	9.3129675	23
38	9.3045934	9.3136076	22
39	9.3052066	9.3142468	21
40	9.3058189	9.3148851	20
41	9.3064303	9.3155226	19
42	9.3070407	9.3161592	18
43	9.3076503	9.3167950	17
44	9.3082590	9.3174299	16
45	9.3088668	9.3180640	15
46	9.3094737	9.3186972	14
47	9.3100798	9.3193295	13
48	9.3106849	9.3199611	12
49	9.3112892	9.3205918	11
50	9.3118926	9.3212216	10
51	9.3124951	9.3218506	9
52	9.3130968	9.3224788	8
53	9.3136976	9.3231061	7
54	9.3142975	9.3237327	6
55	9.3148965	9.3243584	5
56	9.3154947	9.3249832	4
57	9.3160921	9.3256073	3
58	9.3166885	9.3262305	2
59	9.3172841	9.3268529	1
60	9.3178789	9.3274745	0

101	Sinus.	Tangens.	
0	9.9919466	10.7113477	60
1	9.9919220	10.7106737	59
2	9.9918974	10.7100007	58
3	9.9918727	10.7093287	57
4	9.9918480	10.7086576	56
5	9.9918233	10.7079874	55
6	9.9917986	10.7073183	54
7	9.9917737	10.7066500	53
8	9.9917489	10.7059828	52
9	9.9917240	10.7053164	51
10	9.9916991	10.7046511	50
11	9.9916741	10.7039866	49
12	9.9916492	10.7033231	48
13	9.9916241	10.7026605	47
14	9.9915990	10.7019989	46
15	9.9915739	10.7013382	45
16	9.9915488	10.7006784	44
17	9.9915236	10.7000196	43
18	9.9914984	10.6993617	42
19	9.9914731	10.6987046	41
20	9.9914478	10.6980486	40
21	9.9914225	10.6973934	39
22	9.9913971	10.6967391	38
23	9.9913717	10.6960857	37
24	9.9913462	10.6954333	36
25	9.9913207	10.6947817	35
26	9.9912952	10.6941311	34
27	9.9912696	10.6934813	33
28	9.9912440	10.6928325	32
29	9.9912184	10.6921845	31
30	9.9911927	10.6915374	30
31	9.9911670	10.6908912	29
32	9.9911412	10.6902459	28
33	9.9911154	10.6896015	27
34	9.9910896	10.6889579	26
35	9.9910637	10.6883152	25
36	9.9910378	10.6876734	24
37	9.9910119	10.6870325	23
38	9.9909859	10.6863924	22
39	9.9909598	10.6857532	21
40	9.9909338	10.6851149	20
41	9.9909077	10.6844774	19
42	9.9908815	10.6838408	18
43	9.9908553	10.6832050	17
44	9.9908291	10.6825701	16
45	9.9908029	10.6819360	15
46	9.9907766	10.6813028	14
47	9.9907502	10.6806705	13
48	9.9907239	10.6800389	12
49	9.9906974	10.6794082	11
50	9.9906710	10.6787784	10
51	9.9906445	10.6781494	9
52	9.9906180	10.6775212	8
53	9.9905914	10.6768939	7
54	9.9905648	10.6762673	6
55	9.9905382	10.6756416	5
56	9.9905115	10.6750168	4
57	9.9904848	10.6743927	3
58	9.9904580	10.6737695	2
59	9.9904312	10.6731471	1
60	9.9904044	10.6725255	0

12	Sinus.	Tangens.	
0	9.3178789	9.3274745	60
1	9.3184728	9.3280953	59
2	9.3190659	9.3287153	58
3	9.3196581	9.3293345	57
4	9.3202495	9.3299528	56
5	9.3208400	9.3305704	55
6	9.3214297	9.3311872	54
7	9.3220186	9.3318031	53
8	9.3226066	9.3324183	52
9	9.3231938	9.3330327	51
10	9.3237802	9.3336463	50
11	9.3243657	9.3342591	49
12	9.3249505	9.3348711	48
13	9.3255344	9.3354823	47
14	9.3261174	9.3360927	46
15	9.3266997	9.3367024	45
16	9.3272811	9.3373113	44
17	9.3278617	9.3379194	43
18	9.3284416	9.3385267	42
19	9.3290206	9.3391333	41
20	9.3295988	9.3397391	40
21	9.3301761	9.3403441	39
22	9.3307527	9.3409484	38
23	9.3313285	9.3415519	37
24	9.3319035	9.3421546	36
25	9.3324777	9.3427566	35
26	9.3330511	9.3433578	34
27	9.3336237	9.3439583	33
28	9.3341955	9.3445580	32
29	9.3347665	9.3451570	31
30	9.3353368	9.3457552	30
31	9.3359062	9.3463527	29
32	9.3364749	9.3469494	28
33	9.3370428	9.3475454	27
34	9.3376099	9.3481407	26
35	9.3381762	9.3487352	25
36	9.3387418	9.3493290	24
37	9.3393065	9.3499220	23
38	9.3398706	9.3505143	22
39	9.3404338	9.3511059	21
40	9.3409963	9.3516968	20
41	9.3415580	9.3522869	19
42	9.3421190	9.3528763	18
43	9.3426792	9.3534650	17
44	9.3432386	9.3540530	16
45	9.3437973	9.3546402	15
46	9.3443552	6.3552267	14
47	9.3449124	9.3558126	13
48	9.3454688	9.3563977	12
49	9.3460245	9.3569821	11
50	9.3465704	9.3575658	10
51	9.3471336	9.3581487	9
52	9.3476870	9.3587310	8
53	9.3482397	9.3593126	7
54	9.3487917	9.3598935	6
55	9.3493429	9.3604736	5
56	9.3498934	9.3610531	4
57	9.3504433	9.3616319	3
58	9.3509922	9.3622100	2
59	9.3515405	9.3627874	1
60	9.3520880	9.3633641	0

102	Sinus.	Tangens.	
0	9.9904044	10.6725255	60
1	9.9903775	10.6719047	59
2	9.9903506	10.6712847	58
3	9.9903237	10.6706655	57
4	9.9902967	10.6700472	56
5	9.9902697	10.6694296	55
6	9.9902426	10.6688128	54
7	9.9902155	10.6681969	53
8	9.9901882	10.6675817	52
9	9.9901612	10.6669673	51
10	9.9901339	10.6663537	50
11	9.9901067	10.6657409	49
12	9.9900794	10.6651289	48
13	9.9900521	10.6645177	47
14	9.9900247	10.6639072	46
15	9.9899973	10.6632976	45
16	9.9899698	10.6626887	44
17	9.9899423	10.6620806	43
18	9.9899148	10.6614733	42
19	9.9898873	10.6608667	41
20	9.9898597	10.6602610	40
21	9.9898320	10.6596559	39
22	9.9898043	10.6590516	38
23	9.9897766	10.6584481	37
24	9.9897489	10.6578454	36
25	9.9897211	10.6572434	35
26	9.9896932	10.6566422	34
27	9.9896654	10.6560417	33
28	9.9896374	10.6554420	32
29	9.9896095	10.6548430	31
30	9.9895815	10.6542448	30
31	9.9895535	10.6536473	29
32	9.9895254	10.6530506	28
33	9.9894973	10.6524546	27
34	9.9894692	10.6518593	26
35	9.9894410	10.6512648	25
36	9.9894128	10.6506710	24
37	9.9893845	10.6500780	23
38	9.9893562	10.6494857	22
39	9.9893279	10.6488941	21
40	9.9892995	10.6483032	20
41	9.9892711	10.6477131	19
42	9.9892427	10.6471237	18
43	9.9892142	10.6465350	17
44	9.9891856	10.6459470	16
45	9.9891571	10.6453598	15
46	9.9891285	10.6447733	14
47	9.9890998	10.6441874	13
48	9.9890711	10.6436023	12
49	9.9890424	10.6430179	11
50	9.9890137	10.6424342	10
51	9.9889849	10.6418513	9
52	9.9889560	10.6412690	8
53	9.9889271	10.6406874	7
54	9.9888982	10.6401065	6
55	9.9888693	10.6395264	5
56	9.9888403	10.6389469	4
57	9.9888113	10.6383681	3
58	9.9887821	10.6377900	2
59	9.9887531	10.6372126	1
60	9.9887239	10.6366359	0

13	Sinus.	Tangens.	
0	9.3520080	9.3633641	60
1	9.3526349	9.3639401	59
2	9.3531810	9.3645155	58
3	9.3537264	9.3650901	57
4	9.3542710	9.3656641	56
5	9.3548150	9.3662374	55
6	9.3553582	9.3668100	54
7	9.3559007	9.3673819	53
8	9.3564426	9.3679532	52
9	9.3569836	9.3685238	51
10	9.3575240	9.3690937	50
11	9.3580637	9.3696629	49
12	9.3586027	9.3702315	48
13	9.3591409	9.3707994	47
14	9.3596785	9.3713667	46
15	9.3602154	9.3719333	45
16	9.3607515	9.3724992	44
17	9.3612870	9.3730645	43
18	9.3618217	9.3736291	42
19	9.3623558	9.3741930	41
20	9.3628892	9.3747563	40
21	9.3634219	9.3753190	39
22	9 3639539	9.3758810	38
23	9.3644852	9.3764423	37
24	9.3650158	9.3770030	36
25	9.3655458	9.3775631	35
26	9.3660750	9.3781225	34
27	9.3666036	9.3786813	33
28	9.3671315	9.3792394	32
29	9.3676587	9.3797969	31
30	9.3681853	9.3803537	30
31	9.3687111	9.3809100	29
32	9.3692363	9.3814655	28
33	9.3697608	9.3820205	27
34	9.3702847	9.3825748	26
35	9.3708079	9.3831285	25
36	9.3713304	9.3836816	24
37	9.3718523	9.3842340	23
38	9.3723735	9.3847858	22
39	9.3728940	9.3853370	21
40	9.3734139	9.3858876	20
41	9.3739331	9.3864376	19
42	9.3744517	9 3869869	18
43	9.3749696	9.3875356	17
44	9.3754868	9.3880837	16
45	9.3760034	9.3886312	15
46	9.3765194	9.3891781	14
47	9.3770347	9.3897244	13
48	9.3775493	9.3902700	12
49	9.3780633	9.3908151	11
50	9.3785767	9.3913595	10
51	9.3790894	9.3919034	9
52	9.3796015	9.3924466	8
53	9.3801129	9.3929893	7
54	9.3806237	9.3935313	6
55	9.3811339	9.3940727	5
56	9.3816434	9.3946136	4
57	9.3821523	9.3951538	3
58	9.3826605	9.3956935	2
59	9.3831682	9.3962326	1
60	9.3836752	9.3967711	0

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103	Sinus.	Tangens.	
0	9.9887239	10.6366359	60
1	9.9886947	10.6360599	59
2	9.9886655	10.6354845	58
3	9.9886363	10.6349099	57
4	9.9886070	10.6343359	56
5	9.9885776	10.6337626	55
6	9.9885482	10.6331900	54
7	9.9885188	10.6326181	53
8	9.9884894	10.6320468	52
9	9.9884599	10.6314762	51
10	9.9884303	10.6309063	50
11	9.9884008	10.6303371	49
12	9.9883712	10.6297685	48
13	9.9883415	10.6292006	47
14	9.9883118	10.6286333	46
15	9.9882821	10.6280667	45
16	9.9882523	10.6275008	44
17	9.9882225	10.6269355	43
18	9.9881927	10.6263709	42
19	9.9881628	10.6258070	41
20	9.9881329	10.6252437	40
21	9.9881029	10.6246810	39
22	9.9880729	10.6241190	38
23	9.9880429	10.6235577	37
24	9.9880128	10.6229970	36
25	9.9879827	10.6224369	35
26	9.9879525	10.6218775	34
27	9.9879223	10.6213187	33
28	9.9878921	10.6207606	32
29	9.9878618	10.6202031	31
30	9.9878315	10.6196463	30
31	9.9878012	10.6190900	29
32	9.9877708	10.6185345	28
33	9.9877404	10.6179795	27
34	9.9877099	10.6174252	26
35	9.9876794	10.6168715	25
36	9.9876488	10.6163184	24
37	9.9876183	10.6157660	23
38	9.9875876	10.6152142	22
39	9.9875570	10.6146630	21
40	9.9875263	10.6141124	20
41	9.9874955	10.6135624	19
42	9.9874648	10.6130131	18
43	9.9874339	10.6124644	17
44	9.9874031	10.6119163	16
45	9.9873722	10.6113688	15
46	9.9873413	10.6108219	14
47	9.9873103	10.6102756	13
48	9.9872793	10.6097300	12
49	9.9872482	10.6091849	11
50	9.9872171	10.6086405	10
51	9.9871860	10.6080966	9
52	9.9871549	10.6075534	8
53	9.9871236	10.6070107	7
54	9.9870924	10.6064687	6
55	9.9870611	10.6059273	5
56	9.9870298	10.6053864	4
57	9.9869984	10.6048462	3
58	9.9869670	10.6043065	2
59	9.9869356	10.6037674	1
60	9.9869041	10.6032289	0

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14	Sinus.	Tangens.	
0	9.3836752	9.3967711	60
1	9.3841815	9.3973089	59
2	9.3846873	9.3978463	58
3	9.3851924	9.3983830	57
4	9.3856969	9 3989191	56
5	9.3862008	9.3994547	55
6	9.3867040	9.3999896	54
7	9.3872067	9.4005240	53
8	9.3877087	9.4010578	52
9	9.3882101	9.4015910	51
10	9.3887109	9.4021237	50
11	9.3892111	9.4026558	49
12	9.3897106	9.4031873	48
13	9.3902096	9.4037182	47
14	9.3907079	9.4042486	46
15	9.3912057	9.4047784	45
16	9.3917028	9.4053076	44
17	9.3921993	9.4058363	43
18	9.3926952	9.4063644	42
19	9.3931905	9.4068919	41
20	9.3936852	9.4074189	40
21	9.3941794	9.4079453	39
22	9.3946729	9.4084712	38
23	9.3951658	9.4089965	37
24	9.3956581	9.4095212	36
25	9.3961499	9.4100454	35
26	9.3966410	9.4105690	34
27	9.3971315	9.4110921	33
28	9.3976215	9.4116146	32
29	9.3981109	9.4121366	31
30	9.3985996	9.4126581	30
31	9.3990878	9.4131789	29
32	9.3995754	9.4136993	28
33	9.4000625	9.4142191	27
34	9.4005489	9.4147383	26
35	9.4010348	9.4152570	25
36	9.4015201	9.4157752	24
37	9.4020048	9.4162928	23
38	9.4024889	9.4168099	22
39	9.4029724	9.4173265	21
40	9.4034554	9.4178425	20
41	9.4039378	9.4183580	19
42	9.4044196	9.4188729	18
43	9.4049009	9.4193874	17
44	9.4053816	9.4199013	16
45	9.4058617	9.4204146	15
46	9.4063413	9.4209275	14
47	9.4068203	9.4214398	13
48	9.4072987	9.4219515	12
49	9 4077766	9.4224628	11
50	9.4082539	9.4229735	10
51	9.4087306	9.4234838	9
52	9.4092068	9.4239935	8
53	9.4096824	9.4245026	7
54	9.4101575	9.4250113	6
55	9.4106320	9.4255194	5
56	9.4111059	9.4260271	4
57	9.4115793	9.4265342	3
58	9.4120522	9.4270408	2
59	9.4125245	9.4275469	1
60	9.4129962	9.4280525	0

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104	Sinus.	Tangens.	
0	9.9869041	10.6032289	60
1	9.9868726	10.6026911	59
2	9.9868410	10.6021537	58
3	9.9868094	10.6016170	57
4	9.9867778	10.6010809	56
5	9.9867461	10.6005453	55
6	9.9867144	10.6000104	54
7	9.9866827	10.5994760	53
8	9.9866509	10.5989422	52
9	9.9866191	10.5984090	51
10	9.9865872	10.5978763	50
11	9.9865553	10.5973442	49
12	9.9865233	10.5968127	48
13	9.9864913	10.5962818	47
14	9.9864593	10.5957514	46
15	9.9864273	10.5952216	45
16	9.9863952	10.5946924	44
17	9.9863630	10.5941637	43
18	9.9863308	10.5936356	42
19	9.9862986	10.5931081	41
20	9.9862663	10.5925811	40
21	9.9862340	10.5920547	39
22	9.9862017	10.5915288	38
23	9.9861693	10.5910035	37
24	9.9861369	10.5904788	36
25	9.9861045	10.5899546	35
26	9.9860720	10.5894310	34
27	9.9860394	10.5889079	33
28	9.9860069	10.5883854	32
29	9.9859742	10.5878634	31
30	9.9859416	10.5873419	30
31	9.9859089	10.5868211	29
32	9.9858762	10.5863007	28
33	9.9858434	10.5857809	27
34	9.9858106	10.5852617	26
35	9.9857777	10.5847430	25
36	9.9857449	10.5842248	24
37	9.9857119	10.5837072	23
38	9.9856790	10.5831901	22
39	9.9856460	10.5826735	21
40	9.9856129	10.5821575	20
41	9.9855798	10.5816420	19
42	9.9855467	10.5811271	18
43	9.9855135	10.5806126	17
44	9.9854803	10.5800987	16
45	9.9854471	10.5795854	15
46	9.9854138	10.5790725	14
47	9.9853805	10.5785602	13
48	9.9853471	10.5780485	12
49	9.9853138	10.5775372	11
50	9.9852803	10.5770265	10
51	9.9852468	10.5765162	9
52	9.9852133	10.5760065	8
53	9.9851795	10.5754974	7
54	9.9851402	10.5749887	6
55	9.9851125	10.5744806	5
56	9.9850789	10.5739729	4
57	9.9850452	10.5734658	3
58	9.9850114	10.5729592	2
59	9.9849776	10.5724531	1
60	9.9849438	10.5719475	0

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15	Sinus.	Tangens.	
0	9.4129962	9.4280525	60
1	9.4134674	9.4285575	59
2	9.4139381	9.4290621	58
3	9.4144081	9.4295661	57
4	9.4148778	9.4300697	56
5	9.4153468	9.4305727	55
6	9.4158152	9.4310753	54
7	9.4162832	9.4315773	53
8	9.4167506	9.4320789	52
9	9.4172174	9.4325799	51
10	9.4176837	9.4330804	50
11	9.4181495	9.4335805	49
12	9.4186148	9.4340800	48
13	9.4190795	9.4345791	47
14	9.4195436	9.4350776	46
15	9.4200073	9.4355757	45
16	9.4204704	9.4360733	44
17	9.4209330	9.4365704	43
18	9.4213950	9.4370670	42
19	9.4218566	9.4375631	41
20	9.4223176	9.4380587	40
21	9.4227780	9.4385538	39
22	9.4232380	9.4390485	38
23	9.4236974	9.4395426	37
24	9.4241563	9.4400363	36
25	9.4246147	9.4405295	35
26	9.4250726	9.4410221	34
27	9.4255299	9.4415145	33
28	9.4259867	9.4420061	32
29	9.4264430	9.4424975	31
30	9.4268988	9.4429883	30
31	9.4273541	9.4434786	29
32	9.4278089	9.4439685	28
33	9.4282631	9.4444579	27
34	9.4287169	9.4449468	26
35	9.4291701	9.4454352	25
36	9.4296228	9.4459232	24
37	9.4300750	9.4464107	23
38	9.4305267	9.4468978	22
39	9.4309779	9.4473843	21
40	9.4314286	9.4478704	20
41	9.4318788	9.4483561	19
42	9.4323285	9.4488413	18
43	9.4327777	9.4493260	17
44	9.4332264	9.4498102	16
45	9.4336746	9.4502940	15
46	9.4341223	9.4507774	14
47	9.4345694	9.4512602	13
48	9.4350161	9.4517427	12
49	9.4354623	9.4522246	11
50	9.4359080	9.4527061	10
51	9.4363532	9.4531872	9
52	9.4367980	9.4536678	8
53	9.4372422	9.4541479	7
54	9.4376859	9.4546276	6
55	9.4381292	9.4551069	5
56	9.4385719	9.4555857	4
57	9.4390142	9.4560641	3
58	9.4394560	9.4565420	2
59	9.4398973	9.4570194	1
60	9.4403381	9.4574964	0

105	Sinus.	Tangens.	
0	9.9849438	10.5719475	60
1	9.9849099	10.5714425	59
2	9.9848760	10.5709379	58
3	9.9848420	10.5704339	57
4	9.9848081	10.5699303	56
5	9.9847740	10.5694273	55
6	9.9847400	10.5689247	54
7	9.9847059	10.5684227	53
8	9.9846717	10.5679211	52
9	9.9846375	10.5674201	51
10	9.9846033	10.5669196	50
11	9.9845690	10.5664195	49
12	9.9845347	10.5659200	48
13	9.9845004	10.5654209	47
14	9.9844660	10.5649224	46
15	9.9844316	10.5644243	45
16	9.9843971	10.5639267	44
17	9.9843626	10.5634296	43
18	9.9843281	10.5629330	42
19	9.9842935	10.5624369	41
20	9.9842589	10.5619413	40
21	9.9842242	10.5614462	39
22	9.9841895	10.5609515	38
23	9.9841548	10.5604574	37
24	9.9841200	10.5599637	36
25	9.9840852	10.5594705	35
26	9.9840503	10.5589778	34
27	9.9840154	10.5584855	33
28	9.9839805	10.5579938	32
29	9.9839455	10.5575025	31
30	9.9839105	10.5570117	30
31	9.9838755	10.5565214	29
32	9.9838404	10.5560315	28
33	9.9838052	10.5555421	27
34	9.9837701	10.5550532	26
35	9.9837348	10.5545648	25
36	9.9836996	10.5540768	24
37	9.9836643	10.5535893	23
38	9.9836290	10.5531022	22
39	9.9835936	10.5526157	21
40	9.9835582	10.5521296	20
41	9.9835227	10.5516439	19
42	9.9834872	10.5511587	18
43	9.9834517	10.5506740	17
44	9.9834161	10.5501898	16
45	9.9833805	10.5497060	15
46	9.9833449	10.5492226	14
47	9.9833092	10.5487398	13
48	9.9832735	10.5482573	12
49	9.9832377	10.5477754	11
50	9.9832019	10.5472939	10
51	9.9831661	10.5468128	9
52	9.9831302	10.5463322	8
53	9.9830942	10.5458521	7
54	9.9830583	10.5453724	6
55	9.9830223	10.5448931	5
56	9.9829862	10.5444143	4
57	9.9829501	10.5439359	3
58	9.9829140	10.5434580	2
59	9.9828778	10.5429806	1
60	9.9828416	10.5425036	0

16	Sinus.	Tangens.	
0	9.4403381	9.4574964	60
1	9.4407784	9.4579730	59
2	9.4412182	9.4584491	58
3	9.4416576	9.4589248	57
4	9.4420965	9.4594001	56
5	9.4425349	9.4598749	55
6	9.4429728	9.4603492	54
7	9.4434103	9.4608232	53
8	9.4438472	9.4612967	52
9	9.4442837	9.4617697	51
10	9.4447197	9.4622423	50
11	9.4451553	9.4627145	49
12	9.4455904	9.4631863	48
13	9.4460250	9.4636576	47
14	9.4464591	9.4641285	46
15	9.4468927	9.4645990	45
16	9.4473259	9.4650690	44
17	9.4477586	9.4655386	43
18	9.4481909	9.4660078	42
19	9.4486227	9.4664765	41
20	9.4490540	9.4669448	40
21	9.4494849	9.4674127	39
22	9.4499153	9.4678802	38
23	9.4503452	9.4683473	37
24	9.4507747	9.4688139	36
25	9.4512037	9.4692801	35
26	9.4516322	9.4697459	34
27	9.4520603	9.4702112	33
28	9.4524879	9.4706762	32
29	9.4529151	9.4711407	31
30	9.4533418	9.4716048	30
31	9.4537681	9.4720685	29
32	9.4541939	9.4725318	28
33	9.4546192	9.4729947	27
34	9.4550441	9.4734572	26
35	9.4554686	9.4739192	25
36	9.4558926	9.4743808	24
37	9.4563161	9.4748421	23
38	9.4567392	9.4753029	22
39	9.4571618	9.4757633	21
40	9.4575840	9.4762233	20
41	9.4580058	9.4766829	19
42	9.4584271	9.4771421	18
43	9.4588480	9.4776009	17
44	9.4592684	9.4780592	16
45	9.4596884	9.4785172	15
46	9.4601079	9.4789748	14
47	9.4605270	9.4794319	13
48	9.4609456	9.4798887	12
49	9.4613638	9.4803451	11
50	9.4617816	9.4808011	10
51	9.4621989	9.4812566	9
52	9.4626158	9.4817118	8
53	9.4630323	9.4821666	7
54	9.4634483	9.4826210	6
55	9.4638639	9.4830750	5
56	9.4642790	9.4835286	4
57	9.4646938	9.4839818	3
58	9.4651081	9.4844346	2
59	9.4655219	9.4848870	1
60	9.4659353	9.4853390	0

106	Sinus.	Tangens.	
0	9.9828416	10.5425036	63
1	9.9828054	10.5420270	59
2	9.9827691	10.5415509	58
3	9.9827328	10.5410752	57
4	9.9826964	10.5405999	56
5	9.9826600	10.5401251	55
6	9.9826236	10.5396508	54
7	9.9825871	10.5391768	53
8	9.9825506	10.5387033	52
9	9.9825140	10.5382303	51
10	9.9824774	10.5377577	50
11	9.9824408	10.5372855	49
12	9.9824041	10.5368137	48
13	9.9823674	10.5363424	47
14	9.9823306	10.5358715	46
15	9.9822938	10.5354010	45
16	9.9822569	10.5349310	44
17	9.9822201	10.5344614	43
18	9.9821831	10.5339922	42
19	9.9821462	10.5335235	41
20	9.9821092	10.5330552	40
21	9.9820721	10.5325873	39
22	9.9820351	10.5321198	38
23	9.9819979	10.5316527	37
24	9.9819608	10.5311861	36
25	9.9819236	10 5307199	35
26	9.9818863	10.5302541	34
27	9.9818490	10.5297883	33
28	9.9818117	10.5293238	32
29	9.9817744	10.5288593	31
30	9.9817370	10.5283952	30
31	9.9816995	10.5279315	29
32	9.9816620	10.5274682	28
33	9.9816245	10.5270053	27
34	9.9815870	10.5265428	26
35	9.9815494	10.5260808	25
36	9.9815117	10.5256192	24
37	9.9814740	10.5251579	23
38	9.9814363	10.5246971	22
39	9.9813986	10.5242367	21
40	9.9813608	10.5237767	20
41	9.9813229	10.5233171	19
42	9.9812850	10.5228579	18
43	9.9812471	10 5223991	17
44	9.9812091	10.5219408	16
45	9.9811711	10.5214828	15
46	9.9811331	10.5210252	14
47	9.9810950	10.5205681	13
48	9.9810569	10.5201113	12
49	9.9810187	10.5196549	11
50	9.9809805	10.5191989	10
51	9.9809423	10.5187434	9
52	9.9809040	10.5182882	8
53	9.9808657	10.5178334	7
54	9.9808273	10.5173790	6
55	9.9807889	10.5169250	5
56	9.9807505	10.5164714	4
57	9.9807120	10.5160182	3
58	9.9806735	10.5155654	2
59	9.9806349	10.5151130	1
60	9.9805963	10.5146610	0

17	Sinus.	Tangens.	
0	9.4659353	9.4853390	60
1	9.4663483	9.4857907	59
2	9.4667609	9.4862419	58
3	9.4671730	9.4866928	57
4	9.4675848	9.4871433	56
5	9.4679960	9.4875933	55
6	9.4684069	9.4880430	54
7	9.4688173	9.4884924	53
8	9.4692273	9.4889413	52
9	9.4696369	9.4893898	51
10	9.4700461	9.4898380	50
11	9.4704548	9.4902858	49
12	9.4708631	9.4907332	48
13	9.4712710	9.4911802	47
14	9.4716785	9.4916269	46
15	9.4720856	9.4920731	45
16	9.4724922	9.4925190	44
17	9.4728985	9.4929646	43
18	9.4733043	9.4934097	42
19	9.4737097	9.4938545	41
20	9.4741146	9.4942988	40
21	9.4745192	9.4947429	39
22	9.4749234	9.4951865	38
23	9.4753271	9.4956298	37
24	9.4757304	9.4960727	36
25	9.4761334	9.4965152	35
26	9.4765359	9.4969574	34
27	9.4769380	9.4973991	33
28	9.4773396	9.4978406	32
29	9.4777409	9.4982816	31
30	9.4781418	9.4987223	30
31	9.4785423	9.4991626	29
32	9.4789423	9.4996026	28
33	9.4793420	9.5000424	27
34	9.4797412	9.5004814	26
35	9.4801401	9.5009203	25
36	9.4805385	9.5013588	24
37	9.4809366	9.5017969	23
38	9.4813342	9.5022347	22
39	9.4817315	9.5026721	21
40	9.4821283	9.5031092	20
41	9.4825248	9.5035459	19
42	9.4829208	9.5039822	18
43	9.4833165	9.5044181	17
44	9.4837117	9.5048538	16
45	9.4841066	9.5052891	15
46	9.4845010	9.5057240	14
47	9.4848951	9.5061586	13
48	9.4852888	9.5065928	12
49	9.4856820	9.5070267	11
50	9.4860749	9.5074602	10
51	9.4864674	9.5078933	9
52	9.4868595	9.5083261	8
53	9.4872512	9.5087586	7
54	9.4876426	9.5091907	6
55	9.4880335	9.5096224	5
56	9.4884240	9.5100539	4
57	9.4888142	9.5104849	3
58	9.4892040	9.5109156	2
59	9.4895934	9.5113460	1
60	9.4899824	9.5117760	0

107	Sinus.	Tangens.	
0	9.9805963	10.5146610	60
1	9.9805577	10.5142093	59
2	9.9805190	10.5137581	58
3	9.9804803	10.5133072	57
4	9.9804415	10.5128567	56
5	9.9804027	10.5124067	55
6	9.9803639	10.5119570	54
7	9.9803250	10.5115076	53
8	9.9802860	10.5110587	52
9	9.9802471	10.5106102	51
10	9.9802081	10.5101620	50
11	9.9801690	10.5097142	49
12	9.9801299	10.5092668	48
13	9.9800908	10.5088198	47
14	9.9800516	10.5083731	46
15	9.9800124	10.5079269	45
16	9.9799732	10.5074810	44
17	9.9799339	10.5070354	43
18	9.9798946	10.5065903	42
19	9.9798552	10.5061455	41
20	9.9798158	10.5057012	40
21	9.9797764	10.5052571	39
22	9.9797369	10.5048135	38
23	9.9796973	10.5043702	37
24	9.9796578	10.5039273	36
25	9.9796182	10.5034848	35
26	9.9795785	10.5030426	34
27	9.9795388	10.5026009	33
28	9.9794991	10.5021594	32
29	9.9794593	10.5017184	31
30	9.9794195	10.5012777	30
31	9.9793796	10.5008374	29
32	9.9793398	10.5003974	28
33	9.9792998	10.4999578	27
34	9.9792599	10.4995186	26
35	9.9792198	10.4990797	25
36	9.9791798	10.4986412	24
37	9.9791397	10.4982031	23
38	9.9790996	10.4977653	22
39	9.9790594	10.4973279	21
40	9.9790192	10.4968908	20
41	9.9789789	10.4964541	19
42	9.9789386	10.4960178	18
43	9.9788983	10.4955818	17
44	9.9788579	10.4951462	16
45	9.9788175	10.4947109	15
46	9.9787770	10.4942760	14
47	9.9787365	10.4938414	13
48	9.9786960	10.4934072	12
49	9.9786554	10.4929733	11
50	9.9786148	10.4925398	10
51	9.9785741	10.4921067	9
52	9.9785334	10.4916739	8
53	9.9784927	10.4912414	7
54	9.9784519	10.4908093	6
55	9.9784111	10.4903776	3
56	9.9783702	10.4899462	4
57	9.9783293	10.4895151	3
58	9.9782883	10.4890844	2
59	9.9782474	10.4886540	1
60	9.9782063	10.4882240	0

18	Sinus.	Tangens.	
0	9.4899824	9.5117760	60
1	9.4903710	9.5122057	59
2	9.4907592	9.5126351	58
3	9.4911471	9.5130641	57
4	9.4915345	9.5134927	56
5	9.4919216	9.5139210	55
6	9.4923083	9.5143490	54
7	9.4926946	9.5147766	53
8	9.4930806	9.5152039	52
9	9.4934661	9.5156309	51
10	9.4938513	9.5160575	50
11	9.4942361	9.5164838	49
12	9.4946205	9.5169097	48
13	9.4950046	9.5173353	47
14	9.4953883	9.5177606	46
15	9.4957716	9.5181855	45
16	9.4961545	9.5186101	44
17	9.4965370	9.5190344	43
18	9.4969192	9.5194583	42
19	9.4973010	9.5198819	41
20	9.4976824	9.5203052	40
21	9.4980635	9.5207282	39
22	9.4984442	9.5211508	38
23	9.4988245	9.5215730	37
24	9.4992045	9.5219950	36
25	9.4995840	9.5224166	35
26	9.4999633	9.5228379	34
27	9.5003421	9.5232589	33
28	9.5007206	9.5236795	32
29	9.5010987	9.5240999	31
30	9.5014764	9.5245199	30
31	9.5018538	9.5249395	29
32	9.5022308	9.5253589	28
33	9.5026075	9.5257779	27
34	9.5029838	9.5261966	26
35	9.5033597	9.5266150	25
36	9.5037353	9.5270331	24
37	9.5041105	9.5274508	23
38	9.5044853	9.5278682	22
39	9.5048598	9.5282853	21
40	9.5052339	9.5287021	20
41	9.5056077	9.5291186	19
42	9.5059811	9.5295347	18
43	9.5063542	9.5299505	17
44	9.5067269	9.5303661	16
45	9.5070992	9.5307813	15
46	9.5074712	9.5311961	14
47	9.5078428	9.5316107	13
48	9.5082141	9.5320250	12
49	9.5085850	9.5324389	11
50	9.5089556	9.5328526	10
51	9.5093258	9.5332659	9
52	9.5096956	9.5336789	8
53	9.5100651	9.5340916	7
54	9.5104343	9.5345040	6
55	9.5108031	9.5349161	5
56	9.5111716	9.5353278	4
57	9.5115397	9.5357393	3
58	9.5119074	9.5361505	2
59	9.5122749	9.5365613	1
60	9.5126419	9.5369719	0

108	Sinus.	Tangens.	
0	9.9782063	10.4882240	60
1	9.9781653	10.4877941	59
2	9.9781241	10.4873649	58
3	9.9780830	10.4869359	57
4	9.9780418	10.4865073	56
5	9.9780006	10.4860790	55
6	9.9779593	10.4856510	54
7	9.9779180	10.4852234	53
8	9.9778766	10.4847961	52
9	9.9778353	10.4843691	51
10	9.9777938	10.4839425	50
11	9.9777523	10.4835162	49
12	9.9777108	10.4830903	48
13	9.9776693	10.4826647	47
14	9.9776277	10.4822394	46
15	9.9775860	10.4818145	45
16	9.9775444	10.4813899	44
17	9.9775026	10.4809656	43
18	9.9774609	10.4805417	42
19	9.9774191	10.4801181	41
20	9.9773772	10.4796948	40
21	9.9773354	10.4792718	39
22	9.9772934	10.4788492	38
23	9.9772515	10.4784270	37
24	9.9772095	10.4780050	36
25	9.9771674	10.4775834	35
26	9.9771252	10.4771621	34
27	9.9770832	10.4767413	33
28	9.9770410	10.4763209	32
29	9.9769988	10.4759008	31
30	9.9769566	10.4754810	30
31	9.9769143	10.4750615	29
32	9.9768720	10.4746424	28
33	9.9768296	10.4742236	27
34	9.9767872	10.4738051	26
35	9.9767447	10.4733870	25
36	9.9767022	10.4729692	24
37	9.9766597	10.4725517	23
38	9.9766171	10.4721348	22
39	9.9765745	10.4717183	21
40	9.9765318	10.4713019	20
41	9.9764891	10.4708858	19
42	9.9764464	10.4704655	18
43	9.9764036	10.4700495	17
44	9.9763608	10.4696339	16
45	9.9763179	10.4692187	15
46	9.9762750	10.4688039	14
47	9.9762321	10.4683893	13
48	9.9761891	10.4679750	12
49	9.9761461	10.4675611	11
50	9.9761030	10.4671474	10
51	9.9760599	10.4667341	9
52	9.9760167	10.4663211	8
53	9.9759736	10.4659084	7
54	9.9759303	10.4654960	6
55	9.9758870	10.4650839	5
56	9.9758437	10.4646722	4
57	9.9758004	10.4642607	3
58	9.9757570	10.4638495	2
59	9.9757135	10.4634387	1
60	9.9756701	10.4630281	0

19	Sinus.	Tangens.	
0	9.5126419	9.5369719	60
1	9.5130086	9.5373821	59
2	9.5133750	9.5377920	58
3	9.5137410	9.5382017	57
4	9.5141067	9.5386110	56
5	9.5144721	9.5390200	55
6	9.5148371	9.5394287	54
7	9.5152017	9.5398371	53
8	9.5155660	9.5402453	52
9	9.5159300	9.5406531	51
10	9.5162936	9.5410606	50
11	9.5166569	9.5414678	49
12	9.5170198	9.5418747	48
13	9.5173824	9.5422813	47
14	9.5177447	9.5426877	46
15	9.5181066	9.5430937	45
16	9.5184682	9.5434994	44
17	9.5188295	9.5439048	43
18	9.5191904	9.5443100	42
19	9.5195510	9.5447148	41
20	9.5199112	9.5451193	40
21	9.5202711	9.5455236	39
22	9.5206307	9.5459276	38
23	9.5209899	9.5463312	37
24	9.5213488	9.5467346	36
25	9.5217074	9.5471377	35
26	9.5220656	9.5475405	34
27	9.5224235	9.5479430	33
28	9.5227811	9.5483452	32
29	9.5231383	9.5487471	31
30	9.5234953	9.5491487	30
31	9.5238518	9.5495500	29
32	9.5242081	9.5499511	28
33	9.5245640	9.5503519	27
34	9.5249196	9.5507523	26
35	9.5252749	9.5511525	25
36	9.5256298	9.5515524	24
37	9.5259844	9.5519521	23
38	9.5263387	9.5523514	22
39	9.5266927	9.5527504	21
40	9.5270463	9.5531492	20
41	9.5273997	9.5535477	19
42	9.5277526	9.5539459	18
43	9.5281053	9.5543438	17
44	9.5284577	9.5547415	16
45	9.5288097	9.5551388	15
46	9.5291614	9.5555359	14
47	9.5295128	9.5559327	13
48	9.5298638	9.5563292	12
49	9.5302146	9.5567255	11
50	9.5305650	9.5571214	10
51	9.5309151	9.5575171	9
52	9.5312649	9.5579125	8
53	9.5316143	9.5583077	7
54	9.5319635	9.5587025	6
55	9.5323123	9.5590971	5
56	9.5326608	9.5594914	4
57	9.5330090	9.5598854	3
58	9.5333569	9.5602792	2
59	9.5337044	9.5606727	1
60	9.5340517	9.5610659	0

109	Sinus.	Tangens.	
0	9.9756701	10.4630281	60
1	9.9756265	10.4626179	59
2	9.9755830	10.4622080	58
3	9.9755394	10.4617983	57
4	9.9754957	10.4613890	56
5	9.9754521	10.4609800	55
6	9.9754083	10.4605713	54
7	9.9753646	10.4601629	53
8	9.9753208	10.4597547	52
9	9.9752769	10.4593469	51
10	9.9752330	10.4589394	50
11	9.9751891	10.4585322	49
12	9.9751451	10.4581253	48
13	9.9751011	10.4577187	47
14	9.9750570	10.4573123	46
15	9.9750129	10.4569063	45
16	9.9749688	10.4565006	44
17	9.9749246	10.4560952	43
18	9.9748804	10.4556900	42
19	9.9748361	10.4552852	41
20	9.9747918	10.4548807	40
21	9.9747475	10.4544764	39
22	9.9747031	10.4540724	38
23	9.9746587	10.4536688	37
24	9.9746142	10.4532654	36
25	9.9745697	10.4528623	35
26	9.9745252	10.4524595	34
27	9.9744806	10.4520570	33
28	9.9744359	10.4516548	32
29	9.9743913	10.4512529	31
30	9.9743466	10.4508513	30
31	9.9743018	10.4504500	29
32	9.9742570	10.4500489	28
33	9.9742122	10.4496481	27
34	9.9741673	10.4492477	26
35	9.9741224	10.4488475	25
36	9.9740774	10.4484476	24
37	9.9740324	10.4480479	23
38	9.9739873	10.4476486	22
39	9.9739422	10.4472496	21
40	9.9738971	10.4468508	20
41	9.9738519	10.4464523	19
42	9.9738067	10.4460541	18
43	9.9737615	10.4456562	17
44	9.9737162	10.4452585	16
45	9.9736709	10.4448612	15
46	9.9736255	10.4444641	14
47	9.9735801	10.4440673	13
48	9.9735346	10.4436708	12
49	9.9734891	10.4432745	11
50	9.9734435	10.4428786	10
51	9.9733980	10.4424829	9
52	9.9733523	10.4420875	8
53	9.9733067	10.4416923	7
54	9.9732610	10.4412975	6
55	9.9732151	10.4409029	5
56	9.9731694	10.4405086	4
57	9.9731236	10.4401146	3
58	9.9730777	10.4397208	2
59	9.9730318	10.4393273	1
60	9.9729858	10.4389341	0

20	Sinus.	Tangens.	
0	9.5340517	9.5610659	60
1	9.5343986	9.5614588	59
2	9.5347452	9.5618515	58
3	9.5350915	9.5622439	57
4	9.5354375	9.5626360	56
5	9.5357832	9.5630278	55
6	9.5361286	9.5634194	54
7	9.5364737	9.5638107	53
8	9.5368184	9.5642018	52
9	9.5371628	9.5645925	51
10	9.5375070	9.5649831	50
11	9.5378508	9.5653733	49
12	9.5381943	9.5657633	48
13	9.5385375	9.5661530	47
14	9.5388804	9.5665424	46
15	9.5392230	9.5669316	45
16	9.5395653	9.5673205	44
17	9.5399073	9.5677091	43
18	9.5402489	9.5680975	42
19	9.5405903	9.5684856	41
20	9.5409314	9.5688735	40
21	9.5412721	9.5692611	39
22	9.5416126	9.5696484	38
23	9.5419527	9.5700355	37
24	9.5422926	9.5704223	36
25	9.5426321	9.5708088	35
26	9.5429713	9.5711951	34
27	9.5433103	9.5715811	33
28	9.5436489	9.5719669	32
29	9.5439873	9.5723524	31
30	9.5443253	9.5727377	30
31	9.5446630	9.5731227	29
32	9.5450005	9.5735074	28
33	9.5453376	9.5738919	27
34	9.5456745	9.5742761	26
35	9.5460110	9.5746601	25
36	9.5463472	9.5750438	24
37	9.5466832	9.5754272	23
38	9.5470189	9.5758104	22
39	9.5473542	9.5761934	21
40	9.5476893	9.5765761	20
41	9.5480240	9.5769585	19
42	9.5483585	9.5773407	18
43	9.5486927	9.5777226	17
44	9.5490266	9.5781043	16
45	9.5493602	9.5784858	15
46	9.5496935	9.5788669	14
47	9.5500265	9.5792479	13
48	9.5503592	9.5796286	12
49	9.5506916	9.5800090	11
50	9.5510237	9.5803892	10
51	9.5513556	9.5807691	9
52	9.5516871	9.5811488	8
53	9.5520184	9.5815282	7
54	9.5523494	9.5819074	6
55	9.5526801	9.5822864	5
56	9.5530105	9.5826651	4
57	9.5533406	9.5830435	3
58	9.5536704	9.5834217	2
59	9.5539999	9.5837997	1
60	9.5543292	9.5841774	0

110	Sinus.	Tangens.	
0	9.9729858	10.4389341	60
1	9.9729398	10.4385412	59
2	9.9728938	10.4381485	58
3	9.9728477	10.4377561	57
4	9.9728016	10.4373640	56
5	9.9727554	10.4369722	55
6	9.9727092	10.4365806	54
7	9.9726629	10.4361893	53
8	9.9726166	10.4357982	52
9	9.9725703	10.4354075	51
10	9.9725239	10.4350169	50
11	9.9724775	10.4346267	49
12	9.9724310	10.4342367	48
13	9.9723845	10.4338470	47
14	9.9723380	10.4334576	46
15	9.9722914	10.4330684	45
16	9.9722448	10.4326795	44
17	9.9721981	10.4322909	43
18	9.9721514	10.4319025	42
19	9.9721047	10.4315144	41
20	9.9720579	10.4311265	40
21	9.9720110	10.4307389	39
22	9.9719642	10.4303516	38
23	9.9719172	10.4299645	37
24	9.9718703	10.4295777	36
25	9.9718233	10.4291912	35
26	9.9717762	10.4288049	34
27	9.9717291	10.4284189	33
28	9.9716820	10.4280331	32
29	9.9716348	10.4276476	31
30	9.9715876	10.4272623	30
31	9.9715404	10.4268773	29
32	9.9714931	10.4264926	28
33	9.9714457	10.4261081	27
34	9.9713984	10.4257239	26
35	9.9713509	10.4253399	25
36	9.9713035	10.4249562	24
37	9.9712560	10.4245728	23
38	9.9712084	10.4241896	22
39	9.9711608	10.4238066	21
40	9.9711132	10.4234239	20
41	9.9710655	10.4230415	19
42	9.9710178	10.4226593	18
43	9.9709701	10.4222774	17
44	9.9709223	10.4218957	16
45	9.9708744	10.4215142	15
46	9.9708265	10.4211331	14
47	9.9707786	10.4207521	13
48	9.9707306	10.4203714	12
49	9.9706826	10.4199910	11
50	9.9706346	10.4196108	10
51	9.9705865	10.4192309	9
52	9.9705383	10.4188512	8
53	9.9704902	10.4184718	7
54	9.9704419	10.4180926	6
55	9.9703937	10.4177136	5
56	9.9703454	10.4173349	4
57	9.9702970	10.4169565	3
58	9.9702486	10.4165783	2
59	9.9702002	10.4162003	1
60	9.9701517	10.4158226	0

21	Sinus.	Tangens.	
0	9.5543292	9.5841774	60
1	9.5546581	9.5845549	59
2	9.5549868	9.5849321	58
3	9.5553152	9.5853091	57
4	9.5556433	9.5856859	56
5	9.5559711	9.5860624	55
6	9.5562987	9.5864386	54
7	9.5566259	9.5868147	53
8	9.5569529	9.5871904	52
9	9.5572796	9.5875660	51
10	9.5576060	9.5879413	50
11	9.5579321	9.5883163	49
12	9.5582579	9.5886912	48
13	9.5585835	9.5890657	47
14	9.5589088	9.5894401	46
15	9.5592338	9.5898142	45
16	9.5595585	9.5901881	44
17	9.5598829	9.5905617	43
18	9.5602071	9.5909351	42
19	9.5605310	9.5913082	41
20	9.5608546	9.5916812	40
21	9.5611779	9.5920539	39
22	9.5615010	9.5924263	38
23	9.5618237	9.5927985	37
24	9.5621462	9.5931705	36
25	9.5624685	9.5935423	35
26	9.5627904	9.5939138	34
27	9.5631121	9.5942851	33
28	9.5634335	9.5946561	32
29	9.5637546	9.5950269	31
30	9.5640754	9.5953975	30
31	9.5643960	9.5957679	29
32	9.5647163	9.5961380	28
33	9.5650363	9.5965079	27
34	9.5653561	9.5968776	26
35	9.5656756	9.5972470	25
36	9.5659948	9.5976162	24
37	9.5663137	9.5979852	23
38	9.5666324	9.5983540	22
39	9.5669508	9.5987225	21
40	9.5672689	9.5990908	20
41	9.5675868	9.5994588	19
42	9.5679044	9.5998267	18
43	9.5682217	9.6001943	17
44	9.5685387	9.6005617	16
45	9.5688555	9.6009289	15
46	9.5691721	9.6012958	14
47	9.5694883	9.6016625	13
48	9.5698043	9.6020290	12
49	9.5701200	9.6023953	11
50	9.5704355	9.6027613	10
51	9.5707506	9.6031271	9
52	9.5710656	9.6034927	8
53	9.5713802	9.6038581	7
54	9.5716946	9.6042233	6
55	9.5720087	9.6045882	5
56	9.5723226	9.6049529	4
57	9.5720362	9.6053174	3
58	9.5729495	9.6056817	2
59	9.5732626	9.6060457	1
60	9.5735754	9.6064096	0

111	Sinus.	Tangens.	
0	9.9701517	10.4158226	60
1	9.9701032	10.4154451	59
2	9.9700547	10.4150679	58
3	9.9700061	10.4146909	57
4	9.9699574	10.4143141	56
5	9.9699087	10.4139376	55
6	9.9698600	10.4135614	54
7	9.9698112	10.4131853	53
8	9.9697624	10.4128096	52
9	9.9697136	10.4124340	51
10	9.9696647	10.4120587	50
11	9.9696158	10.4116837	49
12	9.9695668	10.4113088	48
13	9.9695177	10.4109343	47
14	9.9694687	10.4105599	46
15	9.9694196	10.4101858	45
16	9.9693704	10.4098119	44
17	9.9693212	10.4094383	43
18	9.9692720	10.4090649	42
19	9.9692227	10.4086918	41
20	9.9691734	10.4083188	40
21	9.9691241	10.4079461	39
22	9.9690746	10.4075737	38
23	9.9690252	10.4072015	37
24	9.9689757	10.4068295	36
25	9.9689262	10.4064577	35
26	9.9683766	10.4060862	34
27	9.9688270	10.4057149	33
28	9.9687773	10.4053439	32
29	9.9687276	10.4049731	31
30	9.9686779	10.4046025	30
31	9.9686281	10.4042321	29
32	9.9685783	10.4038620	28
33	9.9685284	10.4034921	27
34	9.9684785	10.4031224	26
35	9.9684286	10.4027530	25
36	9.9683786	10.4023838	24
37	9.9683285	10.4020148	23
38	9.9682784	10.4016460	22
39	9.9682283	10.4012775	21
40	9.9681781	10.4009092	20
41	9.9681279	10.4005412	19
42	9.9680777	10.4001733	18
43	9.9680274	10.3998057	17
44	9.9679771	10.3994383	16
45	9.9679267	10.3990711	15
46	9.9678763	10.3987042	14
47	9.9678258	10.3983375	13
48	9.9677753	10.3979710	12
49	9.9677247	10.3976047	11
50	9.9676741	10.3972387	10
51	9.9676235	10.3968729	9
52	9.9675728	10.3965073	8
53	9.9675221	10.3961419	7
54	9.9674713	10.3957767	6
55	9.9674205	10.3954118	5
56	9.9673697	10.3950471	4
57	9.9673188	10.3946826	3
58	9.9672679	10.3943183	2
59	9.9672169	10.3939543	1
60	9.9671659	10.3935904	0

22	Sinus.	Tangens.	
0	9.5735754	9.6064096	60
1	9.5738880	9.6067732	59
2	9.5742003	9.6071366	58
3	9.5745123	9.6074997	57
4	9.5748240	9.6078627	56
5	9.5751356	9.6082254	55
6	9.5754468	9.6085880	54
7	9.5757578	9.6089503	53
8	9.5760685	9.6093124	52
9	9.5763790	9.6096742	51
10	9.5766892	9.6100359	50
11	9.5769991	9.6103973	49
12	9.5773088	9.6107586	48
13	9.5776183	9.6111196	47
14	9.5779275	9.6114804	46
15	9.5782364	9.6118409	45
16	9.5785450	9.6122013	44
17	9.5788535	9.6125615	43
18	9.5791616	9.6129214	42
19	9.5794695	9.6132812	41
20	9.5797772	9.6136407	40
21	9.5800845	9.6140000	39
22	9.5803917	9.6143591	38
23	9.5806986	9.6147180	37
24	9.5810052	9.6150766	36
25	9.5813116	9.6154351	35
26	9.5816177	9.6157934	34
27	9.5819236	9.6161514	33
28	9.5822292	9.6165093	32
29	9.5825345	9.6168669	31
30	9.5828397	9.6172243	30
31	9.5831445	9.6175815	29
32	9.5834491	9.6179385	28
33	9.5837535	9.6182953	27
34	9.5840576	9.6186519	26
35	9.5843615	9.6190083	25
36	9.5846651	9.6193645	24
37	9.5849685	9.6197205	23
38	9.5852716	9.6200762	22
39	9.5855745	9.6204318	21
40	9.5858771	9.6207872	20
41	9.5861795	9.6211423	19
42	9.5864816	9.6214974	18
43	9.5867835	9.6218520	17
44	9.5870851	9.6222066	16
45	9.5873865	9.6225609	15
46	9.5876876	9.6229150	14
47	9.5879885	9.6232690	13
48	9.5882892	9.6236227	12
49	9.5885896	9.6239763	11
50	9.5888897	9.6243296	10
51	9.5891897	9.6246827	9
52	9.5894893	9.6250356	8
53	9.5897888	9.6253884	7
54	9.5900880	9.6257409	6
55	9.5903869	9.6260932	5
56	9.5906856	9.6264454	4
57	9.5909841	9.6267973	3
58	9.5912823	9.6271491	2
59	9.5915803	9.6275006	1
60	9.5918780	9.6278519	0

112	Sinus.	Tangens.	
0	9.9671659	10.3935904	60
1	9.9671148	10.3932268	59
2	9.9670637	10.3928634	58
3	9.9670125	10.3925003	57
4	9.9669614	10.3921373	56
5	9.9669101	10.3917746	55
6	9.9668588	10.3914120	54
7	9.9668075	10.3910497	53
8	9.9667562	10.3906876	52
9	9.9667048	10.3903258	51
10	9.9666533	10.3899641	50
11	9.9666018	10.3896027	49
12	9.9665503	10.3892414	48
13	9.9664987	10.3888804	47
14	9.9664471	10.3885196	46
15	9.9663954	10.3881591	45
16	9.9663437	10.3877987	44
17	9.9662920	10.3874385	43
18	9.9662402	10.3870786	42
19	9.9661884	10.3867188	41
20	9.9661365	10.3863593	40
21	9.9660846	10.3860000	39
22	9.9660326	10.3856409	38
23	9.9659806	10.3852820	37
24	9.9659285	10.3849234	36
25	9.9658764	10.3845649	35
26	9.9658243	10.3842066	34
27	9.9657721	10.3838486	33
28	9.9657199	10.3834907	32
29	9.9656677	10.3831331	31
30	9.9656153	10.3827757	30
31	9.9655630	10.3824185	29
32	9.9655106	10.3820615	28
33	9.9654582	10.3817047	27
34	9.9654057	10.3813481	26
35	9.9653532	10.3809917	25
36	9.9653006	10.3806355	24
37	9.9652480	10.3802795	23
38	9.9651953	10.3799238	22
39	9.9651426	10.3795682	21
40	9.9650899	10.3792128	20
41	9.9650371	10.3788577	19
42	9.9649843	10.3785027	18
43	9.9649314	10.3781480	17
44	9.9648785	10.3777934	16
45	9.9648256	10.3774391	15
46	9.9647726	10.3770850	14
47	9.9647195	10.3767310	13
48	9.9646665	10.3763773	12
49	9.9646133	10 3760237	11
50	9.9645602	10.3756704	10
51	9.9645069	10.3753173	9
52	9.9644537	10.3749644	8
53	9.9644004	10.3746116	7
54	9.9643470	10.3742591	6
55	9.9642937	10.3739068	5
56	9.9642402	10.3735546	4
57	9.9641868	10.3732027	3
58	9.9641332	10.3728509	2
59	9.9640797	10.3724994	1
60	9.9640261	10.3721481	0

23	Sinus.	Tangens.	
0	9.5918780	9.6278519	60
1	9.5921755	9.6282031	59
2	9.5924728	9.6285540	58
3	9.5927698	9.6289048	57
4	9.5930666	9.6292553	56
5	9.5933631	9.6296057	55
6	9.5936594	9.6299558	54
7	9.5939554	9.6303058	53
8	9.5942513	9.6306556	52
9	9.5945469	9.6310052	51
10	9.5948422	9.6313545	50
11	9.5951373	9.6317037	49
12	9.5954322	9.6320527	48
13	9.5957268	9.6324015	47
14	9.5960212	9.6327501	46
15	9.5963154	9.6330985	45
16	9.5966093	9.6334468	44
17	9.5969030	9.6337948	43
18	9.5971965	9.6341426	42
19	9.5974897	9.6344903	41
20	9.5977827	9.6348378	40
21	9.5980754	9.6351850	39
22	9.5983679	9.6355321	38
23	9.5986602	9.6358790	37
24	9.5989523	9.6362257	36
25	9.5992441	9.6365722	35
26	9.5995357	9.6369185	34
27	9.5998270	9.6372646	33
28	9.6001181	9.6376106	32
29	9.6004090	9.6379563	31
30	9.6006997	9.6383019	30
31	9.6009901	9.6386473	29
32	9.6012803	9.6389925	28
33	9.6015703	9.6393375	27
34	9.6018600	9.6396823	26
35	9.6021495	9.6400269	25
36	9.6024388	9.6403714	24
37	9.6027278	9.6407156	23
38	9.6030166	9.6410597	22
39	9.6033052	9.6414036	21
40	9.6035936	9.6417473	20
41	9.6038817	9.6420908	19
42	9.6041695	9.6424342	18
43	9.6044571	9.6427773	17
44	9.6047445	9.6431203	16
45	9.6050316	9.6434631	15
46	9.6053186	9.6438057	14
47	9.6056053	9.6441481	13
48	9.6058918	9.6444903	12
49	9.6061780	9.6448324	11
50	9.6064640	9.6451743	10
51	9.6067506	9.6455160	9
52	9.6070362	9.6458575	8
53	9.6073216	9.6461988	7
54	9.6076068	9.6465400	6
55	9.6078918	9.6468810	5
56	9.6081765	9.6472217	4
57	9.6084611	9.6475624	3
58	9.6087454	9.6479028	2
59	9.6090294	9.6482431	1
60	9.6093133	9.6485831	0

113	Sinus.	Tangens.	
0	9.9640261	10.3721481	60
1	9.9639724	10.3717969	59
2	9.9639187	10.3714460	58
3	9.9638650	10.3710952	57
4	9.9638112	10.3707447	56
5	9.9637574	10.3703943	55
6	9.9637036	10.3700442	54
7	9.9636496	10.3696942	53
8	9.9635957	10.3693444	52
9	9.9635417	10.3689948	51
10	9.9634877	10.3686455	50
11	9.9634336	10.3682963	49
12	9.9633795	10.3679473	48
13	9.9633253	10.3675985	47
14	9.9632711	10.3672499	46
15	9.9632168	10.3669015	45
16	9.9631625	10.3665532	44
17	9.9631082	10.3662052	43
18	9.9630538	10.3658574	42
19	9.9629994	10.3655097	41
20	9.9629449	10.3651622	40
21	9.9628904	10.3648150	39
22	9.9628358	10.3644679	38
23	9.9627812	10.3641210	37
24	9.9627266	10.3637743	36
25	9.9626719	10.3634278	35
26	9.9626172	10.3630815	34
27	9.9625624	10.3627354	33
28	9.9625076	10.3623894	32
29	9.9624527	10.3620437	31
30	9.9623978	10.3616981	30
31	9.9623428	10.3613527	29
32	9.9622878	10.3610075	28
33	9.9622328	10.3606625	27
34	9.9621777	10.3603177	26
35	9.9621226	10.3599731	25
36	9.9620674	10.3596286	24
37	9.9620122	10.3592844	23
38	9.9619569	10.3589403	22
39	9.9619016	10.3585964	21
40	9.9618463	10.3582527	20
41	9.9617909	10.3579092	19
42	9.9617355	10.3575658	18
43	9.9616800	10.3572227	17
44	9.9616245	10.3568797	16
45	9.9615689	10.3565369	15
46	9.9615133	10.3561943	14
47	9.9614576	10.3558519	13
48	9.9614020	10.3555097	12
49	9.9613463	10.3551676	11
50	9.9612904	10.3548257	10
51	9.9612346	10.3544840	9
52	9.9611787	10.3541425	8
53	9.9611228	10.3538012	7
54	9.9610668	10.3534600	6
55	9.9610108	10.3531190	5
56	9.9609548	10.3527783	4
57	9.9608987	10.3524376	3
58	9.9608426	10.3520972	2
59	9.9607864	10.3517569	1
60	9.9607302	10.3514169	0

24	Sinus.	Tangens.	
0	9.6093133	9.6485831	60
1	9.6095969	9.6489230	59
2	9.6098803	9.6492628	58
3	9.6101635	9.6496023	57
4	9.6104465	9.6499417	56
5	9.6107293	9.6502809	55
6	9.6110118	9.6506199	54
7	9.6112941	9.6509587	53
8	9.6115762	9.6512974	52
9	9.6118580	9.6516359	51
10	9.6121397	9.6519742	50
11	9.6124211	9.6523123	49
12	9.6127023	9.6526503	48
13	9.6129833	9.6529881	47
14	9.6132641	9.6533257	46
15	9.6135446	9.6536631	45
16	9.6138250	9.6540004	44
17	9.6141051	9.6543375	43
18	9.6143850	9.6546744	42
19	9.6146647	9.6550112	41
20	9.6149441	9.6553477	40
21	9.6152234	9.6556811	39
22	9.6155024	9.6560204	38
23	9.6157812	9.6563564	37
24	9.6160599	9.6566923	36
25	9.6163382	9.6570280	35
26	9.6166164	9.6573636	34
27	9.6168944	9.6576989	33
28	9.6171721	9.6580341	32
29	9.6174496	9.6583692	31
30	9.6177270	9.6587041	30
31	9.6180041	9.6590387	29
32	9.6182809	9.6593733	28
33	9.6185576	9.6597076	27
34	9.6188341	9.6600418	26
35	9.6191103	9.6603758	25
36	9.6193864	9.6607097	24
37	9.6196622	9.6610434	23
38	9.6199378	9.6613769	22
39	9.6202132	9.6617103	21
40	9.6204884	9.6620434	20
41	9.6207634	9.6623765	19
42	9.6210382	9.6627093	18
43	9.6213127	9.6630420	17
44	9.6215871	9.6633745	16
45	9.6218612	9.6637069	15
46	9.6221351	9.6640391	14
47	9.6224088	9.6643711	13
48	9.6226824	9.6647030	12
49	9.6229557	9.6650346	11
50	9.6232287	9.6653662	10
51	9.6235016	9.6656975	9
52	9.6237743	9.6660288	8
53	9.6240468	9.6663598	7
54	9.6243190	9.6666907	6
55	9.6245911	9.6670214	5
56	9.6248629	9.6673519	4
57	9.6251346	9.6676823	3
58	9.6254060	9.6680126	2
59	9.6256772	9.6683426	1
60	9.6259483	9.6686725	0

114	Sinus.	Tangens.	
0	9.9607302	10.3514169	60
1	9.9606739	10.3510770	59
2	9.9606176	10.3507372	58
3	9.9605612	10.3503977	57
4	9.9605048	10.3500583	56
5	9.9604484	10.3497191	55
6	9.9603919	10.3493801	54
7	9.9603354	10.3490413	53
8	9.9602788	10.3487026	52
9	9.9602222	10.3483641	51
10	9.9601655	10.3480258	50
11	9.9601088	10.3476877	49
12	9.9600520	10.3473497	48
13	9.9599952	10.3470119	47
14	9.9599384	10.3466743	46
15	9.9598815	10.3463369	45
16	9.9598246	10.3459996	44
17	9.9597676	10.3456625	43
18	9.9597106	10.3453256	42
19	9.9596535	10.3449888	41
20	9.9595964	10.3446523	40
21	9.9595393	10.3443159	39
22	9.9594821	10.3439796	38
23	9.9594248	10.3436436	37
24	9.9593675	10.3433077	36
25	9.9593102	10.3429720	35
26	9.9592528	10.3426364	34
27	9.9591954	10.3423011	33
28	9.9591380	10.3419659	32
29	9.9590805	10.3416308	31
30	9.9590229	10.3412960	30
31	9.9589653	10.3409613	29
32	9.9589077	10.3406267	28
33	9.9588500	10.3402924	27
34	9.9587923	10.3399582	26
35	9.9587345	10.3396242	25
36	9.9586767	10.3392903	24
37	9.9586188	10.3389566	23
38	9.9585609	10.3386231	22
39	9.9585030	10.3382897	21
40	9.9584450	10.3379566	20
41	9.9583869	10.3376235	19
42	9.9583288	10.3372907	18
43	9.9582707	10.3369580	17
44	9.9582125	10.3366255	16
45	9.9581543	10.3362931	15
46	9.9580961	10.3359609	14
47	9.9580378	10.3356289	13
48	9.9579794	10.3352970	12
49	9.9579210	10.3349654	11
50	9.9578626	10.3346338	10
51	9.9578041	10.3343025	9
52	9.9577456	10.3339712	8
53	9.9576870	10.3336402	7
54	9.9576284	10.3333093	6
55	9.9575697	10.3329786	5
56	9.9575110	10.3326481	4
57	9.9574523	10.3323177	3
58	9.9573934	10.3319874	2
59	9.9573346	10.3316574	1
60	9.9572757	10.3313275	0

25	Sinus.	Tangens.	
0	9.6259483	9.6686725	60
1	9.6262191	9.6690023	59
2	9.6264897	9.6693319	58
3	9.6267601	9.6696613	57
4	9.6270303	9.6699906	56
5	9.6273003	9.6703197	55
6	9.6275701	9.6706486	54
7	9.6278397	9.6709774	53
8	9.6281090	9.6713060	52
9	9.6283782	9.6716345	51
10	9.6286472	9.6719628	50
11	9.6289160	9.6722910	49
12	9.6291845	9.6726190	48
13	9.6294529	9.6729468	47
14	9.6297211	9.6732745	46
15	9.6299890	9.6736020	45
16	9.6302568	9.6739294	44
17	9.6305243	9.6742566	43
18	9.6307917	9.6745836	42
19	9.6310589	9.6749105	41
20	9.6313258	9.6752372	40
21	9.6315926	9.6755638	39
22	9.6318591	9.6758903	38
23	9.6321255	9.6762165	37
24	9.6323916	9.6765426	36
25	9.6326576	9.6768686	35
26	9.6329233	9.6771944	34
27	9.6331889	9.6775201	33
28	9.6334542	9.6778456	32
29	9.6337194	9.6781709	31
30	9.6339844	9.6784961	30
31	9.6342491	9.6788211	29
32	9.6345137	9.6791460	28
33	9.6347780	9.6794708	27
34	9.6350422	9.6797953	26
35	9.6353062	9.6801198	25
36	9.6355699	9.6804440	24
37	9.6358335	9.6807682	23
38	9.6360969	9.6810921	22
39	9.6363601	9.6814160	21
40	9.6366231	9.6817396	20
41	9.6368860	9.6820632	19
42	9.6371484	9.6823865	18
43	9.6374108	9.6827098	17
44	9.6376731	9.6830328	16
45	9.6379351	9.6833557	15
46	9.6381969	9.6836785	14
47	9.6384585	9.6840011	13
48	9.6387199	9.6843236	12
49	9.6389812	9.6846459	11
50	9.6392422	9.6849681	10
51	9.6395030	9.6852901	9
52	9.6397637	9.6856120	8
53	9.6400241	9.6859338	7
54	9.6402844	9.6862553	6
55	9.6405445	9.6865768	5
56	9.6408044	9.6868981	4
57	9.6410640	9.6872192	3
58	9.6413235	9.6875402	2
59	9.6415828	9.6878611	1
60	9.6418420	9.6881818	0

115	Sinus.	Tangens.	
0	9.9572757	10.3313275	60
1	9.9572168	10.3309977	59
2	9.9571578	10.3306681	58
3	9.9570988	10.3303387	57
4	9.9570397	10.3300095	56
5	9.9569806	10.3296803	55
6	9.9569215	10.3293514	54
7	9.9568623	10.3290226	53
8	9.9568030	10.3286940	52
9	9.9567437	10.3283655	51
10	9.9566844	10.3280372	50
11	9.9566250	10.3277090	49
12	9.9565656	10.3273810	48
13	9.9565061	10.3270532	47
14	9.9564466	10.3267255	46
15	9.9563870	10.3263980	45
16	9.9563274	10.3260706	44
17	9.9562678	10.3257434	43
18	9.9562081	10.3254164	42
19	9.9561483	10.3250895	41
20	9.9560886	10.3247628	40
21	9.9560287	10.3244362	39
22	9.9559689	10.3241097	38
23	9.9559089	10.3237835	37
24	9.9558490	10.3234574	36
25	9.9557890	10.3231314	35
26	9.9557289	10.3228056	34
27	9.9556688	10.3224799	33
28	9.9556087	10.3221544	32
29	9.9555485	10.3218291	31
30	9.9554882	10.3215039	30
31	9.9554280	10.3211789	29
32	9.9553676	10.3208540	28
33	9.9553073	10.3205292	27
34	9.9552469	10.3202047	26
35	9.9551864	10.3198802	25
36	9.9551259	10.3195560	24
37	9.9550653	10.3192318	23
38	9.9550047	10.3189079	22
39	9.9549441	10.3185840	21
40	9.9548834	10.3182604	20
41	9.9548227	10.3179368	19
42	9.9547619	10.3176135	18
43	9.9547011	10.3172902	17
44	9.9546402	10.3169672	16
45	9.9545793	10.3166443	15
46	9.9545184	10.3163215	14
47	9.9544574	10.3159989	13
48	9.9543963	10.3156764	12
49	9.9543352	10.3153541	11
50	9.9542741	10.3150319	10
51	9.9542129	10.3147099	9
52	9.9541517	10.3143880	8
53	9.9540904	10.3140662	7
54	9.9540291	10.3137447	6
55	9.9539677	10.3134232	5
56	9.9539063	10.3131019	4
57	9.9538448	10.3127808	3
58	9.9537833	10.3124598	2
59	9.9537219	10.3121389	1
60	9.9536602	10.3118182	0

26	Sinus.	Tangens.	
0	9.6418420	9.6881818	60
1	9.6421009	9.6885023	59
2	9.6423596	9.6888227	58
3	9.6426182	9.6891430	57
4	9.6428765	9.6894631	56
5	9.6431347	9.6897831	55
6	9.6433926	9.6901030	54
7	9.6436504	9.6904226	53
8	9.6439080	9.6907422	52
9	9.6441654	9.6910616	51
10	9.6444226	9.6913809	50
11	9.6446796	9.6917000	49
12	9.6449365	9.6920189	48
13	9.6451931	9.6923378	47
14	9.6454496	9.6926565	46
15	9.6457058	9.6929750	45
16	9.6459619	9.6932934	44
17	9.6462178	9.6936117	43
18	9.6464735	9.6939298	42
19	9.6467290	9.6942478	41
20	9.6469844	9.6945656	40
21	9.6472395	9.6948833	39
22	9.6474945	9.6952009	38
23	9.6477492	9.6955183	37
24	9.6480038	9.6958355	36
25	9.6482582	9.6961527	35
26	9.6485124	9.6964697	34
27	9.6487665	9.6967865	33
28	9.6490203	9.6971032	32
29	9.6492740	9.6974198	31
30	9.6495274	9.6977363	30
31	9.6497807	9.6980526	29
32	9.6500338	9.6983687	28
33	9.6502868	9.6986847	27
34	9.6505395	9.6990006	26
35	9.6507920	9.6993164	25
36	9.6510444	9.6996320	24
37	9.6512966	9.6999474	23
38	9.6515486	9.7002628	22
39	9.6518004	9.7005780	21
40	9.6520521	9.7008930	20
41	9.6523035	9.7012080	19
42	9.6525548	9.7015227	18
43	9.6528059	9.7018374	17
44	9.6530568	9.7021519	16
45	9.6533075	9.7024663	15
46	9.6535581	9.7027805	14
47	9.6538084	9.7030946	13
48	9.6540586	9.7034086	12
49	9.6543086	9.7037225	11
50	9.6545584	9.7040362	10
51	9.6548081	9.7043497	9
52	9.6550575	9.7046632	8
53	9.6553068	9.7049765	7
54	9.6555559	9.7052897	6
55	9.6558048	9.7056027	5
56	9.6560536	9.7059156	4
57	9.6563021	9.7062284	3
58	9.6565505	9.7065410	2
59	9.6567987	9.7068535	1
60	9.6570468	9.7071659	0

116	Sinus.	Tangens.	
0	9.9536602	10.3118182	60
1	9.9535985	10.3114977	59
2	9.9535369	10.3111773	58
3	9.9534751	10.3108570	57
4	9.9534134	10.3105369	56
5	9.9533515	10.3102169	55
6	9.9532897	10.3098970	54
7	9.9532278	10.3095774	53
8	9.9531658	10.3092578	52
9	9.9531038	10.3089384	51
10	9.9530418	10.3086191	50
11	9.9529797	10.3083000	49
12	9.9529175	10.3079811	48
13	9.9528553	10.3076622	47
14	9.9527931	10.3073435	46
15	9.9527308	10.3070250	45
16	9.9526685	10.3067066	44
17	9.9526061	10.3063883	43
18	9.9525437	10.3060702	42
19	9.9524813	10.3057522	41
20	9.9524183	10.3054344	40
21	9.9523562	10.3051167	39
22	9.9522936	10.3047991	38
23	9.9522310	10.3044817	37
24	9.9521683	10.3041645	36
25	9.9521054	10.3038473	35
26	9.9520428	10.3035303	34
27	9.9519799	10.3032135	33
28	9.9519171	10.3028968	32
29	9.9518541	10.3025802	31
30	9.9517912	10.3022637	30
31	9.9517282	10.3019474	29
32	9.9516651	10.3016313	28
33	9.9516020	10.3013153	27
34	9.9515389	10.3009994	26
35	9.9514757	10.3006836	25
36	9.9514124	10.3003680	24
37	9.9513492	10.3000526	23
38	9.9512858	10.2997372	22
39	9.9512224	10.2994220	21
40	9.9511590	10.2991070	20
41	9.9510956	10.2987920	19
42	9.9510320	10.2984773	18
43	9.9509685	10.2981626	17
44	9.9509049	10.2978481	16
45	9.9508412	10.2975337	15
46	9.9507775	10.2972195	14
47	9.9507138	10.2969054	13
48	9.9506500	10.2965914	12
49	9.9505861	10.2962775	11
50	9.9505223	10.2959638	10
51	9.9504583	10.2956503	9
52	9.9503944	10.2953368	8
53	9.9503303	10.2950235	7
54	9.9502663	10.2947103	6
55	9.9502022	10.2943973	5
56	9.9501380	10.2940844	4
57	9.9500738	10.2937716	3
58	9.9500095	10.2934590	2
59	9.9499452	10.2931465	1
60	9.9498809	10.2928341	0

27	Sinus.	Tangens.	
0	9.6570468	9.7071659	60
1	9.6572946	9.7074781	59
2	9.6575423	9.7077902	58
3	9.6577898	9.7081022	57
4	9.6580371	9.7084141	56
5	9.6582842	9.7087258	55
6	9.6585312	9.7090374	54
7	9.6587780	9.7093488	53
8	9.6590246	9.7096601	52
9	9.6592710	9.7099713	51
10	9.6595173	9.7102824	50
11	9.6597634	9.7105933	49
12	9.6600093	9.7109041	48
13	9.6602550	9.7112148	47
14	9.6605005	9.7115254	46
15	9.6607459	9.7118358	45
16	9.6609911	9.7121461	44
17	9.6612361	9.7124562	43
18	9.6614810	9.7127662	42
19	9.6617257	9.7130761	41
20	9.6619702	9.7133859	40
21	9.6622145	9.7136956	39
22	9.6624586	9.7140051	38
23	9.6627026	9.7143145	37
24	9.6629464	9.7146237	36
25	9.6631900	9.7149329	35
26	9.6634335	9.7152419	34
27	9.6636768	9.7155508	33
28	9.6639199	9.7158595	32
29	9.6641628	9.7161682	31
30	9.6644056	9.7164767	30
31	9.6646482	9.7167851	29
32	9.6648906	9.7170933	28
33	9.6651329	9.7174014	27
34	9.6653749	9.7177094	26
35	9.6656168	9.7180173	25
36	9.6658586	9.7183251	24
37	9.6661001	9.7186327	23
38	9.6663415	9.7189402	22
39	9.6665828	9.7192476	21
40	9.6668238	9.7195549	20
41	9.6670647	9.7198620	19
42	9.6673054	9.7201690	18
43	9.6675459	9.7204759	17
44	9.6677863	9.7207827	16
45	9.6680265	9.7210893	15
46	9.6682665	9.7213958	14
47	9.6685064	9.7217022	13
48	9.6687461	9.7220085	12
49	9.6689856	9.7223147	11
50	9.6692250	9.7226207	10
51	9.6694640	9.7229266	9
52	9.6697032	9.7232324	8
53	9.6699420	9.7235381	7
54	9.6701807	9.7238436	6
55	9.6704192	9.7241490	5
56	9.6706576	9.7244543	4
57	9.6708958	9.7247595	3
58	9.6711338	9.7250646	2
59	9.6713716	9.7253695	1
60	9.6716093	9.7256744	0

152

117	Sinus.	Tangens.	
0	9.9498809	10.2928341	60
1	9.9498165	10.2925219	59
2	9.9497521	10.2922098	58
3	9.9496876	10.2918978	57
4	9.9496230	10.2915859	56
5	9.9495585	10.2912742	55
6	9.9494938	10.2909626	54
7	9.9494292	10.2906512	53
8	9.9493645	10.2903399	52
9	9.9492997	10.2900287	51
10	9.9492349	10.2897176	50
11	9.9491700	10.2894067	49
12	9.9491051	10.2890959	48
13	9.9490402	10.2887852	47
14	9.9489752	10.2884746	46
15	9.9489101	10.2881642	45
16	9.9488450	10.2878539	44
17	9.9487799	10.2875438	43
18	9.9487147	10.2872338	42
19	9.9486495	10.2869239	41
20	9.9485842	10.2866141	40
21	9.9485189	10.2863044	39
22	9.9484535	10.2859949	38
23	9.9483881	10.2856855	37
24	9.9483227	10.2853763	36
25	9.9482572	10.2850671	35
26	9.9481916	10.2847581	34
27	9.9481260	10.2844492	33
28	9.9480604	10.2841405	32
29	9.9479947	10.2838318	31
30	9.9479289	10.2835233	30
31	9.9478631	10.2832149	29
32	9.9477973	10.2829067	28
33	9.9477314	10.2825986	27
34	9.9476655	10.2822906	26
35	9.9475995	10.2819827	25
36	9.9475335	10.2816749	24
37	9.9474674	10.2813673	23
38	9.9474013	10.2810598	22
39	9.9473352	10.2807524	21
40	9.9472689	10.2804451	20
41	9.9472027	10.2801380	19
42	9.9471364	10.2798310	18
43	9.9470700	10.2795241	17
44	9.9470036	10.2792173	16
45	9.9469372	10.2789107	15
46	9.9468707	10.2786042	14
47	9.9468042	10.2782978	13
48	9.9467376	10.2779915	12
49	9.9466710	10.2776853	11
50	9.9466043	10.2773793	10
51	9.9465376	10.2770734	9
52	9.9464708	10.2767676	8
53	9.9464040	10.2764619	7
54	9.9463371	10.2761564	6
55	9.9462702	10.2758510	5
56	9.9462032	10.2755457	4
57	9.9461362	10.2752405	3
58	9.9460692	10.2749354	2
59	9.9460021	10.2746305	1
60	9.9459349	10.2743256	0

62

28	Sinus.	Tangens.	
0	9.6716003	9.7256744	60
1	9.6718468	9.7259791	59
2	9.6720841	9.7262837	58
3	9.6723213	9.7265881	57
4	9.6725583	9.7268925	56
5	9.6727952	9.7271967	55
6	9.6730319	9.7275008	54
7	9.6732684	9.7278048	53
8	9.6735047	9.7281087	52
9	9.6737409	9.7284124	51
10	9.6739769	9.7287161	50
11	9.6742128	9.7290196	49
12	9.6744485	9.7293230	48
13	9.6746840	9.7296263	47
14	9.6749194	9.7299295	46
15	9.6751546	9.7302325	45
16	9.6753896	9.7305354	44
17	9.6756245	9.7308383	43
18	9.6758592	9.7311410	42
19	9.6760937	9.7314436	41
20	9.6763281	9.7317460	40
21	9.6765623	9.7320484	39
22	9.6767963	9.7323506	38
23	9.6770302	9.7326527	37
24	9.6772640	9.7329547	36
25	9.6774975	9.7332566	35
26	9.6777309	9.7335584	34
27	9.6779642	9.7338601	33
28	9.6781972	9.7341616	32
29	9.6784301	9.7344631	31
30	9.6786629	9.7347644	30
31	9.6788955	9.7350656	29
32	9.6791279	9.7353667	28
33	9.6793602	9.7356677	27
34	9.6795923	9.7359685	26
35	9.6798243	9.7362693	25
36	9.6800560	9.7365699	24
37	9.6802877	9.7368705	23
38	9.6805191	9.7371709	22
39	9.6807504	9.7374712	21
40	9.6809816	9.7377714	20
41	9.6812126	9.7380715	19
42	9.6814434	9.7383714	18
43	9.6816741	9.7386713	17
44	9.6819046	9.7389710	16
45	9.6821349	9.7392707	15
46	9.6823651	9.7395702	14
47	9.6825952	9.7398696	13
48	9.6828250	9.7401689	12
49	9.6830548	9.7404681	11
50	9.6832843	9.7407672	10
51	9.6835137	9.7410662	9
52	9.6837430	9.7413650	8
53	9.6839720	9.7416638	7
54	9.6842010	9.7419624	6
55	9.6844297	9.7422609	5
56	9.6846581	9.7425594	4
57	9.6848868	9.7428577	3
58	9.6851151	9.7431559	2
59	9.6853432	9.7434540	1
60	9.6855712	9.7437520	0

151

118	Sinus.	Tangens.	
0	9.9459349	10.2743256	60
1	9.9458677	10.2740209	59
2	9.9458005	10.2737163	58
3	9.9457332	10.2734119	57
4	9.9456659	10.2731075	56
5	9.9455985	10.2728033	55
6	9.9455310	10.2724992	54
7	9.9454636	10.2721952	53
8	9.9453960	10.2718913	52
9	9.9453285	10.2715876	51
10	9.9452609	10.2712839	50
11	9.9451932	10.2709804	49
12	9.9451255	10.2706770	48
13	9.9450577	10.2703737	47
14	9.9449899	10.2700705	46
15	9 9449220	10.2697675	45
16	9.9448541	10.2694646	44
17	9.9447862	10.2691617	43
18	9.9447182	10.2688590	42
19	9.9446501	10.2685564	41
20	9.9445821	10.2682540	40
21	9.9445139	10.2679516	39
22	9.9444457	10.2676494	38
23	9.9443775	10.2673473	37
24	9.9443092	10.2670453	36
25	9.9442409	10.2667434	35
26	9.9441725	10.2664416	34
27	9.9441041	10.2661399	33
28	9.9440356	10.2658384	32
29	9.9439671	10.2655369	31
30	9 9438985	10.2652356	30
31	9.9438299	10.2649344	29
32	9.9437612	10.2646333	28
33	9.9436925	10.2643323	27
34	9.9436238	10.2640315	26
35	9.9435549	10.2637307	25
36	9.9434861	10.2634301	24
37	9.9434172	10.2631295	23
38	9.9433482	10.2628291	22
39	9.9432792	10.2625288	21
40	9.9432102	10.2622286	20
41	9.9431411	10.2619285	19
42	9.9430720	10.2616286	18
43	9.9430028	10.2613287	17
44	9.9429335	10.2610290	16
45	9.9428643	10 2607293	15
46	9.9427949	10.2604298	14
47	9.9427255	10.2601304	13
48	9.9426561	10.2598311	12
49	9.9425866	10.2595319	11
50	9.9425171	10.2592328	10
51	9.9424476	10.2589338	9
52	9.9423779	10.2586350	8
53	9.9423083	10.2583362	7
54	9.9422386	10.2580376	6
55	9.9421688	10.2577391	5
56	9.9420990	10.2574406	4
57	9.9420291	10.2571423	3
58	9.9419592	10.2568441	2
59	9.9418893	10 2565460	1
60	9.9418193	10.2562480	0

61

29	Sinus.	Tangens.	
0	9.6855712	9.7437520	60
1	9.6857991	9.7440499	59
2	9.6860267	9.7443476	58
3	9.6862542	9.7446453	57
4	9.6864816	9.7449428	56
5	9.6867088	9.7452403	55
6	9.6869359	9.7455376	54
7	9.6871628	9.7458349	53
8	9.6873895	9.7461320	52
9	9.6876161	9.7464290	51
10	9.6878425	9.7467259	50
11	9.6880688	9.7470227	49
12	9.6882949	9.7473194	48
13	9.6885209	9.7476160	47
14	9.6887467	9.7479125	46
15	9.6889723	9.7482089	45
16	9.6891978	9.7485052	44
17	9.6894232	9.7488013	43
18	9.6896484	9.7490974	42
19	9.6898734	9.7493934	41
20	9.6900983	9.7496892	40
21	9.6903231	9.7499850	39
22	9.6905476	9.7502806	38
23	9.6907721	9.7505762	37
24	9.6909964	9.7508716	36
25	9.6912205	9.7511669	35
26	9.6914445	9.7514622	34
27	9.6916683	9.7517573	33
28	9.6918919	9.7520523	32
29	9.6921155	9.7523472	31
30	9.6923388	9.7526420	30
31	9.6925620	9.7529368	29
32	9.6927851	9.7532314	28
33	9.6930080	9.7535259	27
34	9.6932308	9.7538203	26
35	9.6934534	9.7541146	25
36	9.6936758	9.7544088	24
37	9.6938981	9.7547029	23
38	9.6941203	9.7549969	22
39	9.6943423	9.7552908	21
40	9.6945642	9.7555846	20
41	9.6947859	9.7558783	19
42	9.6950074	9.7561718	18
43	9.6952288	9.7564653	17
44	9.6954501	9.7567587	16
45	9.6956712	9.7570520	15
46	9.6958922	9.7573452	14
47	9.6961130	9.7576383	13
48	9.6963336	9.7579313	12
49	9.6965541	9.7582242	11
50	9.6967745	9.7585170	10
51	9.6969947	9.7588096	9
52	9.6972148	9.7591022	8
53	9.6974347	9.7593947	7
54	9.6976545	9.7596871	6
55	9.6978741	9.7599794	5
56	9.6980936	9.7602716	4
57	9.6983129	9.7605637	3
58	9.6985321	9.7608557	2
59	9.6987511	9.7611476	1
60	9.6989700	9.7614394	0

119	Sinus.	Tangens.	
0	9.9418193	10.2562480	60
1	9.9417492	10.2559501	59
2	9.9416791	10.2556524	58
3	9.9416090	10.2553547	57
4	9.9415388	10.2550572	56
5	9.9414685	10.2547597	55
6	9.9413982	10.2544624	54
7	9.9413279	10.2541651	53
8	9.9412575	10.2538680	52
9	9.9411871	10.2535710	51
10	9.9411166	10.2532741	50
11	9.9410461	10.2529773	49
12	9.9409755	10.2526806	48
13	9.9409048	10.2523840	47
14	9.9408342	10.2520875	46
15	9.9407634	10.2517911	45
16	9.9406927	10.2514948	44
17	9.9406219	10.2511987	43
18	9.9405510	10.2509026	42
19	9.9404801	10.2506066	41
20	9.9404091	10.2503108	40
21	9.9403381	10.2500150	39
22	9.9402670	10.2497194	38
23	9.9401959	10.2494238	37
24	9.9401248	10.2491284	36
25	9.9400535	10.2488331	35
26	9.9399823	10.2485378	34
27	9.9399110	10.2482427	33
28	9.9398396	10.2479477	32
29	9.9397682	10.2476528	31
30	9.9396968	10.2473580	30
31	9.9396253	10.2470632	29
32	9.9395537	10.2467686	28
33	9.9394821	10.2464741	27
34	9.9394105	10.2461797	26
35	9.9393388	10.2458854	25
36	9.9392671	10.2455912	24
37	9.9391953	10.2452971	23
38	9.9391234	10.2450031	22
39	9.9390515	10.2447092	21
40	9.9389796	10.2444154	20
41	9.9389076	10.2441217	19
42	9.9388356	10.2438282	18
43	9.9387635	10.2435347	17
44	9.9386914	10.2432413	16
45	9.9386192	10.2429480	15
46	9.9385470	10.2426548	14
47	9.9384747	10.2423617	13
48	9.9384024	10.2420687	12
49	9.9383300	10.2417758	11
50	9.9382576	10.2414830	10
51	9.9381851	10.2411904	9
52	9.9381126	10.2408978	8
53	9.9380400	10.2406053	7
54	9.9379674	10.2403129	6
55	9.9378947	10.2400206	5
56	9.9378220	10.2397284	4
57	9.9377492	10.2394363	3
58	9.9376764	10.2391443	2
59	9.9376035	10.2388524	1
60	9.9375306	10.2385606	0

30	Sinus.	Tangens.	
0	9.6989700	9.7614394	60
1	9.6991887	9.7617311	59
2	9.6994073	9.7620227	58
3	9.6996258	9.7623142	57
4	9.6998441	9.7626056	56
5	9.7000622	9.7628969	55
6	9.7002802	9.7631881	54
7	9.7004981	9.7634792	53
8	9.7007158	9.7637702	52
9	9.7009334	9.7640612	51
10	9.7011508	9.7643520	50
11	9.7013681	9.7646427	49
12	9.7015852	9.7649334	48
13	9.7018022	9.7652239	47
14	9.7020190	9.7655143	46
15	9.7022357	9.7658047	45
16	9.7024523	9.7660949	44
17	9.7026687	9.7663851	43
18	9.7028849	9.7666751	42
19	9.7031011	9.7669651	41
20	9.7033170	9.7672550	40
21	9.7035329	9.7675448	39
22	9.7037486	9.7678344	38
23	9.7039641	9.7681240	37
24	9.7041795	9.7684135	36
25	9.7043947	9.7687029	35
26	9.7046099	9.7689922	34
27	9.7048248	9.7692814	33
28	9.7050397	9.7695705	32
29	9.7052543	9.7698596	31
30	9.7054689	9.7701485	30
31	9.7056833	9.7704372	29
32	9.7058975	9.7707261	28
33	9.7061116	9.7710147	27
34	9.7063256	9.7713033	26
35	9.7065394	9.7715917	25
36	9.7067531	9.7718801	24
37	9.7069667	9.7721684	23
38	9.7071801	9.7724566	22
39	9.7073933	9.7727447	21
40	9.7076064	9.7730327	20
41	9.7078194	9.7733206	19
42	9.7080323	9.7736084	18
43	9.7082450	9.7738961	17
44	9.7084575	9.7741838	16
45	9.7086699	9.7744713	15
46	9.7088822	9.7747588	14
47	9.7090943	9.7750462	13
48	9.7093063	9.7753334	12
49	9.7095182	9.7756206	11
50	9.7097299	9.7759077	10
51	9.7099415	9.7761947	9
52	9.7101529	9.7764816	8
53	9.7103642	9.7767685	7
54	9.7105753	9.7770552	6
55	9.7107863	9.7773418	5
56	9.7109972	9.7776284	4
57	9.7112080	9.7779149	3
58	9.7114186	9.7782012	2
59	9.7116290	9.7784875	1
60	9.7118393	9.7787737	0

120	Sinus.	Tangens.	
0	9.9375306	10.2385606	60
1	9.9374577	10.2382689	59
2	9.9373847	10.2379773	58
3	9.9373116	10.2376858	57
4	9.9372385	10.2373944	56
5	9.9371653	10.2371031	55
6	9.9370921	10.2368119	54
7	9.9370189	10.2365208	53
8	9.9369456	10.2362298	52
9	9.9368722	10.2359388	51
10	9.9367988	10.2356480	50
11	9.9367254	10.2353573	49
12	9.9366519	10.2350666	48
13	9.9365783	10.2347761	47
14	9.9365047	10.2344857	46
15	9.9364311	10.2341953	45
16	9.9363574	10.2339051	44
17	9.9362836	10.2336149	43
18	9.9362098	10.2333249	42
19	9.9361360	10.2330349	41
20	9.9360621	10.2327450	40
21	9.9359881	10.2324552	39
22	9.9359141	10.2321656	38
23	9.9358401	10.2318760	37
24	9.9357660	10.2315865	36
25	9.9356918	10.2312971	35
26	9.9356177	10.2310078	34
27	9.9355434	10.2307186	33
28	9.9354691	10.2304295	32
29	9.9353948	10.2301404	31
30	9.9353204	10.2298515	30
31	9.9352459	10.2295627	29
32	9.9351715	10.2292739	28
33	9.9350969	10.2289853	27
34	9.9350223	10.2286967	26
35	9.9349477	10.2284083	25
36	9.9348730	10.2281199	24
37	9.9347983	10.2278316	23
38	9.9347235	10.2275434	22
39	9.9346486	10.2272553	21
40	9.9345738	10.2269673	20
41	9.9344988	10.2266794	19
42	9.9344238	10.2263916	18
43	9.9343488	10.2261039	17
44	9.9342737	10.2258162	16
45	9.9341986	10.2255287	15
46	9.9341234	10.2252412	14
47	9.9340482	10.2249538	13
48	9.9339729	10.2246666	12
49	9.9338976	10.2243794	11
50	9.9338222	10.2240923	10
51	9.9337467	10.2238053	9
52	9.9336713	10.2235184	8
53	9.9335957	10.2232315	7
54	9.9335201	10.2229448	6
55	9.9334445	10.2226582	5
56	9.9333688	10.2223716	4
57	9.9332931	10.2220851	3
58	9.9332173	10.2217988	2
59	9.9331415	10.2215125	1
60	9.9330656	10.2212263	0

31	Sinus.	Tangens.	
0	9.7118393	9.7787737	60
1	9.7120495	9.7790599	59
2	9.7122596	9.7793459	58
3	9.7124695	9.7796318	57
4	9.7126792	9.7799177	56
5	9.7128889	9.7802034	55
6	9.7130983	9.7804891	54
7	9.7133077	9.7807747	53
8	9.7135169	9.7810602	52
9	9.7137260	9.7813456	51
10	9.7139349	9.7816309	50
11	9.7141437	9.7819162	49
12	9.7143524	9.7822013	48
13	9.7145609	9.7824864	47
14	9.7147693	9.7827713	46
15	9.7149776	9.7830562	45
16	9.7151857	9.7833410	44
17	9.7153937	9.7836258	43
18	9.7156015	9.7839104	42
19	9.7158092	9.7841949	41
20	9.7160168	9.7844794	40
21	9.7162243	9.7847638	39
22	9.7164316	9.7850481	38
23	9.7166387	9.7853323	37
24	9.7168458	9.7856164	36
25	9.7170526	9.7859004	35
26	9.7172594	9.7861844	34
27	9.7174660	9.7864682	33
28	9.7176725	9.7867520	32
29	9.7178789	9.7870357	31
30	9.7180851	9.7873193	30
31	9.7182912	9.7876028	29
32	9.7184971	9.7878863	28
33	9.7187030	9.7881696	27
34	9.7189086	9.7884529	26
35	9.7191142	9.7887361	25
36	9.7193196	9.7890192	24
37	9.7195249	9.7893023	23
38	9.7197300	9.7895852	22
39	9.7199350	9.7898681	21
40	9.7201399	9.7901508	20
41	9.7203447	9.7904335	19
42	9.7205493	9.7907161	18
43	9.7207538	9.7909987	17
44	9.7209581	9.7912811	16
45	9.7211623	9.7915635	15
46	9.7213664	9.7918458	14
47	9.7215704	9.7921280	13
48	9.7217742	9.7924101	12
49	9.7219779	9.7926921	11
50	9.7221814	9.7929741	10
51	9.7223848	9.7932560	9
52	9.7225881	9.7935378	8
53	9.7227913	9.7938195	7
54	9.7229943	9.7941011	6
55	9.7231972	9.7943827	5
56	9.7234000	9.7946641	4
57	9.7236026	9.7949455	3
58	9.7238051	9.7952268	2
59	9.7240075	9.7955081	1
60	9.7242097	9.7957892	0

121	Sinus.	Tangens.	
0	9.9330656	10.2212263	60
1	9.9329897	10.2209401	59
2	9.9329137	10.2206541	58
3	9.9328376	10.2203682	57
4	9.9327616	10.2200823	56
5	9.9326854	10.2197966	55
6	9.9326092	10.2195109	54
7	9.9325330	10.2192253	53
8	9.9324567	10.2189398	52
9	9.9323804	10.2186544	51
10	9.9323040	10.2183691	50
11	9.9322276	10.2180838	49
12	9.9321511	10.2177987	48
13	9.9320746	10.2175136	47
14	9.9319980	10.2172287	46
15	9.9319213	10.2169438	45
16	9.9318447	10.2166590	44
17	9.9317679	10.2163742	43
18	9.9316911	10.2160896	42
19	9.9316143	10.2158051	41
20	9.9315374	10.2155206	40
21	9.9314605	10.2152362	39
22	9.9313835	10.2149519	38
23	9.9313065	10.2146677	37
24	9.9312294	10.2143836	36
25	9.9311522	10.2140996	35
26	9.9310750	10.2138156	34
27	9.9309978	10.2135318	33
28	9.9309205	10.2132480	32
29	9.9308432	10.2129643	31
30	9.9307658	10.2126807	30
31	9.9306883	10.2123972	29
32	9.9306109	10.2121137	28
33	9.9305333	10.2118304	27
34	9.9304557	10.2115471	26
35	9.9303781	10.2112639	25
36	9.9303004	10.2109808	24
37	9.9302226	10.2106977	23
38	9.9301448	10.2104148	22
39	9.9300670	10.2101319	21
40	9.9299891	10.2098492	20
41	9.9299112	10.2095665	19
42	9.9298332	10.2092839	18
43	9.9297551	10.2090013	17
44	9.9296770	10.2087189	16
45	9.9295989	10.2084365	15
46	9.9295207	10.2081542	14
47	9.9294424	10.2078720	13
48	9.9293641	10.2075899	12
49	9.9292857	10.2073079	11
50	9.9292073	10.2070259	10
51	9.9291289	10.2067440	9
52	9.9290504	10.2064622	8
53	9.9289718	10.2061805	7
54	9.9288932	10.2058989	6
55	9.9288145	10.2056173	5
56	9.9287358	10.2053359	4
57	9.9286571	10.2050545	3
58	9.9285783	10.2047732	2
59	9.9284994	10 2044919	1
60	9.9284205	10.2042108	0

32	Sinus.	Tangens.	
0	9.7242097	9.7957892	60
1	9.7244118	9.7960703	59
2	9.7246138	9.7963513	58
3	9.7248156	9.7966322	57
4	9.7250174	9.7969130	56
5	9.7252189	9.7971938	55
6	9.7254204	9.7974745	54
7	9.7256217	9.7977551	53
8	9.7258229	9.7980356	52
9	9.7260240	9.7983160	51
10	9.7262249	9.7985964	50
11	9.7264257	9.7988767	49
12	9.7266264	9.7991569	48
13	9.7268269	9.7994370	47
14	9.7270273	9.7997170	46
15	9.7272276	9.7999970	45
16	9.7274278	9.8002769	44
17	9.7276278	9.8005567	43
18	9.7278277	9.8008365	42
19	9.7280275	9.8011161	41
20	9.7282271	9.8013957	40
21	9.7284267	9.8016752	39
22	9.7286260	9.8019546	38
23	9.7288253	9.8022340	37
24	9.7290244	9.8025133	36
25	9.7292234	9.8027925	35
26	9.7294223	9.8030716	34
27	9.7296211	9.8033506	33
28	9.7298197	9.8036296	32
29	9.7300182	9.8039085	31
30	9.7302165	9.8041873	30
31	9.7304148	9.8044661	29
32	9.7306129	9.8047447	28
33	9.7308109	9.8050233	27
34	9.7310087	9.8053019	26
35	9.7312064	9.8055803	25
36	9.7314040	9.8058587	24
37	9.7316015	9.8061370	23
38	9.7317989	9.8064152	22
39	9.7319961	9.8066933	21
40	9.7321932	9.8069714	20
41	9.7323902	9.8072494	19
42	9.7325870	9.8075273	18
43	9.7327837	9.8078052	17
44	9.7329803	9.8080829	16
45	9.7331768	9.8083606	15
46	9.7333731	9.8086383	14
47	9.7335693	9.8089158	13
48	9.7337654	9.8091933	12
49	9.7339614	9.8094707	11
50	9.7341572	9.8097480	10
51	9.7343529	9.8100253	9
52	9.7345485	9.8103025	8
53	9.7347440	9.8105796	7
54	9.7349393	9.8108566	6
55	9.7351345	9.8111336	5
56	9.7353296	9.8114105	4
57	9.7355246	9.8116873	3
58	9.7357195	9.8119641	2
59	9.7359142	9.8122408	1
60	9.7361088	9.8125174	0

122	Sinus.	Tangens.	
0	9.9284205	10.2042108	60
1	9.9283415	10.2039297	59
2	9.9282625	10.2036487	58
3	9.9281834	10.2033678	57
4	9.9281043	10.2030870	56
5	9.9280251	10.2028062	55
6	9.9279459	10.2025255	54
7	9.9278666	10.2022449	53
8	9.9277873	10.2019644	52
9	9.9277079	10.2016840	51
10	9.9276285	10.2014036	50
11	9.9275490	10.2011233	49
12	9.9274695	10.2008431	48
13	9.9273899	10.2005630	47
14	9.9273103	10.2002830	46
15	9.9272306	10.2000030	45
16	9.9271509	10.1997231	44
17	9.9270711	10.1994433	43
18	9.9269913	10.1991635	42
19	9.9269114	10.1988839	41
20	9.9268314	10.1986043	40
21	9.9267514	10.1983248	39
22	9.9266714	10.1980454	38
23	9.9265913	10.1977660	37
24	9.9265112	10.1974867	36
25	9.9264310	10.1972075	35
26	9.9263507	10.1969284	34
27	9.9262704	10.1966494	33
28	9.9261901	10.1963704	32
29	9.9261096	10.1960915	31
30	9.9260292	10.1958127	30
31	9.9259487	10.1955339	29
32	9.9258681	10.1952553	28
33	9.9257875	10.1949767	27
34	9.9257069	10.1946981	26
35	9.9256261	10.1944197	25
36	9.9255454	10.1941413	24
37	9.9254646	10.1938630	23
38	9.9253837	10.1935848	22
39	9.9253028	10.1933067	21
40	9.9252218	10.1930286	20
41	9.9251408	10.1927506	19
42	9.9250597	10.1924727	18
43	9.9249786	10.1921948	17
44	9.9248974	10.1919171	16
45	9.9248161	10.1916394	15
46	9.9247349	10.1913617	14
47	9.9246535	10.1910842	13
48	9.9245721	10.19 8067	12
49	9.9244907	10.1905293	11
50	9.9244092	10.1902520	10
51	9.9243277	10.1899747	9
52	9.9242461	10.1896975	8
53	9.9241644	10.1894204	7
54	9.9240827	10.1891434	6
55	9.9240010	10.1888664	5
56	9.9239191	10.1885895	4
57	9.9238373	10.1883127	3
58	9.9237554	10.1880359	2
59	9.9236734	10.1877592	1
60	9.9235914	10.1874826	0

33	Sinus.	Tangens.	
0	9.7361088	9.8125174	60
1	9.7363032	9.8127939	59
2	9.7364976	9.8130704	58
3	9.7366918	9.8133468	57
4	9.7368859	9.8136231	56
5	9.7370799	9.8138993	55
6	9.7372737	9.8141755	54
7	9.7374675	9.8144516	53
8	9.7376611	9.8147277	52
9	9.7378546	9.8150036	51
10	9.7380479	9.8152795	50
11	9.7382412	9.8155554	49
12	9.7384343	9.8158311	48
13	9.7386273	9.8161068	47
14	9.7388201	9.8163824	46
15	9.7390129	9.8166580	45
16	9.7392055	9.8169335	44
17	9.7393980	9.8172089	43
18	9.7395904	9.8174842	42
19	9.7397827	9.8177595	41
20	9.7399748	9.8180347	40
21	9.7401668	9.8183098	39
22	9.7403587	9.8185849	38
23	9.7405505	9.8188599	37
24	9.7407421	9.8191348	36
25	9.7409337	9.8194096	35
26	9.7411251	9.8196844	34
27	9.7413164	9.8199592	33
28	9.7415075	9.8202338	32
29	9.7416986	9.8205084	31
30	9.7418895	9.8207829	30
31	9.7420803	9.8210574	29
32	9.7422710	9.8213317	28
33	9.7424616	9.8216060	27
34	9.7426520	9.8218803	26
35	9.7428423	9.8221545	25
36	9.7430325	9.8224286	24
37	9.7432226	9.8227026	23
38	9.7434126	9.8229766	22
39	9.7436024	9.8232505	21
40	9.7437921	9.8235244	20
41	9.7439817	9.8237981	19
42	9.7441712	9.8240719	18
43	9.7443606	9.8243455	17
44	9.7445498	9.8246191	16
45	9.7447390	9.8248926	15
46	9.7449280	9.8251660	14
47	9.7451169	9.8254394	13
48	9.7453056	9 8257127	12
49	9.7454943	9.8259860	11
50	9.7456828	9.8262592	10
51	9.7458712	9.8265323	9
52	9.7460595	9.8268053	8
53	9.7462477	9.8270783	7
54	9.7464358	9.8273513	6
55	9 7466237	9.8276241	5
56	9.7468115	9.8278969	4
57	9.7469992	9.8281696	3
58	9.7471868	9 8284423	2
59	9.7473743	9.8287149	1
60	9.7475617	9.8289874	0

123	Sinus.	Tangens.	
0	9.9235914	10.1874826	60
1	9.9235093	10.1872061	59
2	9.9234271	10.1869296	58
3	9.9233450	10.1866532	57
4	9.9232628	10.1863769	56
5	9.9231805	10.1861007	55
6	9.9230982	10.1858245	54
7	9.9230158	10.1855484	53
8	9.9229334	10.1852723	52
9	9.9228509	10.1849964	51
10	9.9227684	10.1847205	50
11	9.9226858	10.1844446	49
12	9.9226032	10.1841689	48
13	9.9225205	10.1838932	47
14	9.9224377	10.1836176	46
15	9.9223549	10.1833420	45
16	9.9222721	10.1830665	44
17	9.9221891	10.1827911	43
18	9.9221062	10.1825158	42
19	9.9220232	10.1822405	41
20	9.9219401	10.1819653	40
21	9.9218570	10.1816902	39
22	9.9217738	10.1814151	38
23	9.9216906	10.1811401	37
24	9.9216073	10.1808652	36
25	9.9215240	10.1805904	35
26	9.9214406	10.1803156	34
27	9.9213572	10.1800408	33
28	9.9212737	10.1797662	32
29	9.9211902	10.1794916	31
30	9.9211066	10.1792171	30
31	9.9210229	10.1789426	29
32	9.9209393	10.1786683	28
33	9.9208555	10.1783940	27
34	9.9207717	10.1781197	26
35	9.9206878	10.1778455	25
36	9.9206039	10.1775714	24
37	9.9205200	10.1772974	23
38	9.9204360	10.1770234	22
39	9.9203519	10.1767495	21
40	9.9202678	10.1764756	20
41	9.9201836	10.1762019	19
42	9.9200994	10.1759281	18
43	9.9200151	10.1756545	17
44	9.9199308	10.1753809	16
45	9.9198464	10.1751074	15
46	9.9197619	10.1748340	14
47	9.9196775	10.1745606	13
48	9.9195929	10.1742873	12
49	9.9195083	10.1740140	11
50	9.9194237	10.1737408	10
51	9.9193390	10.1734677	9
52	9.9192542	10.1731947	8
53	9.9191694	10.1729217	7
54	9.9190845	10.1726487	6
55	9.9189996	10.1723759	5
56	9.9189146	10.1721031	4
57	9.9188296	10.1718304	3
58	9.9187445	10.1715577	2
59	9.9186594	10.1712851	1
60	9.9185742	10.1710126	0

34	Sinus.	Tangens.	
0	9.7475617	9.8289874	60
1	9.7477489	9.8292599	59
2	9.7479360	9.8295323	58
3	9.7481230	9.8298047	57
4	9.7483099	9.8300769	56
5	9.7484967	9.8303492	55
6	9.7486833	9.8306213	54
7	9.7488698	9.8308934	53
8	9.7490562	9.8311654	52
9	9.7492425	9.8314374	51
10	9.7494287	9.8317093	50
11	9.7496148	9.8319811	49
12	9.7498007	9.8322529	48
13	9.7499866	9.8325246	47
14	9.7501723	9.8327963	46
15	9.7503579	9.8330679	45
16	9.7505434	9.8333394	44
17	9.7507287	9.8336109	43
18	9.7509140	9.8338823	42
19	9.7510991	9.8341536	41
20	9.7512842	9.8344249	40
21	9.7514691	9.8346961	39
22	9.7516538	9.8349673	38
23	9.7518385	9.8352384	37
24	9.7520231	9.8355094	36
25	9.7522075	9.8357804	35
26	9.7523919	9.8360513	34
27	9.7525761	9.8363221	33
28	9.7527602	9.8365929	32
29	9.7529442	9.8368636	31
30	9.7531280	9.8371343	30
31	9.7533118	9.8374049	29
32	9.7534954	9.8376755	28
33	9.7536790	9.8379460	27
34	9.7538624	9.8382164	26
35	9.7540457	9.8384867	25
36	9.7542288	9.8387571	24
37	9.7544119	9.8390273	23
38	9.7545949	9.8392975	22
39	9.7547777	9.8395676	21
40	9.7549604	9.8398377	20
41	9.7551431	9.8401077	19
42	9.7553256	9.8403776	18
43	9.7555080	9.8406475	17
44	9.7556902	9.8409174	16
45	9.7558724	9.8411871	15
46	9.7560544	9.8414569	14
47	9.7562364	9.8417265	13
48	9.7564182	9.8419961	12
49	9.7565999	9.8422657	11
50	9.7567815	9.8425351	10
51	9.7569630	9.8428046	9
52	9.7571444	9.8430739	8
53	9.7573256	9.8433432	7
54	9.7575068	9.8436125	6
55	9.7576878	9.8438817	5
56	9.7578687	9.8441508	4
57	9.7580495	9.8444199	3
58	9.7582302	9.8446889	2
59	9.7584108	9.8449579	1
60	9.7585913	9.8452268	0

124	Sinus.	Tangens.	
0	9.9185742	10.1710126	60
1	9.9134890	10.1707401	59
2	9.9184037	10.1704677	58
3	9.9183183	10.1701953	57
4	9.9182329	10 1699231	56
5	9.9181475	10.1696508	55
6	9.9180620	10.1693787	54
7	9.9179764	10.1691066	53
8	9.9178908	10.1688346	52
9	9.9178051	10.1685626	51
10	9.9177194	10.1682907	50
11	9.9176336	10.1680189	49
12	9.9175478	10.1677471	48
13	9.9174619	10.1674754	47
14	9.9173760	10.1672037	46
15	9.9172900	10.1669321	45
16	9.9172040	10.1666606	44
17	9.9171179	10.1663891	43
18	9.9170317	10.1661177	42
19	9.9169455	10.1658464	41
20	9.9168593	10.1655751	40
21	9.9167730	10.1653039	39
22	9.9166866	10.1650327	38
23	9.9166002	10.1647616	37
24	9.9165137	10.1644906	36
25	9.9164272	10.1642196	35
26	9.9163406	10.1639487	34
27	9.9162539	10.1636779	33
28	9.9161673	10.1634071	32
29	9.9160805	10.1631364	31
30	9.9159937	10.1628657	30
31	9.9159069	10.1625951	29
32	9.9158200	10.1623245	28
33	9.9157330	10.1620540	27
34	9.9156460	10.1617836	26
35	9.9155589	10.1615133	25
36	9.9154718	10.1612429	24
37	9.9153846	10.1609727	23
38	9.9152974	10.1607025	22
39	9.9152101	10.1604324	21
40	9.9151228	10.1601623	20
41	9 9150354	10.1598923	19
42	9.9149479	10.1596224	18
43	9.9148604	10.1593525	17
44	9.9147729	10.1590826	16
45	9.9146852	10.1588129	15
46	9.9145976	10.1585431	14
47	9.9145099	10.1582735	13
48	9.9144221	10.1580039	12
49	9.9143342	10.1577343	11
50	9.9142464	10.1574649	10
51	9.9141584	10.1571954	9
52	9.9140704	10.1569261	8
53	9.9139824	10.1566568	7
54	9.9138943	10.1563875	6
55	9.9138061	10.1561183	5
56	9.9137179	10.1558492	4
57	9.9136296	10.1555801	3
58	9.9135413	10.1553111	2
59	9.9134530	10.1550421	1
60	9.9133645	10.1547732	0

35	Sinus.	Tangens.	
0	9.7585913	9.8452268	60
1	9.7587717	9.8454956	59
2	9.7589519	9.8457644	58
3	9.7591321	9.8460332	57
4	9.7593121	9.8463018	56
5	9.7594920	9.8465705	55
6	9.7596718	9.8468390	54
7	9.7598515	9.8471075	53
8	9.7600311	9.8473760	52
9	9.7602106	9.8476444	51
10	9.7603899	9.8479127	50
11	9.7605692	9.8481810	49
12	9.7607483	9.8484492	48
13	9.7609274	9.8487174	47
14	9.7611063	9.8489855	46
15	9.7612851	9.8492536	45
16	9.7614638	9.8495216	44
17	9.7616424	9.8497896	43
18	9.7618208	9.8500575	42
19	9.7619992	9.8503253	41
20	9.7621775	9.8505931	40
21	9.7623556	9.8508608	39
22	9.7625337	9.8511285	38
23	9.7627116	9.8513961	37
24	9.7628894	9.8516637	36
25	9.7630671	9.8519312	35
26	9.7632447	9.8521987	34
27	9.7634222	9.8524661	33
28	9.7635996	9.8527335	32
29	9.7637769	9.8530008	31
30	9.7639540	9.8532680	30
31	9.7641311	9.8535352	29
32	9.7643080	9.8538023	28
33	9.7644849	9.8540694	27
34	9.7646616	9.8543365	26
35	9.7648382	9.8546034	25
36	9.7650147	9.8548704	24
37	9.7651911	9.8551372	23
38	9.7653674	9.8554041	22
39	9.7655436	9.8556708	21
40	9.7657197	9.8559376	20
41	9.7658957	9.8562042	19
42	9.7660715	9.8564708	18
43	9.7662473	9.8567374	17
44	9.7664229	9.8570039	16
45	9.7665985	9.8572704	15
46	9.7667739	9.8575368	14
47	9.7669492	9.8578031	13
48	9.7671244	9.8580694	12
49	9.7672996	9.8583357	11
50	9.7674746	9.8586019	10
51	9.7676494	9.8588680	9
52	9.7678242	9.8591341	8
53	9.7679989	9.8594002	7
54	9.7681735	9.8596661	6
55	9.7683480	9.8599321	5
56	9.7685223	9.8601980	4
57	9.7686966	9.8604638	3
58	9.7688707	9.8607296	2
59	9.7690448	9.8609954	1
60	9.7692187	9.8612610	0

125	Sinus.	Tangens.	
0	9.9133645	10.1547732	60
1	9.9132760	10.1545044	59
2	9.9131875	10.1542356	58
3	9.9130989	10.1539668	57
4	9.9130102	10.1536982	56
5	9.9129215	10.1534295	55
6	9.9128328	10.1531610	54
7	9.9127440	10.1528925	53
8	9.9126551	10.1526240	52
9	9.9125662	10.1523556	51
10	9.9124772	10.1520873	50
11	9.9123882	10.1518190	49
12	9.9122991	10.1515508	48
13	9.9122099	10.1512826	47
14	9.9121207	10.1510145	46
15	9.9120315	10.1507464	45
16	9.9119422	10.1504784	44
17	9.9118528	10.1502104	43
18	9.9117634	10.1499425	42
19	9.9116739	10.1496747	41
20	9.9115844	10.1494069	40
21	9.9114948	10.1491392	39
22	9.9114051	10.1488715	38
23	9.9113155	10.1486039	37
24	9.9112257	10.1483363	36
25	9.9111359	10.1480688	35
26	9.9110460	10.1478013	34
27	9.9109561	10.1475339	33
28	9.9108661	10.1472665	32
29	9.9107761	10.1469992	31
30	9.9106860	10.1467320	30
31	9.9105959	10.1464648	29
32	9.9105057	10.1461977	28
33	9.9104155	10.1459306	27
34	9.9103251	10.1456635	26
35	9.9102348	10.1453966	25
36	9.9101444	10.1451296	24
37	9.9100539	10.1448628	23
38	9.9099634	10.1445959	22
39	9.9098728	10.1443292	21
40	9.9097821	10.1440624	20
41	9.9096915	10.1437958	19
42	9.9096007	10.1435292	18
43	9.9095099	10.1432626	17
44	9.9094190	10.1429961	16
45	9.9093281	10.1427296	15
46	9.9092371	10.1424632	14
47	9.9091461	10.1421969	13
48	9.9090550	10.1419306	12
49	9.9089639	10.1416643	11
50	9.9088727	10.1413981	10
51	9.9087814	10.1411320	9
52	9.9086901	10.1408659	8
53	9.9085988	10.1405998	7
54	9.9085073	10.1403339	6
55	9.9084159	10.1400679	5
56	9.9083243	10.1398020	4
57	9.9082327	10.1395362	3
58	9.9081411	10.1392704	2
59	9.9080494	10.1390046	1
60	9.9079576	10.1387390	0

36	Sinus.	Tangens.	
0	9.7692187	9.8612610	60
1	9.7693925	9.8615267	59
2	9.7695661	9.8617923	58
3	9.7697398	9.8620578	57
4	9.7699134	9.8623233	56
5	9.7700868	9.8625887	55
6	9.7702601	9.8628541	54
7	9.7704332	9.8631195	53
8	9.7706063	9.8633848	52
9	9.7707793	9.8636500	51
10	9.7709522	9.8639152	50
11	9.7711249	9.8641803	49
12	9.7712976	9.8644454	48
13	9.7714702	9.8647105	47
14	9.7716426	9.8649755	46
15	9.7718150	9.8652404	45
16	9.7719872	9.8655053	44
17	9.7721593	9.8657702	43
18	9.7723314	9.8660350	42
19	9.7725033	9.8662997	41
20	9.7726751	9.8665644	40
21	9.7728468	9.8668291	39
22	9.7730185	9.8670937	38
23	9.7731900	9.8673583	37
24	9.7733614	9.8676228	36
25	9.7735327	9.8678873	35
26	9.7737039	9.8681517	34
27	9.7738749	9.8684160	33
28	9.7740459	9.8686804	32
29	9.7742168	9.8689446	31
30	9.7743876	9.8692089	30
31	9.7745583	9.8694731	29
32	9.7747288	9.8697372	28
33	9.7748993	9.8700013	27
34	9.7750697	9.8702653	26
35	9.7752399	9.8705293	25
36	9.7754101	9.8707933	24
37	9.7755801	9.8710572	23
38	9.7757501	9.8713210	22
39	9.7759199	9.8715848	21
40	9.7760897	9.8718486	20
41	9.7762593	9.8721123	19
42	9.7764289	9.8723760	18
43	9.7765983	9.8726396	17
44	9.7767676	9.8729032	16
45	9.7769369	9.8731668	15
46	9.7771060	9.8734302	14
47	9.7772750	9.8736937	13
48	9.7774439	9.8739571	12
49	9.7776128	9.8742204	11
50	9.7777815	9.8744838	10
51	9.7779501	9.8747470	9
52	9.77811186	9.8750102	8
53	9.7782870	9.8752734	7
54	9.7784559	9.8755365	6
55	9.7786235	9.8757996	5
56	9.7787916	9.8760627	4
57	9.7789596	9.8763257	3
58	9.7791275	9.8765886	2
59	9.7792953	9.8768515	1
60	9.7794630	9.8771144	0

126	Sinus.	Tangens.	
0	9.9079576	10.1387390	60
1	9.9078658	10.1384733	59
2	9.9077740	10.1382077	58
3	9.9076820	10.1379422	57
4	9.9075901	19.1376767	56
5	9.9074980	10.1374113	55
6	9.9074059	10.1371459	54
7	9.9073138	10.1368805	53
8	9.9072216	10.1366152	52
9	9.9071293	10.1363500	51
10	9.9070370	10.1360848	50
11	9.9069446	10.1358197	49
12	9.9068522	10.1355546	48
13	9.9067597	10.1352895	47
14	9.9066671	10.1350245	46
15	9.9065745	10.1347596	45
16	9.9064819	10.1344947	44
17	9.9063892	10.1342298	43
18	9.9062964	10.1339650	42
19	9.9062036	10.1337003	41
20	9.9061107	10.1334356	40
21	9.9060177	10.1331709	39
22	9.9059247	10.1329063	38
23	9.9058317	10.1326417	37
24	9.9057386	10.1323772	36
25	9.9056454	10.1321127	35
26	9.9055522	10.1318483	34
27	9.9054589	10.1315840	33
28	9.9053656	10.1313196	32
29	9.9052722	10.1310554	31
30	9.9051787	10.1307911	30
31	9.9050852	10.1305269	29
32	9.9049916	10.1302628	28
33	9.9048980	10.1299987	27
34	9.9048043	10.1297347	26
35	9 9047106	10.1294707	25
36	9.9046168	10.1292067	24
37	9.9045230	10.1289428	23
38	9.9044291	10.1286790	22
39	9.9043351	10.1284152	21
40	9.9042411	10.1281514	20
41	9.9041470	10.1278877	19
42	9.9040529	10.1276240	18
43	9.9039587	10.1273604	17
44	9.9038644	10.1270968	16
45	9.9037701	10.1268332	15
46	9.9036757	10.1265698	14
47	9.9035813	10.1263033	13
48	9.9034868	10.1260429	12
49	9.9033923	10.1257796	11
50	9.9032977	10 1255162	10
51	9.9032031	10.1252530	9
52	9.9031084	10.1249898	8
53	9.9030136	10.1247266	7
54	9.9029188	10.1244635	6
55	9.9028239	10.1242004	5
56	9.9027289	10.1239373	4
57	9.9026339	10.1236743	3
58	9.9025389	10.1234114	2
59	9.9024438	10.1231485	1
60	9.9023486	10.1228856	0

37	Sinus.	Tangens.	
0	9.7794630	9.8771144	60
1	9.7796306	9.8773772	59
2	9.7797981	9.8776400	58
3	9.7799655	9.8779027	57
4	9.7801328	9.8781654	56
5	9.7803000	9.8784281	55
6	9.7804671	9.8786907	54
7	9.7806341	9.8789533	53
8	9.7808010	9.8792158	52
9	9.7809677	9.8794782	51
10	9.7811344	9.8797407	50
11	9.7813010	9.8800031	49
12	9.7814675	9.8802654	48
13	9.7816339	9.8805277	47
14	9.7818002	9.8807900	46
15	9.7819664	9.8810522	45
16	9.7821324	9.8813144	44
17	9.7822984	9.8815765	43
18	9.7824643	9.8818386	42
19	9.7826301	9.8821007	41
20	9.7827958	9.8823627	40
21	9.7829614	9.8826246	39
22	9.7831268	9.8828866	38
23	9.7832922	9.8831484	37
24	9.7834575	9.8834103	36
25	9.7836227	9.8836721	35
26	9.7837878	9.8839338	34
27	9.7839528	9.8841956	33
28	9.7841177	9.8844572	32
29	9.7842824	9.8847189	31
30	9.7844471	9.8849805	30
31	9.7846117	9.8852420	29
32	9.7847762	9.8855035	28
33	9.7849406	9.8857650	27
34	9.7851049	9.8860264	26
35	9.7852691	9.8862878	25
36	9.7854332	9.8865492	24
37	9.7855972	9.8868105	23
38	9.7857611	9.8870718	22
39	9.7859249	9.8873330	21
40	9.7860886	9.8875942	20
41	9.7862522	9.8878554	19
42	9.7864157	9.8881165	18
43	9.7865791	9.8883775	17
44	9.7867424	9.8886386	16
45	9.7869056	9.8888996	15
46	9.7870687	9.8891605	14
47	9.7872317	9.8894214	13
48	9.7873946	9.8896823	12
49	9.7875574	9.8899432	11
50	9.7877202	9.8902040	10
51	9.7878828	9.8904647	9
52	9.7880453	9.8907254	8
53	9.7882077	9.8909861	7
54	9.7883701	9.8912468	6
55	9.7885323	9.8915074	5
56	9.7886944	9.8917679	4
57	9.7888565	9.8920285	3
58	9.7890184	9.8922890	2
59	9.7891802	9.8925494	1
60	9.7893420	9.8928098	0

127	Sinus.	Tangens.	
0	9.9023486	10.1228856	60
1	9.9022534	10.1226228	59
2	9.9021581	10.1223600	58
3	9.9020628	10.1220973	57
4	9.9019674	10.1218346	56
5	9.9018719	10.1215719	55
6	9.9017764	10.1213093	54
7	9.9016808	10.1210467	53
8	9.9015852	10.1207842	52
9	9.9014895	10.1205218	51
10	9.9013938	10.1202593	50
11	9.9012980	10.1199969	49
12	9.9012021	10.1197346	48
13	9.9011062	10.1194723	47
14	9.9010102	10.1192100	46
15	9.9009142	10.1189478	45
16	9.9008181	10.1186856	44
17	9.9007219	10.1184235	43
18	9.9006257	10.1181614	42
19	9.9005294	10.1178993	41
20	9.9004331	10.1176373	40
21	9.9003367	10.1173754	39
22	9.9002403	10.1171134	38
23	9.9001438	10.1168516	37
24	9.9000472	10.1165897	36
25	8.8999506	10.1163279	35
26	8.8998539	10.1160662	34
27	9.8997572	10.1158044	33
28	9.8996604	10.1155428	32
29	9.8995636	10.1152811	31
30	9.8994667	10.1150195	30
31	9.8993697	10.1147580	29
32	9.8992727	10.1144965	28
33	9.8991756	10.1142350	27
34	9.8990784	10.1139736	26
35	9.8989812	10.1137122	25
36	9.8988840	10.1134508	24
37	9.8987867	10.1131895	23
38	9.8986893	10.1129282	22
39	9.8985919	10.1126670	21
40	9.8984944	10.1124058	20
41	9.8983968	10.1121446	19
42	9.8982992	10.1118835	18
43	9.8982015	10.1116225	17
44	9.8981038	10.1113614	16
45	9.8980060	10.1111004	15
46	9.8979082	10.1108395	14
47	9.8978103	10.1105786	13
48	9.8977123	10.1103177	12
49	9.8976143	10.1100568	11
50	9.8975162	10.1097960	10
51	9.8974181	10.1095353	9
52	9.8973199	10.1092746	8
53	9.8972216	10.1090139	7
54	9.8971233	10.1087532	6
55	9.8970249	10.1084926	5
56	9.8969265	10.1082321	4
57	9.8968280	10.1079715	3
58	9.8967294	10.1077110	2
59	9.8966308	10.1074506	1
60	9.8965321	10.1071902	0

38	Sinus.	Tangens.	
0	9.7893420	9.8928098	60
1	9.7895036	9.8930702	59
2	9.7896652	9.8933306	58
3	9.7898266	9.8935909	57
4	9.7899880	9.8938511	56
5	9.7901493	9.8941114	55
6	9.7903104	9.8943715	54
7	9.7904715	9.8946317	53
8	9.7906325	9.8948918	52
9	9.7907933	9.8951519	51
10	9.7909541	9.8954119	50
11	9.7911148	9.8956719	49
12	9.7912754	9.8959317	48
13	9.7914359	9.8961918	47
14	9.7915963	9.8964517	46
15	9.7917566	9.8967116	45
16	9.7919168	9.8969714	44
17	9.7920769	9.8972312	43
18	9.7922369	9.8974910	42
19	9.7923968	9.8977507	41
20	9.7925566	9.8980104	40
21	9.7927163	9.8982700	39
22	9.7928760	9.8985296	38
23	9.7930355	9.8987892	37
24	9.7931949	9.8990487	36
25	9.7933543	9.8993082	35
26	9.7935135	9.8995677	34
27	9.7936727	9.8998271	33
28	9.7938317	9.9000865	32
29	9.7939907	9.9003459	31
30	9.7941496	9.9006052	30
31	9.7943083	9.9008645	29
32	9.7944670	9.9011237	28
33	9.7946256	9.9013830	27
34	9.7947841	9.9016422	26
35	9.7949425	9.9019013	25
36	9.7951008	9.9021604	24
37	9.7952590	9.9024195	23
38	9.7954171	9.9026786	22
39	9.7955751	9.9029376	21
40	9.7957330	9.9031966	20
41	9.7958909	9.9034555	19
42	9.7960486	9.9037144	18
43	9.7962062	9.9039737	17
44	9.7963638	9.9042321	16
45	9.7965212	9.9044910	15
46	9.7966786	9.9047497	14
47	9.7968359	9.9050085	13
48	9.7969930	9.9052672	12
49	9.7971501	9.9055259	11
50	9.7973071	9.9057845	10
51	9.7974640	9.9060431	9
52	9.7976208	9.9063017	8
53	9.7977775	9.9065603	7
54	9.7979341	9.9068188	6
55	9.7980906	9.9070773	5
56	9.7982470	9.9073357	4
57	9.7984034	9.9075941	3
58	9.7985596	9.9078525	2
59	9.7987158	9.9081109	1
60	9.7988718	9.9083692	0

128	Sinus.	Tangens.	
0	9.8965321	10.1071902	60
1	9.8964334	10.1069298	59
2	9.8963346	10.1066694	58
3	9.8962358	10.1064091	57
4	9.8961369	10.1061489	56
5	9.8960379	10.1058886	55
6	9.8959389	10.1056285	54
7	9.8958398	10.1053683	53
8	9.8957406	10.1051082	52
9	9.8956414	10.1048481	51
10	9.8955422	10.1045881	50
11	9.8954429	10.1043281	49
12	9.8953435	10.1040681	48
13	9.8952440	10.1038082	47
14	9.8951445	10.1035483	46
15	9.8950450	10.1032884	45
16	9.8949453	10.1030286	44
17	9.8948457	10.1027688	43
18	9.8947459	10.1025090	42
19	9.8946461	10.1022493	41
20	9.8945463	10.1019896	40
21	9.8944463	10.1017300	39
22	9.8943464	10.1014704	38
23	9.8942463	10.1012108	37
24	9.8941462	10.1009513	36
25	9.8940461	10.1006918	35
26	9.8939458	10.1004323	34
27	9.8938456	10.1001729	33
28	9.8937452	10.0999135	32
29	9.8936448	10.0996541	31
30	9.8935444	10.0993948	30
31	9.8934439	10.0991355	29
32	9.8933433	10.0988763	28
33	9.8932426	10.0986170	27
34	9.8931419	10.0983578	26
35	9.8930412	10.0980987	25
36	9.8929404	10.0978396	24
37	9.8928395	10.0975805	23
38	9.8927385	10.0973214	22
39	9.8926375	10.0970624	21
40	9.8925365	10.0968034	20
41	9.8924354	10.0965445	19
42	9.8923342	10.0962856	18
43	9.8922329	10.0960267	17
44	9.8921316	10.0957679	16
45	9.8920303	10.0955090	15
46	9.8919289	10.0952503	14
47	9.8918274	10.0949915	13
48	9.8917258	10.0947328	12
49	9.8916242	10.0944741	11
50	9.8915226	10.0942155	10
51	9.8914208	10.0939569	9
52	9.8913191	10.0936983	8
53	9.8912172	10.0934397	7
54	9.8911153	10.0931812	6
55	9.8910133	10.0929227	5
56	9.8909113	10.0926643	4
57	9.8908092	10.0924059	3
58	9.8907071	10.0921475	2
59	9.8906049	10.0918891	1
60	9.8905026	10.0916308	0

39	Sinus.	Tangens.	
0	9.7988718	9.9083692	60
1	9.7990278	9.9086275	59
2	9.7991836	9.9088858	58
3	9.7993394	9.9091440	57
4	9.7994951	9.9094022	56
5	9.7996507	9.9096603	55
6	9.7998062	9.9099185	54
7	9.7999616	9.9101766	53
8	9.8001169	9.9104347	52
9	9.8002721	9.9106927	51
10	9.8004272	9.9109507	50
11	9.8005823	9.9112087	49
12	9.8007372	9.9114666	48
13	9.8008921	9.9117245	47
14	9.8010468	9.9119824	46
15	9.8012015	9.9122403	45
16	9.8013561	9.9124981	44
17	9.8015106	9.9127559	43
18	9.8016649	9.9130137	42
19	9.8018192	9.9132714	41
20	9.8019735	9.9135291	40
21	9.8021276	9.9137868	39
22	9.8022816	9.9140444	38
23	9.8024355	9.9143020	37
24	9.8025894	9.9145596	36
25	9.8027431	9.9148171	35
26	9.8028968	9.9150747	34
27	9.8030504	9.9153322	33
28	9.8032038	9.9155896	32
29	9.8033572	9.9158471	31
30	9.8035105	9.9161045	30
31	9.8036637	9.9163618	29
32	9.8038168	9.9166192	28
33	9.8039699	9.9168765	27
34	9.8041228	9.9171338	26
35	9.8042757	9.9173911	25
36	9.8044284	9.9176483	24
37	9.8045811	9.9179055	23
38	9.8047336	9.9181627	22
39	9.8048861	9.9184198	21
40	9.8050385	9.9186769	20
41	9.8051908	9.9189340	19
42	9.8053430	9.9191911	18
43	9.8054951	9.9194481	17
44	9.8056472	9.9197051	16
45	9.8057991	9.9199621	15
46	9.8059510	9.9202191	14
47	9.8061027	9.9204760	13
48	9.8062544	9.9207329	12
49	9.8064060	9.9209898	11
50	9.8065575	9.9212466	10
51	9.8067089	9.9215034	9
52	9.8068602	9.9217602	8
53	9.8070114	9.9220170	7
54	9.8071626	9.9222737	6
55	9.8073136	9.9225304	5
56	9.8074646	9.9227871	4
57	9.8076154	9.9230437	3
58	9.8077662	9.9233004	2
59	9.8079169	9.9235570	1
60	9.8080675	9.9238135	0

129	Sinus.	Tangens.	
0	9.8905226	10.0916308	60
1	9.8904003	10.0913725	59
2	9.8902979	10.0911142	58
3	9.8901954	10.0908560	57
4	9.8900929	10.0905978	56
5	9.8899903	10.0903397	55
6	9.8898877	10.0900815	54
7	9.8897850	10.0898234	53
8	9.8896822	10.0895653	52
9	9.8895794	10.0893073	51
10	9.8894765	10.0890493	50
11	9.8893736	10.0887913	49
12	9.8892706	10.0885334	48
13	9.8891675	10.0882755	47
14	9.8890644	10.0880176	46
15	9.8889612	10.0877597	45
16	9.8888580	10.0875019	44
17	9.8887547	10.0872441	43
18	9.8886513	10.0869863	42
19	9.8885479	10.0867286	41
20	9.8884444	10.0864709	40
21	9.8883408	10.0862132	39
22	9.8882372	10.0859556	38
23	9.8881335	10.0856980	37
24	9.8880298	10.0854404	36
25	9.8879260	10.0851829	35
26	9.8878221	10.0849253	34
27	9.8877182	10.0846678	33
28	9.8876142	10.0844104	32
29	9.8875102	10.0841529	31
30	9.8874061	10.0838955	30
31	9.8873019	10.0836382	29
32	9.8871977	10.0833808	28
33	9.8870934	10.0831235	27
34	9.8869890	10.0828662	26
35	9.8868846	10.0826089	25
36	9.8867801	10.0823517	24
37	9.8866756	10.0820945	23
38	9.8865710	10.0818373	22
39	9.8864663	10.0815802	21
40	9.8863616	10.0813231	20
41	9.8862568	10.0810660	19
42	9.8861519	10.0808089	18
43	9.8860470	10.0805519	17
44	9.8859420	10.0802949	16
45	9.8858370	10.0800379	15
46	9.8857319	10.0797809	14
47	9.8856267	10.0795240	13
48	9.8855215	10.0792671	12
49	9.8854162	10.0790102	11
50	9.8853109	10.0787534	10
51	9.8852055	10.0784966	9
52	9.8851000	10.0782398	8
53	9.8849945	10.0779830	7
54	9.8848889	10.0777263	6
55	9.8847832	10.0774696	5
56	9.8846775	10.0772129	4
57	9.8845717	10.0769563	3
58	9.8844659	10.0766996	2
59	9.8843599	10.0764430	1
60	9.8842540	10.0761865	0

40	Sinus.	Tangens.	
0	9.8080675	9.9238135	60
1	9.8082180	9.9240701	59
2	9.8083684	9.9243266	58
3	9.8085188	9.9245831	57
4	9.8086690	9.9248396	56
5	9.8088192	9.9250960	55
6	9.8089692	9.9253524	54
7	9.8091192	9.9256088	53
8	9.8092691	9.9258652	52
9	9.8094189	9.9261215	51
10	9.8095686	9.9263778	50
11	9.8097182	9.9266341	49
12	9.8098678	9.9268904	48
13	9.8100172	9.9271466	47
14	9.8101666	9.9274028	46
15	9.8103159	9.9276590	45
16	9.8104650	9.9279152	44
17	9.8106141	9.9281713	43
18	9.8107631	9.9284274	42
19	9.8109121	9.9286835	41
20	9.8110609	9.9289396	40
21	9.8112096	9.9291956	39
22	9.8113583	9.9294516	38
23	9.8115069	9.9297076	37
24	9.8116554	9.9299636	36
25	9.8118038	9.9302195	35
26	9.8119521	9.9304755	34
27	9.8121003	9.9307314	33
28	9.8122484	9.9309872	32
29	9.8123965	9.9312431	31
30	9.8125444	9.9314989	30
31	9.8126923	9.9317547	29
32	9.8128401	9.9320105	28
33	9.8129878	9.9322662	27
34	9.8131354	9.9325220	26
35	9.8132829	9.9327777	25
36	9.8134303	9.9330334	24
37	9.8135777	9.9332890	23
38	9.8137250	9.9335446	22
39	9.8138721	9.9338003	21
40	9.8140192	9.9340559	20
41	9.8141662	9.9343114	19
42	9.8143131	9.9345670	18
43	9.8144600	9.9348225	17
44	9.8146067	9.9350780	16
45	9.8147534	9.9353335	15
46	9.8148999	9.9355889	14
47	9.8150464	9.9358444	13
48	9.8151928	9.9360998	12
49	9.8153391	9.9363552	11
50	9.8154854	9.9366105	10
51	9.8156315	9.9368659	9
52	9.8157776	9.9371212	8
53	9.8159235	9.9373765	7
54	9.8160694	9.9376318	6
55	9.8162152	9.9378871	5
56	9.8163609	9.9381423	4
57	9.8165066	9.9383975	3
58	9.8166521	9.9386527	2
59	9.8167975	9.9389 79	1
60	9.8169429	9.9391631	0

130	Sinus.	Tangens.	
0	9.8842540	10.0761865	60
1	9.8841479	10.0759299	59
2	9.8840418	10.0756734	58
3	9.8839357	10.0754169	57
4	9.8838294	10.0751604	56
5	9.8837232	10.0749040	55
6	9.8836168	10.0746476	54
7	9.8835104	10.0743912	53
8	9.8834039	10.0741348	52
9	9.8832974	10.0738785	51
10	9.8831908	10.0736222	50
11	9.8830841	10.0733659	49
12	9.8829774	10.0731096	48
13	9.8828706	10.0728534	47
14	9.8827638	10.0725972	46
15	9.8826568	10.0723410	45
16	9.8825499	10.0720848	44
17	9.8824428	10.0718287	43
18	9.8823357	10.0715726	42
19	9.8822285	10.0713165	41
20	9.8821213	10.0710604	40
21	9.8820140	10.0708044	39
22	9.8819067	10.0705484	38
23	9.8817992	10.0702924	37
24	9.8816918	10.0700364	36
25	9.8815842	10.0697805	35
26	9.8814766	10.0695245	34
27	9.8813689	10.0692686	33
28	9.8812612	10.0690128	32
29	9.8811534	10.0687569	31
30	9.8810455	10.0685011	30
31	9.8809376	10.0682453	29
32	9.8808296	10.0679895	28
33	9.8807215	10.0677338	27
34	9.8806134	10.0674780	26
35	9.8805052	10.0672223	25
36	9.8803970	10.0669666	24
37	9.8802887	10.0667110	23
38	9.8801803	10.0664554	22
39	9.8800719	10.0661997	21
40	9.8799634	10.0659441	20
41	9.8798548	10.0656886	19
42	9.8797462	10.0654330	18
43	9.8796375	10.0651775	17
44	9.8795287	10.0649220	16
45	9.8794199	10.0646665	15
46	9.8793110	10.0644111	14
47	9.8792021	10.0641556	13
48	9.8790930	10.0639002	12
49	9.8789840	10.0636448	11
50	9.8788748	10.0633895	10
51	9.8787656	10.0631341	9
52	9.8786563	10.0628788	8
53	9.8785470	10.0626235	7
54	9.8784376	10.0623682	6
55	9.8783281	10.0621129	5
56	9.8782186	10.0618577	4
57	9.8781090	10.0616025	3
58	9.8779994	10.0613473	2
59	9.8778898	10.0610921	1
60	9.8777799	10.0608369	0

41	Sinus.	Tangens.	
0	9.8169429	9.9391611	60
1	9.8170882	9.9394182	59
2	9.8172334	9.9396752	58
3	9.8173785	9.9399324	57
4	9.8175235	9.9401895	56
5	9.8176685	9.9404465	55
6	9.8178133	9.9407036	54
7	9.8179581	9.9409606	53
8	9.8181028	9.9412176	52
9	9.8182474	9.9414745	51
10	9.8183919	9.9417315	50
11	9.8185364	9.9419884	49
12	9.8186807	9.9422453	48
13	9.8188250	9.9425021	47
14	9.8189692	9.9427591	46
15	9.8191133	9.9430159	45
16	9.8192573	9.9432728	44
17	9.8194012	9.9435296	43
18	9.8195450	9.9437864	42
19	9.8196888	9.9440432	41
20	9.8198325	9.9442999	40
21	9.8199761	9.9445566	39
22	9.8201196	9.9448134	38
23	9.8202630	9.9450701	37
24	9.8204063	9.9453267	36
25	9.8205496	9.9455834	35
26	9.8206927	9.9458400	34
27	9.8208358	9.9460967	33
28	9.8209788	9.9463533	32
29	9.8211217	9.9466099	31
30	9.8212646	9.9468664	30
31	9.8214073	9.9471230	29
32	9.8215500	9.9473795	28
33	9.8216926	9.9476360	27
34	9.8218351	9.9478925	26
35	9.8219775	9.9481490	25
36	9.8221198	9.9484055	24
37	9.8222621	9.9486619	23
38	9.8224042	9.9489183	22
39	9.8225463	9.9491747	21
40	9.8226883	9.9494311	20
41	9.8228302	9.9496875	19
42	9.8229721	9.9499439	18
43	9.8231138	9.9502002	17
44	9.8232555	9.9504565	16
45	9.8233971	9.9507128	15
46	9.8235386	9.9509691	14
47	9.8236800	9.9512254	13
48	9.8238213	9.9514816	12
49	9.8239626	9.9517379	11
50	9.8241037	9.9519941	10
51	9.8242448	9.9522503	9
52	9.8243858	9.9525065	8
53	9.8245267	9.9527627	7
54	9.8246676	9.9530188	6
55	9.8248083	9.9532750	5
56	9.8249490	9.9535312	4
57	9.8250896	9.9537872	3
58	9.8252301	9.9540433	2
59	9.8253705	9.9542994	1
60	9.8255109	9.9545554	0

131	Sinus.	Tangens.	
0	9.8777799	10.0603369	60
1	9.8776700	10.0605813	59
2	9.8775601	10.0608267	58
3	9.8774501	10.0610716	57
4	9.8773401	10.0613165	56
5	9.8772300	10.0615615	55
6	9.8771198	10.0618064	54
7	9.8770096	10.0620514	53
8	9.8768993	10.0622964	52
9	9.8767889	10.0625415	51
10	9.8766785	10.0627865	50
11	9.8765680	10.0630316	49
12	9.8764574	10.0632767	48
13	9.8763468	10.0635218	47
14	9.8762361	10.0637669	46
15	9.8761253	10.0640121	45
16	9.8760145	10.0642572	44
17	9.8759036	10.0645024	43
18	9.8757927	10.0647476	42
19	9.8756816	10.0649928	41
20	9.8755706	10.0652381	40
21	9.8754594	10.0654834	39
22	9.8753482	10.0657286	38
23	9.8752369	10.0659739	37
24	9.8751256	10.0662193	36
25	9.8750142	10.0664646	35
26	9.8749027	10.0667100	34
27	9.8747912	10.0669553	33
28	9.8746795	10.0672007	32
29	9.8745679	10.0674461	31
30	9.8744561	10.0676916	30
31	9.8743443	10.0679370	29
32	9.8742325	10.0681825	28
33	9.8741205	10.0684280	27
34	9.8740085	10.0686735	26
35	9.8738965	10.0689190	25
36	9.8737844	10.0691645	24
37	9.8736722	10.0694101	23
38	9.8735599	10.0696557	22
39	9.8734476	10.0699013	21
40	9.8733352	10.0701469	20
41	9.8732227	10.0703925	19
42	9.8731102	10.0706381	18
43	9.8729976	10.0708838	17
44	9.8728849	10.0711295	16
45	9.8727722	10.0713752	15
46	9.8726594	10.0716209	14
47	9.8725466	10.0718666	13
48	9.8724337	10.0721124	12
49	9.8723207	10.0723581	11
50	9.8722076	10.0726039	10
51	9.8720945	10.0728497	9
52	9.8719813	10.0730955	8
53	9.8718681	10.0733413	7
54	9.8717548	10.0735872	6
55	9.8716414	10.0738330	5
56	9.8715279	10.0740789	4
57	9.8714144	10.0743248	3
58	9.8713008	10.0745707	2
59	9.8711872	10.0748166	1
60	9.8710735	10.0750626	0

42	Sinus.	Tangens.	
0	9.8255109	9.9544374	60
1	9.8256512	9.9546915	59
2	9.8257913	9.9549455	58
3	9.8259314	9.9551995	57
4	9.8260715	9.9554535	56
5	9.8262114	9.9557075	55
6	9.8263512	9.9559615	54
7	9.8264910	9.9562154	53
8	9.8266307	9.9564694	52
9	9.8267703	9.9567233	51
10	9.8269098	9.9569772	50
11	9.8270493	9.9572311	49
12	9.8271887	9.9574850	48
13	9.8273279	9.9577389	47
14	9.8274671	9.9579927	46
15	9.8276063	9.9582465	45
16	9.8277453	9.9585004	44
17	9.8278843	9.9587542	43
18	9.8280231	9.9590080	42
19	9.8281619	9.9592618	41
20	9.8283006	9.9595155	40
21	9.8284393	9.9597693	39
22	9.8285778	9.9600230	38
23	9.8287163	9.9602767	37
24	9.8288547	9.9605305	36
25	9.8289930	9.9607842	35
26	9.8291312	9.9610378	34
27	9.8292694	9.9612915	33
28	9.8294075	9.9615452	32
29	9.8295454	9.9617988	31
30	9.8296833	9.9620525	30
31	9.8298212	9.9623061	29
32	9.8299589	9.9625597	28
33	9.8300966	9.9628133	27
34	9.8302342	9.9630669	26
35	9.8303717	9.9633204	25
36	9.8305091	9.9635740	24
37	9.8306464	9.9638275	23
38	9.8307837	9.9640811	22
39	9.8309209	9.9643346	21
40	9.8310580	9.9645881	20
41	9.8311950	9.9648416	19
42	9.8313320	9.9650951	18
43	9.8314688	9.9653486	17
44	9.8316056	9.9656020	16
45	9.8317423	9.9658555	15
46	9.8318789	9.9661089	14
47	9.8320155	9.9663623	13
48	9.8321519	9.9666157	12
49	6.8322883	9.9668692	11
50	9.8324246	9.9671225	10
51	9.8325609	9.9673759	9
52	9.8326970	9.9676293	8
53	9.8328331	9.9678827	7
54	9.8329691	9.9681360	6
55	9.8331050	9.9683893	5
56	9.8332408	9.9686427	4
57	9.8333766	9.9688960	3
58	9.8335122	9.9691493	2
59	9.8336478	9.9694026	1
60	9.8337833	9.9696559	0

132	Sinus.	Tangens.	
0	9.8710735	10.0455626	60
1	9.8709597	10.0453085	59
2	9.8708458	10.0450545	58
3	9.8707319	10.0448005	57
4	9.8706179	10.0445465	56
5	9.8705039	10.0442925	55
6	9.8703898	10.0440385	54
7	9.8702756	10.0437846	53
8	9.8701613	10.0435306	52
9	9.8700470	10.0432767	51
10	9.8699326	10.0430228	50
11	9.8698182	10.0427689	49
12	9.8697037	10.0425150	48
13	9.8695891	10.0422611	47
14	9.8694744	10.0420073	46
15	9.8693597	10.0417535	45
16	9.8692449	10.0414996	44
17	9.8691301	10.0412458	43
18	9.8690152	10.0409920	42
19	9.8689002	10.0407382	41
20	9.8687851	10.0404845	40
21	9.8686700	10.0402307	39
22	9.8685548	10.0399770	38
23	9.8684396	10.0397233	37
24	9.8683242	10.0394695	36
25	9.8682088	10.0392158	35
26	9.8680934	10.0389622	34
27	9.8679779	10.0387085	33
28	9.8678623	10.0384548	32
29	9.8677466	10.0382012	31
30	9.8676309	10.0379475	30
31	9.8675151	10.0376939	29
32	9.8673992	10.0374403	28
33	9.8672833	10.0371867	27
34	9.8671673	10.0369331	26
35	9.8670512	10.0366796	25
36	9.8669351	10.0364260	24
37	9.8668189	10.0361725	23
38	9.8667026	10.0359189	22
39	9.8665863	10.0356654	21
40	9.8664699	10.0354119	20
41	9.8663534	10.0351584	19
42	9.8662369	10.0349049	18
43	9.8661203	10.0346514	17
44	9.8660036	10.0343980	16
45	9.8658868	10.0341445	15
46	9.8657700	10.0338911	14
47	9.8656531	10.0336377	13
48	9.8655362	10.0333843	12
49	9.8654192	10.0331308	11
50	9.8653021	10.0328775	10
51	9.8651849	10.0326241	9
52	9.8650677	10.0323707	8
53	9.8649504	10.0321173	7
54	9.8648331	10.0318640	6
55	9.8647156	10.0316107	5
56	9.8645981	10.0313573	4
57	9.8644806	10.0311040	3
58	9.8643629	10.0308507	2
59	9.8642452	10.0305974	1
60	9.8641275	10.0303441	0

43	Sinus.	Tangens.	
0	9.8337833	9.9696559	60
1	9.8339138	9.9699091	59
2	9.8340541	9.9701624	58
3	9.8341894	9.9704157	57
4	9.8343246	9.9706689	56
5	9.8344597	9.9709221	55
6	9.8345948	9.9711754	54
7	9.8347297	9.9714286	53
8	9.8348646	9.9716818	52
9	9.8349994	9.9719350	51
10	9.8351341	9.9721882	50
11	9.8352688	9.9724413	49
12	9.8354033	9.9726945	48
13	9.8355378	9.9729477	47
14	9.8356722	9.9732008	46
15	9.8358066	9.9734539	45
16	9.8359408	9.9737071	44
17	9.8360750	9.9739602	43
18	9.8362091	9.9742133	42
19	9.8363431	9.9744664	41
20	9.8364771	9.9747195	40
21	9.8366109	9.9749726	39
22	9.8367447	9.9752257	38
23	9.8368784	9.9754787	37
24	9.8370121	9.9757318	36
25	9.8371456	9.9759849	35
26	9.8372791	9.9762379	34
27	9.8374125	9.9764909	33
28	9.8375458	9.9767440	32
29	9.8376790	9.9769970	31
30	9.8378122	9.9772500	30
31	9.8379453	9.9775030	29
32	9.8380783	9.9777560	28
33	9.8382112	9.9780090	27
34	9.8383441	9.9782620	26
35	9.8384769	9.9785149	25
36	9.8386096	9.9787679	24
37	9.8387422	9.9790209	23
38	9.8388747	9.9792738	22
39	9.8390072	9.9795268	21
40	9.8391396	9.9797797	20
41	9.8392719	9.9800326	19
42	9.8394041	9.9802856	18
43	9.8395363	9.9805385	17
44	9.8396684	9.9807914	16
45	9.8398004	9.9810443	15
46	9.8399323	9.9812972	14
47	9.8400642	9.9815501	13
48	9.8401959	9.9818030	12
49	9.8403276	9.9820559	11
50	9.8404593	9.9823087	10
51	9.8405908	9.9825616	9
52	9.8407223	9.9828145	8
53	9.8408537	9.9830673	7
54	9.8409850	9.9833202	6
55	9.8411162	9.9835730	5
56	9.8412474	9.9838259	4
57	9.8413785	9.9840787	3
58	9.8415095	9.9843315	2
59	9.8416404	9.9845844	1
60	9.8417713	9.9848372	0

133	Sinus.	Tangens.	
0	9.8641275	10.0303441	60
1	9.8640096	10.0300909	59
2	9.8638917	10.0298376	58
3	9.8637737	10.0295843	57
4	9.8636557	10.0293311	56
5	9.8635376	10.0290779	55
6	9.8634194	10.0288246	54
7	9.8633011	10.0285714	53
8	9.8631828	10.0283182	52
9	9.8630644	10.0280650	51
10	9.8629460	10.0278118	50
11	9.8628274	10.0275587	49
12	9.8627088	10.0273055	48
13	9.8625902	10.0270523	47
14	9.8624714	10.0267992	46
15	9.8623526	10.0265461	45
16	9.8622338	10.0262929	44
17	9.8621148	10.0260398	43
18	9.8619958	10.0257867	42
19	9.8618767	10.0255336	41
20	9.8617576	10.0252805	40
21	9.8616383	10.0250274	39
22	9.8615190	10.0247743	38
23	9.8613997	10.0245213	37
24	9.8612803	10.0242682	36
25	9.8611608	10.0240151	35
26	9.8610412	10.0237621	34
27	9.8609215	10.0235091	33
28	9.8608018	10.0232560	32
29	9.8606821	10.0230030	31
30	9.8605622	10.0227500	30
31	9.8604423	10.0224970	29
32	9.8603223	10.0222440	28
33	9.8602022	10.0219910	27
34	9.8600821	10.0217380	26
35	9.8599619	10.0214851	25
36	9.8598416	10.0212321	24
37	9.8597213	10.0209791	23
38	9.8596009	10.0207262	22
39	9.8594804	10.0204732	21
40	9.8593599	10.0202203	20
41	9.8592393	10.0199674	19
42	9.8591186	10.0197144	18
43	9.8589978	10.0194615	17
44	9.8588770	10.0192086	16
45	9.8587561	10.0189557	15
46	9.8586351	10.0187028	14
47	9.8585141	10.0184499	13
48	9.8583929	10.0181970	12
49	9.8582718	10.0179441	11
50	9.8581505	10.0176913	10
51	9.8580292	10.0174384	9
52	9.8579078	10.0171855	8
53	9.8577863	10.0169327	7
54	9.8576648	10.0166798	6
55	9.8575432	10.0164270	5
56	9.8574215	10.0161741	4
57	9.8572998	10.0159213	3
58	9.8571779	10.0156685	2
59	9.8570561	10.0154156	1
60	9.8569341	10.0151628	0

44	Sinus.	Tangens.	
0	9.8417713	9.9848372	60
1	9.8419021	9.9850900	59
2	9.8420328	9.9853428	58
3	9.8421634	9.9855956	57
4	9.8422939	9.9858484	56
5	9.8424244	9.9861012	55
6	9.8425548	9.9863540	54
7	9.8426851	9.9866068	53
8	9.8428154	9.9868596	52
9	9.8429456	9.9871123	51
10	9.8430757	9.9873651	50
11	9.8432057	9.9876179	49
12	9.8433356	9.9878706	48
13	9.8434655	9.9881234	47
14	9.8435953	9.9883761	46
15	9.8437250	9.9886289	45
16	9.8438547	9.9888816	44
17	9.8439842	9.9891344	43
18	9.8441137	9.9893871	42
19	9.8442432	9.9896399	41
20	9.8443725	9.9898926	40
21	9.8445018	9.9901453	39
22	9.8446310	9.9903981	38
23	9.8447601	9.9906508	37
24	9.8448891	9.9909035	36
25	9.8450181	9.9911562	35
26	9.8451470	9.9914089	34
27	9.8452758	9.9916616	33
28	9.8454045	9.9919143	32
29	9.8455332	9.9921670	31
30	9.8456618	9.9924197	30
31	9.8457903	9.9926724	29
32	9.8459188	9.9929251	28
33	9.8460471	9.9931778	27
34	9.8461754	9.9934305	26
35	9.8463036	9.9936832	25
36	9.8464318	9.9939359	24
37	9.8465599	9.9941886	23
38	9.8466879	9.9944413	22
39	9.8468158	9.9946940	21
40	9.8469436	9.9949466	20
41	9.8470714	9.9951993	19
42	9.8471991	9.9954520	18
43	9.8473267	9.9957047	17
44	9.8474543	9.9959573	16
45	9.8475817	9.9962100	15
46	9.8477091	9.9964627	14
47	9.8478365	9.9967154	13
48	9.8479637	9.9969680	12
49	9.8480909	9.9972207	11
50	9.8482180	9.9974734	10
51	9.8483450	9.9977260	9
52	9.8484720	9.9979787	8
53	9.8485989	9.9982314	7
54	9.8487257	9.9984840	6
55	9.8488524	9.9987367	5
56	9.8489791	9.9989893	4
57	9.8491057	9.9992420	3
58	9.8492322	9.9994947	2
59	9.8493586	9.9997473	1
60	9.8494850	10.0000000	0

134	Sinus.	Tangens.	
0	9.8569341	10.0151628	60
1	9.8568121	10.0149100	59
2	9.8566900	10.0146572	58
3	9.8565678	10.0144044	57
4	9.8564455	10.0141516	56
5	9.8563232	10.0138988	55
6	9.8562008	10.0136460	54
7	9.8560784	10.0133932	53
8	9.8559558	10.0131404	52
9	9.8558332	10.0128877	51
10	9.8557106	10.0126349	50
11	9.8555878	10.0123821	49
12	9.8554650	10.0121294	48
13	9.8553421	10.0118766	47
14	9.8552192	10.0116239	46
15	9.8550961	10.0113711	45
16	9.8549730	10.0111184	44
17	9.8548499	10.0108656	43
18	9.8547266	10.0106129	42
19	9.8546033	10.0103601	41
20	9.8544799	10.0101074	40
21	9.8543564	10.0098547	39
22	9.8542329	10.0096019	38
23	9.8541093	10.0093492	37
24	9.8539856	10.0090965	36
25	9.8538619	10.0088438	35
26	9.8537381	10.0085911	34
27	9.8536142	10.0083384	33
28	9.8534902	10.0080857	32
29	9.8533662	10.0078330	31
30	9.8532421	10.0075803	30
31	9.8531179	10.0073276	29
32	9.8529936	10.0070749	28
33	9.8528693	10.0068222	27
34	9.8527449	10.0065695	26
35	9.8526204	10.0063168	25
36	9.8524959	10.0060641	24
37	9.8523713	10.0058114	23
38	9.8522466	10.0055587	22
39	9.8521218	10.0053060	21
40	9.8519970	10.0050534	20
41	9.8518721	10.0048007	19
42	9.8517471	10.0045480	18
43	9.8516220	10.0042953	17
44	9.8514969	10.0040427	16
45	9.8513717	10.0037900	15
46	9.8512465	10.0035373	14
47	9.8511211	10.0032846	13
48	9.8509957	10.0030320	12
49	9.8508702	10.0027793	11
50	9.8507446	10.0025266	10
51	9.8506190	10.0022740	9
52	9.8504933	10.0020213	8
53	9.8503675	10.0017686	7
54	9.8502417	10.0015160	6
55	9.8501157	10.0012633	5
56	9.8499897	10.0010107	4
57	9.8498637	10.0007580	3
58	9.8497375	10.0005053	2
59	9.8496113	10.0002527	1
60	9.8494850	10.0000000	0

TABVLA LOGARITHMICA

CONTINENS

VNDECIM NVMERORVM CHILIADES,

CVM SVIS LOGARITHMIS

Ab vnitate, scilicèt, ad 11100.

DISPOSITIS

NOVA METHODO,

ET PROPORTIONI ASTRONOMICÆ

APPLICATIS IN GRATIAM

ASTRONOMORVM.

MATRITI.

Apud Bernardum à Villa-Diego.
Anno M.DC.LXXII.

LECTORI MONITVM.

TAbula sequens continet Logarithmos numerorum ab vnitate vsque ad 11100. numeri tamen nunquam positi sunt nisi supra centenarios, & ad numeri dexteram ipsius inuenietur Logarithmus *exemp. gr.* si quæratur Logarithmus numeri 225. quæratur prius numerus 200. & posteà infrà ipsum descendendo numerus 25. cui respondet Logarithmus 2.3521825. similiter desideratur Logarithmus numeri 7834. quæratur priùs numerus 7800. & infrà ipsum descēdēdo numerus 34. cui respōdet Logarithmus 3.8939836.

In superiori tabulæ parte positi sunt gradus, & eorum minuta quibus etiam *secunda* sunt addita in primis columnis omnium paginarum, quæ pro singulis minutis omnium paginarum inserviunt. *Exemp. gr.* Datus sit arcus *gr.* 0. 4. *min.* 47. *secunda.*

Inveniantur priùs in parte superiori tabulæ *gr.* 0. 4. *min.* scilicèt, in columna quinta Logarithmorum prioris paginæ. Deinde in priori numerorum columna eiusdem paginæ inveniantur 47 *secunda* quibus in columna quinta rectè procedendo respondet Logarithmus 2.4578819. similiter in alijs erit operatio instituenda. Videantur quæ de proportione Astronomica diximus lib. 1. *Trigonom.* à numero 227.

secūda.	Gr. 0. Mi. 0. Nu.	Logarith.	Gr. 0. Mi. 1. Nu.	Logarith.	Gr. 0. Mi. 2. Nu.	Logarith.	Gr. 0. Mi. 3. Nu.	Logarith.	Gr. 0. Mi. 4. Nu.	Logarit
0	0	0.0000000	60	1.7781512	120	2.0791812	180	2.2552725	240	2.3802112
1	0	0.0000000	61	1.7853298	21	2.0827854	81	2.2576786	41	2.3826170
2	0	0.3010300	62	1.7923917	22	2.0863598	82	2.2600714	42	2.3838154
3	0	0.4771212	63	1.7993405	23	2.0899051	83	2.2624511	43	2.3856063
4	0	0.6020600	64	1.8061800	24	2.0934217	84	2.2648178	44	2.3873898
5	0	0.6989700	65	1.8129133	25	2.0969100	85	2.2671717	45	2.3891661
6	0	0.7781512	66	1.8195439	26	2.1003705	86	2.2695129	46	2.3909351
7	0	0.8450980	67	1.8260748	27	2.1038037	87	2.2717416	47	2.3926969
8	0	0.9030900	68	1.8325089	28	2.1072100	88	2.2741578	48	2.3944517
9	0	0.9542425	69	1.8388491	29	2.1105897	89	2.2764618	49	2.3961993
10	1	0.0000000	70	1.8450980	30	2.1139433	90	2.2787536	50	2.3979400
11	1	0.0413927	71	1.8512583	31	2.1172713	91	2.2810334	51	2.3996737
12	1	0.0791812	72	1.8573325	32	2.1205739	92	2.2833012	52	2.4014005
13	1	0.1139433	73	1.8633229	33	2.1238516	93	2.2855573	53	2.4031205
14	1	0.1461280	74	1.8692317	34	2.1271048	94	2.2878017	54	2.4048337
15	1	0.1760913	75	1.8750613	35	2.1303338	95	2.2900346	55	2.4065402
16	1	0.2041200	76	1.8808136	36	2.1335389	96	2.2922561	56	2.4082400
17	1	0.2304489	77	1.8864907	37	2.1367206	97	2.2944662	57	2.4099331
18	1	0.2552725	78	1.8920946	38	2.1398791	98	2.2966652	58	2.4116197
19	1	0.2787536	79	1.8976271	39	2.1430148	99	2.2988531	59	2.4132998
20	1	0.3010300	80	1.9030900	40	2.1461280	200	2.3010300	60	2.4149733
21	1	0.3222193	81	1.9084850	41	2.1492191	1	2.3031961	61	2.4166405
22	1	0.3424227	82	1.9138138	42	2.1522883	2	2.3053514	62	2.4183013
23	1	0.3617278	83	1.9190781	43	2.1553360	3	2.3074960	63	2.4199557
24	1	0.3802112	84	1.9242793	44	2.1583625	4	2.3096302	64	2.4216039
25	1	0.3979400	85	1.9294189	45	2.1613680	5	2.3117539	65	2.4232459
26	1	0.4149733	86	1.9344984	46	2.1643528	6	2.3138672	66	2.4248816
27	1	0.4313638	87	1.9395192	47	2.1673173	7	2.3159703	67	2.4265113
28	1	0.4471580	88	1.9444827	48	2.1702617	8	2.3180633	68	2.4281348
29	1	0.4623980	89	1.9493900	49	2.1731863	9	2.3201463	69	2.4297523
30	1	0.4771212	90	1.9542425	50	2.1760913	10	2.3222193	70	2.4313638
31	1	0.4913617	91	1.9590414	51	2.1789769	11	2.3242824	71	2.4329693
32	1	0.5051500	92	1.9637878	52	2.1818436	12	2.3263359	72	2.4345689
33	1	0.5185139	93	1.9684829	53	2.1846914	13	2.3283796	73	2.4361626
34	1	0.5314789	94	1.9731278	54	2.1875207	14	2.3304138	74	2.4377506
35	1	0.5440680	95	1.9777236	55	2.1903317	15	2.3324385	75	2.4393327
36	1	0.5563025	96	1.9822712	56	2.1931246	16	2.3344537	76	2.4409091
37	1	0.5682017	97	1.9867717	57	2.1958996	17	2.3364597	77	2.4424798
38	1	0.5797836	98	1.9912261	58	2.1986571	18	2.3384565	78	2.4440448
39	1	0.5910646	99	1.9956352	59	2.2013971	19	2.3404441	79	2.4456042
40	1	0.6020600	100	2.0000000	60	2.2041200	20	2.3424227	80	2.4471580
41	1	0.6127839	1	2.0043214	61	2.2068259	21	2.3443923	81	2.4487063
42	1	0.6232493	2	2.0086002	62	2.2095150	22	2.3463530	82	2.4502491
43	1	0.6334685	3	2.0128372	63	2.2121876	23	2.3483049	83	2.4517864
44	1	0.6434527	4	2.0170333	64	2.2148438	24	2.3502480	84	2.4533183
45	1	0.6532125	5	2.0211893	65	2.2174839	25	2.3521825	85	2.4548449
46	1	0.6627578	6	2.0253059	66	2.2201081	26	2.3541084	86	2.4563660
47	1	0.6720979	7	2.0293838	67	2.2227165	27	2.3560259	87	2.4578819
48	1	0.6812412	8	2.0334238	68	2.2253093	28	2.3579348	88	2.4593925
49	1	0.6901961	9	2.0374265	69	2.2278867	29	2.3598355	89	2.4608978
50	1	0.6989700	10	2.0413927	70	2.2304489	30	2.3617278	90	2.4623980
51	1	0.7075702	11	2.0453230	71	2.2329961	31	2.3636120	91	2.4638930
52	1	0.7160033	12	2.0492180	72	2.2355284	32	2.3654880	92	2.4653828
53	1	0.7242759	13	2.0530784	73	2.2380461	33	2.3673559	93	2.4668676
54	1	0.7323938	14	2.0569048	74	2.2405492	34	2.3692159	94	2.4683473
55	1	0.7403627	15	2.0606978	75	2.2430380	35	2.3710679	95	2.4698220
56	1	0.7481880	16	2.0644580	76	2.2455127	36	2.3729120	96	2.4712917
57	1	0.7558748	17	2.0681859	77	2.2479733	37	2.3747483	97	2.4727564
58	1	0.7634280	18	2.0718820	78	2.2504200	38	2.3765770	98	2.4742163
59	1	0.7708520	19	2.0755470	79	2.2528530	39	2.3783979	99	2.4756712

secũda.	Gr. Mi. 0. 5.		Gr. Mi. 0. 6.		Gr. Mi. 0. 7.		Gr. Mi. 0. 8.		Gr. Mi. 0. 9.	
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith	Nu.	Logarith.	
300	2.4771212	60	2.5563025	420	2.6232493	480	2.6812412	540	2.7323938	
1	2.4785665	61	2.5575072	21	2.6242821	81	2.6821451	41	2.7331973	
2	2.4800069	62	2.5587086	22	2.6253124	82	2.6830470	42	2.7339903	
3	2.4814426	63	2.5599066	23	2.6263404	83	2.6839471	43	2.7347928	
4	2.4828736	64	2.5611014	24	2.6273659	84	2.6848454	44	2.7355989	
5	2.4842998	65	2.5622929	25	2.6283889	85	2.6857417	45	2.7361965	
6	2.4857214	66	2.5634811	26	2.6294096	86	2.6866363	46	2.7371926	
7	2.4871384	67	2.5646661	27	2.6304279	87	2.6875290	47	2.7379873	
8	2.4885507	68	2.5658478	28	2.6314438	88	2.6884198	48	2.7387806	
9	2.4899585	69	2.5670264	29	2.6324573	89	2.6893089	49	2.7395723	
10	2.4913617	70	2.5682017	30	2.6334685	90	2.6901961	50	2.7403627	
11	2.4927604	71	2.5693739	31	2.6344773	91	2.6910815	51	2.7411516	
12	2.4941546	72	2.5705429	32	2.6354837	92	2.6919651	52	2.7419391	
13	2.4955443	73	2.5717088	33	2.6364879	93	2.6928469	53	2.7427251	
14	2.4969296	74	2.5728716	34	2.6374897	94	2.6937269	54	2.7435098	
15	2.4983105	75	2.5740313	35	2.6384893	95	2.6946052	55	2.7442930	
16	2.4996871	76	2.5751878	36	2.6394865	96	2.6954817	56	2.7450748	
17	2.5010593	77	2.5763413	37	2.6404814	97	2.6963564	57	2.7458552	
18	2.5024271	78	2.5774918	38	2.6414741	98	2.6972293	58	2.7466342	
19	2.5037907	79	2.5786392	39	2.6424645	99	2.6981005	59	2.7474118	
20	2.5051500	80	2.5797836	40	2.6434527	500	2.6989700	60	2.7481880	
21	2.5065050	81	2.5809250	41	2.6444386	1	2.6998377	61	2.7489629	
22	2.5078559	82	2.5820634	42	2.6454223	2	2.7007037	62	2.7497363	
23	2.5092025	83	2.5831988	43	2.6464037	3	2.7015680	63	2.7505084	
24	2.5105450	84	2.5843312	44	2.6473830	4	2.7024305	64	2.7512791	
25	2.5118834	85	2.5854607	45	2.6483600	5	2.7032914	65	2.7520484	
26	2.5132176	86	2.5865873	46	2.6493349	6	2.7041505	66	2.7528164	
27	2.5145477	87	2.5877110	47	2.6503075	7	2.7050080	67	2.7535831	
28	2.5158738	88	2.5888317	48	2.6512780	8	2.7058637	68	2.7543483	
29	2.5171959	89	2.5899496	49	2.6522463	9	2.7067178	69	2.7551123	
30	2.5185139	90	2.5910646	50	2.6532125	10	2.7075702	70	2.7558748	
31	2.5198280	91	2.5921768	51	2.6541765	11	2.7084209	71	2.7566361	
32	2.5211381	92	2.5932861	52	2.6551384	12	2.7092700	72	2.7573960	
33	2.5224442	93	2.5943925	53	2.6560982	13	2.7101174	73	2.7581546	
34	2.5237465	94	2.5954962	54	2.6570558	14	2.7109631	74	2.7589119	
35	2.5250448	95	2.5965971	55	2.6580114	15	2.7118072	75	2.7596678	
36	2.5263393	96	2.5976952	56	2.6589648	16	2.7126497	76	2.7604225	
37	2.5276299	97	2.5987905	57	2.6599162	17	2.7134905	77	2.7611758	
38	2.5289167	98	2.5998831	58	2.6608655	18	2.7143298	78	2.7619278	
39	2.5301997	99	2.6009729	59	2.6618127	19	2.7151674	79	2.7626786	
40	2.5314789	400	2.6020600	60	2.6627578	20	2.7160033	80	2.7634280	
41	2.5327544	1	2.6031444	61	2.6637009	21	2.7168377	81	2.7641761	
42	2.5340261	2	2.6042260	62	2.6646420	22	2.7176705	82	2.7649230	
43	2.5352941	3	2.6053050	63	2.6655810	23	2.7185017	83	2.7656685	
44	2.5365584	4	2.6063814	64	2.6665180	24	2.7193313	84	2.7664128	
45	2.5378191	5	2.6074550	65	2.6674529	25	2.7201593	85	2.7671559	
46	2.5390761	6	2.6085260	66	2.6683859	26	2.7209857	86	2.7678976	
47	2.5403295	7	2.6095944	67	2.6693169	27	2.7218106	87	2.7686381	
48	2.5415792	8	2.6106602	68	2.6702458	28	2.7226339	88	2.7693773	
49	2.5428254	9	2.6117233	69	2.6711728	29	2.7234557	89	2.7701153	
50	2.5440680	10	2.6127839	70	2.6720979	30	2.7242759	90	2.7708520	
51	2.5453071	11	2.6138418	71	2.6730209	31	2.7250945	91	2.7715875	
52	2.5465427	12	2.6148972	72	2.6739420	32	2.7259116	92	2.7723217	
53	2.5477747	13	2.6159500	73	2.6748611	33	2.7267272	93	2.7730547	
54	2.5490033	14	2.6170003	74	2.6757783	34	2.7275413	94	2.7737864	
55	2.5502283	15	2.6180481	75	2.6766936	35	2.7283538	95	2.7745170	
56	2.5514500	16	2.6190932	76	2.6776069	36	2.7291648	96	2.7752463	
57	2.5526682	17	2.6201360	77	2.6785184	37	2.7299743	97	2.7759743	
58	2.5538830	18	2.6211763	78	2.6794279	38	2.7307823	98	2.7767012	
59	2.5550944	19	2.6222140	79	2.6803355	39	2.7315888	99	2.7774268	

secũda.	Gr. Mi. 0. 10.		Gr. Mi. 0. 11.		Gr. Mi. 0. 12.		Gr. Mi. 0. 13.		Gr. Mi. 0. 14.	
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	
600	2.7781512	660	2.8195439	720	2.8573325	780	2.8920946	840	2.9242793	
1	2.7788745	61	2.8202015	21	2.8579353	81	2.8926510	41	2.9247960	
2	2.7795965	62	2.8208580	22	2.8585372	82	2.8932067	42	2.9253121	
3	2.7803173	63	2.8215135	23	2.8591383	83	2.8937618	43	2.9258276	
4	2.7810369	64	2.8221681	24	2.8597386	84	2.8943161	44	2.9263424	
5	2.7817554	65	2.8228216	25	2.8603380	85	2.8948696	45	2.9268567	
6	2.7824726	66	2.8234742	26	2.8609366	86	2.8954225	46	2.9273704	
7	2.7831887	67	2.8241258	27	2.8615344	87	2.8959747	47	2.9278834	
8	2.7839036	68	2.8247765	28	2.8621314	88	2.8965262	48	2.9283958	
9	2.7846173	69	2.8254261	29	2.8627275	89	2.8970770	49	2.9289077	
10	2.7853298	70	2.8260748	30	2.8633229	90	2.8976271	50	2.9294189	
11	2.7860412	71	2.8267225	31	2.8639174	91	2.8981765	51	2.9299296	
12	2.7867514	72	2.8273693	32	2.8645111	92	2.8987252	52	2.9304396	
13	2.7874605	73	2.8280151	33	2.8651040	93	2.8992732	53	2.9309490	
14	2.7881684	74	2.8286590	34	2.8656961	94	2.8998205	54	2.9314579	
15	2.7888751	75	2.8293038	35	2.8662873	95	2.9003671	55	2.9319661	
16	2.7895807	76	2.8299467	36	2.8668778	96	2.9009131	56	2.9324738	
17	2.7902852	77	2.8305887	37	2.8674675	97	2.9014583	57	2.9329808	
18	2.7909885	78	2.8312297	38	2.8680564	98	2.9020029	58	2.9334873	
19	2.7916906	79	2.8318698	39	2.8686444	99	2.9025468	59	2.9339932	
20	2.7923917	80	2.8325089	40	2.8692317	800	2.9030900	60	2.9344984	
21	2.7930916	81	2.8331471	41	2.8698182	1	2.9036325	6	2.9350031	
22	2.7937904	82	2.8337844	42	2.8704039	2	2.9041744	62	2.9355073	
23	2.7944880	83	2.8344207	43	2.8709888	3	2.9047155	6	2.9360108	
24	2.7951846	84	2.8350561	44	2.8715729	4	2.9052560	64	2.9365137	
25	2.7958800	85	2.8356906	45	2.8721563	5	2.9057959	65	2.9370161	
26	2.7965744	86	2.8363241	46	2.8727388	6	2.9063350	66	2.9375179	
27	2.7972675	87	2.8369567	47	2.8733206	7	2.9068735	6	2.9380191	
28	2.7979596	88	2.8375884	48	2.8739016	8	2.9074114	6	2.9385197	
29	2.7986506	89	2.8382192	49	2.8744818	9	2.9079485	6	2.9390198	
30	2.7993405	90	2.8388491	50	2.8750613	10	2.9084850	7	2.9395192	
31	2.8000294	91	2.8394780	51	2.8756399	11	2.9090208	7	2.9400181	
32	2.8007171	92	2.8401061	52	2.8762178	12	2.9095560	72	2.9405165	
33	2.8014037	93	2.8407332	53	2.8767950	13	2.9100905	7	2.9410142	
34	2.8020893	94	2.8413595	54	2.8773713	14	2.9106244	74	2.9415114	
35	2.8027737	95	2.8419848	55	2.8779469	15	2.9111576	7	2.9420080	
36	2.8034571	96	2.8426092	56	2.8785218	16	2.9116901	76	2.9425041	
37	2.8041394	97	2.8432328	57	2.8790959	17	2.9122220	77	2.9429996	
38	2.8048207	98	2.8438554	58	2.8796692	18	2.9127533	78	2.9434945	
39	2.8055009	99	2.8444771	59	2.8802418	19	2.9132839	7	2.9439889	
40	2.8061800	700	2.8450980	60	2.8808136	20	2.9138138	80	2.9444827	
41	2.8068580	1	2.8457180	61	2.8813847	21	2.9143431	81	2.9449759	
42	2.8075350	2	2.8463371	62	2.8819550	22	2.9148718	82	2.9454686	
43	2.8082110	3	2.8469553	63	2.8825245	23	2.9153998	83	2.9459607	
44	2.8088859	4	2.8475727	64	2.8830934	24	2.9159272	84	2.9464523	
45	2.8095597	5	2.8481891	65	2.8836614	25	2.9164539	85	2.9469433	
46	2.8102325	6	2.8488047	66	2.8842288	26	2.9169800	86	2.9474337	
47	2.8109043	7	2.8494194	67	2.8847954	27	2.9175055	87	2.9479239	
48	2.8115750	8	2.8500333	68	2.8853612	28	2.9180303	88	2.9484130	
49	2.8122447	9	2.8506462	69	2.8859263	29	2.9185545	89	2.9489018	
50	2.8129134	10	2.8512583	70	2.8864907	30	2.9190781	90	2.9493900	
51	2.8135810	11	2.8518696	71	2.8870544	31	2.9196010	91	2.9498777	
52	2.8142476	12	2.8524800	72	2.8876173	32	2.9201233	92	2.9503648	
53	2.8149132	13	2.8530895	73	2.8881795	33	2.9206450	93	2.9508514	
54	2.8155777	14	2.8536982	74	2.8887410	34	2.9211660	94	2.9513375	
55	2.8162413	15	2.8543060	75	2.8893017	35	2.9216865	95	2.9518230	
56	2.8169038	16	2.8549130	76	2.8898617	36	2.9222063	96	2.9523080	
57	2.8175654	17	2.8555191	77	2.8904210	37	2.9227254	97	2.9527924	
58	2.8182259	18	2.8561244	78	2.8909796	38	2.9232440	98	2.9532763	
59	2.8188854	19	2.8567289	79	2.8915375	39	2.9237620	99	2.9537597	

Secũ da.	Gr. Mi. 0. 15.		Gr. Mi. 0. 16.		Gr. Mi. 0. 17.		Gr. Mi. 0. 18.		Gr. Mi. 0. 19.	
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	
900	2.9542425	60	2.9822712	1020	3.0086002	1080	3.0334237	1140	3.0569048	
1	2.9547248	61	2.9827234	21	3.0090257	81	3.0338257	41	3.0572856	
2	2.9552065	62	2.9831751	22	3.0094509	82	3.0342273	42	3.0576661	
3	2.9556877	63	2.9836263	23	3.0098756	83	3.0346284	43	3.0580462	
4	2.9561684	64	2.9840770	24	3.0102999	84	3.0350293	44	3.0584260	
5	2.9566486	65	2.9845273	25	3.0107239	85	3.0354297	45	3.0588055	
6	2.9571282	66	2.9849771	26	3.0111474	86	3.0358298	46	3.0591846	
7	2.9576073	67	2.9854265	27	3.0115704	87	3.0362295	47	3.0595634	
8	2.9580858	68	2.9858753	28	3.0119931	88	3.0366289	48	3.0599419	
9	2.9585639	69	2.9863238	29	3.0124154	89	3.0370279	49	3.0603200	
10	2.9590414	70	2.9867717	30	3.0128372	90	3.0374265	50	3.0606978	
11	2.9595184	71	2.9872192	31	3.0132587	91	3.0378247	51	3.0610753	
12	2.9599948	72	2.9876663	32	3.0136797	92	3.0382226	52	3.0614525	
13	2.9604708	73	2.9881128	33	3.0141003	93	3.0386201	53	3.0618293	
14	2.9609462	74	2.9885589	34	3.0145205	94	3.0390173	54	3.0622058	
15	2.9614211	75	2.9890046	35	3.0149403	95	3.0394141	55	3.0625820	
16	2.9618955	76	2.9894498	36	3.0153597	96	3.0398105	56	3.0629578	
17	2.9623693	77	2.9898946	37	3.0157787	97	3.0402066	57	3.0633334	
18	2.9628427	78	2.9903388	38	3.0161973	98	3.0406023	58	3.0637085	
19	2.9633155	79	2.9907827	39	3.0166155	99	3.0409977	59	3.0640834	
20	2.9637878	80	2.9912261	40	3.0170333	1100	3.0413927	60	3.0644580	
21	2.9642596	81	2.9916690	41	3.0174507	1	3.0417873	61	3.0648322	
22	2.9643709	82	2.9921115	42	3.0178677	2	3.0421816	62	3.0652061	
23	2.9652017	83	2.9925535	43	3.0182843	3	3.0425755	63	3.0655797	
24	2.9656720	84	2.9929951	44	3.0187005	4	3.0429691	64	3.0659530	
25	2.9661417	85	2.9934362	45	3.0191163	5	3.0433623	65	3.0663259	
26	2.9666110	86	2.9938769	46	3.0195317	6	3.0437551	66	3.0666985	
27	2.9670797	87	2.9943171	47	3.0199467	7	3.0441476	67	3.0670708	
28	2.9675480	88	2.9947569	48	3.0203613	8	3.0445398	68	3.0674428	
29	2.9680157	89	2.9951963	49	3.0207755	9	3.0449315	69	3.0678145	
30	2.9684829	90	2.9956352	50	3.0211893	10	3.0453230	70	3.0681859	
31	2.9689497	91	2.9960736	51	3.0216027	11	3.0457140	71	3.0685569	
32	2.9694159	92	2.9965117	52	3.0220157	12	3.0461048	72	3.0689276	
33	2.9698816	93	2.9969492	53	3.0224284	13	3.0464952	73	3.0692980	
34	2.9703469	94	2.9973864	54	3.0228406	14	3.0468852	74	3.0696681	
35	2.9708116	95	2.9978231	55	3.0232524	15	3.0472749	75	3.0700379	
36	2.9712758	96	2.9982593	56	3.0236639	16	3.0476642	76	3.0704073	
37	2.9717396	97	2.9986951	57	3.0240750	17	3.0480532	77	3.0707765	
38	2.9722028	98	2.9991305	58	3.0244857	18	3.0484418	78	3.0711453	
39	2.9726656	99	2.9995655	59	3.0248960	19	3.0488301	79	3.0715138	
40	2.9731278	1000	3.0000000	60	3.0253059	20	3.0492180	80	3.0718820	
41	2.9735896	1	3.0004341	61	3.0257154	21	3.0496056	81	3.0722499	
42	2.9740509	2	3.0008687	62	3.0261245	22	3.0499928	82	3.0726175	
43	2.9745117	3	3.0013009	63	3.0265333	23	3.0503797	83	3.0729847	
44	2.9749720	4	3.0017337	64	3.0269416	24	3.0507663	84	3.0733517	
45	2.9754318	5	3.0021661	65	3.0273496	25	3.0511525	85	3.0737183	
46	2.9758911	6	3.0025980	66	3.0277572	26	3.0515384	86	3.0740847	
47	2.9763500	7	3.0030295	67	3.0281644	27	3.0519239	87	3.0744507	
48	2.9768083	8	3.0034605	68	3.0285712	28	3.0523091	88	3.0748164	
49	2.9772662	9	3.0038912	69	3.0289777	29	3.0526939	89	3.0751818	
50	2.9777236	10	3.0043214	70	3.0293838	30	3.0530784	90	3.0755470	
51	2.9781805	11	3.0047511	71	3.0297895	31	3.0534626	91	3.0759118	
52	2.9786369	12	3.0051805	72	3.0301948	32	3.0538464	92	3.0762762	
53	2.9790929	13	3.0056094	73	3.0305997	33	3.0542299	93	3.0766404	
54	2.9795484	14	3.0060379	74	3.0310043	34	3.0546130	94	3.0770043	
55	2.9800034	15	3.0064660	75	3.0314085	35	3.0549958	95	3.0773679	
56	2.9804579	16	3.0068937	76	3.0318123	36	3.0553783	96	3.0777312	
57	2.9809119	17	3.0073209	77	3.0322157	37	3.0557604	97	3.0780941	
58	2.9813655	18	3.0077478	78	3.0326188	38	3.0561423	98	3.0784568	
59	2.9818186	19	3.0081742	79	3.0330214	39	3.0565237	99	3.0788192	

Secũ da.	Gr. Mi. 0. 20		Gr. Mi. 0. 21.		Gr. Mi. 0. 22.		Gr. Mi. 0. 23.		Gr. Mi. 0. 24.	
Nu.	Logarith.	Nu	Logarith.	Nu	Logarith.	Nu	Logarith.	Nu.	Logarith.	
1260	3.0791812	1260	3.1003705	1320	3.1205739	1380	3.1398791	1440	3.1583645	
1	3.0795430	61	3.1007151	21	3.1209028	81	3.1401917	41	3.1586840	
2	3.0799045	62	3.1010593	22	3.1212314	82	3.1405080	42	3.1589653	
3	3.0802656	63	3.1014033	23	3.1215598	83	3.1408222	43	3.1592663	
4	3.0806265	64	3.1017471	24	3.1218880	84	3.1411361	44	3.1595672	
5	3.0809870	65	3.1020905	25	3.1222159	85	3.1414498	45	3.1598678	
6	3.0813473	66	3.1024337	26	3.1225435	86	3.1417632	46	3.1601683	
7	3.0817073	67	3.1027766	27	3.1228709	87	3.1420765	47	3.1604685	
8	3.0820669	68	3.1031192	28	3.1231981	88	3.1423895	48	3.1607686	
9	3.0824263	69	3.1034616	29	3.1235250	89	3.1427022	49	3.1610684	
10	3.0827854	70	3.1038037	30	3.1238516	90	3.1430148	50	3.1613680	
11	3.0831441	71	3.1041455	31	3.1241780	91	3.1433271	51	3.1616674	
12	3.0835026	72	3.1044871	32	3.1245042	92	3.1436392	52	3.1619666	
13	3.0838608	73	3.1048284	33	3.1248301	93	3.1439511	53	3.1622656	
14	3.0842187	74	3.1051694	34	3.1251558	94	3.1442628	54	3.1625644	
15	3.0845763	75	3.1055102	35	3.1254813	95	3.1445742	55	3.1628630	
16	3.0849336	76	3.1058507	36	3.1258064	96	3.1448854	56	3.1631614	
17	3.0852906	77	3.1061909	37	3.1261314	97	3.1451964	57	3.1634595	
18	3.0856473	78	3.1065308	38	3.1264561	98	3.1455072	58	3.1637575	
19	3.0860037	79	3.1068705	39	3.1267806	99	3.1458177	59	3.1640553	
20	3.0863598	80	3.1072100	40	3.1271048	1400	3.1461280	60	3.1643528	
21	3.0867156	81	3.1075491	41	3.1274288	1	3.1464381	61	3.1646502	
22	3.0870712	82	3.1078880	42	3.1277525	2	3.1467480	62	3.1649474	
23	3.0874264	83	3.1082266	43	3.1280760	3	3.1470577	63	3.1652443	
24	3.0877814	84	3.1085650	44	3.1283993	4	3.1473671	64	3.1655411	
25	3.0881361	85	3.1089031	45	3.1287223	5	3.1476763	65	3.1658376	
26	3.0884905	86	3.1092410	46	3.1290450	6	3.1479853	66	3.1661340	
27	3.0888446	87	3.1095785	47	3.1293676	7	3.1482941	67	3.1664301	
28	3.0891984	88	3.1099159	48	3.1296899	8	3.1486026	68	3.1667260	
29	3.0895519	89	3.1102529	49	3.1300119	9	3.1489110	69	3.1670218	
30	3.0899051	90	3.1105897	50	3.1303338	10	3.1492191	70	3.1673173	
31	3.0902580	91	3.1109262	51	3.1306553	11	3.1495270	71	3.1676127	
32	3.0906107	92	3.1112625	52	3.1309767	12	3.1498347	72	3.1679078	
33	3.0909631	93	3.1115985	53	3.1312978	13	3.1501422	73	3.1682027	
34	3.0913151	94	3.1119343	54	3.1316187	14	3.1504494	74	3.1684975	
35	3.0916669	95	3.1122698	55	3.1319393	15	3.1507564	75	3.1687920	
36	3.0920185	96	3.1126050	56	3.1322597	16	3.1510632	76	3.1690863	
37	3.0923697	97	3.1129400	57	3.1325798	17	3.1513698	77	3.1693805	
38	3.0927206	98	3.1132747	58	3.1328998	18	3.1516762	78	3.1696744	
39	3.0930713	99	3.1136091	59	3.1332195	19	3.1519824	79	3.1699682	
40	3.0934217	1300	3.1139433	60	3.1335389	20	3.1522883	80	3.1702617	
41	3.0937718	1	3.1142773	61	3.1338581	21	3.1525941	81	3.1705550	
42	3.0941216	2	3.1146110	62	3.1341771	22	3.1528996	82	3.1708482	
43	3.0944711	3	3.1149444	63	3.1344958	23	3.1532049	83	3.1711411	
44	3.0948204	4	3.1152776	64	3.1348144	24	3.1535100	84	3.1714339	
45	3.0951693	5	3.1156105	65	3.1351326	25	3.1538149	85	3.1717264	
46	3.0955180	6	3.1159432	66	3.1354507	26	3.1541195	86	3.1720188	
47	3.0958664	7	3.1162756	67	3.1357685	27	3.1544240	87	3.1723110	
48	3.0962146	8	3.1166077	68	3.1360861	28	3.1547282	88	3.1726029	
49	3.0965624	9	3.1169396	69	3.1364034	29	3.1550322	89	3.1728947	
50	3.0969100	10	3.1172713	70	3.1367206	30	3.1553360	90	3.1731863	
51	3.0972573	11	3.1176027	71	3.1370374	31	3.1556396	91	3.1734776	
52	3.0976043	12	3.1179338	72	3.1373541	32	3.1559430	92	3.1737688	
53	3.0979511	13	3.1182647	73	3.1376705	33	3.1562462	93	3.1740598	
54	3.0982975	14	3.1185954	74	3.1379867	34	3.1565491	94	3.1743506	
55	3.0986437	15	3.1189257	75	3.1383027	35	3.1568519	95	3.1746412	
56	3.0989896	16	3.1192559	76	3.1386184	36	3.1571544	96	3.1749316	
57	3.0993353	17	3.1195858	77	3.1389339	37	3.1574568	97	3.1752218	
58	3.0996806	18	3.1199154	78	3.1392492	38	3.1577589	98	3.1755118	
59	3.1000257	19	3.1202448	79	3.1395643	39	3.1580609	99	3.1758016	

Secũ da.	Gr. Mi. 0. 25.		Gr. Mi. 0. 26.		Gr. Mi. 0. 27.		Gr. Mi. 0. 28.		Gr. Mi. 0. 29.	
Nu.	Logarith.	Nu.	Logarith.	Nu	Logarith.	Nu	Logarith.	Nu.	Logarith.	
1500	3.1760913	1560	3.1931246	1620	3.2095150	1680	3.2253093	1740	3.2405492	
1	3.1763807	61	3.1934029	21	3.2097830	81	3.2255677	41	3.2407988	
2	3.1766699	62	3.1936810	22	3.2100508	82	3.2258260	42	3.2410481	
3	3.1769590	63	3.1939590	23	3.2103185	83	3.2260841	43	3.2412974	
4	3.1772478	64	3.1942367	24	3.2105860	84	3.2263421	44	3.2415465	
5	3.1775365	65	3.1945143	25	3.2108534	85	3.2265999	45	3.2417954	
6	3.1778250	66	3.1947917	26	3.2111205	86	3.2268576	46	3.2420442	
7	3.1781132	67	3.1950690	27	3.2113876	87	3.2271151	47	3.2422929	
8	3.1784013	68	3.1953460	28	3.2116544	88	3.2273724	48	3.2425414	
9	3.1786892	69	3.1956229	29	3.2119211	89	3.2276296	49	3.2427898	
10	3.1789769	70	3.1958996	30	3.2121876	90	3.2278867	50	3.2430380	
11	3.1792645	71	3.1961762	31	3.2124540	91	3.2281436	51	3.2432861	
12	3.1795518	72	3.1964525	32	3.2127201	92	3.2284004	52	3.2435341	
13	3.1798389	73	3.1967287	33	3.2129862	93	3.2286570	53	3.2437819	
14	3.1801259	74	3.1970047	34	3.2132521	94	3.2289134	54	3.2440296	
15	3.1804126	75	3.1972806	35	3.2135178	95	3.2291697	55	3.2442771	
16	3.1806992	76	3.1975562	36	3.2137833	96	3.2294258	56	3.2445245	
17	3.1809856	77	3.1978317	37	3.2140487	97	3.2296818	57	3.2447718	
16	3.1812718	78	3.1981070	38	3.2143139	98	3.2299377	58	3.2450189	
19	3.1815578	79	3.1983821	39	3.2145789	99	3.2301934	59	3.2452658	
20	3.1818436	80	3.1986571	40	3.2148438	1700	3.2304489	60	3.2455127	
21	3.1821292	81	3.1989319	41	3.2151086	1	3.2307043	61	3.2457594	
22	3.1824146	82	3.1992065	42	3.2153732	2	3.2309596	62	3.2460059	
23	3.1826999	83	3.1994809	43	3.2156376	3	3.2312146	63	3.2462523	
24	3.1829850	84	3.1997552	44	3.2159018	4	3.2314696	64	3.2464986	
25	3.1832698	85	3.2000293	45	3.2161659	5	3.2317244	65	3.2467447	
26	3.1835545	86	3.2003032	46	3.2164298	6	3.2319790	66	3.2469907	
27	3.1838390	87	3.2005769	47	3.2166936	7	3.2322335	67	3.2472365	
28	3.1841233	88	3.2008505	48	3.2169572	8	3.2324879	68	3.2474823	
29	3.1844075	89	3.2011239	49	3.2172206	9	3.2327421	69	3.2477278	
30	3.1846914	90	3.2013971	50	3.2174839	10	3.2329961	70	3.2479733	
31	3.1849752	91	3.2016702	51	3.2177471	11	3.2332500	71	3.2482186	
32	3.1852588	92	3.2019431	52	3.2180100	12	3.2335038	72	3.2484637	
33	3.1855421	93	3.2022158	53	3.2182728	13	3.2337574	73	3.2487087	
34	3.1858253	94	3.2024883	54	3.2185355	14	3.2340108	74	3.2489536	
35	3.1861084	95	3.2027607	55	3.2187980	15	3.2342641	75	3.2491984	
36	3.1863912	96	3.2030329	56	3.2190603	16	3.2345173	76	3.2494430	
37	3.1866739	97	3.2033049	57	3.2193225	17	3.2347703	77	3.2496874	
38	3.1869563	98	3.2035768	58	3.2195845	18	3.2350232	78	3.2499318	
39	3.1872386	99	3.2038485	59	3.2198464	19	3.2352759	79	3.2501759	
40	3.1875207	1600	3.2041200	60	3.2201081	20	3.2355284	80	3.2504200	
41	3.1878026	1	3.2043913	61	3.2203696	21	3.2357809	81	3.2506639	
42	3.1880844	2	3.2046625	62	3.2206310	22	3.2360331	82	3.2509077	
43	3.1883659	3	3.2049335	63	3.2208922	23	3.2362853	83	3.2511513	
44	3.1886473	4	3.2052044	64	3.2211533	24	3.2365373	84	3.2513948	
45	3.1889285	5	3.2054750	65	3.2214142	25	3.2367891	85	3.2516382	
46	3.1892095	6	3.2057455	66	3.2216750	26	3.2370408	86	3.2518815	
47	3.1894903	7	3.2060159	67	3.2219356	27	3.2372923	87	3.2521246	
48	3.1897709	8	3.2062860	68	3.2221960	28	3.2375437	88	3.2523675	
49	3.1900514	9	3.2065560	69	3.2224563	29	3.2377950	89	3.2526103	
50	3.1903317	10	3.2068259	70	3.2227165	30	3.2380461	90	3.2528530	
51	3.1906118	11	3.2070955	71	3.2229764	31	3.2382971	91	3.2530956	
52	3.1908917	12	3.2073650	72	3.2232363	32	3.2385479	92	3.2533380	
53	3.1911714	13	3.2076344	73	3.2234959	33	3.2387986	93	3.2535803	
54	3.1914510	14	3.2079035	74	3.2237555	34	3.2390491	94	3.2538224	
55	3.1917304	15	3.2081725	75	3.2240148	35	3.2392995	95	3.2540645	
56	3.1920096	16	3.2084414	76	3.2242740	36	3.2395497	96	3.2543063	
57	3.1922886	17	3.2087100	77	3.2245331	37	3.2397998	97	3.2545481	
58	3.1925674	18	3.2089785	78	3.2247920	38	3.2400498	98	3.2547897	
59	3.1928461	19	3.2092468	79	3.2250507	39	3.2402996	99	3.2550312	

Secũ da.	Gr. Mi. 0. 30.		Gr. Mi. 0. 31.		Gr. Mi. 0. 32.		Gr. Mi. 0. 33.		Gr. Mi. 0. 34.	
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu,	Logarith.	
1800	3.2552725	1860	3.2695129	1920	3.2833012	1980	3.2966652	20403	3.3096302	
1	3.2555137	61	3.2697464	21	3.2835274	81	3.2968845	41	3.3098430	
2	3.2557548	62	3.2699797	22	3.2837534	82	3.2971036	42	3.3100557	
3	3.2559957	63	3.2702128	23	3.2839793	83	3.2973227	43	3.3102684	
4	3.2562365	64	3.2704459	24	3.2842051	84	3.2975417	44	3.3104809	
5	3.2564772	65	3.2706788	25	3.2844307	85	3.2977605	45	3.3106933	
6	3.2567177	66	3.2709116	26	3.2846563	86	3.2979792	46	3.3109056	
7	3.2569582	67	3.2711443	27	3.2848817	87	3.2981979	47	3.3111178	
8	3.2571984	68	3.2713769	28	3.2851070	88	3.2984164	48	3.3113299	
9	3.2574386	69	3.2716093	29	3.2853322	89	3.2986348	49	3.3115420	
10	3.2576786	70	3.2718416	30	3.2855573	90	3.2988531	50	3.3117539	
11	3.2579184	71	3.2720738	31	3.2857823	91	3.2990713	51	3.3119657	
12	3.2581582	72	3.2723058	32	3.2860071	92	3.2992893	52	3.3121774	
13	3.2583978	73	3.2725378	33	3.2862318	93	3.2995073	53	3.3123889	
14	3.2586373	74	3.2727696	34	3.2864565	94	3.2997251	54	3.3126004	
15	3.2588766	75	3.2730013	35	3.2866810	95	3.2999429	55	3.3128118	
16	3.2591158	76	3.2732328	36	3.2869054	96	3.3001605	56	3.3130231	
17	3.2593549	77	3.2734643	37	3.2871296	97	3.3003781	57	3.3132343	
18	3.2595939	78	3.2736956	38	3.2873538	98	3.3005955	58	3.3134454	
19	3.2598327	79	3.2739268	39	3.2875778	99	3.3008128	59	3.3136563	
20	3.2600714	80	3.2741578	40	3.2878017	2000	3.3010300	60	3.3138672	
21	3.2603099	81	3.2743888	41	3.2880255	1	3.3012471	61	3.3140780	
22	3.2605484	82	3.2746196	42	3.2882492	2	3.3014641	62	3.3142887	
23	3.2607867	83	3.2748503	43	3.2884728	3	3.3016809	63	3.3144992	
24	3.2610248	84	3.2750809	44	3.2886963	4	3.3018977	64	3.3147097	
25	3.2612629	85	3.2753113	45	3.2889196	5	3.3021144	65	3.3149200	
26	3.2615008	86	3.2755417	46	3.2891428	6	3.3023309	66	3.3151303	
27	3.2617385	87	3.2757719	47	3.2893659	7	3.3025474	67	3.3153405	
28	3.2619762	88	3.2760020	48	3.2895889	8	3.3027637	68	3.3155505	
29	3.2622137	89	3.2762320	49	3.2898118	9	3.3029799	69	3.3157605	
30	3.2624511	90	3.2764618	50	3.2900346	10	3.3031961	70	3.3159703	
31	3.2626883	91	3.2766915	51	3.2902573	11	3.3034121	71	3.3161801	
32	3.2629255	92	3.2769211	52	3.2904798	12	3.3036280	72	3.3163897	
33	3.2631625	93	3.2771506	53	3.2907022	13	3.3038438	73	3.3165993	
34	3.2633993	94	3.2773800	54	3.2909246	14	3.3040595	74	3.3168087	
35	3.2636361	95	3.2776092	55	3.2911468	15	3.3042751	75	3.3170181	
36	3.2638727	96	3.2778383	56	3.2913688	16	3.3044905	76	3.3172275	
37	3.2641092	97	3.2780673	57	3.2915908	17	3.3047059	77	3.3174365	
38	3.2643455	98	3.2782962	58	3.2918127	18	3.3049212	78	3.3176455	
39	3.2645817	99	3.2785250	59	3.2920344	19	3.3051363	79	3.3178545	
40	3.2648178	1900	3.2787536	60	3.2922561	20	3.3053514	80	3.3180633	
41	3.2650538	1	3.2789821	61	3.2924776	21	3.3055663	81	3.3182721	
42	3.2652896	2	3.2792105	62	3.2926990	22	3.3057812	82	3.3184807	
43	3.2655253	3	3.2794388	63	3.2929203	23	3.3059959	83	3.3186895	
44	3.2657609	4	3.2796669	64	3.2931415	24	3.3062105	84	3.3188977	
45	3.2659964	5	3.2798950	65	3.2933626	25	3.3064250	85	3.3191061	
46	3.2662317	6	3.2801229	66	3.2935835	26	3.3066394	86	3.3193143	
47	3.2664669	7	3.2803507	67	3.2938044	27	3.3068537	87	3.3195224	
48	3.2667020	8	3.2805784	68	3.2940251	28	3.3070679	88	3.3197305	
49	3.2669369	9	3.2808059	69	3.2942457	29	3.3072820	89	3.3199384	
50	3.2671717	10	3.2810334	70	3.2944662	30	3.3074960	90	3.3201463	
51	3.2674064	11	3.2812607	71	3.2946866	31	3.3077099	91	3.3203540	
52	3.2676410	12	3.2814879	72	3.2949069	32	3.3079237	92	3.3205617	
53	3.2678754	13	3.2817150	73	3.2951271	33	3.3081374	93	3.3207692	
54	3.2681097	14	3.2819419	74	3.2953471	34	3.3083509	94	3.3209767	
55	3.2683439	15	3.2821688	75	3.2955671	35	3.3085644	95	3.3211840	
56	3.2685780	16	3.2823955	76	3.2957869	36	3.3087778	96	3.3213913	
57	3.2688119	17	3.2826221	77	3.2960067	37	3.3089910	97	3.3215984	
58	3.2690457	18	3.2828486	78	3.2962263	38	3.3092042	98	3.3218055	
59	3.2692794	19	3.2830750	79	3.2964458	39	3.3094172	99	3.3220124	

secũ da.	Gr. Mi. 0. 35.		Gr. Mi. 0. 36.		Gr. Mi. 0. 37.		Gr. Mi. 0. 38.		Gr. Mi. 0. 39.	
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	
2100	3.3221193	2160	3.3344537	2220	3.3463530	2280	3.3579348	2340	3.3692159	
1	3.3224260	61	3.3346548	21	3.3465486	81	3.3581253	41	3.3694014	
2	3.3226327	62	3.3348557	22	3.3467441	82	3.3583156	42	3.3695869	
3	3.3228393	63	3.3350565	23	3.3469395	83	3.3585059	43	3.3697723	
4	3.3230457	64	3.3352572	24	3.3471348	84	3.3586961	44	3.3699576	
5	3.3232521	65	3.3354579	25	3.3473300	85	3.3588862	45	3.3701428	
6	3.3234584	66	3.3356585	26	3.3475252	86	3.3590762	46	3.3703280	
7	3.3236645	67	3.3358589	27	3.3477202	87	3.3592662	47	3.3705131	
8	3.3238706	68	3.3360593	28	3.3479152	88	3.3594560	48	3.3706981	
9	3.3240766	69	3.3362596	29	3.3481101	89	3.3596458	49	3.3708830	
10	3.3242825	70	3.3364597	30	3.3483049	90	3.3598355	50	3.3710679	
11	3.3244882	71	3.3366508	31	3.3484996	91	3.3600251	51	3.3712526	
12	3.3246939	72	3.3368590	32	3.3486942	92	3.3602145	52	3.3714373	
13	3.3248995	73	3.3370597	33	3.3488887	93	3.3604041	53	3.3716219	
14	3.3251050	74	3.3372595	34	3.3490832	94	3.3605934	54	3.3718065	
15	3.3253104	75	3.3374593	35	3.3492775	95	3.3607827	55	3.3719909	
16	3.3255157	76	3.3376589	36	3.3494718	96	3.3609719	56	3.3721753	
17	3.3257209	77	3.3378584	37	3.3496660	97	3.3611610	57	3.3723596	
18	3.3259260	78	3.3380579	38	3.3498601	98	3.3613500	58	3.3725438	
19	3.3261310	79	3.3382572	39	3.3500541	99	3.3615390	59	3.3727279	
20	3.3263359	80	3.3384565	40	3.3502480	2300	3.3617278	60	3.3729120	
21	3.3265407	81	3.3386557	41	3.3504419	1	3.3619166	61	3.3730900	
22	3.3267454	82	3.3388547	42	3.3506356	2	3.3621053	62	3.3732799	
23	3.3269500	83	3.3390537	43	3.3508293	3	3.3622939	63	3.3734637	
24	3.3271545	84	3.3392526	44	3.3510228	4	3.3624825	64	3.3736475	
25	3.3273589	85	3.3394514	45	3.3512163	5	3.3626709	65	3.3738311	
26	3.3275632	86	3.3396501	46	3.3514098	6	3.3628593	66	3.3740147	
27	3.3277675	87	3.3398488	47	3.3516031	7	3.3630476	67	3.3741983	
28	3.3279716	88	3.3400473	48	3.3517963	8	3.3632358	68	3.3743817	
29	3.3281757	89	3.3402458	49	3.3519895	9	3.3634239	69	3.3745651	
30	3.3283796	90	3.3404441	50	3.3521825	10	3.3636120	70	3.3747483	
31	3.3285834	91	3.3406424	51	3.3523755	11	3.3637999	71	3.3749316	
32	3.3287872	92	3.3408405	52	3.3525684	12	3.3639878	72	3.3751147	
33	3.3289909	93	3.3410386	53	3.3527612	13	3.3641756	73	3.3752977	
34	3.3291944	94	3.3412366	54	3.3529539	14	3.3643633	74	3.3754807	
35	3.3293979	95	3.3414345	55	3.3531465	15	3.3645510	75	3.3756636	
36	3.3296012	96	3.3416323	56	3.3533391	16	3.3647386	76	3.3758464	
37	3.3298045	97	3.3418301	57	3.3535316	17	3.3649260	77	3.3760292	
38	3.3300077	98	3.3420277	58	3.3537239	18	3.3651134	78	3.3762118	
39	3.3302108	99	3.3422252	59	3.3539162	19	3.3653007	79	3.3763944	
40	3.3304138	2200	3.3424227	60	3.3541084	20	3.3654880	80	3.3765769	
41	3.3306167	1	3.3426200	61	3.3543006	21	3.3656751	81	3.3767594	
42	3.3308195	2	3.3428173	62	3.3544926	22	3.3658622	82	3.3769416	
43	3.3310222	3	3.3430145	63	3.3546846	23	3.3660492	83	3.3771240	
44	3.3312248	4	3.3432116	64	3.3548764	24	3.3662361	84	3.3773062	
45	3.3314273	5	3.3434086	65	3.3550682	25	3.3664230	85	3.3774884	
46	3.3316297	6	3.3436055	66	3.3552599	26	3.3666097	86	3.3776704	
47	3.3318320	7	3.3438022	67	3.3554515	27	3.3667964	87	3.3778524	
48	3.3320343	8	3.3439991	68	3.3556430	28	3.3669830	88	3.3780343	
49	3.3322364	9	3.3441957	69	3.3558345	29	3.3671695	89	3.3782161	
50	3.3324385	10	3.3443923	70	3.3560259	30	3.3673559	90	3.3783979	
51	3.3326404	11	3.3445887	71	3.3562171	31	3.3675423	91	3.3785796	
52	3.3328423	12	3.3447851	72	3.3564083	32	3.3677285	92	3.3787612	
53	3.3330440	13	3.3449814	73	3.3565994	33	3.3679147	93	3.3789427	
54	3.3332457	14	3.3451776	74	3.3567905	34	3.3681008	94	3.3791241	
55	3.3334473	15	3.3453737	75	3.3569814	35	3.3682869	95	3.3793055	
56	3.3336488	16	3.3455698	76	3.3571723	36	3.3684728	96	3.3794868	
57	3.3338501	17	3.3457657	77	3.3573630	37	3.3686587	97	3.3796680	
58	3.3340514	18	3.3459615	78	3.3575537	38	3.3688445	98	3.3798492	
59	3.3342526	19	3.3461573	79	3.3577443	39	3.3690302	99	3.3800302	

secũ da.	Gr. Mi. 0. 40.		Gr. Mi. 0. 41.		Gr. Mi. 0. 42.		Gr. Mi. 0. 43.		Gr. Mi. 0. 44.	
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	
2400	3.3802112	2460	3.3909351	2520	3.4014005	2580	3.4116197	2640	3.4216039	
1	3.3803922	61	3.3911116	21	3.4015728	81	3.4117880	41	3.4217684	
2	3.3805730	62	3.3912880	22	3.4017451	82	3.4119562	42	3.4219328	
3	3.3807538	63	3.3914644	23	3.4019173	83	3.4121244	43	3.4220972	
4	3.3809345	64	3.3916407	24	3.4020893	84	3.4122925	44	3.4222614	
5	3.3811151	65	3.3918169	25	3.4022614	85	3.4124605	45	3.4224257	
6	3.3812956	66	3.3919931	26	3.4024333	86	3.4126285	46	3.4225898	
7	3.3814761	67	3.3921691	27	3.4026052	87	3.4127964	47	3.4227539	
8	3.3816565	68	3.3923452	28	3.4027771	88	3.4129643	48	3.4229180	
9	3.3818368	69	3.3925211	29	3.4029488	89	3.4131320	49	3.4230820	
10	3.3820170	70	3.3926969	30	3.4031205	90	3.4132998	50	3.4232459	
11	3.3821972	71	3.3928727	31	3.4032921	91	3.4134674	51	3.4234097	
12	3.3823773	72	3.3930485	32	3.4034637	92	3.4136350	52	3.4235735	
13	3.3825573	73	3.3932241	33	3.4036352	93	3.4138025	53	3.4237372	
14	3.3827373	74	3.3933997	34	3.4038066	94	3.4139700	54	3.4239009	
15	3.3829171	75	3.3935752	35	3.4039780	95	3.4141374	55	3.4240645	
16	3.3830969	76	3.3937506	36	3.4041492	96	3.4143047	56	3.4242281	
17	3.3832766	77	3.3939260	37	3.4043205	97	3.4144719	57	3.4243916	
18	3.3834563	78	3.3941013	38	3.4044916	98	3.4146391	58	3.4245550	
19	3.3836359	79	3.3942765	39	3.4046627	99	3.4148063	59	3.4247183	
20	3.3838154	80	3.3944517	40	3.4048337	2600	3.4149733	60	3.4248816	
21	3.3839948	81	3.3946268	41	3.4050047	1	3.4151404	61	3.4250449	
22	3.3841741	82	3.3948018	42	3.4051755	2	3.4153073	62	3.4252080	
23	3.3843534	83	3.3949767	43	3.4053464	3	3.4154742	63	3.4253712	
24	3.3845326	84	3.3951516	44	3.4055171	4	3.4156410	64	3.4255342	
25	3.3847117	85	3.3953264	45	3.4056878	5	3.4158077	65	3.4256972	
26	3.3848908	86	3.3955011	46	3.4058584	6	3.4159744	66	3.4258601	
27	3.3850698	87	3.3956758	47	3.4060289	7	3.4161410	67	3.4260230	
28	3.3852487	88	3.3958504	48	3.4061994	8	3.4163076	68	3.4261858	
29	3.3854275	89	3.3960249	49	3.4063698	9	3.4164741	69	3.4263486	
30	3.3856063	90	3.3961993	50	3.4065402	10	3.4166405	70	3.4265113	
31	3.3857850	91	3.3963737	51	3.4067105	11	3.4168069	71	3.4266739	
32	3.3859636	92	3.3965480	52	3.4068807	12	3.4169732	72	3.4268365	
33	3.3861421	93	3.3967223	53	3.4070508	13	3.4171394	73	3.4269990	
34	3.3863206	94	3.3968964	54	3.4072209	14	3.4173056	74	3.4271614	
35	3.3864990	95	3.3970705	55	3.4073909	15	3.4174717	75	3.4273238	
36	3.3866773	96	3.3972446	56	3.4075608	16	3.4176377	76	3.4274861	
37	3.3868555	97	3.3974185	57	3.4077307	17	3.4178037	77	3.4276484	
38	3.3870337	98	3.3975924	58	3.4079005	18	3.4179696	78	3.4278106	
39	3.3872118	99	3.3977662	59	3.4080703	19	3.4181355	79	3.4279727	
40	3.3873898	2500	3.3979400	60	3.4082400	20	3.4183013	80	3.4281348	
41	3.3875678	1	3.3981137	61	3.4084096	21	3.4184670	81	3.4282968	
42	3.3877457	2	3.3982873	62	3.4085791	22	3.4186327	82	3.4284588	
43	3.3879235	3	3.3984608	63	3.4087486	23	3.4187983	83	3.4286207	
44	3.3881012	4	3.3986343	64	3.4089180	24	3.4189638	84	3.4287825	
45	3.3882789	5	3.3988077	65	3.4090874	25	3.4191293	85	3.4289443	
46	3.3884565	6	3.3989811	66	3.4092567	26	3.4192947	86	3.4291060	
47	3.3886340	7	3.3991543	67	3.4094259	27	3.4194601	87	3.4292677	
48	3.3888114	8	3.3993275	68	3.4095950	28	3.4196254	88	3.4294293	
49	3.3889888	9	3.3995007	69	3.4097641	29	3.4197906	89	3.4295908	
50	3.3891661	10	3.3996737	70	3.4099331	30	3.4199557	90	3.4297523	
51	3.3893433	11	3.3998467	71	3.4101021	31	3.4201208	91	3.4299137	
52	3.3895205	12	3.4000196	72	3.4102710	32	3.4202859	92	3.4300751	
53	3.3896975	13	3.4001925	73	3.4104398	33	3.4204509	93	3.4302364	
54	3.3898746	14	3.4003653	74	3.4106085	34	3.4206158	94	3.4303976	
55	3.3900515	15	3.4005380	75	3.4107772	35	3.4207806	95	3.4305588	
56	3.3902284	16	3.4007106	76	3.4109459	36	3.4209454	96	3.4307199	
57	3.3904052	17	3.4008832	77	3.4111144	37	3.4211101	97	3.4308809	
58	3.3905819	18	3.4010557	78	3.4112829	38	3.4212748	98	3.4310419	
59	3.3907585	19	3.4012282	79	3.4114513	39	3.4214394	99	3.4312029	

secũ dã.	Gr. Mi. 0. 45.		Gr. Mi. 0. 46.		Gr. Mi. 0. 47.		Gr. Mi. 0. 48.		Gr. Mi. 0. 49.	
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	
2700	3.4313638	2760	3.4409091	2820	3.4502491	2880	3.4593925	2940	3.4683473	
1	3.4315246	61	3.4410664	21	3.4504031	81	3.4595433	41	3.4684950	
2	3.4316853	62	3.4412237	22	3.4505570	82	3.4596940	42	3.4686427	
3	3.4318460	63	3.4413809	23	3.4507109	83	3.4598446	43	3.4687903	
4	3.4320067	64	3.4415380	24	3.4508647	84	3.4599953	44	3.4689378	
5	3.4321673	65	3.4416951	25	3.4510184	85	3.4601458	45	3.4690853	
6	3.4323278	66	3.4418522	26	3.4511721	86	3.4602963	46	3.4692327	
7	3.4324882	67	3.4420092	27	3.4513258	87	3.4604468	47	3.4693801	
8	3.4326487	68	3.4421661	28	3.4514794	88	3.4605972	48	3.4695275	
9	3.4328090	69	3.4423229	29	3.4516329	89	3.4607475	49	3.4696748	
10	3.4329693	70	3.4424798	30	3.4517864	90	3.4608978	50	3.4698220	
11	3.4331295	71	3.4426365	31	3.4519399	91	3.4610481	51	3.4699692	
12	3.4332897	72	3.4427932	32	3.4520932	92	3.5611983	52	3.4701163	
13	3.4334498	73	3.4429499	33	3.4522466	93	3.4613484	53	3.4702634	
14	3.4336098	74	3.4431065	34	3.4523998	94	3.4614985	54	3.4704105	
15	3.4337698	75	3.4432630	35	3.4525531	95	3.4616486	55	3.4705575	
16	3.4339298	76	3.4434195	36	3.4527062	96	3.4617986	56	3.4707044	
17	3.4340896	77	3.4435759	37	3.4528593	97	3.4619485	57	3.4708513	
18	3.4342494	78	3.4437322	38	3.4530124	98	3.4620984	58	3.4709982	
19	3.4344092	79	3.4438885	39	3.4531654	99	3.4622482	59	3.4711450	
20	3.4345689	80	3.4440448	40	3.4533183	2900	3.4623980	60	3.4712917	
21	3.4347285	81	3.4442010	41	3.4534712	1	3.4625477	61	3.4714384	
22	3.4348881	82	3.4443571	42	3.4536241	2	3.4626974	62	3.4715851	
23	3.4350476	83	3.4445132	43	3.4537769	3	3.4628470	63	3.4717317	
24	3.4352071	84	3.4446692	44	3.4539296	4	3.4629966	64	3.4718782	
25	3.4353665	85	3.4448252	45	3.4540823	5	3.4631461	65	3.4720247	
26	3.4355258	86	3.4449811	46	3.4542349	6	3.4632956	66	3.4721711	
27	3.4356851	87	3.4451370	47	3.4543875	7	3.4634450	67	3.4723175	
28	3.4358444	88	3.4452928	48	3.4545400	8	3.4635944	68	3.4724639	
29	3.4360035	89	3.4454485	49	3.4546924	9	3.4637437	69	3.4726102	
30	3.4361626	90	3.4456042	50	3.4548449	10	3.4638930	70	3.4727564	
31	3.4363217	91	3.4457598	51	3.4549972	11	3.4640422	71	3.4729027	
32	3.4364807	92	3.4459154	52	3.4551495	12	3.4641914	72	3.4730488	
33	3.4366396	93	3.4460709	53	3.4553018	13	3.4643405	73	3.4731949	
34	3.4367985	94	3.4462264	54	3.4554540	14	3.4644895	74	3.4733410	
35	3.4369573	95	3.4463818	55	3.4556061	15	3.4646386	75	3.4734870	
36	3.4371161	96	3.4465372	56	3.4557582	16	3.4647875	76	3.4736329	
37	3.4372748	97	3.4466925	57	3.4559102	17	3.4649364	77	3.4737788	
38	3.4374334	98	3.4468477	58	3.4560622	18	3.4650853	78	3.4739247	
39	3.4375920	99	3.4470029	59	3.4562142	19	3.4652341	79	3.4740705	
40	3.4377506	2800	3.4471580	60	3.4563660	20	3.4653828	80	3.4742163	
41	3.4379090	1	3.4473131	61	3.4565179	21	3.4655316	81	3.4743620	
42	3.4380674	2	3.4474681	62	3.4566696	22	3.4656802	82	3.4745076	
43	3.4382258	3	3.4476231	63	3.4568213	23	3.4658288	83	3.4746533	
44	3.4383841	4	3.4477780	64	3.4569730	24	3.4659774	84	3.4747988	
45	3.4385423	5	3.4479329	65	3.4571246	25	3.4661259	85	3.4749443	
46	3.4387005	6	3.4480877	66	3.4572762	26	3.4662743	86	3.4750898	
47	3.4388587	7	3.4482424	67	3.4574277	27	3.4664227	87	3.4752352	
48	3.4390167	8	3.4483971	68	3.4575791	28	3.4665711	88	3.4753806	
49	3.4391747	9	3.4485517	69	3.4577305	29	3.4667194	89	3.4755259	
50	3.4393327	10	3.4487063	70	3.4578819	30	3.4668676	90	3.4756712	
51	3.4394906	11	3.4488608	71	3.4580332	31	3.4670158	91	3.4758164	
52	3.4396484	12	3.4490153	72	3.4581844	32	3.4671640	92	3.4759616	
53	3.4398062	13	3.4491697	73	3.4583356	33	3.4673121	93	3.4761067	
54	3.4399639	14	3.4493241	74	3.4584867	34	3.4674601	94	3.4762518	
55	3.4401216	15	3.4494784	75	3.4586378	35	3.4676081	95	3.4763968	
56	3.4402792	16	3.4496326	76	3.4587889	36	3.4677560	96	3.4765418	
57	3.4404368	17	3.4497868	77	3.4589399	37	3.4679039	97	3.4766867	
58	3.4405943	18	3.4499410	78	3.4590908	38	3.4680518	98	3.4768316	
59	3.4407517	19	3.4500951	79	3.4592417	39	3.4681996	99	3.4769765	

secũ dã.	Gr. Mi. 0. 50.		Gr. Mi. 0. 51.		Gr. Mi. 0. 52.		Gr. Mi. 0. 53.		Gr. Mi. 0. 54.	
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	
3000	3.4771212	3060	3.4857214	3120	3.4941546	3180	3.5024271	3240	3.5105450	
1	3.4772660	61	3.4858633	21	3.4942958	81	3.5025637	41	3.5106790	
2	3.4774107	62	3.4860052	22	3.4944329	82	3.5027002	42	3.5108130	
3	3.4775553	63	3.4861470	23	3.4945720	83	3.5028366	43	3.5109469	
4	3.4776999	64	3.4862888	24	3.4947110	84	3.5029731	44	3.5110808	
5	3.4778445	65	3.4864305	25	3.4948500	85	3.5031094	45	3.5112147	
6	3.4779890	66	3.4865721	26	3.4949890	86	3.5032458	46	3.5113485	
7	3.4781334	67	3.4867138	27	3.4951279	87	3.5033821	47	3.5114823	
8	3.4782778	68	3.4868554	28	3.4952667	88	3.5035183	48	3.5116160	
9	3.4784222	69	3.4869969	29	3.4954056	89	3.5036545	49	3.5117497	
10	3.4785665	70	3.4871384	30	3.4955443	90	3.5037907	50	3.5118834	
11	3.4787108	71	3.4872798	31	3.4956831	91	3.5039268	51	3.5120170	
12	3.4788550	72	3.4874212	32	3.4958218	92	3.5040629	52	3.5121505	
13	3.4789991	73	3.4875626	33	3.4959604	93	3.5041989	53	3.5122841	
14	3.4791432	74	3.4877039	34	3.4960990	94	3.5043349	54	3.5124175	
15	3.4792873	75	3.4878451	35	3.4962375	95	3.5044709	55	3.5125510	
16	3.4794313	76	3.4879863	36	3.4963761	96	3.5046068	56	3.5126844	
17	3.4795753	77	3.4881275	37	3.4965145	97	3.5047426	57	3.5128178	
18	3.4797192	78	3.4882686	38	3.4966529	98	3.5048785	58	3.5129511	
19	3.4798631	79	3.4884097	39	3.4967913	99	3.5050142	59	3.5130844	
20	3.4800069	30	3.4885507	40	3.4969296	3200	3.5051500	60	3.5132176	
21	3.4801507	81	3.4886917	41	3.4970679	1	3.5052857	61	3.5133508	
22	3.4802945	82	3.4888326	42	3.4972062	2	3.5054213	62	3.5134840	
23	3.4804381	83	3.4889735	43	3.4973444	3	3.5055569	63	3.5136171	
24	3.4805818	84	3.4891144	44	3.4974825	4	3.5056925	64	3.5137501	
25	3.4807254	85	3.4892552	45	3.4976206	5	3.5058280	65	3.5138832	
26	3.4808689	86	3.4893959	46	3.4977587	6	3.5059635	66	3.5140162	
27	3.4810124	87	3.4895366	47	3.4978967	7	3.5060990	67	3.5141491	
28	3.4811559	88	3.4896773	48	3.4980347	8	3.5062344	68	3.5142820	
29	3.4812993	89	3.4898179	49	3.4981727	9	3.5063697	69	3.5144149	
30	3.4814426	90	3.4899585	50	3.4983106	10	3.5065050	70	3.5145478	
31	3.4815859	91	3.4900990	51	3.4984484	11	3.5066403	71	3.5146805	
32	3.4817292	92	3.4902395	52	3.4985862	12	3.5067755	72	3.5148133	
33	3.4818724	93	3.4903799	53	3.4987240	13	3.5069107	73	3.5149460	
34	3.4820156	94	3.4905203	54	3.4988617	14	3.5070459	74	3.5150787	
35	3.4821587	95	3.4906607	55	3.4989994	15	3.5071810	75	3.5152113	
36	3.4823018	96	3.4908009	56	3.4991370	16	3.5073160	76	3.5153439	
37	3.4824448	97	3.4909412	57	3.4992746	17	3.5074511	77	3.5154764	
38	3.4825878	98	3.4910814	58	3.4994121	18	3.5075860	78	3.5156089	
39	3.4827307	99	3.4912216	59	3.4995496	19	3.5077210	79	3.5157414	
40	3.4828736	3100	3.4913617	60	3.4996871	20	3.5078559	80	3.5158738	
41	3.4830164	1	3.4915018	61	3.4998245	21	3.5079907	81	3.5160062	
42	3.4831592	2	3.4916418	62	3.4999619	22	3.5081255	82	3.5161386	
43	3.4833019	3	3.4917818	63	3.5000992	23	3.5082603	83	3.5162709	
44	3.4834446	4	3.4919217	64	3.5002365	24	3.5083950	84	3.5164031	
45	3.4835873	5	3.4920616	65	3.5003737	25	3.5085297	85	3.5165354	
46	3.4837299	6	3.4922014	66	3.5005109	26	3.5086644	86	3.5166676	
47	3.4838725	7	3.4923413	67	3.5006481	27	3.5087990	87	3.5167997	
48	3.4840150	8	3.4924810	68	3.5007851	28	3.5089335	88	3.5169318	
49	3.4841574	9	3.4926207	69	3.5009222	29	3.5090680	89	3.5170639	
50	3.4842998	10	3.4927604	70	3.5010593	30	3.5092025	90	3.5171959	
51	3.4844422	11	3.4929000	71	3.5011962	31	3.5093370	91	3.5173279	
52	3.4845845	12	3.4930396	72	3.5013332	32	3.5094713	92	3.5174598	
53	3.4847268	13	3.4931791	73	3.5014701	33	3.5096057	93	3.5175917	
54	3.4848690	14	3.4933186	74	3.5016069	34	3.5097400	94	3.5177236	
55	3.4850112	15	3.4934580	75	3.5017437	35	3.5098743	95	3.5178554	
56	3.4851533	16	3.4935974	76	3.5018805	36	3.5100085	96	3.5179872	
57	3.4852954	17	3.4937368	77	3.5020172	37	3.5101427	97	3.5181189	
58	3.4854375	18	3.4938761	78	3.5021539	38	3.5102768	98	3.5182506	
59	3.4855795	19	3.4940154	79	3.5022905	39	3.5104109	99	3.5183823	

Secũda.	Gr. 0.	Mi. 55		Gr. 0.	Mi. 56.		Gr. 0.	Mi. 57.		Gr. 0.	Mi. 58.		Gr. 0.	Mi. 59.
Nu.	Logarith.		Nu.	Logarith.		Nu.	Logarith.		Nu.	Logarith.		Nu.	Logarith.	
3300	3.5185139		3360	3.5263393		3420	3.5340261		3480	3.5415792		3540	3.5490033	
1	3.5186455		61	3.5264685		21	3.5341531		81	3.5417040		41	3.5491259	
2	3.5187771		62	3.5265977		22	3.5342890		82	3.5418288		42	3.5492486	
3	3.5189080		63	3.5267269		23	3.5344069		83	3.5419535		43	3.5493712	
4	3.5190400		64	3.5268560		24	3.5345338		84	3.5420781		44	3.5494937	
5	3.5191715		65	3.5269851		25	3.5346606		85	3.5422028		45	3.5496162	
6	3.5193028		66	3.5271141		26	3.5347874		86	3.5423274		46	3.5497387	
7	3.5194342		67	3.5272431		27	3.5349141		87	3.5424519		47	3.5498612	
8	3.5195655		68	3.5273721		28	3.5350408		88	3.5425765		48	3.5499836	
9	3.5196968		69	3.5275010		29	3.5351675		89	3.5427010		49	3.5501060	
10	3.5198280		70	3.5276299		30	3.5352941		90	3.5428254		50	3.5502283	
11	3.5199592		71	3.5277588		31	3.5354207		91	3.5429498		51	3.5503507	
12	3.5200903		72	3.5278876		32	3.5355473		92	3.5430742		52	3.5504730	
13	3.5202214		73	3.5280163		33	3.5356738		93	3.5431986		53	3.5505952	
14	3.5203525		74	3.5281451		34	3.5358003		94	3.5433229		54	3.5507174	
15	3.5204835		75	3.5282738		35	3.5359267		95	3.5434472		55	3.5508396	
16	3.5206145		76	3.5284024		36	3.5360532		96	3.5435714		56	3.5509618	
17	3.5207453		77	3.5285311		37	3.5361795		97	3.5436956		57	3.5510839	
18	3.5208764		78	3.5286596		38	3.5363059		98	3.5438198		58	3.5512059	
19	3.5210073		79	3.5287882		39	3.5364322		99	3.5439439		59	3.5513280	
20	3.5211381		80	3.5289167		40	3.5365584		3500	3.5440680		60	3.5514500	
21	3.5212689		81	3.5290452		41	3.5366847		1	3.5441921		61	3.5515720	
22	3.5213996		82	3.5291736		42	3.5368109		2	3.5443161		62	3.5516939	
23	3.5215303		83	3.5293020		43	3.5369370		3	3.5444401		63	3.5518158	
24	3.5216610		84	3.5294303		44	3.5370631		4	3.5445641		64	3.5519377	
25	3.5217916		85	3.5295587		45	3.5371892		5	3.5446880		65	3.5520595	
26	3.5219222		86	3.5296869		46	3.5373153		6	3.5448119		66	3.5521813	
27	3.5220528		87	3.5298152		47	3.5374413		7	3.5449355		67	3.5523031	
28	3.5221833		88	3.5299434		48	3.5375672		8	3.5450596		68	3.5524248	
29	3.5223138		89	3.5300716		49	3.5376932		9	3.5451834		69	3.5525465	
30	3.5224442		90	3.5301997		50	3.5378191		10	3.5453071		70	3.5526682	
31	3.5225746		91	3.5303278		51	3.5379450		11	3.5454308		71	3.5527898	
32	3.5227050		92	3.5304558		52	3.5380708		12	3.5455545		72	3.5529114	
33	3.5228353		93	3.5305839		53	3.5381966		13	3.5456781		73	3.5530330	
34	3.5229656		94	3.5307118		54	3.5383223		14	3.5458018		74	3.5531545	
35	3.5230958		95	3.5308398		55	3.5384481		15	3.5459253		75	3.5532760	
36	3.5232260		96	3.5309677		56	3.5385737		16	3.5460489		76	3.5533975	
37	3.5233562		97	3.5310955		57	3.5386994		17	3.5461724		77	3.5535189	
38	3.5234863		98	3.5312234		58	3.5388250		18	3.5462958		78	3.5536403	
39	3.5236164		99	3.5313512		59	3.5389506		19	3.5464193		79	3.5537617	
40	3.5237465		3400	3.5314789		60	3.5390761		20	3.5465427		80	3.5538830	
41	3.5238765		1	3.5316066		61	3.5392016		21	3.5466660		81	3.5540043	
42	3.5240064		2	3.5317343		62	3.5393271		22	3.5467894		82	3.5541256	
43	3.5241363		3	3.5318619		63	3.5394525		23	3.5469126		83	3.5542468	
44	3.5242663		4	3.5319895		64	3.5395779		24	3.5470359		84	3.5543680	
45	3.5243961		5	3.5321171		65	3.5397032		25	3.5471591		85	3.5544892	
46	3.5245259		6	3.5322446		66	3.5398286		26	3.5472823		86	3.5546103	
47	3.5246557		7	3.5323721		67	3.5399538		27	3.5474055		87	3.5547314	
48	3.5247854		8	3.5324996		68	3.5400791		28	3.5475286		88	3.5548524	
49	3.5249151		9	3.5326270		69	3.5402043		29	3.5476517		89	3.5549735	
50	3.5250448		10	3.5327544		70	3.5403295		30	3.5477747		90	3.5550944	
51	3.5251744		11	3.5328817		71	3.5404546		31	3.5478977		91	3.5552154	
52	3.5253040		12	3.5330090		72	3.5405797		32	3.5480207		92	3.5553363	
53	3.5254335		13	3.5331363		73	3.5407048		33	3.5481436		93	3.5554572	
54	3.5255631		14	3.5332635		74	3.5408298		34	3.5482665		94	3.5555781	
55	3.5256925		15	3.5333907		75	3.5409548		35	3.5483894		95	3.5556989	
56	3.5258219		16	3.5335179		76	3.5410798		36	3.5485123		96	3.5558197	
57	3.5259513		17	3.5336450		77	3.5412047		37	3.5486351		97	3.5559404	
58	3.5260807		18	3.5337721		78	3.5413296		38	3.5487578		98	3.5560612	
59	3.5262100		19	3.5338991		79	3.5414544		39	3.5488806		99	3.5561818	

Secũda.	Gr. 1.	Mi. 0.		Gr. 1.	Mi. 1.		Gr. 1.	Mi. 2.		Gr. 1.	Mi. 3.		Gr. 1.	Mi. 4.
Nu.	Logarith.		Nu.	Logarith.		Nu.	Logarith.		Nu.	Logarith.		Nu.	Logarith.	
3600	3.5563025		3660	3.5634811		3720	3.5705429		3780	3.5774918		3840	3.5843312	
1	3.5564231		61	3.5635997		21	3.5706597		81	3.5776067		41	3.5844443	
2	3.5565437		62	3.5637183		22	3.5707764		82	3.5777215		42	3.5845574	
3	3.5566643		63	3.5638369		23	3.5708930		83	3.5778363		43	3.5846704	
4	3.5567848		64	3.5639555		24	3.5710097		84	3.5779511		44	3.5847834	
5	3.5569053		65	3.5640740		25	3.5711263		85	3.5780659		45	3.5848963	
6	3.5570257		66	3.5641925		26	3.5712428		86	3.5781806		46	3.5850093	
7	3.5571461		67	3.5643109		27	3.5713594		87	3.5782953		47	3.5851222	
8	3.5572665		68	3.5644293		28	3.5714759		88	3.5784100		48	3.5852351	
9	3.5573869		69	3.5645477		29	3.5715924		89	3.5785246		49	3.5853479	
10	3.5575072		70	3.5646661		30	3.5717088		90	3.5786392		50	3.5854607	
11	3.5576275		71	3.5647844		31	3.5718252		91	3.5787538		51	3.5855735	
12	3.5577477		72	3.5649027		32	3.5719416		92	3.5788683		52	3.5856863	
13	3.5578680		73	3.5650209		33	3.5720580		93	3.5789828		53	3.5857990	
14	3.5579881		74	3.5651392		34	3.5721743		94	3.5790973		54	3.5859117	
15	3.5581083		75	3.5652573		35	3.5722906		95	3.5792118		55	3.5860244	
16	3.5582284		76	3.5653755		36	3.5724069		96	3.5793262		56	3.5861370	
17	3.5583485		77	3.5654936		37	3.5725231		97	3.5794406		57	3.5862496	
18	3.5584686		78	3.5656117		38	3.5726393		98	3.5795550		58	3.5863622	
19	3.5585886		79	3.5657298		39	3.5727555		99	3.5796693		59	3.5864748	
20	3.5587086		80	3.5658478		40	3.5728716		3800	3.5797836		60	3.5865873	
21	3.5588285		81	3.5659658		41	3.5729877		1	3.5798979		61	3.5866998	
22	3.5589484		82	3.5660838		42	3.5731038		2	3.5800121		62	3.5868123	
23	3.5590683		83	3.5662017		43	3.5732198		3	3.5801263		63	3.5869247	
24	3.5591882		84	3.5663196		44	3.5733358		4	3.5802405		64	3.5870371	
25	3.5593080		85	3.5664375		45	3.5734518		5	3.5803547		65	3.5871495	
26	3.5594278		86	3.5665553		46	3.5735678		6	3.5804688		66	3.5872618	
27	3.5595476		87	3.5666731		47	3.5736837		7	3.5805829		67	3.5873742	
28	3.5596673		88	3.5667909		48	3.5737996		8	3.5806969		68	3.5874865	
29	3.5597870		89	3.5669087		49	3.5739154		9	3.5808110		69	3.5875987	
30	3.5599066		90	3.5670264		50	3.5740313		10	3.5809250		70	3.5877110	
31	3.5600262		91	3.5671440		51	3.5741471		11	3.5810389		71	3.5878232	
32	3.5601458		92	3.5672617		52	3.5742628		12	3.5811529		72	3.5879353	
33	3.5602654		93	3.5673793		53	3.5743786		13	3.5812668		73	3.5880475	
34	3.5603849		94	3.5674969		54	3.5744943		14	3.5813807		74	3.5881596	
35	3.5605044		95	3.5676144		55	3.5746099		15	3.5814945		75	3.5882717	
36	3.5606239		96	3.5677320		56	3.5747256		16	3.5816084		76	3.5883838	
37	3.5607433		97	3.5678494		57	3.5748412		17	3.5817222		77	3.5884958	
38	3.5608627		98	3.5679669		58	3.5749568		18	3.5818359		78	3.5886078	
39	3.5609820		99	3.5680843		59	3.5750723		19	3.5819497		79	3.5887198	
40	3.5611014		3700	3.5682017		60	3.5751878		20	3.5820634		80	3.5888317	
41	3.5612207		1	3.5683191		61	3.5753033		21	3.5821770		81	3.5889436	
42	3.5613399		2	3.5684364		62	3.5754188		22	3.5822907		82	3.5890555	
43	3.5614592		3	3.5685537		63	3.5755342		23	3.5824043		83	3.5891674	
44	3.5615784		4	3.5686710		64	3.5756496		24	3.5825179		84	3.5892792	
45	3.5616975		5	3.5687882		65	3.5757650		25	3.5826314		85	3.5893910	
46	3.5618167		6	3.5689054		66	3.5758803		26	3.5827450		86	3.5895028	
47	3.5619358		7	3.5690226		67	3.5759956		27	3.5828585		87	3.5896145	
48	3.5620548		8	3.5691397		68	3.5761109		28	3.5829719		88	3.5897262	
49	3.5621739		9	3.5692568		69	3.5762261		29	3.5830854		89	3.5898379	
50	3.5622929		10	3.5693739		70	3.5763413		30	3.5831988		90	3.5899496	
51	3.5624118		11	3.5694910		71	3.5764565		31	3.5833122		91	3.5900612	
52	3.5625308		12	3.5696080		72	3.5765717		32	3.5834255		92	3.5901728	
53	3.5626497		13	3.5697249		73	3.5766868		33	3.5835388		93	3.5902844	
54	3.5627685		14	3.5698419		74	3.5768019		34	3.5836521		94	3.5903959	
55	3.5628874		15	3.5699588		75	3.5769169		35	3.5837654		95	3.5905073	
56	3.5630062		16	3.5700757		76	3.5770320		36	3.5838786		96	3.5906189	
57	3.5631250		17	3.5701926		77	3.5771470		37	3.5839918		97	3.5907304	
58	3.5632437		18	3.5703094		78	3.5772620		38	3.5841050		98	3.5908418	
59	3.5633624		19	3.5704262		79	3.5773769		39	3.5842181		99	3.5909532	

Secũda.	Gr. Mi. 1. 5.		Gr. Mi. 1. 6.		Gr. Mi. 1. 7.		Gr. Mi. 1. 8.		Gr. Mi. 1. 9.	
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	
3900	3.5910646	3960	3.5976952	4020	3.6042261	4080	3.6106602	4140	3.6170005	
1	3.5911739	61	3.5978048	21	3.6043341	81	3.6107666	41	3.6171052	
2	3.5912833	62	3.5979145	22	3.6044421	82	2.6108730	42	3.6172101	
3	2.5913985	63	3.5980241	23	3.6045500	83	3.6109794	43	3.6173149	
4	3.5915093	64	3.5981336	24	3.6046580	84	3.6110857	44	3.6174197	
5	3.5916170	65	3.5982432	25	3.6047659	85	3.6111921	45	3.6175245	
6	3.5917322	66	3.5983527	26	3.6048738	86	3.6112984	46	3.6176293	
7	3.5918434	67	3.5984622	27	3.6049816	87	3.6114046	47	3.6177340	
8	3.5919546	68	3.5985717	28	3.6050895	88	3.6115109	48	3.6178387	
9	3.5920657	69	3.5986811	29	3.6051973	89	3.6116171	49	3.6179434	
10	3.5921768	70	3.5987905	30	3.6053050	90	3.6117233	50	3.6180481	
11	3.5922878	71	3.5988999	31	3.6054128	91	3.6118295	51	3.6181527	
12	3.5923988	72	3.5990092	32	3.6055205	92	3.6119356	52	3.6182573	
13	3.5925098	73	3.5991186	33	3.6056282	93	3.6120417	53	3.6183619	
14	3.5926208	74	3.5992279	34	3.6057359	94	3.6121478	54	3.6184665	
15	3.5927318	75	3.5993371	35	3.6058435	95	3.6122539	55	3.6185710	
16	3.5928427	76	3.5994464	36	3.6059512	96	3.6123599	56	3.6186755	
17	3.5929536	77	3.5995556	37	3.6060587	97	3.6124660	57	3.6187800	
18	3.5930644	78	3.5996648	38	3.6061663	98	3.6125720	58	3.6188845	
19	3.5931753	79	3.5997739	39	3.6062738	99	3.6126779	59	3.6189889	
20	3.5932861	80	3.5998831	40	3.6063814	4100	3.6127830	60	3.6190933	
21	3.5933968	81	3.5999922	41	3.6064888	1	3.6128898	61	3.6191977	
22	3.5935076	82	3.6001013	42	3.6065963	2	3.6129957	62	3.6193021	
23	3.5936183	83	3.6002103	43	3.6067037	3	3.6131015	63	3.6194064	
24	3.5937290	84	3.6003193	44	3.6068111	4	3.6132073	64	3.6195107	
25	3.5938397	85	3.6004283	45	3.6069185	5	3.6133132	65	3.6196150	
26	3.5939503	86	3.6005373	46	3.6070259	6	3.6134189	66	3.6197193	
27	3.5940609	87	3.6006462	47	3.6071332	7	3.6135247	67	3.6198235	
28	3.5941715	88	3.6007551	48	3.6072405	8	3.6136304	68	3.6199277	
29	3.5942820	89	3.6008640	49	3.6073478	9	3.6137361	69	3.6200319	
30	3.5943925	90	3.6009729	50	3.6074550	10	3.6138418	70	3.6201360	
31	3.5945030	91	3.6010817	51	3.6075622	11	3.6139475	71	3.6202402	
32	3.5946135	92	3.6011905	52	3.6076694	12	3.6140531	72	3.6203443	
33	3.5947239	93	3.6012993	53	3.6077766	13	3.6141587	73	3.6204484	
34	3.5948344	94	3.6014080	54	3.6078837	14	3.6142643	74	3.6205524	
35	3.5949447	95	3.6015168	55	3.6079909	15	3.6143698	75	3.6206565	
36	3.5950551	96	3.6016255	56	3.6080979	16	3.6144754	76	3.6207605	
37	3.5951654	97	3.6017341	57	3.6082050	17	3.6145809	77	3.6208645	
38	3.5952757	98	3.6018428	58	3.6083120	18	3.6146864	78	3.6209684	
39	3.5953860	99	3.6019514	59	3.6084190	19	3.6147918	79	3.6210724	
40	3.5954962	4000	3.6020600	60	3.6085260	20	3.6148972	80	3.6211763	
41	3.5956063	1	3.6021685	61	3.6086330	21	3.6150026	81	3.6212802	
42	3.5957166	2	3.6022771	62	3.6087399	22	3.6151080	82	3.6213840	
43	3.5958268	3	3.6023856	63	3.6088468	23	3.6152133	83	3.6214879	
44	3.5959369	4	3.6024941	64	3.6089537	24	3.6153187	84	3.6215917	
45	3.5960470	5	3.6026025	65	3.6090605	25	3.6154240	85	3.6216955	
46	3.5961571	6	3.6027109	66	3.6091674	26	3.6155292	86	3.6217992	
47	3.5962671	7	3.6028193	67	3.6092742	27	3.6156345	87	3.6219030	
48	3.5963771	8	3.6029277	68	3.6093809	28	3.6157397	88	3.6220067	
49	3.5964871	9	3.6030361	69	3.6094877	29	3.6158449	89	3.6221104	
50	3.5965971	10	3.6031444	70	3.6095944	30	3.6159501	90	3.6222140	
51	3.5967070	11	3.6032527	71	3.6097011	31	3.6160552	91	3.6223177	
52	3.5968169	12	3.6033609	72	3.6098078	32	3.6161603	92	3.6224213	
53	3.5969268	13	3.6034692	73	3.6099144	33	3.6162654	93	3.6225249	
54	3.5970367	14	3.6035774	74	3.6100210	34	3.6163705	94	3.6226284	
55	3.5971465	15	3.6036855	75	3.6101276	35	3.6164755	95	3.6227320	
56	3.5972563	16	3.6037937	76	3.6102342	36	3.6165805	96	3.6228355	
57	3.5973660	17	3.6039018	77	3.6103407	37	3.6166855	97	3.6229390	
58	3.5974758	18	3.6040099	78	3.6104472	38	3.6167905	98	3.6230424	
59	3.5975855	19	3.6041180	79	3.6105537	39	3.6168954	99	3.6231459	

Secũda.	Gr. Mi. 1. 10.		Gr. Mi. 1. 11.		Gr. Mi. 1. 12.		Gr. Mi. 1. 13.		Gr. Mi. 1. 14.	
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	
4200	3.6232493	4260	3.6294096	4320	3.6354837	4380	3.6414 741	4440	3.6473830	
1	3.6233527	61	3.6295115	21	3.6355843	81	3.6415733	41	3.6474808	
2	3.6344560	62	3.6296134	22	3.6356848	82	3.6416724	42	3.6475785	
3	3.6235594	63	3.6297153	23	3.6357852	83	3.6417715	43	3.6476763	
4	3.6236627	64	3.6298172	24	3.6358857	84	3.6418705	44	3.6477740	
5	3.6237660	65	3.6299190	25	3.6359861	85	3.6419696	45	3.6478718	
6	3.6234693	66	3.6300208	26	3.6360865	86	3.6420686	46	3.6479695	
7	3.6239725	67	3.6301226	27	3.6361869	87	3.6421676	47	3.6480671	
8	3.6240757	68	3.6302244	28	3.6362872	88	3.6422666	48	3.6481648	
9	3.6241789	69	3.6303262	29	3.6363876	89	3.6423656	49	3.6482624	
10	3.6242821	70	3.6304279	30	3.6364879	90	3.6424645	50	3.6483600	
11	3.6243852	71	3.6305296	31	3.6365882	91	3.6425634	51	3.6484576	
12	3.6244884	72	3.6306312	32	3.6366884	92	3.6426623	52	3.6485552	
13	3.6245915	73	3.6307329	33	3.6367887	93	3.6427612	53	3.6486527	
14	3.6246945	74	3.6308345	34	3.6368889	94	3.6428601	54	3.6487502	
15	3.6247976	75	3.6309361	35	3.6369891	95	3.6429589	55	3.6488477	
16	3.6249006	76	3.6310377	36	3.6370893	96	3.6430577	56	3.6489452	
17	3.6250036	77	3.6311392	37	3.6371894	97	3.6431565	57	3.6490426	
18	3.6251066	78	3.6312408	38	3.6372895	98	3.6432552	58	3.6491401	
19	3.6252095	79	3.6313423	39	3.6373896	99	3.6433540	59	3.6492375	
20	3.6253124	80	3.6314438	40	3.6374897	4400	3.6434527	60	3.6493349	
21	3.6254153	81	3.6315452	41	3.6375898	1	3.6435514	61	3.6494322	
22	3.6255182	82	3.6316467	42	3.6376898	2	3.6436500	62	3.6495296	
23	3.6256211	83	3.6317481	43	3.6377898	3	3.6437487	63	3.6496269	
24	3.6257239	84	3.6318495	44	3.6378898	4	3.6438473	64	3.6497242	
25	3.6258267	85	3.6319508	45	3.6379898	5	3.6439459	65	4.6498215	
26	3.6259295	86	3.6320522	46	3.6380897	6	3.6440445	66	3.6499187	
27	3.6260322	87	3.6321535	47	3.6381896	7	3.6441430	67	3.6500160	
28	3.6261350	88	3.6322548	48	3.6382895	8	3.6442416	68	3.6501132	
29	3.6262377	89	3.6323560	49	3.6383894	9	3.6443401	69	3.6502104	
30	3.6263404	90	3.6324573	50	3.6384893	10	3.6444386	70	3.6503075	
31	3.6264430	91	3.6325585	51	3.6385891	11	3.6445371	71	3.6504047	
32	3.6265457	92	3.6326597	52	3.6386889	12	3.6446355	72	2.6505018	
33	3.6266483	93	3.6327609	53	3.6387887	13	3.6447339	73	3.6505989	
34	3.6267509	94	3.6328620	54	5.6388884	14	3.6448323	74	3.6506960	
35	3.6268534	95	3.6329632	55	3.6389882	15	3.6449307	75	3.6507930	
36	3.6269559	96	3.6330643	56	3.6390879	16	3.6450291	76	3.6508901	
37	3.6270585	97	3.6331653	57	3.6391876	17	3.6451274	77	3.6509871	
38	3.6271610	98	3.6332664	58	3.6392872	18	3.6452257	78	3.6510841	
39	3.6272634	99	3.6333674	59	3.6393869	19	3.6453240	79	3.6511811	
40	3.6273659	4300	3.6334625	60	3.6394865	20	3.6454223	80	3.6512780	
41	3.6274683	1	3.6335694	61	3.6395861	21	3.6455205	81	3.6513749	
42	3.6275707	2	3.6336704	62	3.6396857	22	3.6456187	82	3.6514719	
43	3.6276730	3	3.6337713	63	3.6397852	23	3.6457169	83	3.6515687	
44	3.6277754	4	3.6338723	64	3.6398847	24	3.6458151	84	3.6516656	
45	3.6278777	5	3.6339732	65	3.6399842	25	3.6459133	85	3.6517624	
46	3.6279800	6	3.6340740	66	3.6400837	26	3.6460114	86	3.6518593	
47	3.6280823	7	3.6341749	67	3.6401832	27	3.6461095	87	3.6519561	
48	3.6281845	8	3.6342757	68	3.6402826	28	3.6462076	88	3.6520528	
49	3.6282867	9	3.6343765	69	3.6403820	29	3.6463057	89	3.6521496	
50	3.6283889	10	3.6344773	70	3.6404814	30	3.6464037	90	3.6522463	
51	3.6284911	11	3.6345780	71	3.6405808	31	3.6465017	91	3.6523430	
52	3.6285933	12	3.6346788	72	3.6406802	32	3.6465997	92	3.6524397	
53	3.6286954	13	3.6347795	73	3.6407795	33	3.6466977	93	3.6525364	
54	3.6287975	14	3.6348801	74	3.6408788	34	3.6467957	94	3.6526331	
55	3.6288996	15	3.6349808	75	3.6409781	35	3.6468936	95	3.6527297	
56	3.6290016	16	3.6350814	76	3.6410773	36	3.6469915	96	3.6528263	
57	3.6291036	17	3.6351820	77	3.6411765	37	3.6470894	97	3.6529229	
58	3.6292057	18	3.6352826	78	3.6412758	38	3.6471873	98	3.6530195	
59	3.6293076	19	3.6353832	79	3.6413749	39	3.6472851	99	3.6531160	

secũ da.	Gr. Mi. 1. 15		Gr. Mi. 1. 16.		Gr. Mi. 1. 17.		Gr. Mi. 1. 18.		Gr. Mi. 1. 19.	
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	
4500	3.6532125	4560	3.6589648	4620	3.6646420	4680	3.6702459	4740	3.6757783	
1	3.6533090	61	3.6590601	21	3.6647360	81	3.6703386	41	3.6758700	
2	3.6534055	62	3.6591552	22	3.6648299	82	3.6704314	42	3.6759615	
3	3.6535019	63	3.6592505	23	3.6649239	83	3.6705242	43	3.6760531	
4	3.6535984	64	3.6593456	24	3.6650178	84	3.6706169	44	3.6761447	
5	3.6536948	65	3.6594408	25	3.6651117	85	3.6707096	45	3.6762362	
6	3.6537912	66	3.6595359	26	3.6652056	86	3.6708023	46	3.6763277	
7	3.6538876	67	3.6596310	27	3.6652995	87	3.6708950	47	3.6764192	
8	3.6539839	68	3.6597261	28	3.6653933	88	3.6709876	48	3.6765107	
9	3.6540802	69	3.6598212	29	3.6654872	89	3.6710802	49	3.6766022	
10	3.6541765	70	3.6599162	30	3.6655810	90	3.6711728	50	3.6766936	
11	3.6542728	71	3.6600112	31	3.6656748	91	3.6712654	51	3.6767850	
12	3.6543691	72	3.6601062	32	3.6657685	92	3.6713580	52	3.6768764	
13	3.6544653	73	3.6602012	33	3.6658623	93	3.6714506	53	3.6769678	
14	3.6545616	74	3.6602962	34	3.6659560	94	3.6715431	54	3.6770592	
15	3.6546578	75	3.6603911	35	3.6660497	95	3.6716356	55	3.6771505	
16	3.6547539	76	3.6604860	36	3.6661434	96	3.6717281	56	3.6772418	
17	3.6548501	77	3.6605809	37	3.6662371	97	3.6718206	57	3.6773332	
18	3.6549462	78	3.6606758	38	3.6663307	98	3.6719130	58	3.6774244	
19	3.6550423	79	3.6607706	39	3.6664244	99	3.6720054	59	3.6775157	
20	3.6551384	80	3.6608655	40	3.6665180	4700	3.6720979	60	3.6776069	
21	3.6552345	81	3.6609603	41	3.6666116	1	3.6721903	61	3.6776982	
22	3.6553306	82	3.6610551	42	3.6667051	2	3.6722826	62	3.6777894	
23	3.6554266	83	3.6611499	43	3.6667987	3	3.6723750	63	3.6778806	
24	3.6555226	84	3.6612446	44	3.6668922	4	3.6724673	64	3.6779718	
25	3.6556186	85	3.6613393	45	3.6669857	5	3.6725596	65	3.6780629	
26	3.6557145	86	3.6614340	46	3.6670792	6	3.6726519	66	3.6781540	
27	3.6558105	87	3.6615287	47	3.6671727	7	3.6727442	67	3.6782452	
28	3.6559064	88	3.6616234	48	3.6672661	8	3.6728365	68	3.6783362	
29	3.6560023	89	3.6617181	49	3.6673595	9	3.6729287	69	3.6784273	
30	3.6560982	90	3.6618127	50	3.6674530	10	3.6730209	70	3.6785184	
31	3.6561941	91	3.6619073	51	3.6675463	11	3.6731131	71	3.6786094	
32	3.6562899	92	3.6620019	52	3.6676397	12	3.6732053	72	3.6787004	
33	3.6563857	93	3.6620964	53	3.6677331	13	3.6732974	73	3.6787914	
34	3.6564815	94	3.6621910	54	3.6678264	14	3.6733896	74	3.6788824	
35	3.6565773	95	3.6622855	55	3.6679197	15	3.6734817	75	3.6789734	
36	3.6566730	96	3.6623800	56	3.6680130	16	3.6735738	76	3.6790643	
37	3.6567688	97	3.6624745	57	3.6681062	17	3.6736659	77	3.6791552	
38	3.6568645	98	3.6625690	58	3.6681995	18	3.6737579	78	3.6792461	
39	3.6569602	99	3.6626634	59	3.6682927	19	3.6738500	79	3.6793370	
40	3.6570559	4600	3.6627578	60	3.6683859	20	3.6739420	80	3.6794279	
41	3.6571515	1	3.6628522	61	3.6684791	21	3.6740340	81	3.6795187	
42	3.6572471	2	3.6629466	62	3.6685723	22	3.6741260	82	3.6796096	
43	3.6573427	3	3.6630410	63	3.6686654	23	3.6742179	83	3.6797004	
44	3.6574383	4	3.6631353	64	3.6687585	24	3.6743099	84	3.6797912	
45	3.6575339	5	3.6632296	65	3.6688516	25	3.6744018	85	3.6798819	
46	3.6576294	6	3.6633239	66	3.6689447	26	3.6744937	86	3.6799727	
47	3.6577250	7	3.6634182	67	3.6690378	27	3.6745856	87	3.6800634	
48	3.6578205	8	3.6635125	68	3.6691308	28	3.6746775	88	3.6801541	
49	3.6579159	9	3.6636067	69	3.6692239	29	3.6747693	89	3.6802448	
50	3.6580114	10	3.6637009	70	3.6693169	30	3.6748611	90	3.6803355	
51	3.6581068	11	3.6637951	71	3.6694099	31	3.6749529	91	3.6804262	
52	3.6582023	12	3.6638893	72	3.6695028	32	3.6750447	92	3.6805168	
53	3.6582976	13	3.6639835	73	3.6695958	33	3.6751365	93	3.6806074	
54	3.6583930	14	3.6640776	74	3.6696887	34	3.6752283	94	3.6806980	
55	3.6584884	15	3.6641717	75	3.6697816	35	3.6753200	95	3.6807886	
56	3.6585837	16	3.6642658	76	3.6698745	36	3.6754117	96	3.6808792	
57	3.6586790	17	3.6643599	77	3.6699674	37	3.6755034	97	3.6809697	
58	3.6587743	18	3.6644539	78	3.6700602	38	3.6755951	98	3.6810602	
59	3.6588696	19	3.6645480	79	3.6701530	39	3.6756867	99	3.6811507	

secũ da.	Gr. Mi. 1. 20.		Gr. Mi. 1. 21.		Gr. Mi. 1. 22.		Gr. Mi. 1. 23.		Gr. Mi. 1. 24.	
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	
4800	3.6812412	4860	3.6866363	4920	3.6919651	4980	3.6972293	5040	3.7024305	
1	3.6813317	61	3.6867256	21	3.6920534	81	3.6973165	41	3.7025167	
2	3.6814222	62	3.6868149	22	3.6921416	82	3.6974037	42	3.7026028	
3	3.6815126	63	3.6869043	23	3.6922298	83	3.6974909	43	3.7026890	
4	3.6816030	64	3.6869936	24	3.6923180	84	3.6975780	44	3.7027751	
5	3.6816934	65	3.6870828	25	3.6924062	85	3.6976652	45	3.7028612	
6	3.6817838	66	3.6871721	26	3.6924944	86	3.6977523	46	3.7029472	
7	3.6818741	67	3.6872613	27	3.6925826	87	3.6978394	47	3.7030333	
8	3.6819645	68	3.6873506	28	3.6926707	88	3.6979264	48	3.7031193	
9	3.6820548	69	3.6874398	29	3.6927588	89	3.6980135	49	3.7032054	
10	3.6821451	70	3.6875290	30	3.6928469	90	3.6981005	50	3.7032914	
11	3.6822354	71	3.6876181	31	3.6929350	91	3.6981876	51	3.7033774	
12	3.6823256	72	3.6877073	32	3.6930231	92	3.6982746	52	3.7034633	
13	3.6824159	73	3.6877964	33	3.6931111	93	3.6983616	53	3.7035493	
14	3.6825061	74	3.6878855	34	3.6931991	94	3.6984485	54	3.7036352	
15	3.6825963	75	3.6879746	35	3.6932872	95	3.6985353	55	3.7037212	
16	3.6826865	76	3.6880637	36	3.6933752	96	3.6986224	56	3.7038071	
17	3.6827766	77	3.6881528	37	3.6934631	97	3.6987093	57	3.7038929	
18	3.6828668	78	3.6882418	38	3.6935511	98	3.6987963	58	3.7039788	
19	3.6829569	79	3.6883308	39	3.6936390	99	3.6988831	59	3.7040647	
20	3.6830470	80	3.6884198	40	3.6937269	5000	3.6989700	60	3.7041505	
21	3.6831371	81	3.6885088	41	3.6938148	1	3.6990569	61	3.7042363	
22	3.6832272	82	3.6885978	42	3.6939027	2	3.6991437	62	3.7043221	
23	3.6833173	83	3.6886867	43	3.6939906	3	3.6992305	63	3.7044079	
24	3.6834073	84	3.6887756	44	3.6940785	4	3.6993173	64	3.7044937	
25	3.6834973	85	3.6888646	45	3.6941663	5	3.6994041	65	3.7045794	
26	3.6835873	86	3.6889535	46	3.6942541	6	3.6994908	66	3.7046652	
27	3.6836773	87	3.6890423	47	3.6943419	7	3.6995776	67	3.7047509	
28	3.6837673	88	3.6891312	48	3.6944297	8	3.6996643	68	3.7048366	
29	3.6838572	89	3.6892200	49	3.6945174	9	3.6997510	69	3.7049223	
30	3.6839471	90	3.6893089	50	3.6946052	10	3.6998377	70	3.7050080	
31	3.6840370	91	3.6893977	51	3.6946929	11	3.6999244	71	3.7050936	
32	3.6841269	92	3.6894864	52	3.6947806	12	3.7000111	72	3.7051792	
33	3.6842168	93	3.6895752	53	3.6948683	13	3.7000977	73	3.7052649	
34	3.6843066	94	3.6896640	54	3.6949560	14	3.7001843	74	3.7053505	
35	3.6843965	95	3.6897527	55	3.6950437	15	3.7002709	75	3.7054360	
36	3.6844863	96	3.6898414	56	3.6951313	16	3.7003575	76	3.7055216	
37	3.6845761	97	3.6899301	57	3.6952189	17	3.7004441	77	3.7056072	
38	3.6846659	98	3.6900188	58	3.6953065	18	3.7005307	78	3.7056927	
39	3.6847556	99	3.6901074	59	3.6953941	19	3.7006172	79	3.7057782	
40	3.6848454	4900	3.6901961	60	3.6954817	20	3.7007037	80	3.7058637	
41	3.6849351	1	3.6902847	61	3.6955692	21	3.7007902	81	3.7059492	
42	3.6850248	2	3.6903733	62	3.6956568	22	3.7008767	82	3.7060347	
43	3.6851145	3	3.6904619	63	3.6957443	23	3.7009632	83	3.7061201	
44	3.6852041	4	3.6905505	64	3.6958318	24	3.7010496	84	3.7062055	
45	3.6852938	5	3.6906391	65	3.6959193	25	3.7011361	85	3.7062910	
46	3.6853834	6	3.6907275	66	3.6960067	26	3.7012225	86	3.7063764	
47	3.6854730	7	3.6908161	67	3.6960942	27	3.7013089	87	3.7064617	
48	3.6855626	8	3.6909046	68	3.6961816	28	3.7013953	88	3.7065471	
49	3.6856522	9	3.6909930	69	3.6962690	29	3.7014816	89	3.7066324	
50	3.6857417	10	3.6910815	70	3.6963564	30	3.7015680	90	3.7067178	
51	3.6858313	11	3.6911699	71	3.6964438	31	3.7016543	91	3.7068031	
52	3.6859208	12	3.6912584	72	3.6965311	32	3.7017406	92	3.7068884	
53	3.6860103	13	3.6913468	73	3.6966185	33	3.7018269	93	3.7069737	
54	3.6860998	14	3.6914351	74	3.6967058	34	3.7019132	94	3.7070589	
55	3.6861892	15	3.6915235	75	3.6967931	35	3.7019995	95	3.7071442	
56	3.6862787	16	3.6916118	76	3.6968804	36	3.7020857	96	3.7072294	
57	3.6863681	17	3.6917002	77	3.6969676	37	3.7021719	97	3.7073146	
58	3.6864575	18	3.6917885	78	3.6970549	38	3.7022581	98	3.7073998	
59	3.6865469	19	3.6918768	79	3.6971421	39	3.7023444	99	3.7074850	

Secũda.	Gr. Mi. 1. 25.		Gr. Mi. 1. 26.		Gr. Mi. 1. 27.		Gr. Mi. 1. 28.		Gr. Mi. 1. 29.
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.
5100	3.7075702	5160	3.7126497	5220	3.7176705	5280	3.7226339	5340	3.7275413
1	3.7076553	61	3.7127339	21	3.7177537	81	3.7227162	41	3.7276216
2	3.7077425	62	3.7128180	22	3.7178369	82	3.7227985	42	3.7277039
3	3.7078250	63	3.7129021	23	3.7179200	83	3.7228806	43	3.7277852
4	3.7079097	64	3.7129862	24	3.7180032	84	3.7229628	44	3.7278664
5	3.7079957	65	3.7130702	25	3.7180863	85	3.7230450	45	3.7279477
6	3.7080808	66	3.7131544	26	3.7181694	86	3.7231272	46	3.7280290
7	3.7081659	67	3.7132385	27	3.7182525	87	3.7232093	47	3.7281102
8	3.7082509	68	3.7133225	28	3.7183356	88	3.7232914	48	3.7281914
9	3.7083359	69	3.7134065	29	3.7184186	89	3.7233736	49	3.7282726
10	3.7084209	70	3.7134905	30	3.7185017	90	3.7234557	50	3.7283538
11	3.7085059	71	3.7135745	31	3.7185847	91	3.7235378	51	3.7284349
12	3.7085908	72	3.7136585	32	3.7186677	92	3.7236198	52	3.7285161
13	3.7086758	73	3.7137425	33	3.7187507	93	3.7237019	53	3.7285972
14	3.7087607	74	3.7138264	34	3.7188337	94	3.7237839	54	3.7286784
15	3.7088456	75	3.7139104	35	3.7189167	95	3.7238660	55	3.7287595
16	3.7089305	76	3.7139943	36	3.7189996	96	3.7239480	56	3.7288406
17	3.7090154	77	3.7140782	37	3.7190826	97	3.7240300	57	3.7289216
18	3.7091003	78	3.7141620	38	3.7191655	98	3.7241120	58	3.7290027
19	3.7091851	79	3.7142459	39	3.7192484	99	3.7241939	59	3.7290838
20	3.7092700	80	3.7143298	40	3.7193313	5300	3.7242759	60	3.7291648
21	3.7093548	81	3.7144136	41	3.7194142	1	3.7243578	61	3.7292458
22	3.7094396	82	3.7144974	42	3.7194970	2	3.7244397	62	3.7293268
23	3.7095244	83	3.7145812	43	3.7195799	3	3.7245216	63	3.7294078
24	3.7096091	84	3.7146650	44	3.7196627	4	3.7246035	64	3.7294888
25	3.7096939	85	3.7147488	45	3.7197455	5	3.7246854	65	3.7295697
26	3.7097786	86	3.7148325	46	3.7198283	6	3.7247672	66	3.7296507
27	3.7098633	87	3.7149162	47	3.7199111	7	3.7248491	67	3.7297316
28	3.7099480	88	3.7150000	48	3.7199938	8	3.7249309	68	3.7298125
29	3.7100327	89	3.7150837	49	3.7200766	9	3.7250127	69	3.7298934
30	3.7101174	90	3.7151674	50	3.7201593	10	3.7250945	70	3.7299743
31	3.7102020	91	3.7152510	51	3.7202420	11	3.7251763	71	3.7300551
32	3.7102866	92	3.7153347	52	3.7203247	12	3.7252581	72	3.7301360
33	3.7103713	93	3.7154183	53	3.7204074	13	3.7253398	73	3.7302168
34	3.7104559	94	3.7155019	54	3.7204901	14	3.7254215	74	3.7302977
35	3.7105404	95	3.7155856	55	3.7205727	15	3.7255033	75	3.7303785
36	3.7106250	96	3.7156691	56	3.7206554	16	3.7255850	76	3.7304593
37	3.7107096	97	3.7157527	57	3.7207380	17	3.7256667	77	3.7305400
38	3.7107941	98	3.7158363	58	3.7208206	18	3.7257483	78	3.7306208
39	3.7108786	99	3.7159198	59	3.7209032	19	3.7258300	79	3.7307015
40	3.7109631	5200	3.7160033	60	3.7209857	20	3.7259116	80	3.7307823
41	3.7110476	1	3.7160869	61	3.7210683	21	3.7259933	81	3.7308630
42	3.7111321	2	3.7161703	62	3.7211508	22	3.7260749	82	3.7309437
43	3.7112165	3	3.7162538	63	3.7212334	23	3.7261565	83	3.7310244
44	3.7113010	4	3.7163373	64	3.7213159	24	3.7262380	84	3.7311051
45	3.7113854	5	3.7164207	65	3.7213984	25	3.7263196	85	3.7311857
46	3.7114698	6	3.7165042	66	3.7214809	26	3.7264012	86	3.7312663
47	3.7115542	7	3.7165876	67	3.7215633	27	3.7264817	87	3.7313470
48	3.7116385	8	3.7166710	68	3.7216458	28	3.7265642	88	3.7314276
49	3.7117229	9	3.7167544	69	3.7217282	29	3.7266457	89	3.7315082
50	3.7118072	10	3.7168377	70	3.7218106	30	3.7267272	90	3.7315888
51	3.7118915	11	3.7169211	71	3.7218930	31	3.7268087	91	3.7316693
52	3.7119759	12	3.7170044	72	3.7219754	32	3.7268901	92	3.7317499
53	3.7120601	13	3.7170877	73	3.7220578	33	3.7269716	93	3.7318304
54	3.7121444	14	3.7171710	74	3.7221401	34	3.7270530	94	3.7319109
55	3.7122287	15	3.7172543	75	3.7222225	35	3.7271344	95	3.7319914
56	3.7123129	16	3.7173376	76	3.7223048	36	3.7272158	96	3.7320719
57	3.7123971	17	3.7174208	77	3.7223871	37	3.7272972	97	3.7321524
58	3.7124813	18	3.7175041	78	3.7224694	38	3.7273786	98	3.7322329
59	3.7125655	19	3.7175873	793	3.7225517	39	3.7274599	99	3.7323133

Secũda.	Gr. Mi. 1. 30.		Gr. Mi. 1. 31.		Gr. Mi. 1. 32.		Gr. Mi. 1. 33.		Gr. Mi. 1. 34.
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.
5400	3.7323938	5460	3.7371926	5520	3.7419391	5580	3.7466342	5640	3.7512791
1	3.7324742	61	3.7372722	21	3.7420177	81	3.7467120	41	3.7513561
2	3.7325546	62	3.7373517	22	3.7420964	82	3.7467898	42	3.7514331
3	3.7326350	63	3.7374312	23	3.7421750	83	3.7468676	43	3.7515100
4	3.7327153	64	3.7375107	24	3.7422537	84	3.7469454	44	3.7515870
5	3.7327957	65	3.7375902	25	3.7423323	85	3.7470232	45	3.7516639
6	3.7328760	66	3.7376696	26	3.7424109	86	3.7471009	46	3.7517409
7	3.7329564	67	3.7377491	27	3.7424895	87	3.7471787	47	3.7518178
8	3.7330367	68	3.7378285	28	3.7425680	88	3.7472564	48	3.7518947
9	3.7331170	69	3.7379079	29	3.7426466	89	3.7473341	49	3.7519716
10	3.7331973	70	3.7379873	30	3.7427251	90	3.7474118	50	3.7520484
11	3.7332775	71	3.7380667	31	3.7428037	91	3.7474895	51	3.7521253
12	3.7333578	72	3.7381461	32	3.7428822	92	3.7475672	52	3.7522022
13	3.7334380	73	3.7382254	33	3.7429607	93	3.7476448	53	3.7522790
14	3.7335182	74	3.7383048	34	3.7430392	94	3.7477225	54	3.7523558
15	3.7335985	75	3.7383841	35	3.7431176	95	3.7478001	55	3.7524326
16	3.7336787	76	3.7384634	36	3.7431961	96	3.7478777	56	3.7525094
17	3.7337588	77	3.7385427	37	3.7432745	97	3.7479553	57	3.7525862
18	3.7338390	78	3.7386220	38	3.7433530	98	3.7480329	58	3.7526629
19	3.7339191	79	3.7387013	39	3.7434314	99	3.7481105	59	3.7527397
20	3.7339993	80	3.7387806	40	3.7435008	5600	3.7481880	60	3.7528164
21	3.7340794	81	3.7388598	41	3.7435881	1	3.7482656	61	3.7528932
22	3.7341595	82	3.7389390	42	3.7436665	2	3.7483431	62	3.7529699
23	3.7342396	83	3.7390182	43	3.7437449	3	3.7484206	63	3.7530466
24	3.7343197	84	3.7390974	44	3.7438232	4	3.7484981	64	3.7531232
25	3.7343997	85	3.7391766	45	3.7439015	5	3.7485756	65	3.7531999
26	3.7344798	86	3.7392558	46	3.7439799	6	3.7486531	66	3.7532766
27	3.7345598	87	3.7393350	47	3.7440582	7	3.7487306	67	3.7533532
28	3.7346398	88	3.7394141	48	3.7441365	8	3.7488080	68	3.7534298
29	3.7347198	89	3.7394932	49	3.7442147	9	3.7488854	69	3.7535065
30	3.7347998	90	3.7395723	50	3.7442930	10	3.7489629	70	3.7535831
31	3.7348798	91	3.7396514	51	3.7443712	11	3.7490403	71	3.7536596
32	3.7349598	92	3.7397305	52	3.7444495	12	3.7491177	72	3.7537362
33	3.7350397	93	3.7398096	53	3.7445277	13	3.7491950	73	3.7538128
34	3.7351196	94	3.7398886	54	3.7446059	14	3.7492724	74	3.7538893
35	3.7351995	95	3.7399677	55	3.7446841	15	3.7493498	75	3.7539659
36	3.7352794	96	3.7400467	56	3.7447622	16	3.7494271	76	3.7540424
37	3.7353593	97	3.7401257	57	3.7448404	17	3.7495044	77	3.7541189
38	3.7354392	98	3.7402047	58	3.7449185	18	3.7495817	78	3.7541954
39	3.7355191	99	3.7402837	59	3.7449967	19	3.7496590	79	3.7542719
40	3.7355989	5500	3.7403627	60	3.7450748	20	3.7497363	80	3.7543483
41	3.7356787	1	3.7404416	61	3.7451529	21	3.7498136	81	3.7544248
42	3.7357585	2	3.7405206	62	3.7452310	22	3.7498908	82	3.7545012
43	3.7358383	3	3.7405995	63	3.7453091	23	3.7499681	83	3.7545777
44	3.7359181	4	3.7406784	64	3.7453871	24	3.7500453	84	3.7546541
45	3.7359979	5	3.7407573	65	3.7454652	25	3.7501225	85	3.7547305
46	3.7360776	6	3.7408362	66	3.7455432	26	3.7501997	86	3.7548069
47	3.7361574	7	3.7409151	67	3.7456212	27	3.7502769	87	3.7548832
48	3.7362371	8	3.7409939	68	3.7456992	28	3.7503541	88	3.7549596
49	3.7363168	9	3.7410728	69	3.7457772	29	3.7504312	89	3.7550359
50	3.7361965	10	3.7411516	70	3.7458552	30	3.7505084	90	3.7551121
51	3.7364762	11	3.7412304	71	3.7459332	31	3.7505855	91	3.7551886
52	3.7365558	12	3.7413092	72	3.7460111	32	3.7506626	92	3.7552649
53	3.7366355	13	3.7413880	73	3.7460890	33	3.7507398	93	3.7553412
54	3.7367151	14	3.7414668	74	3.7461670	34	3.7508168	94	3.7554175
55	3.7367948	15	3.7415455	75	3.7462449	35	3.7508939	95	3.7554937
56	3.7368744	16	3.7416243	76	3.7463228	36	3.7509710	96	3.7555700
57	3.7369540	17	3.7417030	77	3.7464006	37	3.7510480	97	3.7556462
58	3.7370335	18	3.7417817	78	3.7464785	38	3.7511251	98	3.7557224
59	3.7371131	19	3.7418604	791	3.7465564	39	3.7512021	99	3.7557987

Secũda.	Gr. Mi. 1. 35.		Gr. Mi. 1. 36.		Gr. Mi. 1. 37.		Gr. Mi. 1. 38.		Gr. Mi. 1. 39.	
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith	Nu.	Logarith.	
5700	3.7558749	5760	3.7604225	5820	3.7649230	5880	3.7693773	5940	3.7737864	
1	3.7559510	61	3.7604979	21	3.7649976	81	3.7694512	41	3.7738596	
2	3.7560272	62	3.7605733	22	3.7650722	82	3.7695250	42	3.7739326	
3	3.7561034	63	3.7606486	23	3.7651468	83	3.7695988	43	3.7740057	
4	3.7561795	64	3.7607240	24	3.7652214	84	3.7696727	44	3.7740788	
5	3.7562556	65	3.7607993	25	3.7652959	85	3.7697465	45	3.7741519	
6	3.7563318	66	3.7608746	26	3.7653705	86	3.7698203	46	7.7742249	
7	3.7564079	67	3.7609500	27	3.7654450	87	3.7698940	47	3.7742979	
8	3.7564840	68	3.7610253	28	3.7655195	88	3.7699678	48	3.7743710	
9	3.7565600	69	3.7611005	29	3.7655941	89	3.7700416	49	3.7744440	
10	3.7566361	70	3.7611758	30	3.7656686	90	3.7701153	50	3.7745170	
11	3.7567122	71	3.7612511	31	3.7657430	91	3.7701890	51	3.7745899	
12	3.7567882	72	3.7613263	32	3.7658175	92	3.7702627	52	3.7746629	
13	3.7568642	73	3.7614016	33	3.7658920	93	3.7703364	53	3.7747359	
14	3.7569402	74	3.7614768	34	3.7659664	94	3.7704101	54	3.7748088	
15	3.7570162	75	3.7615520	35	3.7660409	95	3.7704838	55	3.7748818	
16	3.7570922	76	3.7616272	36	3.7661153	96	3.7705575	56	3.7749547	
17	3.7571682	77	3.7617024	37	3.7661897	97	3.7706311	57	3.7750276	
18	3.7572441	78	3.7617775	38	3.7662641	98	3.7707048	58	3.7751005	
19	3.7573201	79	3.7618527	39	3.7663385	99	3.7707784	59	3.7751734	
20	3.7573960	80	3.7619278	40	3.7664128	5900	3.7708520	60	3.7752463	
21	3.7574719	81	3.7620030	41	3.7664872	1	3.7709256	61	3.7753191	
22	3.7575479	82	3.7620781	42	3.7665616	2	3.7709992	62	3.7753920	
23	3.7576237	83	3.7621532	43	3.7666359	3	3.7710728	63	3.7754648	
24	3.7576996	84	3.7622283	44	3.7667102	4	3.7711463	64	3.7755376	
25	3.7577755	85	3.7623034	45	3.7667845	5	3.7712199	65	3.7756104	
26	3.7578513	86	3.7623784	46	3.7668588	6	3.7712934	66	3.7756832	
27	3.7579272	87	3.7624535	47	3.7669331	7	3.7713670	67	3.7757560	
28	3.7580030	88	3.7625285	48	3.7670074	8	3.7714405	68	3.7758288	
29	3.7580788	89	3.7626035	49	3.7670816	9	3.7715140	69	3.7759016	
30	3.7581546	90	3.7626786	50	3.7671559	10	3.7715875	70	3.7759743	
31	3.7582304	91	3.7627536	51	3.7672301	11	3.7716610	71	3.7760471	
32	3.7583062	92	3.7628286	52	3.7673043	12	3.7717344	72	3.7761198	
33	3.7583819	93	3.7629035	53	3.7673785	13	3.7718079	73	3.7761925	
34	3.7584577	94	3.7629785	54	3.7674527	14	3.7718813	74	3.7762652	
35	3.7585334	95	3.7630534	55	3.7675269	15	3.7719547	75	3.7763379	
36	3.7586091	96	3.7631284	56	3.7676011	16	3.7720282	76	3.7764106	
37	3.7586848	97	3.7632033	57	3.7676752	17	3.7721016	77	3.7764833	
38	3.7587605	98	3.7632782	58	3.7677494	18	3.7721750	78	3.7765559	
39	3.7588362	99	3.7633531	59	3.7678235	19	3.7722483	79	3.7766286	
40	3.7589119	5800	3.7634280	60	3.7678976	20	3.7723217	80	3.7767012	
41	3.7589875	1	3.7635029	61	3.7679717	21	3.7723951	81	3.7767738	
42	3.7590632	2	3.7635777	62	3.7680458	22	3.7724684	82	3.7768464	
43	3.7591388	3	3.7636526	63	3.7681199	23	3.7725417	83	3.7769190	
44	3.7592144	4	3.7637274	64	3.7681940	24	3.7726150	84	3.7769916	
45	3.7592900	5	3.7638022	65	3.7682680	25	3.7726884	85	3.7770642	
46	3.7593656	6	3.7638770	66	3.7683421	26	3.7727616	86	3.7771367	
47	3.7594412	7	3.7639518	67	3.7684161	27	3.7728349	87	3.7772093	
48	3.7595168	8	3.7640266	68	3.7684901	28	3.7729082	88	3.7772818	
49	3.7595923	9	3.7641014	69	3.7685641	29	3.7729814	89	3.7773543	
50	3.7596678	10	3.7641761	70	3.7686381	30	3.7730547	90	3.7774268	
51	3.7597434	11	3.7642509	71	3.7687121	31	3.7731279	91	3.7774993	
52	3.7598189	12	3.7643256	72	3.7687860	32	3.7732011	92	3.7775718	
53	3.7598944	13	3.7644003	73	3.7688600	33	3.7732743	93	3.7776443	
54	3.7599699	14	3.7644750	74	3.7689339	34	3.7733475	94	3.7777167	
55	3.7600453	15	3.7645497	75	3.7690079	35	3.7734207	95	3.7777892	
56	3.7601208	16	3.7646244	76	3.7690818	36	3.7734939	96	3.7778616	
57	3.7601962	17	3.7646991	77	3.7691557	37	3.7735670	97	3.7779340	
58	3.7602717	18	3.7647737	78	3.7692296	38	3.7736402	98	3.7780065	
59	3.7603471	19	3.7648484	79	3.7693035	39	3.7737133.	99	3.7780789	

Secũda.	Gr. Mi. 1. 40.		Gr. Mi. 1. 41		Gr. Mi. 1. 42.		Gr. Mi. 1. 43.		Gr. Mi. 1. 44.	
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	
6000	3.7781512	6060	3.7824726	6120	3.7867514	6180	3.7909885	6240	3.7951846	
1	3.7782236	61	3.7825443	21	3.7868224	81	3.7910587	41	3.7952542	
2	3.7782960	62	3.7826159	22	3.7868933	82	3.7911290	42	3.7953238	
3	3.7783683	63	3.7826876	23	3.7869643	83	3.7911992	43	3.7953933	
4	3.7784407	64	3.7827592	24	3.7870352	84	3.7912695	44	3.7954629	
5	3.7785130	65	3.7828308	25	3.7871061	85	3.7913397	45	3.7955324	
6	3.7785853	66	3.7829024	26	3.7871770	86	3.7914099	46	3.7956020	
7	3.7786576	67	3.7829740	27	3.7872479	87	3.7914801	47	3.7956715	
8	3.7787299	68	3.7830456	28	3.7873188	88	3.7915503	48	3.7957410	
9	3.7788022	69	3.7831171	29	3.7873896	89	3.7916205	49	3.7958105	
10	3.7788745	70	3.7831887	30	3.7874605	90	3.7916906	50	3.7958800	
11	3.7789467	71	3.7832602	31	3.7875313	91	3.7917608	51	3.7959495	
12	3.7790190	72	3.7833318	32	3.7876021	92	3.7918309	52	3.7960190	
13	3.7790912	73	3.7834033	33	3.7876730	93	3.7919011	53	3.7960884	
14	3.7791634	74	3.7834748	34	3.7877438	94	3.7919712	54	3.7961579	
15	3.7792356	75	3.7835463	35	3.7878146	95	3.7920413	55	3.7962273	
16	3.7793078	76	3.7836178	36	3.7878853	96	3.7921114	56	3.7962967	
17	3.7793800	77	3.7836892	37	3.7879561	97	3.7921815	57	3.7963662	
18	3.7794522	78	3.7837607	38	3.7880269	98	3.7922516	58	3.7964356	
19	3.7795243	79	3.7838321	39	3.7880976	99	3.7923216	59	3.7965050	
20	3.7795965	80	3.7839036	40	3.7881684	6200	3.7923917	60	3.7965743	
21	3.7796686	81	3.7839750	41	3.7882391	1	3.7924617	61	3.7966437	
22	3.7797408	82	3.7840464	42	3.7883098	2	3.7925318	62	3.7967131	
23	3.7798129	83	3.7841178	43	3.7883805	3	3.7926018	63	3.7967824	
24	3.7798850	84	3.7841892	44	3.7884512	4	3.7926718	64	3.7968517	
25	3.7799571	85	3.7842606	45	3.7885219	5	3.7927418	65	3.7969211	
26	3.7800291	86	3.7843319	46	3.7885926	6	3.7928118	66	3.7969904	
27	3.7801012	87	3.7844033	47	3.7886632	7	3.7928817	67	3.7970597	
28	3.7801732	88	3.7844746	48	3.7887339	8	3.7929517	68	3.7971290	
29	3.7802453	89	3.7845460	49	3.7888045	9	3.7930217	69	3.7971983	
30	3.7803173	90	3.7846173	50	3.7888751	10	3.7930916	70	3.7972675	
31	3.7803893	91	3.7846886	51	3.7889457	11	3.7931615	71	3.7973368	
32	3.7804613	92	3.7847599	52	3.7890163	12	3.7932314	72	3.7974060	
33	3.7805333	93	3.7848314	53	3.7890869	13	3.7933014	73	3.7974753	
34	3.7806053	94	3.7849024	54	3.7891575	14	3.7933712	74	3.7975445	
35	3.7806773	95	3.7849737	55	3.7892281	15	3.7934411	75	3.7976137	
36	3.7807492	96	3.7850450	56	3.7892986	16	3.7935110	76	3.7976829	
37	3.7808212	97	3.7851162	57	3.7893691	17	3.7935809	77	3.7977521	
38	3.7808931	98	3.7851874	58	3.7894397	18	3.7936507	78	3.7978213	
39	3.7809650	99	3.7852586	59	3.7895102	19	3.7937206	79	3.7978905	
40	3.7810369	6100	3.7853298	60	3.7895807	20	3.7937904	80	3.7979596	
41	3.7811088	1	3.7854010	61	3.7896512	21	3.7938601	81	3.7980288	
42	3.7811807	2	3.7854722	62	3.7897217	22	3.7939300	82	3.7980979	
43	3.7812526	3	3.7855434	63	3.7897922	23	3.7939998	83	3.7981671	
44	3.7813245	4	3.7856145	64	3.7898626	24	3.7940696	84	3.7982362	
45	3.7813963	5	3.7856857	65	3.7899331	25	3.7941394	85	3.7983053	
46	3.7814681	6	3.7857568	66	3.7900035	26	3.7942091	86	3.7983744	
47	3.7815400	7	3.7858279	67	3.7900739	27	3.7942789	87	3.7984435	
48	3.7816118	8	3.7858990	68	3.7901444	28	3.7943486	88	3.7985125	
49	3.7816836	9	3.7859701	69	3.7902148	29	3.7944183	89	3.7985816	
50	3.7817554	10	3.7860412	70	3.7902852	30	3.7944880	90	3.7986506	
51	3.7818272	11	3.7861123	71	3.7903555	31	3.7945578	91	3.7987197	
52	3.7818989	12	3.7861833	72	3.7904259	32	3.7946274	92	3.7987887	
53	3.7819707	13	3.7862544	73	3.7904963	33	3.7946971	93	3.7988577	
54	3.7820424	14	3.7863254	74	3.7905666	34	3.7947668	94	3.7989267	
55	3.7821141	15	3.7863965	75	3.7906370	35	3.7948365	95	3.7989957	
56	3.7821859	16	3.7864675	76	3.7907073	36	3.7949061	96	3.7990647	
57	3.7822576	17	3.7865385	77	3.7907776	37	3.7949757	97	3.7991337	
58	3.7823293	18	3.7866095	78	3.7908479	38	3.7950454	98	3.7992027	
59	3.7824010	19	3.7866805	79	3.7909182	39	3.7951150	99	3.7992716	

Secũda.	Gr. Mi. 1. 45.		Gr. Mi. 1. 46.		Gr. Mi. 1. 47.		Gr. Mi. 1. 48.		Gr. Mi. 1. 49.	
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	
6300	3.7993405	6360	3.8034571	6420	3.8075350	6480	3.8115750	6540	3.8155777	
1	3.7994095	61	3.8035254	21	3.8076027	81	3.8116420	41	3.8156441	
2	3.7994784	62	3.8035937	22	3.8076703	82	3.8117090	42	3.8157105	
3	3.7995473	63	3.8036619	23	3.8077379	83	3.8117760	43	3.8157769	
4	3.7996162	64	3.8037302	24	3.8078055	84	3.8118430	44	3.8158433	
5	3.7996851	65	3.8037984	25	3.8078731	85	3.8119100	45	3.8159096	
6	3.7997540	66	3.8038666	26	3.8079407	86	3.8119769	46	3.8159760	
7	3.7998228	67	3.8039348	27	3.8080083	87	3.8120439	47	3.8160423	
8	3.7998917	68	3.8040031	28	3.8080759	88	3.8121108	48	3.8161087	
9	3.7999605	69	3.8040712	29	3.8081434	89	3.8121778	49	3.8161750	
10	3.8000294	70	3.8041394	30	3.8082110	90	3.8122447	50	3.8162413	
11	3.8000982	71	3.8042076	31	3.8082785	91	3.8123116	51	3.8163076	
12	3.8001670	72	3.8042758	32	3.8083460	92	3.8123785	52	3.8163739	
13	3.8002358	73	3.8043439	33	3.8084136	93	3.8124454	53	3.8164402	
14	3.8003046	74	3.8044121	34	3.8084811	94	3.8125123	54	3.8165064	
15	3.8003734	75	3.8044802	35	3.8085485	95	3.8125792	55	3.8165727	
16	3.8004421	76	3.8045483	36	3.8086160	96	3.8126460	56	3.8166389	
17	3.8005109	77	3.8046164	37	3.8086835	97	3.8127129	57	3.8167052	
18	3.8005796	78	3.8046845	38	3.8087510	98	3.8127797	58	3.8167714	
19	3.8006484	79	3.8047526	39	3.8088184	99	3.8128465	59	3.8168376	
20	3.8007171	20	3.8048207	40	3.8088859	6500	3.8129134	60	3.8169038	
21	3.8007858	81	3.8048887	41	3.8089533	1	3.8129802	61	3.8169700	
22	3.8008545	82	3.8049568	42	3.8090207	2	3.8130470	62	3.8170362	
23	3.8009232	83	3.8050248	43	3.8090881	3	3.8131138	63	3.8171024	
24	3.8009919	84	3.8050929	44	3.8091555	4	3.8131805	64	3.8171686	
25	3.8010605	85	3.8051609	45	3.8092229	5	3.8132473	65	3.8172347	
26	3.8011292	86	3.8052289	46	3.8092903	6	3.8133141	66	3.8173009	
27	3.8011978	87	3.8052969	47	3.8093577	7	3.8133808	67	3.8173670	
28	3.8012665	88	3.8053649	48	3.8094250	8	3.8134475	68	3.8174331	
29	3.8013351	89	3.8054329	49	3.8094924	9	3.8135143	69	3.8174993	
30	3.8014037	90	3.8055009	50	3.8095597	10	3.8135810	70	3.8175654	
31	3.8014723	91	3.8055688	51	3.8096270	11	3.8136477	71	3.8176315	
32	3.8015409	92	3.8056368	52	3.8096944	12	3.8137144	72	3.8176976	
33	3.8016095	93	3.8057047	53	3.8097617	13	3.8137811	73	3.8177636	
34	3.8016781	94	3.8057726	54	3.8098290	14	3.8138478	74	3.8178297	
35	3.8017466	95	3.8058405	55	3.8098962	15	3.8139144	75	3.8178958	
36	3.8018152	96	3.8059085	56	3.8099635	16	3.8139811	76	3.8179618	
37	3.8018837	97	3.8059763	57	3.8100308	17	3.8140477	77	3.8180278	
38	3.8019522	98	3.8060442	58	3.8100980	18	3.8141144	78	3.8180939	
39	3.8020208	99	3.8061121	59	3.8101653	19	3.8141810	79	3.8181599	
40	3.8020893	6400	3.8061800	60	3.8102325	20	3.8142476	80	3.8182259	
41	3.8021578	1	3.8062478	61	3.8102997	21	3.8143142	81	3.8182919	
42	3.8022262	2	3.8063157	62	3.8103670	22	3.8143808	82	3.8183579	
43	3.8022947	3	3.8063835	63	3.8104342	23	3.8144474	83	3.8184239	
44	3.8023632	4	3.8064513	64	3.8105013	24	3.8145140	84	3.8184898	
45	3.8024316	5	3.8065191	65	3.8105685	25	3.8145805	85	3.8185558	
46	3.8025001	6	3.8065869	66	3.8106357	26	3.8146471	86	3.8186217	
47	3.8025685	7	3.8066547	67	3.8107029	27	3.8147136	87	3.8186877	
48	3.8026369	8	3.8067225	68	3.8107700	28	3.8147801	88	3.8187536	
49	3.8027053	9	3.8067903	69	3.8108371	29	3.8148467	89	3.8188195	
50	3.8027737	10	3.8068580	70	3.8109043	30	3.8149132	90	3.8188854	
51	3.8028421	11	3.8069258	71	3.8109714	31	3.8149797	91	3.8189513	
52	3.8029105	12	3.8069935	72	3.8110385	32	3.8150462	92	3.8190172	
53	3.8029789	13	3.8070612	73	3.8111056	33	3.8151127	93	3.8190831	
54	3.8030472	14	3.8071290	74	3.8111727	34	3.8151791	94	3.8191489	
55	3.8031156	15	3.8071967	75	3.8112398	35	3.8152456	95	3.8192148	
56	3.8031839	16	3.8072644	76	3.8113068	36	3.8153120	96	3.8192806	
57	3.8032522	17	3.8073320	77	3.8113739	37	3.8153785	97	3.8193465	
58	3.8033205	18	3.8073997	78	3.8114409	38	3.8154449	98	3.8194123	
59	3.8033888	19	3.8074674	79	3.8115080	39	3.8155113	99	3.8194781	

Secũda.	Gr. Mi. 1. 50.		Gr. Mi. 1. 51.		Gr. Mi. 1. 52.		Gr. Mi. 1. 53.		Gr. Mi. 1. 54.	
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	
6600	3.8195439	6660	3.8234742	6720	3.8273693	6780	3.8312297	6840	3.8350561	
1	3.8196097	61	3.8235394	21	3.8274339	81	3.8312937	41	3.8351196	
2	3.8196755	62	3.8236046	22	3.8274985	82	3.8313578	42	3.8351831	
3	3.8197413	63	3.8236698	23	3.8275631	83	3.8314218	43	3.8352465	
4	3.8198071	64	3.8237350	24	3.8276277	84	3.8314855	44	3.8353100	
5	3.8198728	65	3.8238002	25	3.8276923	85	3.8315499	45	3.8353735	
6	3.8199386	66	3.8238653	26	3.8277569	86	3.8316139	46	3.8354369	
7	3.8200043	67	3.8239305	27	3.8278214	87	3.8316778	47	3.8355003	
8	3.8200700	68	3.8239956	28	3.8278860	88	3.8317418	48	3.8355638	
9	3.8201358	69	3.8240607	29	3.8279505	89	3.8318058	49	3.8356272	
10	3.8202015	70	3.8241258	30	3.8280151	90	3.8318698	50	3.8356906	
11	3.8202672	71	3.8241909	31	3.8280796	91	3.8319337	51	3.8357540	
12	3.8203328	72	3.8242560	32	3.8281441	92	3.8319977	52	3.8358174	
13	3.8203985	73	3.8243211	33	3.8282086	93	3.8320616	53	3.8358807	
14	3.8204642	74	3.8243862	34	3.8282731	94	3.8321255	54	3.8359441	
15	3.8205298	75	3.8244513	35	3.8283376	95	3.8321895	55	3.8360075	
16	3.8205955	76	3.8245163	36	3.8284021	96	3.8322534	56	3.8360708	
17	3.8206611	77	3.8245814	37	3.8284665	97	3.8323173	57	3.8361341	
18	3.8207268	78	3.8246464	38	3.8285310	98	3.8323812	58	3.8361975	
19	3.8207924	79	3.8247114	39	3.8285955	99	3.8324450	59	3.8362608	
20	3.8208580	80	3.8247765	40	3.8286599	6800	3.8325089	60	3.8363241	
21	3.8209236	81	3.8248415	41	3.8287243	1	3.8325728	61	3.8363874	
22	3.8209892	82	3.8249065	42	3.8287887	2	3.8326366	62	3.8364507	
23	3.8210548	83	3.8249715	43	3.8288532	3	3.8327005	63	3.8365140	
24	3.8211203	84	3.8250304	44	3.8289176	4	3.8327643	64	3.8365773	
25	3.8211859	85	3.8251014	45	3.8289820	5	3.8328281	65	3.8366405	
26	3.8212514	86	3.8251664	46	3.8290463	6	3.8328919	66	3.8367038	
27	3.8213170	87	3.8252313	47	3.8291107	7	3.8329558	67	3.8367670	
28	3.8213825	88	3.8252963	48	3.8291751	8	3.8330195	68	3.8368303	
29	3.8214480	89	3.8253612	49	3.8292394	9	3.8330833	69	3.8368935	
30	3.8215135	90	3.8254261	50	3.8293038	10	3.8331471	70	3.8369567	
31	3.8215790	91	3.8254910	51	3.8293681	11	3.8332109	71	3.8370199	
32	3.8216445	92	3.8255559	52	3.8294324	12	3.8332746	72	3.8370832	
33	3.8217100	93	3.8256208	53	3.8294967	13	3.8333384	73	3.8371463	
34	3.8217755	94	3.8256857	54	3.8295611	14	3.8334021	74	3.8372095	
35	3.8218409	95	3.8257506	55	3.8296254	15	3.8334659	75	3.8372727	
36	3.8219064	96	3.8258154	56	3.8296896	16	3.8335296	76	3.8373359	
37	3.8219718	97	3.8258803	57	3.8297539	17	3.8335933	77	3.8373990	
38	3.8220372	98	3.8259451	58	3.8298182	18	3.8336570	78	3.8374622	
39	3.8221027	99	3.8260100	59	3.8298824	19	3.8337207	79	3.8375253	
40	3.8221681	6700	3.8260748	60	3.8299467	20	3.8337844	80	3.8375884	
41	3.8222335	1	3.8261396	61	3.8300109	21	3.8338480	81	3.8376516	
42	3.8222989	2	3.8262044	62	3.8300752	22	3.8339117	82	3.8377147	
43	3.8223643	3	3.8262692	63	3.8301394	23	3.8339754	83	3.8377778	
44	3.8224296	4	3.8263340	64	3.8302036	24	3.8340390	84	3.8378409	
45	3.8224950	5	3.8263988	65	3.8302678	25	3.8341027	85	3.8379039	
46	3.8225603	6	3.8264635	66	3.8303320	26	3.8341663	86	3.8379670	
47	3.8226257	7	3.8265283	67	3.8303962	27	3.8342299	87	3.8380301	
48	3.8226910	8	3.8265931	68	3.8304603	28	3.8342935	88	3.8380931	
49	3.8227563	9	3.8266578	69	3.8305245	29	3.8343571	89	3.8381562	
50	3.8228216	10	3.8267225	70	3.8305887	30	3.8344207	90	3.8382192	
51	3.8228869	11	3.8267872	71	3.8306528	31	3.8344843	91	3.8382822	
52	3.8229522	12	3.8268519	72	3.8307169	32	3.8345479	92	3.8383453	
53	3.8230175	13	3.8269166	73	3.8307811	33	3.8346114	93	3.8384083	
54	3.8230828	14	3.8269813	74	3.8308452	34	3.8346750	94	3.8384713	
55	3.8231481	15	3.8270460	75	3.8309093	35	3.8347385	95	3.8385343	
56	3.8232133	16	3.8271107	76	3.8309734	36	3.8348021	96	3.8385973	
57	3.8232786	17	3.8271753	77	3.8310375	37	3.8348656	97	3.8386602	
58	3.8233438	18	3.8272400	78	3.8311016	38	3.8349291	98	3.8387232	
59	3.8234090	19	3.8273046	79	3.8311656	39	3.8349926	99	3.8387861	

secũ da.	Gr. Mi. 1. 55.		Gr. Mi. 1. 56.		Gr. Mi. 1. 57.		Gr. Mi. 1. 58.		Gr. Mi. 1. 59.	
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	
6900	3.8388491	6960	3.8426092	7020	3.8463371	7080	3.8500333	7140	3.8536982	
1	3.8388120	61	3.8426716	21	3.8463990	81	3.8500946	41	3.8537590	
2	3.8387750	62	3.8427340	22	3.8464608	82	3.8501559	42	3.8538198	
3	3.8390379	63	3.8427964	23	3.8465227	83	3.8502172	43	3.8538806	
4	3.8391008	64	3.8428588	24	3.8465845	84	3.8502786	44	3.8539414	
5	3.8391637	65	3.8429211	25	3.8466463	85	3.8503399	45	3 8540022	
6	3.8392266	66	3.8429835	26	3.8467081	86	3.8504011	46	3.8540630	
7	3.8392895	67	3.8430458	27	3.8467700	87	3.8504624	47	3.8541238	
8	3.8393523	68	3.8431081	28	3.8468318	88	3.8505237	48	3.8541845	
9	3.8394152	69	3.8431705	29	3.8468935	89	3.8505850	49	3.8542453	
10	3.8394780	70	3.8432328	30	3.8469553	90	3.8506462	50	3.8543060	
11	3.8395409	71	3.8432951	31	3.8470171	91	3.8507075	51	3.8543668	
12	3.8396037	72	3.8433574	32	3.8470789	92	3.8507687	52	3.8544275	
13	3.8396666	73	3.8434197	33	3.8471406	93	3.8508300	53	3.8544882	
14	3.8397294	74	3.8434819	34	3.8472024	94	3.8508912	54	3.8545489	
15	3.8397922	75	3.8435442	35	3.8472641	95	3.8509524	55	3.8546096	
16	3.8398550	76	3.8436065	36	3.8473258	96	3.8510136	56	3.8546703	
17	3.8399178	77	3.8436687	37	3.8473876	97	3.8510748	57	3.8547310	
18	3.8399806	78	3.8437310	38	3.8474493	98	3.8511360	58	3.8547917	
19	3.8400433	79	3.8437932	39	3.8475110	99	3.8511972	59	3.8548524	
20	3.8401061	80	3.8438554	40	3.8475727	7100	3.8512583	60	3.8549130	
21	3.8401688	81	3.8439176	41	3.8476343	1	3.8513195	61	3.8549737	
22	3.8402316	82	3.8439798	42	3.8476960	2	3.8513807	62	3.8550343	
23	3.8402943	83	3.8440420	43	3.8477577	3	3.8514418	63	3.8550949	
24	3.8403571	84	3.8441042	44	3.8478193	4	3.8515030	64	3.8551556	
25	3 8404198	85	3.8441664	45	3.8478810	5	3.8515641	65	3.8552162	
26	3.8404825	86	3.8442286	46	3.8479426	6	3.8516252	66	3.8552768	
27	3.8405452	87	3.8442907	47	3.8480043	7	3.8516863	67	3.8553374	
28	3.8406079	88	3.8443529	48	3.8480659	8	3.8517474	68	3.8553980	
29	3 8406706	89	3.8444150	49	3.8481275	9	3.8518085	69	3.8554586	
30	3.8407332	90	3.8444772	50	3.8481891	10	3.8518696	70	3.8555192	
31	3.8407959	91	3.8445393	51	3.8482507	11	3.8519307	71	3.8555797	
32	3.8408586	92	3.8446014	52	3 8483123	12	3.8519917	72	3.8556403	
33	3.8409212	93	3.8446635	53	3.8483739	13	3.8520528	73	3.8557008	
34	3.8409838	94	3.8447256	54	3.8484355	14	3.8521139	74	3.8557614	
35	3.8410465	95	3.8447877	55	3.8484970	15	3.8521749	75	3.8558219	
36	3.8411091	96	3.8448498	56	3.8485586	16	3.8522359	76	3.8558824	
37	3.8411717	97	3.8449119	57	3.8486201	17	3.8522970	77	3.8559429	
38	3.8412343	98	3.8449739	58	3.8486817	18	3.8523580	78	3.8560035	
39	3.8412969	99	3.8450360	59	3.8487432	19	3.8524190	79	3.8560640	
40	3.8413595	7000	3.8450980	60	3.8488047	20	3.8524800	80	3.8561244	
41	3.8414220	1	3.8451601	61	3.8488662	21	3.8525410	81	3.8561849	
42	3.8414846	2	3.8452221	62	3.8489277	22	3.8526020	82	3.8562454	
43	3.8415472	3	3.8452841	63	3.8489892	23	3.8526629	83	3.8563059	
44	3.8416097	4	3.8453461	64	3.8490507	24	3.8527239	84	3.8563663	
45	3.8416722	5	3.8454081	65	3.8491122	25	3.8527849	85	3.8564268	
46	3.8417348	6	3.8454701	66	3.8491736	26	3.8528458	86	3.8564872	
47	3 8417973	7	3.8455321	67	3.8492351	27	3.8529068	87	3 8565476	
48	3.8418598	8	3.8455941	68	3.8492965	28	3.8529677	88	3.8566081	
49	3.8419223	9	3.8456561	69	3.8493580	29	3 8530286	89	3.8566685	
50	3.8413848	10	3.8457180	70	3.8494194	30	3.85308 5	90	3.8567289	
51	3.8420473	11	3.8457600	71	3.8494808	31	3.8531504	91	3.8567893	
52	3.8421098	12	3.8458419	72	3.8495423	32	3.8532113	92	3.8568497	
53	3.8421722	13	3.8459 38	73	3.8496037	33	3.8532722	93	3.8569101	
54	3.8422347	14	3.8459658	74	3.8496651	34	3.8533331	94	3.8569704	
55	3.8422971	15	3.8460277	75	3.8497264	35	3.8533940	95	3.8570308	
56	3 8423596	16	3.8460896	76	3.8497878	36	3.8534548	96	3.8570912	
57	3.8424220	17	3.8461515	77	3.8498492	37	3.8535157	97	3.8571515	
58	3.8424844	18	3.8462134	78	3.8499106	38	3.8535765	98	3 8572118	
59	3.8425468	19	3.8462752	79	3.8499719	39	3.8536374	99	3.8572722	

secũ da.	Gr. Mi. 2. 0.		Gr. Mi. 2. 1.		Gr. Mi. 2. 2.		Gr. Mi. 2. 3.		Gr. Mi. 2. 4.	
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	
7200	3.8573325	7260	3.8609366	7320	3.8645111	7380	3.8680564	7440	3.8715729	
1	3.8573928	61	3.8609964	21	3.8645704	81	3.8681152	41	3.8716313	
2	3.8574531	62	3.8610562	22	3.8646297	82	3.8681740	42	3.8716897	
3	3.8575134	63	3.8611160	23	3.8646890	83	3.8682329	43	3.8717480	
4	3.8575737	64	3.8611758	24	3.8647483	84	3.8682917	44	3.8718064	
5	3.8576340	65	3.8612356	25	3.8648076	85	3.8683505	45	3.8718647	
6	3.8576943	66	3.8612954	26	3.8648669	86	3.8684093	46	3.8719230	
7	3.8577545	67	3.8613552	27	3.8649262	87	3.8684681	47	3.8719814	
8	3.8578148	68	3.8614149	28	3.8649855	88	3.8685269	48	3.8720397	
9	3.8578750	69	3.8614747	29	3.8650447	89	3.8685857	49	3.8720980	
10	3.8579353	70	3.8615344	30	3.8651040	90	3.8686444	50	3.8721563	
11	3.8579955	71	3.8615941	31	3.8651632	91	3.8687032	51	3.8722146	
12	3.8580557	72	3.8616539	32	3.8652225	92	3.8687620	52	3.8722728	
13	3.8581159	73	3.8617136	33	3.8652817	93	3.8688207	53	3.8723311	
14	3.8581761	74	3.8617733	34	3.8653409	94	3.8688794	54	3.8723894	
15	3.8582363	75	3.8618330	35	3.8654001	95	3.8689382	55	3.8724476	
16	3.8582965	76	3.8618927	36	3.8654593	96	3.8689969	56	3.8725059	
17	3.8583567	77	3.8619524	37	3.8655185	97	3.8690556	57	3.8725641	
18	3.8584169	78	3.8620120	38	3.8655777	98	3.8691143	58	3.8726224	
19	3.8584770	79	3.8620717	39	3.8656369	99	3.8691730	59	3.8726806	
20	3.8585372	80	3.8621314	40	3.8656961	7400	3.8692317	60	3.8727388	
21	3.8585973	81	3.8621910	41	3.8657552	1	3.8692904	61	3.8727970	
22	3.8586575	82	3.8622507	42	3.8658144	2	3.8693491	62	3.8728552	
23	3.8587176	83	3.8623103	43	3.8658735	3	3.8694077	63	3.8729134	
24	3.8587777	84	3.8623699	44	3.8659327	4	3.8694664	64	3.8729716	
25	3.8588378	85	3.8624296	45	3.8659918	5	3.8695251	65	3.8730298	
26	3.8588080	86	3.8624892	46	3.8660509	6	3.8695837	66	3.8730880	
27	3.8589581	87	3.8625488	47	3.8661100	7	3.8696423	67	3.8731461	
28	3.8590181	88	3.8626084	48	3.8661691	8	3.8697010	68	3.8732043	
29	3.8590782	89	3.8626679	49	3.8662282	9	3.8697596	69	3.8732624	
30	3.8591383	90	3.8627275	50	3.8662873	10	3.8698182	70	3.8733206	
31	3.8591984	91	3.8627871	51	3.8663464	11	3.8698768	71	3.8733787	
32	3.8592584	92	3.8628467	52	3.8664055	12	3.8699354	72	3.8734369	
33	3.8593185	93	3.8629062	53	3.8664646	13	3.8699940	73	3.8734950	
34	3.8593785	94	3.8629658	54	3.8665236	14	3.8700526	74	3.8735531	
35	3.8594385	95	3.8630252	55	3.8665827	15	3.8701111	75	3.8736112	
36	3.8594986	96	3.8630848	56	3.8666417	16	3.8701697	76	3.8736693	
37	3.8595586	97	3.8631443	57	3.8667008	17	3.8702283	77	3.8737274	
38	3.8596186	98	3.8632039	58	3.8667598	18	3.8702868	78	3.8737855	
39	3.8596786	99	3.8632634	59	3.8668188	19	3.8703454	79	3.8738435	
40	3.8597386	7300	3.8633229	60	3.8668778	20	3.8704039	80	3.8739016	
41	3.8597985	1	3.8633823	61	3.8669368	21	3.8704624	81	3.8739597	
42	3.8598585	2	3.8634418	62	3.8669958	22	3.8705209	82	3.8740177	
43	3.8599185	3	3.8635013	63	3.8670548	23	3.8705795	83	3.8740757	
44	3.8599784	4	3.8635608	64	3.8671138	24	3.8706380	84	3.8741338	
45	3.8600384	5	3.8636202	65	3.8671728	25	3.8706965	85	3.8741918	
46	3.8600983	6	3.8636797	66	3.8672317	26	3.8707549	86	3.8742498	
47	3.8601583	7	3.8637391	67	3.8672907	27	3.8708134	87	3.8743078	
48	3.8602182	8	3.8637985	68	3.8673496	28	3.8708719	88	3.8743658	
49	3.8602781	9	3.8638580	69	3.8674086	29	3.8709304	89	3.8744238	
50	3.8603380	10	3.8639174	70	3.8674675	30	3.8709888	90	3.8744818	
51	3.8603979	11	3.8639768	71	3.8675264	31	3.8710473	91	3.8745398	
52	3.8604578	12	3.8640362	72	3.8675853	32	3.8711057	92	3.8745978	
53	3.8605177	13	3.8640956	73	3.8676442	33	3.8711641	93	3.8746557	
54	3.8605776	14	3.8641550	74	3.8677031	34	3.8712226	94	3.8747137	
55	3.8606374	15	3.8642143	75	3.8677620	35	3.8712810	95	3.8747716	
56	3.8606973	16	3.8642737	76	3.8678209	36	3.8713394	96	3.8748296	
57	3.8607571	17	3.8643331	77	3.8678798	37	3.8713978	97	3.8748875	
58	3.8608170	18	3.8643924	78	3.8679386	38	3.8714562	98	3.8749454	
59	3.8608768	19	3.8644517	79	3.8679975	39	3.8715146	99	3.8750034	

secun da.	Gr. Mi. 2. 5.		Gr. Mi. 2. 6.		Gr. Mi. 2. 7.		Gr. Mi. 2. 8.		Gr. Mi. 2. 9.	
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	
7500	3.8750613	7560	3.8785218	7620	3.8819550	7680	3.8853612	7740	3.8887410	
1	3.8751192	61	3.8785792	21	3.8820120	81	3.8854178	41	3.8887971	
2	3.8751771	62	3.8786367	22	3.8820689	82	3.8854743	42	3.8888532	
3	3.8752349	63	3.8786941	23	3.8821259	83	3.8855308	43	3.8889093	
4	3.8752928	64	3.8787515	24	3.8821829	84	3.8855874	44	3.8889653	
5	3.8753507	65	3.8788089	25	3.8822398	85	3.8856439	45	3.8890214	
6	3.8754086	66	3.8788663	26	3.8822968	86	3.8857004	46	3.8890775	
7	3.8754664	67	3.8789237	27	3.8823537	87	3.8857569	47	3.8891335	
8	3.8755243	68	3.8789811	28	3.8824107	88	3.8858134	48	3.8891896	
9	3.8755821	69	3.8790385	29	3.8824676	89	3.8858699	49	3.8892457	
10	3.8756399	70	3.8790959	30	3.8825245	90	3.8859263	50	3.8893017	
11	3.8756978	71	3.8791532	31	3.8825815	91	3.8859828	51	3.8893577	
12	3.8757556	72	3.8792106	32	3.8826384	92	3.8860393	52	3.8894138	
13	3.8758134	73	3.8792680	33	3.8826953	93	3.8860957	53	3.8894698	
14	3.8758712	74	3.8793253	34	3.8827522	94	3.8861522	54	3.8895258	
15	3.8759290	75	3.8793826	35	3.8828090	95	3.8862086	55	3.8895818	
16	3.8759868	76	3.8794400	36	3.8828659	96	3.8862651	56	3.8896378	
17	3.8760445	77	3.8794973	37	3.8829228	97	3.8863215	57	3.8896938	
18	3.8761023	78	3.8795546	38	3.8829797	98	3.8863779	58	3.8897498	
19	3.8761601	79	3.8796119	39	3.8830365	99	3.8864343	59	3.8898057	
20	3.8762178	80	3.8796692	40	3.8830934	7700	3.8864907	60	3.8898617	
21	3.8762756	81	3.8797265	41	3.8831502	1	3.8865471	61	3.8899177	
22	3.8763333	82	3.8797838	42	3.8832070	2	3.8866035	62	3.8899736	
23	3.8763911	83	3.8798411	43	3.8832639	3	3.8866599	63	3.8900296	
24	3.8764488	84	3.8798983	44	3.8833207	4	3.8867163	64	3.8900855	
25	3.8765065	85	3.8799556	45	3.8833775	5	3.8867726	65	3.8901415	
26	3.8765642	86	3.8800128	46	3.8834343	6	3.8868290	66	3.8901974	
27	3.8766219	87	3.8800701	47	3.8834911	7	3.8868854	67	3.8902533	
28	3.8766796	88	3.8801273	48	3.8835479	8	3.8869417	68	3.8903092	
29	3.8767373	89	3.8801846	49	3.8836047	9	3.8869980	69	3.8903651	
30	3.8767950	90	3.8802418	50	3.8836614	10	3.8870544	70	3.8904210	
31	3.8763526	91	3.8802990	51	3.8837182	11	3.8871107	71	3.8904769	
32	3.8769103	92	3.8803562	52	3.8837750	12	3.8871670	72	3.8905328	
33	3.8769680	93	3.8804134	53	3.8838317	13	3.8872233	73	3.8905887	
34	3.8770256	94	3.8804706	54	3.8838885	14	3.8872796	74	3.8906445	
35	3.8770833	95	3.8805278	55	3.8839452	15	3.8873359	75	3.8907004	
36	3.8771409	96	3.8805850	56	3.8840019	16	3.8873922	76	3.8907562	
37	3.8771985	97	3.8806421	57	3.8840586	17	3.8874485	77	3.8908121	
38	3.8772561	98	3.8806993	58	3.8841154	18	3.8875048	78	3.8908679	
39	3.8773137	99	3.8807564	59	3.8841721	19	3.8875610	79	3.8909238	
40	3.8773713	7600	3.8808136	60	3.8842288	20	3.8876173	80	3.8909796	
41	3.8774289	1	3.8808707	61	3.8842855	21	3.8876735	81	3.8910354	
42	3.8774865	2	3.8809279	62	3.8843421	22	3.8877298	82	3.8910913	
43	3.8775441	3	3.8809850	63	3.8843988	23	3.8877860	83	3.8911470	
44	3.8776017	4	3.8810421	64	3.8844555	24	3.8878423	84	3.8912028	
45	3.8776592	5	3.8810992	65	3.8845122	25	3.8878985	85	3.8912586	
46	3.8777168	6	3.8811563	66	3.8845688	26	3.8879547	86	3.8913144	
47	3.8777743	7	3.8812134	67	3.8846255	27	3.8880109	87	3.8913702	
48	3.8778319	8	3.8812705	68	3.8846821	28	3.8880671	88	3.8914259	
49	3.8778894	9	3.8813276	69	3.8847387	29	3.8881233	89	3.8914817	
50	3.8779469	10	3.8813847	70	3.8847954	30	3.8881795	90	3.8915375	
51	3.8780045	11	3.8814417	71	3.8848520	31	3.8882357	91	3.8915932	
52	3.8780620	12	3.8814988	72	3.8849086	32	3.8882918	92	3.8916489	
53	3.8781195	13	3.8815558	73	3.8849652	33	3.8883480	93	3.8917047	
54	3.8781770	14	3.8816129	74	3.8850218	34	3.8884042	94	3.8917604	
55	3.8782345	15	3.8816699	75	3.8850784	35	3.8884603	95	3.8918161	
56	3.8782919	16	3.8817269	76	3.8851350	36	3.8885165	96	3.8918718	
57	3.8783494	17	3.8817840	77	3.8851915	37	3.8885726	97	3.8919275	
58	3.8784069	18	3.8818410	78	3.8852481	38	3.8886287	98	3.8919832	
59	3.8784643	19	3.8818980	79	3.8853047	39	3.8886848	99	3.8920389	

secun da.	Gr. Mi. 2. 10.		Gr. Mi. 2. 11.		Gr. Mi. 2. 12.		Gr. Mi. 2. 13.		Gr. Mi. 2. 14.	
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	
7800	3.8920946	7860	3.8954225	7920	3.8987252	7980	3.9020029	8040	3.9052560	
1	3.8921503	61	3.8954778	21	3.8987800	81	3.9020573	41	3.9053101	
2	3.8922059	62	3.8955330	22	3.8988348	82	3.9021117	42	3.9053641	
3	3.8922616	63	3.8955883	23	3.8988897	83	3.9021661	43	3.9054181	
4	3.8923173	64	3.8956435	24	3.8989445	84	3.9022205	44	3.9054721	
5	3.8923729	65	3.8956987	25	3.8989993	85	3.9022749	45	3.9055260	
6	3.8924285	66	3.8957539	26	3.8990541	86	3.9023293	46	3.9055800	
7	3.8924842	67	3.8958092	27	3.8991089	87	3.9023837	47	3.9056340	
8	3.8925398	68	3.8958644	28	3.8991636	88	3.9024381	48	3.9056880	
9	3.8925954	69	3.8959195	29	3.8992184	89	3.9024924	49	3.9057419	
10	3.8926510	70	3.8959747	30	3.8992732	90	3.9025468	50	3.9057959	
11	3.8927066	71	3.8960299	31	3.8993279	91	3.9026011	51	3.9058498	
12	3.8927622	72	3.8960851	32	3.8993827	92	3.9026555	52	3.9059038	
13	3.8928178	73	3.8961403	33	3.8994375	93	3.9027098	53	3.9059577	
14	3.8928734	74	3.8961954	34	3.8994922	94	3.9027641	54	3.9060116	
15	3.8929290	75	3.8962506	35	3.8995469	95	3.9028185	55	3.9060655	
16	3.8929845	76	3.8963057	36	3.8996017	96	3.9028728	56	3.9061195	
17	3.8930401	77	3.8963608	37	3.8996564	97	3.9029271	57	3.9061734	
18	3.8930957	78	3.8964160	38	3.8997111	98	3.9029814	58	3.9062273	
19	3.8931512	79	3.8964711	39	3.8997658	99	3.9030357	59	3.9062812	
20	3.8932067	80	3.8965262	40	3.8998205	8000	3.9030900	60	3.9063350	
21	3.8932623	81	3.8965813	41	3.8998752	1	3.9031443	61	3.9063889	
22	3.8933178	82	3.8966364	42	3.8999299	2	3.9031985	62	3.9064428	
23	3.8933733	83	3.8966915	43	3.8999846	3	3.9032528	63	3.9064967	
24	3.8934288	84	3.8967466	44	3.9000392	4	3.9033071	64	3.9065505	
25	3.8934843	85	3.8968017	45	3.9000939	5	3.9033613	65	3.9066044	
26	3.8935398	86	3.8968568	46	3.9001486	6	3.9034156	66	3.9066582	
27	3.8935953	87	3.8969118	47	3.9002032	7	3.9034698	67	3.9067121	
28	3.8936508	88	3.8969669	48	3.9002579	8	3.9035241	68	3.9067659	
29	3.8937063	89	3.8970219	49	3.9003125	9	3.9035783	69	3.9068197	
30	3.8937618	90	3.8970770	50	3.9003671	10	3.9036325	70	3.9068735	
31	3.8938172	91	3.8971320	51	3.9004218	11	3.9036867	71	3.9069273	
32	3.8938727	92	3.8971871	52	3.9004764	12	3.9037409	72	3.9069812	
33	3.8939281	93	3.8972421	53	3.9005310	13	3.9037951	73	3.9070350	
34	3.8939836	94	3.8972971	54	3.9005856	14	3.9038493	74	3.9070887	
35	3.8940390	95	3.8973521	55	3.9006402	15	3.9039035	75	3.9071425	
36	3.8940944	96	3.8974071	56	3.9006948	16	3.9039577	76	3.9071963	
37	3.8941498	97	3.8974621	57	3.9007494	17	3.9040119	77	3.9072501	
38	3.8942053	98	3.8975171	58	3.9008039	18	3.9040661	78	3.9073038	
39	3.8942607	99	3.8975721	59	3.9008585	19	3.9041202	79	3.9073576	
40	3.8943161	7900	3.8976271	60	3.9009131	20	3.9041744	80	3.9074114	
41	3.8943715	1	3.8976821	61	3.9009676	21	3.9042285	81	3.9074651	
42	3.8944268	2	3.8977370	62	3.9010222	22	3.9042827	82	3.9075188	
43	3.8944822	3	3.8977920	63	3.9010767	23	3.9043368	83	3.9075726	
44	3.8945376	4	3.8978469	64	3.9011313	24	3.9043909	84	3.9076263	
45	3.8945929	5	3.8979019	65	3.9011858	25	3.9044450	85	3.9076800	
46	3.8946483	6	3.8979568	66	3.9012403	26	3.9044992	86	3.9077337	
47	3.8947036	7	3.8980117	67	3.9012948	27	3.9045533	87	3.9077874	
48	3.8947590	8	3.8980667	68	3.9013493	28	3.9046074	88	3.9078411	
49	3.8948143	9	3.8981216	69	3.9014038	29	3.9046615	89	3.9078948	
50	3.8948696	10	3.8981765	70	3.9014583	30	3.9047155	90	3.9079485	
51	3.8949250	11	3.8982314	71	3.9015128	31	3.9047696	91	3.9080022	
52	3.8949803	12	3.8982863	72	3.9015673	32	3.9048237	92	3.9080559	
53	3.8950356	13	3.8983412	73	3.9016218	33	3.9048778	93	3.9081095	
54	3.8950909	14	3.8983960	74	3.9016762	34	3.9049318	94	3.9081632	
55	3.8951462	15	3.8984509	75	3.9017307	35	3.9049859	95	3.9082169	
56	3.8952015	16	3.8985058	76	3.9017851	36	3.9050399	96	3.9082705	
57	3.8952567	17	3.8985606	77	3.9018396	37	3.9050940	97	3.9083241	
58	3.8953120	18	3.8986155	78	3.9018940	38	3.9051480	98	3.9083778	
59	3.8953673	19	3.8986703	79	3.9019485	39	3.9052020	99	3.9084314	

secũ da.	Gr. Mi. 2. 15.		Gr. Mi. 2. 16.		Gr. Mi. 2. 17.		Gr. Mi. 2. 18.		Gr. Mi. 2. 19.	
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	
8100	3.9084550	8160	3.9116902	8220	3.9148718	8280	3.9180303	8340	3.9211661	
1	3.9085386	61	3.9117434	21	3.9149246	81	3.9180828	41	3.9212181	
2	3.9086222	62	3.9117966	22	3.9149775	82	3.9181352	42	3.9212702	
3	3.9086458	63	3.9118498	23	3.9150303	83	3.9181877	43	3.9213222	
4	3.9086994	64	3.9119030	24	3.9150831	84	3.9182401	44	3.9213743	
5	3.9087530	65	3.9119562	25	3.9151359	85	3.9182925	45	3.9214263	
6	3.9088066	66	3.9120094	26	3.9151887	86	3.9183449	46	3.9214784	
7	3.9088602	67	3.9120625	27	3.9152415	87	3.9183973	47	3.9215304	
8	3.9089137	68	3.9121157	28	3.9152943	88	3.9184497	48	3.9215824	
9	3.9089673	69	3.9121689	29	3.9153471	89	3.9185021	49	3.9216345	
10	3.9090208	70	3.9122220	30	3.9153998	90	3.9185545	50	3.9216865	
11	3.9090744	71	3.9122752	31	3.9154526	91	3.9186069	51	3.9217385	
12	3.9091279	72	3.9123283	32	3.9155054	92	3.9186593	52	3.9217905	
13	3.9091815	73	3.9123815	33	3.9155581	93	3.9187117	53	3.9218425	
14	3.9092350	74	3.9124346	34	3.9156109	94	3.9187640	54	3.9218945	
15	3.9092885	75	3.9124878	35	3.9156636	95	3.9188164	55	3.9219465	
16	3.9093420	76	3.9125409	36	3.9157163	96	3.9188687	56	3.9219984	
17	3.9093955	77	3.9125940	37	3.9157691	97	3.9189211	57	3.9220504	
18	3.9094490	78	3.9126471	38	3.9158218	98	3.9189734	58	3.9221024	
19	3.9095025	79	3.9127002	39	3.9158745	99	3.9190258	59	3.9221543	
20	3.9095560	80	3.9127533	40	3.9159272	8300	3.9190781	60	3.9222063	
21	3.9096095	81	3.9128064	41	3.9159799	1	3.9191304	61	3.9222582	
22	3.9096630	82	3.9128595	42	3.9160326	2	3.9191827	62	3.9223102	
23	3.9097164	83	3.9129125	43	3.9160853	3	3.9192350	63	3.9223621	
24	3.9097699	84	3.9129656	44	3.9161380	4	3.9192873	64	3.9224140	
25	3.9098234	85	3.9130187	45	3.9161907	5	3.9193396	65	3.9224659	
26	3.9098768	86	3.9130717	46	3.9162433	6	3.9193919	66	3.9225179	
27	3.9099302	87	3.9131248	47	3.9162960	7	3.9194442	67	3.9225698	
28	3.9099837	88	3.9131778	48	3.9163487	8	3.9194965	68	3.9226217	
29	3.9100371	89	3.9132309	49	3.9164013	9	3.9195488	69	3.9226736	
30	3.9100905	90	3.9132839	50	3.9164539	10	3.9196010	70	3.9227255	
31	3.9101440	91	3.9133369	51	3.9165066	11	3.9196533	71	3.9227773	
32	3.9101974	92	3.9133899	52	3.9165592	12	3.9197055	72	3.9228292	
33	3.9102508	93	3.9134429	53	3.9166118	13	3.9197578	73	3.9228811	
34	3.9103042	94	3.9134959	54	3.9166645	14	3.9198100	74	3.9229330	
35	3.9103575	95	3.9135489	55	3.9167171	15	3.9198623	75	3.9229848	
36	3.9104109	96	3.9136019	56	3.9167697	16	3.9199145	76	3.9230367	
37	3.9104643	97	3.9136549	57	3.9168223	17	3.9199667	77	3.9230885	
38	3.9105177	98	3.9137079	58	3.9168749	18	3.9200189	78	3.9231404	
39	3.9105710	99	3.9137609	59	3.9169275	19	3.9200711	79	3.9231922	
40	3.9106244	8200	3.9138138	60	3.9169800	20	3.9201233	80	3.9232440	
41	3.9106777	1	3.9138668	61	3.9170326	21	3.9201755	81	3.9232958	
42	3.9107311	2	3.9139198	62	3.9170852	22	3.9202277	82	3.9233477	
43	3.9107844	3	3.9139727	63	3.9171377	23	3.9202799	83	3.9233995	
44	3.9108378	4	3.9140256	64	3.9171903	24	3.9203321	84	3.9234513	
45	3.9108911	5	3.9140786	65	3.9172428	25	3.9203842	85	3.9235031	
46	3.9109444	6	3.9141315	66	3.9172954	26	3.9204364	86	3.9235549	
47	3.9109977	7	3.9141844	67	3.9173479	27	3.9204886	87	3.9236066	
48	3.9110510	8	3.9142373	68	3.9174005	28	3.9205407	88	3.9236584	
49	3.9111043	9	3.9142902	69	3.9174530	29	3.9205929	89	3.9237102	
50	3.9111576	10	3.9143432	70	3.9175055	30	3.9206450	90	3.9237620	
51	3.9112109	11	3.9143960	71	3.9175580	31	3.9206971	91	3.9238137	
52	3.9112642	12	3.9144489	72	3.9176105	32	3.9207493	92	3.9238655	
53	3.9113174	13	3.9145018	73	3.9176630	33	3.9208014	93	3.9239172	
54	3.9113707	14	3.9145547	74	3.9177155	34	3.9208535	94	3.9239690	
55	3.9114240	15	3.9146076	75	3.9177680	35	3.9209056	95	3.9240207	
56	3.9114772	16	3.9146604	76	3.9178205	36	3.9209577	96	3.9240724	
57	3.9115305	17	3.9147133	77	3.9178729	37	3.9210098	97	3.9241242	
58	3.9115837	18	3.9147661	78	3.9179254	38	3.9210619	98	3.9241759	
59	3.9116369	19	3.9148190	79	3.9179779	39	3.9211140	99	3.9242276	

secũ da.	Gr. Mi. 2. 20.		Gr. Mi. 2. 21.		Gr. Mi. 2. 22.		Gr. Mi. 2. 23.		Gr. Mi. 2. 24.	
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	
8400	3.9242793	8460	3.9273704	8520	3.9304396	8580	3.9334873	8640	3.9365137	
1	3.9243310	61	3.9274217	21	3.9304906	81	3.9335379	41	3.9365640	
2	3.9243827	62	3.9274730	22	3.9305415	82	3.9335885	42	3.9366143	
3	3.9244344	63	3.9275243	23	3.9305925	83	3.9336391	43	3.9366645	
4	3.9244860	64	3.9275757	24	3.9306434	84	3.9336897	44	3.9367147	
5	3.9245377	65	3.9276270	25	3.9306944	85	3.9337403	45	3.9367650	
6	3.9245894	66	3.9276783	26	3.9307453	86	3.9337909	46	3.9368152	
7	3.9246410	67	3.9277296	27	3.9307963	87	3.9338415	47	3.9368654	
8	3.9246927	68	3.9277808	28	3.9308472	88	3.9338920	48	3.9369157	
9	3.9247444	69	3.9278321	29	3.9308981	89	3.9339426	49	3.9369659	
10	3.9247960	70	3.9278834	30	3.9309490	90	3.9339932	50	3.937 161	
11	3.9248476	71	3.9279347	31	3.9309999	91	3.9340437	51	3.937 663	
12	3.9248993	72	3.9279859	32	3.9310508	92	3.9340943	52	3.9371165	
13	3.9249509	73	3.9280372	33	3.9311017	93	3.9341448	53	3.9371667	
14	3.9250025	74	3.9280885	34	3.9311526	94	3.9341953	54	3.9372169	
15	3.9250541	75	3.9281397	35	3.9312035	95	3.9342459	55	3.9372671	
16	3.9251057	76	3.9281909	36	3.9312544	96	3.9342964	56	3.9373172	
17	3.9251573	77	3.9282422	37	3.9313053	97	3.9343469	57	3.9373674	
18	3.9252089	78	3.9282934	38	3.9313561	98	3.9343974	58	3.9374176	
19	3.9252605	79	3.9283446	39	3.9314070	99	3.9344479	59	3.9374677	
20	3.9253121	80	3.9283959	40	3.9314579	8600	3.9344984	60	3.9375179	
21	3.9253637	81	3.9284471	41	3.9315087	1	3.9345489	61	3.9375680	
22	3.9254152	82	3.9284983	42	3.9315596	2	3.9345994	62	3.9376182	
23	3.9254668	83	3.9285495	43	3.9316104	3	3.9346499	63	3.9376683	
24	3.9255184	84	3.9286007	44	3.9316612	4	3.9347004	64	3.9377184	
25	3.9255699	85	3.9286518	45	3.9317121	5	3.9347509	65	3.9377686	
26	3.9256215	86	3.9287030	46	3.9317629	6	3.9348013	66	3.9378187	
27	3.9256730	87	3.9287542	47	3.9318137	7	3.9348518	67	3.9378683	
28	3.9257245	88	3.9288054	48	3.9318645	8	3.9349022	68	3.9379189	
29	3.9257761	89	3.9288565	49	3.9319153	9	3.9349527	69	3.9379690	
30	3.9258276	90	3.9289077	50	3.9319661	10	3.9350031	70	3.9380191	
31	3.9258791	91	3.9289588	51	3.9320169	11	3.9350536	71	3.9380692	
32	3.9259306	92	3.9290100	52	3.9320677	12	3.9351041	72	3.9381193	
33	3.9259821	93	3.9290611	53	3.9321185	13	3.9351544	73	3.9381693	
34	3.9260336	94	3.9291123	54	3.9321692	14	3.9352049	74	3.9382194	
35	3.9260851	95	3.9291634	55	3.9322200	15	3.9352553	75	3.9382695	
36	3.9261366	96	3.9292145	56	3.9322708	16	3.9353057	76	3.9383195	
37	3.9261880	97	3.9292656	57	3.9323215	17	3.9353561	77	3.9383696	
38	3.9262395	98	3.9293167	58	3.9323723	18	3.9354066	78	3.9384196	
39	3.9262910	99	3.9293678	59	3.9324230	19	3.9354569	79	3.9384697	
40	3.9263424	8500	3.9294189	60	3.9324738	20	3.9355073	80	3.9385197	
41	3.9263939	1	3.9294700	61	3.9325245	21	3.9355576	81	3.9385697	
42	3.9264453	2	3.9295211	62	3.9325752	22	3.9356080	82	3.9386198	
43	3.9264968	3	3.9295722	63	3.9326259	23	3.9356583	83	3.9386698	
44	3.9265482	4	3.9296232	64	3.9326766	24	3.9357087	84	3.9387198	
45	3.9265997	5	3.9296743	65	3.9327274	25	3.9357591	85	3.9387698	
46	3.9266511	6	3.9297254	66	3.9327781	26	3.9358094	86	3.9388198	
47	3.9267025	7	3.9297764	67	3.9328288	27	3.9358598	87	3.9388698	
48	3.9267539	8	3.9298275	68	3.9328794	28	3.9359101	88	3.9389198	
49	3.9268053	9	3.9298785	69	3.9329301	29	3.9359605	89	3.9389698	
50	3.9268567	10	3.9299296	70	3.9329808	30	3.9360108	90	3.9390198	
51	3.9269081	11	3.9299806	71	3.9330315	31	3.9360611	91	3.9390697	
52	3.9269595	12	3.9300316	72	3.9330822	32	3.9361114	92	3.9391197	
53	3.9270109	13	3.9300826	73	3.9331328	33	3.9361617	93	3.9391697	
54	3.9270622	14	3.9301336	74	3.9331835	34	3.9362120	94	3.9392196	
55	3.9271136	15	3.9301846	75	3.9332342	35	3.9362623	95	3.9392696	
56	3.9271650	16	3.9302356	76	3.9332848	36	3.9363126	96	3.9393195	
57	3.9272163	17	3.9302866	77	3.9333354	37	3.9363629	97	3.9393695	
58	3.9272677	18	3.9303376	78	3.9333860	38	3.9364132	98	3.9394194	
59	3.9273190	19	3.9303886	79	3.9334367	39	3.9364635	99	3.9394693	

Secũda.	Gr. Mi. 2. 25.		Gr. Mi. 2. 26.		Gr. Mi. 2. 27.		Gr. Mi. 2. 28.		Gr. Mi. 2. 29.	
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	
8700	3.9395192	8760	3.9425041	8820	3.9454686	8880	3.9484130	8940	3.9513375	
1	3.9395692	61	3.9425537	21	3.9455178	81	3.9484619	41	3.9513861	
2	3.9396191	62	3.9426032	22	3.9455670	82	3.9485108	42	3.9514347	
3	3.9396690	63	3.9426528	23	3.9456163	83	3.9485597	43	3.9514832	
4	3.9397189	64	3.9427024	24	3.9456655	84	3.9486085	44	3.9515318	
5	3.9397688	65	3.9427518	25	3.9457147	85	3.9486574	45	3.9515803	
6	3.9398187	66	3.9428015	26	3.9457639	86	3.9487063	46	3.9516289	
7	3.9398685	67	3.9428510	27	3.9458131	87	3.9487552	47	3.9516774	
8	3.9399184	68	3.9429005	28	3.9458623	88	3.9488040	48	3.9517260	
9	3.9399683	69	3.9429501	29	3.9459115	89	3.9488529	49	3.9517745	
10	3.9400182	70	3.9429996	30	3.9459607	90	3.9489018	50	3.9518230	
11	3.9400680	71	3.9430491	31	3.9460099	91	3.9489506	51	3.9518716	
12	3.9401179	72	3.9430986	32	3.9460591	92	3.9489994	52	3.9519201	
13	3.9401677	73	3.9431481	33	3.9461082	93	3.9490483	53	3.9519686	
14	3.9402176	74	3.9431976	34	3.9461574	94	3.9490971	54	3.9520171	
15	3.9402674	75	3.9432471	35	3.9462065	95	3.9491459	55	3.9520656	
16	3.9403172	76	3.9432966	36	3.9462557	96	3.9491948	56	3.9521141	
17	3.9403670	77	3.9433461	37	3.9463048	97	3.9492436	57	3.9521626	
18	3.9404169	78	3.9433956	38	3.9463540	98	3.9492924	58	3.9522111	
19	3.9404667	79	3.9434450	39	3.9464031	99	3.9493412	59	3.9522595	
20	3.9405165	80	3.9434945	40	3.9464523	8900	3.9493900	60	3.9523080	
21	3.9405663	81	3.9435440	41	3.9465014	1	3.9494388	61	3.9523565	
22	3.9406161	82	3.9435934	42	3.9465505	2	3.9494876	62	3.9524049	
23	3.9406659	83	3.9436429	43	3.9465996	3	3.9495364	63	3.9524534	
24	3.9407157	84	3.9436923	44	3.9466487	4	3.9495852	64	3.9525018	
25	3.9407654	85	3.9437418	45	3.9466978	5	3.9496339	65	3.9525503	
26	3.9408152	86	3.9437912	46	3.9467469	6	3.9496827	66	3.9525987	
27	3.9408650	87	3.9438406	47	3.9467960	7	3.9497315	67	3.9526472	
28	3.9409147	88	3.9438900	48	3.9468451	8	3.9497802	68	3.9526956	
29	3.9409645	89	3.9439395	49	3.9468942	9	3.9498290	69	3.9527440	
30	3.9410142	90	3.9439889	50	3.9469433	10	3.9498777	70	3.9527924	
31	3.9410640	91	3.9440383	51	3.9469923	11	3.9499264	71	3.9528409	
32	3.9411137	92	3.9440877	52	3.9470414	12	3.9499752	72	3.9528893	
33	3.9411635	93	3.9441371	53	3.9470905	13	3.9500239	73	3.9529377	
34	3.9412132	94	3.9441865	54	3.9471395	14	3.9500726	74	3.9529861	
35	3.9412629	95	3.9442358	55	3.9471886	15	3.9501213	75	3.9530345	
36	3.9413126	96	3.9442852	56	3.9472376	16	3.9501701	76	3.9530828	
37	3.9413623	97	3.9443346	57	3.9472866	17	3.9502188	77	3.9531312	
38	3.9414120	98	3.9443840	58	3.9473357	18	3.9502675	78	3.9531796	
39	3.9414617	99	3.9444333	59	3.9473847	19	3.9503162	79	3.9532280	
40	3.9415114	8800	3.9444827	60	3.9474337	20	3.9503649	80	3.9532763	
41	3.9415611	1	3.9445320	61	3.9474827	21	3.9504135	81	3.9533247	
42	3.9416108	2	3.9445814	62	3.9475317	22	3.9504622	82	3.9533730	
43	3.9416605	3	3.9446307	63	3.9475807	23	3.9505109	83	3.9534214	
44	3.9417101	4	3.9446800	64	3.9476297	24	3.9505596	84	3.9534697	
45	3.9417598	5	3.9447294	65	3.9476787	25	3.9506082	85	3.9535181	
46	3.9418095	6	3.9447787	66	3.9477277	26	3.9506569	86	3.9535664	
47	3.9418591	7	3.9448280	67	3.9477767	27	3.9507055	87	3.9536147	
48	3.9419088	8	3.9448773	68	3.9478257	28	3.9507542	88	3.9536631	
49	3.9419584	9	3.9449266	69	3.9478746	29	3.9508028	89	3.9537114	
50	3.9420081	10	3.9449759	70	3.9479236	30	3.9508515	90	3.9537597	
51	3.9420577	11	3.9450252	71	3.9479726	31	3.9509001	91	3.9538080	
52	3.9421073	12	3.9450745	72	3.9480215	32	3.9509487	92	3.9538563	
53	3.9421569	13	3.9451238	73	3.9480705	33	3.9509973	93	3.9539046	
54	3.9422065	14	3.9451730	74	3.9481194	34	3.9510459	94	3.9539529	
55	3.9422561	15	3.9452223	75	3.9481684	35	3.9510946	95	3.9540012	
56	3.9423058	16	3.9452716	76	3.9482173	36	3.9511432	96	3.9540494	
57	3.9423553	17	3.9453208	77	3.9482662	37	3.9511918	97	3.9540977	
58	3.9424049	18	3.9453701	78	3.9483151	38	3.9512404	98	3.9541460	
59	3.9424545	19	3.9454193	79	3.9483640	39	3.9512889	99	3.9541943	

Secũda.	Gr. Mi. 2. 30.		Gr. Mi. 2. 31.		Gr. Mi. 2. 32.		Gr. Mi. 2. 33.		Gr. Mi. 2. 34.	
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	
9000	3.9542425	9060	3.9571282	9120	3.9599948	9180	3.9628427	9240	3.9656720	
1	3.9542908	61	3.9571761	21	3.9600424	81	3.9628900	41	3.9657190	
2	3.9543390	62	3.9572241	22	3.9600901	82	3.9629373	42	3.9657660	
3	3.9543872	63	3.9572720	23	3.9601377	83	3.9629846	43	3.9658129	
4	3.9544355	64	3.9573199	24	3.9601853	84	3.9630319	44	3.9658599	
5	3.9544837	65	3.9573678	25	3.9602329	85	3.9630792	45	3.9659069	
6	3.9545319	66	3.9574157	26	3.9602805	86	3.9631264	46	3.9659539	
7	3.9545802	67	3.9574636	27	3.9603280	87	3.9631737	47	3.9660008	
8	3.9546284	68	3.9575115	28	3.9603756	88	3.9632210	48	3.9660478	
9	3.9546766	69	3.9575594	29	3.9604232	89	3.9632682	49	3.9660948	
10	3.9547248	70	3.9576073	30	3.9604708	90	3.9633155	50	3.9661417	
11	3.9547730	71	3.9576552	31	3.9605183	91	3.9633628	51	3.9661887	
12	3.9548212	72	3.9577030	32	3.9605659	92	3.9634100	52	3.9662356	
13	3.9548694	73	3.9577509	33	3.9606134	93	3.9634573	53	3.9662826	
14	3.9549176	74	3.9577988	34	3.9606610	94	3.9635045	54	3.9663295	
15	3.9549657	75	3.9578466	35	3.9607085	95	3.9635517	55	3.9663764	
16	3.9550139	76	3.9578945	36	3.9607561	96	3.9635990	56	3.9664233	
17	3.9550621	77	3.9579423	37	3.9608036	97	3.9636462	57	3.9664702	
18	3.9551102	78	3.9579902	38	3.9608511	98	3.9636934	58	3.9665172	
19	3.9551584	79	3.9580380	39	3.9608987	99	3.9637406	59	3.9665641	
20	3.9552065	80	3.9580858	40	3.9609462	9200	3.9637878	60	3.9666110	
21	3.9552547	81	3.9581337	41	3.9609937	1	3.9638350	61	3.9666579	
22	3.9553028	82	3.9581815	42	3.9610412	2	3.9638822	62	3.9667048	
23	3.9553510	83	3.9582293	43	3.9610887	3	3.9639294	63	3.9667517	
24	3.9553991	84	3.9582771	44	3.9611362	4	3.9639766	64	3.9667985	
25	3.9554472	85	3.9583249	45	3.9611837	5	3.9640238	65	3.9668454	
26	3.9554953	86	3.9583727	46	3.9612312	6	3.9640710	66	3.9668923	
27	3.9555434	87	3.9584205	47	3.9612787	7	3.9641181	67	3.9669392	
28	3.9555915	88	3.9584683	48	3.9613261	8	3.9641653	68	3.9669860	
29	3.9556397	89	3.9585161	49	3.9613736	9	3.9642125	69	3.9670329	
30	3.9556877	90	3.9585639	50	3.9614211	10	3.9642596	70	3.9670797	
31	3.9557358	91	3.9586117	51	3.9614685	11	3.9643068	71	3.9671266	
32	3.9557839	92	3.9586594	52	3.9615160	12	3.9643539	72	3.9671734	
33	3.9558320	93	3.9587072	53	3.9615635	13	3.9644011	73	3.9672202	
34	3.9558801	94	3.9587549	54	3.9616109	14	3.9644482	74	3.9672671	
35	3.9559282	95	3.9588027	55	3.9616583	15	3.9644953	75	3.9673139	
36	3.9559762	96	3.9588505	56	3.9617058	16	3.9645425	76	3.9673607	
37	3.9560243	97	3.9588982	57	3.9617532	17	3.9645896	77	3.9674075	
38	3.9560723	98	3.9589459	58	3.9618006	18	3.9646367	78	3.9674544	
39	3.9561204	99	3.9589937	59	3.9618480	19	3.9646838	79	3.9675012	
40	3.9561684	9100	3.9590414	60	3.9618953	20	3.9647309	80	3.9675480	
41	3.9562165	1	3.9590891	61	3.9619429	21	3.9647780	81	3.9675948	
42	3.9562645	2	3.9591368	62	3.9619903	22	3.9648251	82	3.9676416	
43	3.9563125	3	3.9591845	63	3.9620377	23	3.9648722	83	3.9676883	
44	3.9563606	4	3.9592322	64	3.9620851	24	3.9649193	84	3.9677351	
45	3.9564086	5	3.9592799	65	3.9621325	25	3.9649664	85	3.9677819	
46	3.9564566	6	3.9593276	66	3.9621798	26	3.9650134	86	3.9678287	
47	3.9565046	7	3.9593753	67	3.9622272	27	3.9650605	87	3.9678754	
48	3.9565526	8	3.9594230	68	3.9622746	28	3.9651076	88	3.9679222	
49	3.9566006	9	3.9594707	69	3.9623220	29	3.9651546	89	3.9679690	
50	3.9566486	10	3.9595184	70	3.9623693	30	3.9652017	90	3.9680157	
51	3.9566966	11	3.9595660	71	3.9624167	31	3.9652487	91	3.9680625	
52	3.9567445	12	3.9596137	72	3.9624640	32	3.9652958	92	3.9681092	
53	3.9567925	13	3.9596614	73	3.9625114	33	3.9653428	93	3.9681559	
54	3.9568405	14	3.9597090	74	3.9625587	34	3.9653899	94	3.9682027	
55	3.9568885	15	3.9597567	75	3.9626061	35	3.9654369	95	3.9682494	
56	3.9569364	16	3.9598043	76	3.9626534	36	3.9654839	96	3.9682962	
57	3.9569844	17	3.9598519	77	3.9627007	37	3.9655309	97	3.9683428	
58	3.9570323	18	3.9598996	78	3.9627480	38	3.9655779	98	3.9683895	
59	3.9570803	19	3.9599472	79	3.9627954	39	3.9656250	99	3.9684362	

secũda.	Gr. Mi. 2. 35.		Gr. Mi. 2. 36.		Gr. Mi. 2. 37.		Gr. Mi. 2. 38.		Gr. Mi. 2. 39.	
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu	Logarith.	Nu.	Logarith.	
9300	3.9684829	9360	3.9712758	9420	3.9740509	9480	3.9768083	9540	3.9795484	
1	3.9685296	61	3.9713222	21	3.9740970	81	3.9768541	41	3.9795939	
2	3.9685763	62	3.9713686	22	3.9741431	82	3.9768999	42	3.9796394	
3	3.9686230	63	3.9714150	23	3.9741892	83	3.9769457	43	3.9796849	
4	3.9686697	64	3.9714614	24	3.9742353	84	3.9769915	44	3.9797304	
5	3.9687164	65	3.9715078	25	3.9742814	85	3.9770373	45	3.9797759	
6	3.9687631	66	3.9715542	26	3.9743274	86	3.9770831	46	3.9798214	
7	3.9688097	67	3.9716005	27	3.9743735	87	3.9771289	47	3.9798669	
8	3.9688564	68	3.9716469	28	3.9744196	88	3.9771747	48	3.9799124	
9	3.9689030	69	3.9716932	29	3.9744656	89	3.9772204	49	3.9799579	
10	3.9689497	70	3.9717396	30	3.9745117	90	3.9772662	50	3.9800034	
11	3.9689963	71	3.9717859	31	3.9745577	91	3.9773120	51	3.9800488	
12	3.9690430	72	3.9718323	32	3.9746038	92	3.9773577	52	3.9800943	
13	3.9690896	73	3.9718786	33	3.9746498	93	3.9774035	53	3.9801398	
14	3.9691362	74	3.9719249	34	3.9746959	94	3.9774492	54	3.9801852	
15	3.9691829	75	3.9719713	35	3.9747419	95	3.9774950	55	3.9802307	
16	3.9692295	76	3.9720176	36	3.9747879	96	3.9775407	56	3.9802761	
17	3.9692761	77	3.9720639	37	3.9748340	97	3.9775864	57	3.9803216	
18	3.9693227	78	3.9721102	38	3.9748800	98	3.9776322	58	3.9803670	
19	3.9693693	79	3.9721565	39	3.9749260	99	3.9776779	59	3.9804125	
20	3.9694159	80	3.9722028	40	3.9749720	9500	3.9777236	60	3.9804579	
21	3.9694625	81	3.9722491	41	3.9750180	1	3.9777693	61	3.9805033	
22	3.9695091	82	3.9722954	42	3.9750640	2	3.9778150	62	3.9805487	
23	3.9695557	83	3.9723417	43	3.9751100	3	3.9778607	63	3.9805941	
24	3.9696023	84	3.9723880	44	3.9751560	4	3.9779064	64	3.9806396	
25	3.9696488	85	3.9724343	45	3.9752020	5	3.9779521	65	3.9806850	
26	3.9696954	86	3.9724805	46	3.9752479	6	3.9779978	66	3.9807304	
27	3.9697420	87	3.9725268	47	3.9752939	7	3.9780435	67	3.9807758	
28	3.9697885	88	3.9725731	48	3.9753399	8	3.9780892	68	3.9808212	
29	3.9698351	89	3.9726193	49	3.9753858	9	3.9781348	69	3.9808665	
30	3.9698816	90	3.9726656	50	3.9754318	10	3.9781805	70	3.9809119	
31	3.9699282	91	3.9727118	51	3.9754778	11	3.9782262	71	3.9809573	
32	3.9699747	92	3.9727581	52	3.9755237	12	3.9782718	72	3.9810027	
33	3.9700213	93	3.9728043	53	3.9755697	13	3.9783175	73	3.9810480	
34	3.9700678	94	3.9728506	54	3.9756156	14	3.9783631	74	3.9810934	
35	3.9701142	95	3.9728968	55	3.9756615	15	3.9784088	75	3.9811388	
36	3.9701608	96	3.9729430	56	3.9757075	16	3.9784544	76	3.9811841	
37	3.9702074	97	3.9729892	57	3.9757534	17	3.9785001	77	3.9812295	
38	3.9702539	98	3.9730354	58	3.9757993	18	3.9785457	78	3.9812748	
39	3.9703004	99	3.9730816	59	3.9758452	19	3.9785913	79	3.9813202	
40	3.9703469	9400	3.9731279	60	3.9758911	20	3.9786369	80	3.9813655	
41	3.9703934	1	3.9731741	61	3.9759370	21	3.9786826	81	3.9814108	
42	3.9704399	2	3.9732202	62	3.9759829	22	3.9787282	82	3.9814562	
43	3.9704863	3	3.9732664	63	3.9760288	23	3.9787738	83	3.9815015	
44	3.9705328	4	3.9733126	64	3.9760747	24	3.9788194	84	3.9815468	
45	3.9705793	5	3.9733588	65	3.9761206	25	3.9788650	85	3.9815921	
46	3.9706257	6	3.9734050	66	3.9761665	26	3.9789106	86	3.9816374	
47	3.9706722	7	3.9734511	67	3.9762124	27	3.9789562	87	3.9816827	
48	3.9707187	8	3.9734973	68	3.9762584	28	3.9790017	88	3.9817280	
49	3.9707652	9	3.9735435	69	3.9763041	29	3.9790473	89	3.9817733	
50	3.9708116	10	3.9735896	70	3.9763500	30	3.9790929	90	3.9818186	
51	3.9708581	11	3.9736358	71	3.9763958	31	3.9791385	91	3.9818639	
52	3.9709045	12	3.9736819	72	3.9764417	32	3.9791840	92	3.9819092	
53	3.9709509	13	3.9737281	73	3.9764875	33	3.9792296	93	3.9819544	
54	3.9709973	14	3.9737742	74	3.9765334	34	3.9792751	94	3.9819997	
55	3.9710438	15	3.9738203	75	3.9765792	35	3.9793207	95	3.9820450	
56	3.9710902	16	3.9738664	76	3.9766251	36	3.9793662	96	3.9820902	
57	3.9711366	17	3.9739126	77	3.9766709	37	3.9794118	97	3.9821355	
58	3.9711830	18	3.9739587	78	3.9767167	38	3.9794573	98	3.9821807	
59	3.9712294	19	3.9740048	79	3.9767625	39	3.9795028	99	3.9822260	

secũda.	Gr. Mi. 2. 40.		Gr. Mi. 2. 41.		Gr. Mi. 2. 42.		Gr. Mi. 2. 43.		Gr. Mi. 2. 44.	
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	
9600	3.9822712	9660	3.9849771	9720	3.9876663	9780	3.9903389	9840	3.9929951	
1	3.9823165	61	3.9850221	21	3.9877109	81	3.9903833	41	3.9930392	
2	3.9823617	62	3.9850670	22	3.9877556	82	3.9904277	42	3.9930834	
3	3.9824069	63	3.9851120	23	3.9878003	83	3.9904721	43	3.9931275	
4	3.9824521	64	3.9851569	24	3.9878449	84	3.9905164	44	3.9931716	
5	3.9824974	65	3.9852018	25	3.9878896	85	3.9905608	45	3.9932157	
6	3.9825426	66	3.9852468	26	3.9879343	86	3.9906052	46	3.9932598	
7	3.9825878	67	3.9852917	27	3.9879789	87	3.9906496	47	3.9933039	
8	3.9826330	68	3.9853366	28	3.9880236	88	3.9906940	48	3.9933480	
9	3.9826782	69	3.9853816	29	3.9880682	89	3.9907383	49	3.9933921	
10	3.9827234	70	3.9854265	30	3.9881128	90	3.9907827	50	3.9934362	
11	3.9827686	71	3.9854714	31	3.9881575	91	3.9908270	51	3.9934803	
12	3.9828138	72	3.9855163	32	3.9882021	92	3.9908714	52	3.9935244	
13	3.9828589	73	3.9855612	33	3.9882467	93	3.9909158	53	3.9935685	
14	3.9829041	74	3.9856061	34	3.9882913	94	3.9909601	54	3.9936126	
15	3.9829493	75	3.9856510	35	3.9883360	95	3.9910044	55	3.9936566	
16	3.9829944	76	3.9856958	36	3.9883806	96	3.9910488	56	3.9937007	
17	3.9830396	77	3.9857407	37	3.9884252	97	3.9910931	57	3.9937448	
18	3.9830848	78	3.9857856	38	3.9884698	98	3.9911374	58	3.9937888	
19	3.9831299	79	3.9858305	39	3.9885144	99	3.9911818	59	3.9938329	
20	3.9831751	80	3.9858753	40	3.9885590	9800	3.9912261	60	3.9938769	
21	3.9832202	81	3.9859202	41	3.9886035	1	3.9912704	61	3.9939210	
22	3.9832653	82	3.9859651	42	3.9886481	2	3.9913147	62	3.9939650	
23	3.9833105	83	3.9860099	43	3.9886927	3	3.9913590	63	3.9940090	
24	3.9833556	84	3.9860548	44	3.9887373	4	3.9914033	64	3.9940531	
25	3.9834007	85	3.9860996	45	3.9887818	5	3.9914476	65	3.9940971	
26	3.9834458	86	3.9861445	46	3.9888264	6	3.9914919	66	3.9941411	
27	3.9834910	87	3.9861893	47	3.9888710	7	3.9915362	67	3.9941851	
28	3.9835361	88	3.9862341	48	3.9889155	8	3.9915805	68	3.9942291	
29	3.9835812	89	3.9862789	49	3.9889601	9	3.9916247	69	3.9942731	
30	3.9836263	90	3.9863238	50	3.9890046	10	3.9916690	70	3.9943172	
31	3.9836714	91	3.9863686	51	3.9890492	11	3.9917133	71	3.9943612	
32	3.9837165	92	3.9864134	52	3.9890937	12	3.9917575	72	3.9944051	
33	3.9837616	93	3.9864582	53	3.9891382	13	3.9918018	73	3.9944491	
34	3.9838066	94	3.9865030	54	3.9891828	14	3.9918461	74	3.9944931	
35	3.9838517	95	3.9865478	55	3.9892273	15	3.9918903	75	3.9945371	
36	3.9838968	96	3.9865926	56	3.9892718	16	3.9919345	76	3.9945811	
37	3.9839418	97	3.9866374	57	3.9893163	17	3.9919788	77	3.9946251	
38	3.9839869	98	3.9866822	58	3.9893608	18	3.9920230	78	3.9946690	
39	3.9840320	99	3.9867269	59	3.9894053	19	3.9920673	79	3.9947130	
40	3.9840770	9700	3.9867717	60	3.9894498	20	3.9921115	80	3.9947569	
41	3.9841221	1	3.9868165	61	3.9894943	21	3.9921557	81	3.9948009	
42	3.9841671	2	3.9868613	62	3.9895388	22	3.9921999	82	3.9948448	
43	3.9842122	3	3.9869060	63	3.9895833	23	3.9922441	83	3.9948888	
44	3.9842572	4	3.9869508	64	3.9896278	24	3.9922884	84	3.9949327	
45	3.9843022	5	3.9869955	65	3.9896722	25	3.9923326	85	3.9949767	
46	3.9843472	6	3.9870403	66	3.9897167	26	3.9923768	86	3.9950206	
47	3.9843923	7	3.9870850	67	3.9897612	27	3.9924210	87	3.9950645	
48	3.9844373	8	3.9871298	68	3.9898056	28	3.9924651	88	3.9951085	
49	3.9844823	9	3.9871745	69	3.9898501	29	3.9925093	89	3.9951524	
50	3.9845273	10	3.9872192	70	3.9898946	30	3.9925535	90	3.9951963	
51	3.9845723	11	3.9872640	71	3.9899390	31	3.9925977	91	3.9952402	
52	3.9846173	12	3.9873087	72	3.9899835	32	3.9926419	92	3.9952841	
53	3.9846623	13	3.9873534	73	3.9900279	33	3.9926860	93	3.9953280	
54	3.9847073	14	3.9873981	74	3.9900723	34	3.9927302	94	3.9953719	
55	3.9847523	15	3.9874428	75	3.9901168	35	3.9927744	95	3.9954158	
56	3.9847972	16	3.9874875	76	3.9901612	36	3.9928185	96	3.9954597	
57	3.9848422	17	3.9875322	77	3.9902056	37	3.9928627	97	3.9955036	
58	3.9848872	18	3.9875769	78	3.9902500	38	3.9929068	98	3.9955474	
59	3.9849322	19	3.9876216	79	3.9902944	39	3.9929510	99	3.9955913	

secũ da.	Gr. Mi. 2. 45.		Gr. Mi. 2. 46		Gr. Mi. 2. 47.		Gr. Mi. 2. 48.		Gr. Mi. 2. 49.	
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	
9900	3.9956352	9960	3.9982593	10020	4.0008677	10080	4.0034605	10140	4.0060379	
1	3.9956791	61	3.9983029	21	4.0009110	81	4.0035036	41	4.0060807	
2	3.9957229	62	3.9983465	22	4.0009543	82	4.0035466	42	4.0061236	
3	3.9957668	63	3.9983901	23	4.0009977	83	4.0035897	43	4.0061664	
4	3.9958106	64	3.9984337	24	4.0010410	84	4.0036328	44	4.0062092	
5	3.9958545	65	3.9984773	25	4.0010843	85	4.0036759	45	4.0062520	
6	3.9958983	66	3.9985209	26	4.0011277	86	4.0037189	46	4.0062948	
7	3.9959422	67	3.9985644	27	4.0011710	87	4.0037620	47	4.0063376	
8	3.9959860	68	3.9986080	28	4.0012143	88	4.0038050	48	4.0063804	
9	3.9960298	69	3.9986516	29	4.0012576	89	4.0038481	49	4.0064232	
10	3.9960736	70	3.9986951	30	4.0013009	90	4.0038911	50	4.0064660	
11	3.9961175	71	3.9987387	31	4.0013442	91	4.0039342	51	4.0065088	
12	3.9961613	72	3.9987823	32	4.0013875	92	4.0039772	52	4.0065516	
13	3.9962051	73	3.9988258	33	4.0014308	93	4.0040202	53	4.0065943	
14	3.9962489	74	3.9988694	34	4.0014740	94	4.0040633	54	4.0066371	
15	3.9962927	75	3.9989129	35	4.0015173	95	4.0041063	55	4.0066799	
16	3.9963365	76	3.9989564	36	4.0015606	96	4.0041493	56	4.0067226	
17	3.9963803	77	3.9990000	37	4.0016039	97	4.0041923	57	4.0067654	
18	3.9964241	78	3.9990435	38	4.0016471	98	4.0042353	58	4.0068082	
19	3.9964679	79	3.9990870	39	4.0016904	99	4.0042783	59	4.0068509	
20	3.9965117	80	3.9991305	40	4.0017337	10100	4.0043213	60	4.0068937	
21	3.9965554	81	3.9991740	41	4.0017769	1	4.0043643	61	4.0069364	
22	3.9965992	82	3.9992176	42	4.0018202	2	4.0044073	62	4.0069792	
23	3.9966430	83	3.9992611	43	4.0018634	3	4.0044503	63	4.0070219	
24	3.9966867	84	3.9993046	44	4.0019067	4	4.0044933	64	4.0070646	
25	3.9967305	85	3.9993481	45	4.0019499	5	4.0045363	65	4.0071073	
26	3.9967743	86	3.9993916	46	4.0019931	6	4.0045792	66	4.0071501	
27	3.9968180	87	3.9994350	47	4.0020364	7	4.0046222	67	4.0071928	
28	3.9968618	88	3.9994785	48	4.0020796	8	4.0046652	68	4.0072355	
29	3.9969055	89	3.9995220	49	4.0021228	9	4.0047081	69	4.0072782	
30	3.9969492	90	3.9995655	50	4.0021660	10	4.0047511	70	4.0073209	
31	3.9969930	91	3.9996089	51	4.0022092	11	4.0047941	71	4.0073636	
32	3.9970367	92	3.9996524	52	4.0022524	12	4.0048370	72	4.0074063	
33	3.9970804	93	3.9996959	53	4.0022956	13	4.0048800	73	4.0074490	
34	3.9971241	94	3.9997393	54	4.0023388	14	4.0049229	74	4.0074917	
35	3.9971679	95	3.9997828	55	4.0023820	15	4.0049658	75	4.0075344	
36	3.9972116	96	3.9998262	56	4.0024252	16	4.0050088	76	4.0075770	
37	3.9972553	97	3.9998697	57	4.0024684	17	4.0050517	77	4.0076197	
38	3.9972990	98	3.9999131	58	4.0025116	18	4.0050946	78	4.0076624	
39	3.9973427	99	3.9999566	59	4.0025548	19	4.0051375	79	4.0077051	
40	3.9973864	10000	4.0000000	60	4.0025979	20	4.0051805	80	4.0077477	
41	3.9974301	1	4.0000434	61	4.0026411	21	4.0052234	81	4.0077904	
42	3.9974737	2	4.0000868	62	4.0026843	22	4.0052663	82	4.0078330	
43	3.9975174	3	4.0001302	63	4.0027274	23	4.0053092	83	4.0078757	
44	3.9975611	4	4.0001736	64	4.0027706	24	4.0053521	84	4.0079183	
45	3.9976048	5	4.0002170	65	4.0028137	25	4.0053950	85	4.0079610	
46	3.9976484	6	4.0002604	66	4.0028569	26	4.0054379	86	4.0080036	
47	3.9976921	7	4.0003038	67	4.0029000	27	4.0054808	87	4.0080463	
48	3.9977358	8	4.0003472	68	4.0029432	28	4.0055236	88	4.0080889	
49	3.9977794	9	4.0003906	69	4.0029863	29	4.0055665	89	4.0081315	
50	3.9978231	10	4.0004340	70	4.0030294	30	4.0056094	90	4.0081741	
51	3.9978667	11	4.0004774	71	4.0030725	31	4.0056523	91	4.0082168	
52	3.9979104	12	4.0005208	72	4.0031157	32	4.0056951	92	4.0082594	
53	3.9979540	13	4.0005642	73	4.0031588	33	4.0057380	93	4.0083020	
54	3.9979976	14	4.0006075	74	4.0032019	34	4.0057809	94	4.0083446	
55	3.9980413	15	4.0006509	75	4.0032450	35	4.0058237	95	4.0083872	
56	3.9980849	16	4.0006943	76	4.0032881	36	4.0058666	96	4.0084298	
57	3.9981285	17	4.0007376	77	4.0033312	37	4.0059094	97	4.0084724	
58	3.9981721	18	4.0007810	78	4.0033743	38	4.0059522	98	4.0085150	
59	3.9982157	19	4.0008243	79	4.0034174	39	4.0059951	99	4.0085575	

secũ da.	Gr. Mi. 2. 50.		Gr. Mi. 2. 51.		Gr. Mi. 2. 52.		Gr. Mi. 2. 53.		Gr. Mi. 2. 54.	
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	
10200	4.0086001	10260	4.0111473	10320	4.0136796	10380	4.0161973	10440	4.0187004	
1	4.0086427	61	4.0111896	21	4.0137217	81	4.0162391	41	4.0187420	
2	4.0086853	62	4.0112320	22	4.0137638	82	4.0162810	42	4.0187836	
3	4.0087278	63	4.0112743	23	4.0138059	83	4.0163228	43	4.0188252	
4	4.0087704	64	4.0113166	24	4.0138479	84	4.0163646	44	4.0188668	
5	4.0088130	65	4.0113589	25	4.0138900	85	4.0164065	45	4.0189084	
6	4.0088555	66	4.0114012	26	4.0139321	86	4.0164483	46	4.0189500	
7	4.0088981	67	4.0114435	27	4.0139741	87	4.0164901	47	4.0189915	
8	4.0089406	68	4.0114858	28	4.0140162	88	4.0165319	48	4.0190331	
9	4.0089832	69	4.0115281	29	4.0140582	89	4.0165737	49	4.0190747	
10	4.0090257	70	4.0115704	30	4.0141003	90	4.0166155	50	4.0191162	
11	4.0090682	71	4.0116127	31	4.0141423	91	4.0166573	51	4.0191578	
12	4.0091108	72	4.0116550	32	4.0141843	92	4.0166991	52	4.0191994	
13	4.0091533	73	4.0116972	33	4.0142264	93	4.0167409	53	4.0192409	
14	4.0091958	74	4.0117395	34	4.0142684	94	4.0167827	54	4.0192824	
15	4.0092383	75	4.0117818	35	4.0143104	95	4.0168244	55	4.0193240	
16	4.0092808	76	4.0118240	36	4.0143525	96	4.0168662	56	4.0193655	
17	4.0093233	77	4.0118663	37	4.0143945	97	4.0169080	57	4.0194071	
18	4.0093658	78	4.0119086	38	4.0144365	98	4.0169498	58	4.0194486	
19	4.0094083	79	4.0119508	39	4.0144785	99	4.0169915	59	4.0194901	
20	4.0094508	80	4.0119931	40	4.0145205	10400	4.0170333	60	4.0195316	
21	4.0094933	81	4.0120353	41	4.0145625	1	4.0170750	61	4.0195732	
22	4.0095358	82	4.0120775	42	4.0146045	2	4.0171168	62	4.0196147	
23	4.0095783	83	4.0121198	43	4.0146465	3	4.0171585	63	4.0196562	
24	4.0096208	84	4.0121620	44	4.0146885	4	4.0172003	64	4.0196977	
25	4.0096633	85	4.0122042	45	4.0147304	5	4.0172420	65	4.0197392	
26	4.0097057	86	4.0122465	46	4.0147724	6	4.0172838	66	4.0197807	
27	4.0097482	87	4.0122887	47	4.0148144	7	4.0173255	67	4.0198222	
28	4.0097907	88	4.0123309	48	4.0148564	8	4.0173672	68	4.0198637	
29	4.0098331	89	4.0123731	49	4.0148983	9	4.0174090	69	4.0199051	
30	4.0098756	90	4.0124153	50	4.0149403	10	4.0174507	70	4.0199466	
31	4.0099180	91	4.0124575	51	4.0149823	11	4.0174924	71	4.0199881	
32	4.0099605	92	4.0124997	52	4.0150242	12	4.0175341	72	4.0200296	
33	4.0100029	93	4.0125419	53	4.0150662	13	4.0175758	73	4.0200711	
34	4.0100454	94	4.0125841	54	4.0151081	14	4.0176175	74	4.0201125	
35	4.0100878	95	4.0126263	55	4.0151501	15	4.0176592	75	4.0201540	
36	4.0101302	96	4.0126685	56	4.0151920	16	4.0177009	76	4.0201954	
37	4.0101727	97	4.0127107	57	4.0152339	17	4.0177426	77	4.0202369	
38	4.0102151	98	4.0127528	58	4.0152759	18	4.0177843	78	4.0202783	
39	4.0102575	99	4.0127950	59	4.0153178	19	4.0178260	79	4.0203198	
40	4.0102999	10300	4.0128372	60	4.0153597	20	4.0178677	80	4.0203612	
41	4.0103423	1	4.0128793	61	4.0154016	21	4.0179093	81	4.0204027	
42	4.0103847	2	4.0129215	62	4.0154435	22	4.0179510	82	4.0204441	
43	4.0104271	3	4.0129636	63	4.0154854	23	4.0179927	83	4.0204855	
44	4.0104695	4	4.0130058	64	4.0155274	24	4.0180344	84	4.0205270	
45	4.0105119	5	4.0130479	65	4.0155693	25	4.0180760	85	4.0205684	
46	4.0105543	6	4.0130901	66	4.0156112	26	4.0181177	86	4.0206098	
47	4.0105967	7	4.0131322	67	4.0156530	27	4.0181593	87	4.0206512	
48	4.0106391	8	4.0131744	68	4.0156949	28	4.0182010	88	4.0206926	
49	4.0106814	9	4.0132165	69	4.0157368	29	4.0182426	89	4.0207340	
50	4.0107238	10	4.0132586	70	4.0157787	30	4.0182843	90	4.0207754	
51	4.0107662	11	4.0133007	71	4.0158206	31	4.0183259	91	4.0208168	
52	4.0108085	12	4.0133429	72	4.0158625	32	4.0183675	92	4.0208582	
53	4.0108509	13	4.0133850	73	4.0159043	33	4.0184092	93	4.0208996	
54	4.0108933	14	4.0134271	74	4.0159462	34	4.0184508	94	4.0209410	
55	4.0109356	15	4.0134692	75	4.0159881	35	4.0184924	95	4.0209824	
56	4.0109780	16	4.0135113	76	4.0160299	36	4.0185340	96	4.0210238	
57	4.0110203	17	4.0135534	77	4.0160718	37	4.0185756	97	4.0210651	
58	4.0110626	18	4.0135955	78	4.0161136	38	4.0186172	98	4.0211065	
59	4.0111050	19	4.0136376	79	4.0161555	39	4.0186588	99	4.0211479	

secũ da.	Gr. Mi. 2. 55.		Gr. Mi. 2. 56.		Gr. Mi. 2. 57.		Gr. Mi. 2. 58.		Gr. Mi. 2. 59.	
Nu.	ogarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	
10560	4.0211892	10560	4.0236639	10620	4.0261245	10680	4.0285712	10740	4.0310042	
1	4.0212306	61	4.0237050	21	4.0261654	81	4.0286119	41	4.0310447	
2	4.0212720	62	4.0237461	22	4.0262062	82	4.0286525	42	4.0310851	
3	4.0213133	63	4.0237872	23	4.0262471	83	4.0286932	43	4.0311255	
4	4.0213547	64	4.0238283	24	4.0262880	84	4.0287338	44	4.0311659	
5	4.0213960	65	4.0238695	25	4.0263289	85	4.0287745	45	4.0312064	
6	4.0214373	66	4.0239106	26	4.0263698	86	4.0288151	46	4.0312468	
7	4.0214787	67	4.0239517	27	4.0264106	87	4.0288558	47	4.0312872	
8	4.0215200	68	4.0239928	28	4.0264515	88	4.0288964	48	4.0313276	
9	4.0215613	69	4.0240338	29	4.0264924	89	4.0289370	49	4.0313680	
10	4.0216027	70	4.0240749	30	4.0265332	90	4.0289777	50	4.0314084	
11	4.0216440	71	4.0241160	31	4.0265741	91	4.0290183	51	4.0314488	
12	4.0216853	72	4.0241571	32	4.0266149	92	4.0290589	52	4.0314892	
13	4.0217266	73	4.0241982	33	4.0266558	93	4.0290995	53	4.0315296	
14	4.0217679	74	4.0242393	34	4.0266966	94	4.0291401	54	4.0315700	
15	4.0218092	75	4.0242803	35	4.0267374	95	4.0291807	55	4.0316104	
16	4.0218505	76	4.0243214	36	4.0267783	96	4.0292213	56	4.0316507	
17	4.0218918	77	4.0243625	37	4.0268191	97	4.0292619	57	4.0316911	
18	4.0219331	78	4.0244035	38	4.0268599	98	4.0293025	58	4.0317315	
19	4.0219744	79	4.0244446	39	4.0269008	99	4.0293431	59	4.0317719	
20	4.0220157	80	4.0244856	40	4.0269416	10700	4.0293837	60	4.0318122	
21	4.0220570	81	4.0245267	41	4.0269824	1	4.0294243	61	4.0318526	
22	4.0220982	82	4.0245677	42	4.0270232	2	4.0294649	62	4.0318929	
23	4.0221395	83	4.0246087	43	4.0270640	3	4.0295055	63	4.0319333	
24	4.0221808	84	4.0246498	44	4.0271048	4	4.0295461	64	4.0319736	
25	4.0222221	85	4.0246908	45	4.0271456	5	4.0295866	65	4.0320140	
26	4.0222633	86	4.0247318	46	4.0271864	6	4.0296272	66	4.0320543	
27	4.0223046	87	4.0247729	47	4.0272272	7	4.0296678	67	4.0320947	
28	4.0223458	88	4.0248139	48	4.0272680	8	4.0297083	68	4.0321350	
29	4.0223871	89	4.0248549	49	4.0273088	9	4.0297489	69	4.0321753	
30	4.0224283	90	4.0248959	50	4.0273496	10	4.0297894	70	4.0322157	
31	4.0224696	91	4.0249369	51	4.0273903	11	4.0298300	71	4.0322560	
32	4.0225108	92	4.0249779	52	4.0274311	12	4.0298705	72	4.0322963	
33	4.0225520	93	4.0250189	53	4.0274719	13	4.0299111	73	4.0323366	
34	4.0225933	94	4.0250599	54	4.0275126	14	4.0299516	74	4.0323769	
35	4.0226345	95	4.0251009	55	4.0275534	15	4.0299921	75	4.0324172	
36	4.0226757	96	4.0251419	56	4.0275942	16	4.0300327	76	4.0324575	
37	4.0227169	97	4.0251829	57	4.0276349	17	4.0300732	77	4.0324978	
38	4.0227581	98	4.0252239	58	4.0276757	18	4.0301137	78	4.0325381	
39	4.0227994	99	4.0252648	59	4.0277164	19	4.0301542	79	4.0325784	
40	4.0228406	10600	4.0253058	60	4.0277572	20	4.0301947	80	4.0326187	
41	4.0228818	1	4.0253468	61	4.0277979	21	4.0302352	81	4.0326590	
42	4.0229230	2	4.0253877	62	4.0278386	22	4.0302758	82	4.0326993	
43	4.0229642	3	4.0254287	63	4.0278794	23	4.0303163	83	4.0327396	
44	4.0230053	4	4.0254697	64	4.0279201	24	4.0303568	84	4.0327798	
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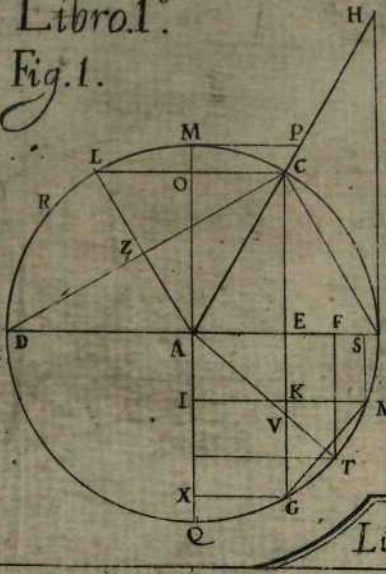
46	4.0230877	6	4.0255516	66	4.0280015	26	4.0304377	86	4.0328604	
47	4.0231289	7	4.0255925	67	4.0280422	27	4.0304782	87	4.0329006	
48	4.0231701	8	4.0256335	68	4.0280830	28	4.0305187	88	4.0329409	
49	4.0232112	9	4.0256744	69	4.0281237	29	4.0305592	89	4.0329811	
50	4.0232524	10	4.0257153	70	4.0281644	30	4.0305997	90	4.0330214	
51	4.0232936	11	4.0257563	71	4.0282051	31	4.0306401	91	4.0330616	
52	4.0233347	12	4.0257972	72	4.0282458	32	4.0306806	92	4.0331019	
53	4.0233759	13	4.0258381	73	4.0282865	33	4.0307211	93	4.0331421	
54	4.0234170	14	4.0258790	74	4.0283271	34	4.0307615	94	4.0331824	
55	4.0234582	15	4.0259199	75	4.0283678	35	4.0308020	95	4.0332226	
56	4.0234993	16	4.0259609	76	4.0284085	36	4.0308425	96	4.0332628	
57	4.0235405	17	4.0260018	77	4.0284492	37	4.0308829	97	4.0333031	
58	4.0235816	18	4.0260427	78	4.0284899	38	4.0309233	98	4.0333433	
59	4.0236227	19	4.0260836	79	4.0285305	39	4.0309638	99	4.0333835	

secũ da.	Gr. Mi. 3. 0.		Gr. Mi. 3. 1.		Gr. Mi. 3. 2.		Gr. Mi. 3. 3.		Gr. Mi. 3. 4.	
Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	Nu.	Logarith.	
10800	4.0334237	10860	4.0358298	10920	4.0382226	10980	4.0406023	11040	4.0429690	
1	4.0334639	61	4.0358698	21	4.0382624	81	4.0406418	41	4.0430084	
2	4.0335041	62	4.0359097	22	4.0383021	82	4.0406814	42	4.0430477	
3	4.0335443	63	4.0359497	23	4.0383419	83	4.0407209	43	4.0430870	
4	4.0335845	64	4.0359897	24	4.0383816	84	4.0407605	44	4.0431263	
5	4.0336247	65	4.0360297	25	4.0384214	85	4.0408000	45	4.0431657	
6	4.0336649	66	4.0360697	26	4.0384611	86	4.0408395	46	4.0432050	
7	4.0337051	67	4.0361096	27	4.0385009	87	4.0408791	47	4.0432443	
8	4.0337453	68	4.0361496	28	4.0385406	88	4.0409186	48	4.0432836	
9	4.0337855	69	4.0361895	29	4.0385804	89	4.0409581	49	4.0433229	
10	4.0338256	70	4.0362295	30	4.0386201	90	4.0409976	50	4.0433622	
11	4.0338658	71	4.0362694	31	4.0386598	91	4.0410372	51	4.0434015	
12	4.0339060	72	4.0363094	32	4.0386996	92	4.0410767	52	4.0434408	
13	4.0339462	73	4.0363493	33	4.0387393	93	4.0411162	53	4.0434801	
14	4.0339863	74	4.0363893	34	4.0387790	94	4.0411557	54	4.0435194	
15	4.0340265	75	4.0364292	35	4.0388187	95	4.0411952	55	4.0435587	
16	4.0340666	76	4.0364691	36	4.0388585	96	4.0412347	56	4.0435980	
17	4.0341068	77	4.0365091	37	4.0388982	97	4.0412742	57	4. 436373	
18	4.0341469	78	4.0365490	38	4.0389379	98	4.0413137	58	4.0436765	
19	4.0341871	79	4.0365889	39	4.0389776	99	4.0413532	59	4.0437158	
20	4.0342272	80	4.0366288	40	4.0390173	11000	4.0413927	60	4.0437551	
21	4.0342673	81	4.0366688	41	4.0390570	1	4.0414321	61	4.0437943	
22	4.0343075	82	4.0367087	42	4.0390967	2	4.0414716	62	4.0438336	
23	4.0343476	83	4.0367486	43	4.0391363	3	4.0415111	63	4.0438729	
24	4.0343877	84	4.0367885	44	4.0391760	4	4.0415505	64	4.0439121	
25	4.0344279	85	4.0368284	45	4.0392157	5	4.0415900	65	4.0439514	
26	4.0344680	86	4.0368683	46	4.0392554	6	4.0416295	66	4.0439906	
27	4.0345081	87	4.0369082	47	4.0392951	7	4.0416689	67	4.0440299	
28	4.0345482	88	4.0369481	48	4.0393347	8	4.0417084	68	4.0440691	
29	4.0345883	89	4.0369879	49	4.0393744	9	4.0417478	69	4.0441083	
30	4.0346284	90	4.0370278	50	4.0394141	10	4.041787	70	4.0441476	
31	4.0346685	91	4.0370677	51	4.0394537	1	4.0418263	71	4.0441868	
32	4.0347086	92	4.0371075	52	4.0394934	12	4.0418657	72	4.0442260	
33	4.0347487	93	4.0371473	53	4.0395330	13	4.0419050	73	4.0442652	
34	4.0347888	94	4.0371873	54	4.0395727	14	4.0419445	74	4.0443045	
35	4.0348289	95	4.0372272	55	4.0396123	15	4.0419837	75	4.0443437	
36	4.0348689	96	4.0372670	56	4.0396520	16	4.0420233	76	4.0443829	
37	4.0349090	97	4.0373069	57	4.0396916	17	4.0420633	77	4.0444221	
38	4.0349491	98	4.0373468	58	4.0397312	18	4.0421022	78	4.0444613	
39	4.0349892	99	4.0373866	59	4.0397709	19	4.0421421	79	4.0445005	
40	4.0350292	10900	4.0374264	60	4.0398105	2	4.0421815	80	4.0445397	
41	4.0350693	1	4.0374662	61	4.0398501	21	4.0422210	81	4.0445789	
42	4.0351094	2	4.0375061	62	4.0398897	21	4.0422604	82	4.0446181	
43	4.0351494	3	4.0375460	63	4.0399294	23	4.0422998	83	4.0446573	
44	4.0351895	4	4.0375858	64	4.0399690	24	4.0423392	84	4.0446965	
45	4.0352295	5	4.0376256	65	4.0400086	25	4.0423785	85	4.0447356	
46	4.0352696	6	4.0376654	66	4.0400482	26	4.0424179	86	4.0447748	
47	4.0353006	7	4.0377053	67	4.0400878	27	4.0424573	87	4.0448140	
48	4.0353496	8	4.0377451	68	4.0401274	28	4.0424967	88	4.0448532	
49	4.0353897	9	4.0377849	69	4.0401670	29	4.0425361	89	4.0448923	
50	4.0354297	10	4.0378247	70	4.0402066	30	4.0425755	90	4.0449315	
51	4.0354697	11	4.0378645	71	4.0402462	31	4.0426148	91	4.0449707	
52	4.0355097	12	4.0379043	72	4.0402857	32	4.0426542	92	4.0450098	
53	4.0355498	13	4.0379441	73	4.0403253	33	4.0426936	93	4.0450490	
54	4.0355898	14	4.0379839	74	4.0403649	34	4.0427329	94	4.0450881	
55	4.0356298	15	4.0380237	75	4.0404045	35	4.0427723	95	4.0451273	
56	4.0356698	16	4.0380635	76	4.0404440	36	4.0428116	96	4.0451664	
57	4.0357098	17	4.0381033	77	4.0404836	37	4.0428510	97	4.0452055	
58	4.0357498	18	4.0381430	78	4.0405232	38	4.0428903	98	4.0452447	
59	4.0357898	19	4.0381828	79	4.0405627	39	4.0429297	99	4.0452838	

FINIS.

Libro 1°.

Fig. 1.

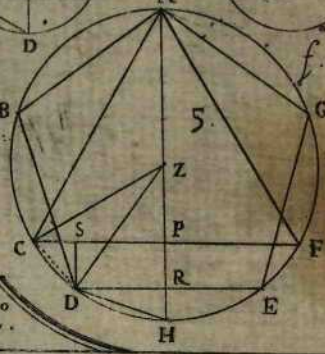


f. 2.

f. 3.

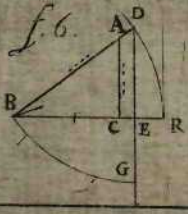
f. 4

f. 5.



Lib. 2°

f. 6.



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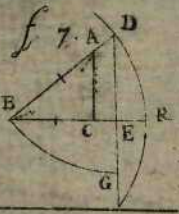

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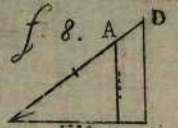

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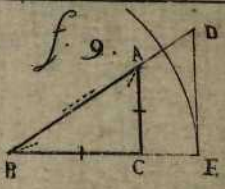
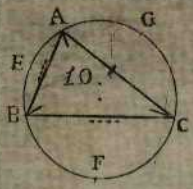
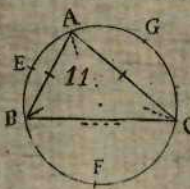
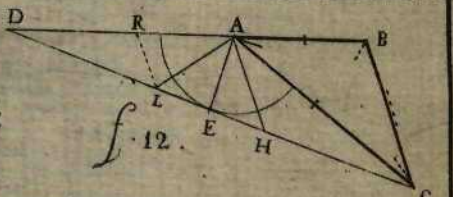


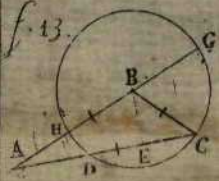






f. 12.

f. 13.



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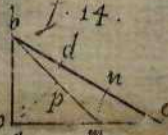

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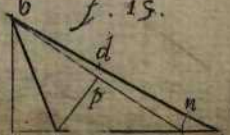

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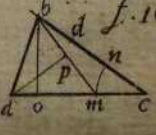
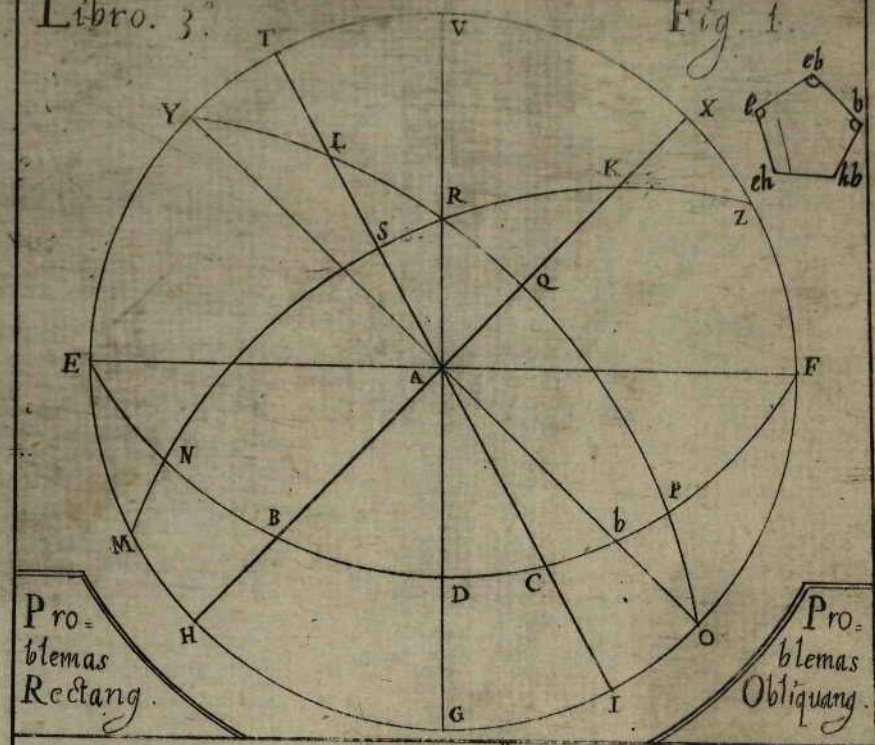


Libro. 3.

Fig. 1.



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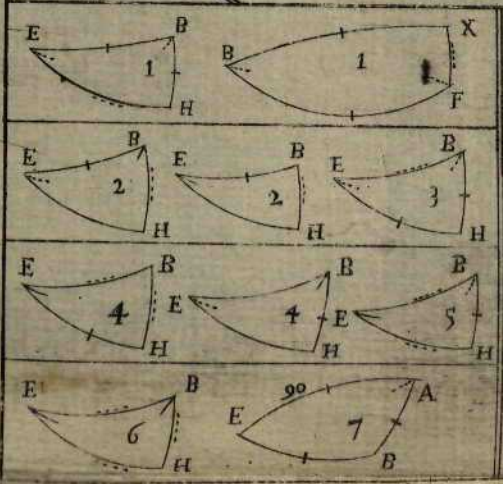

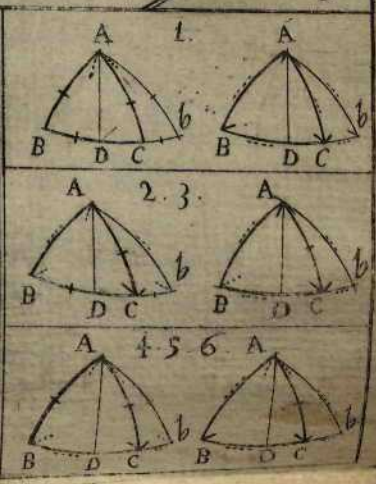

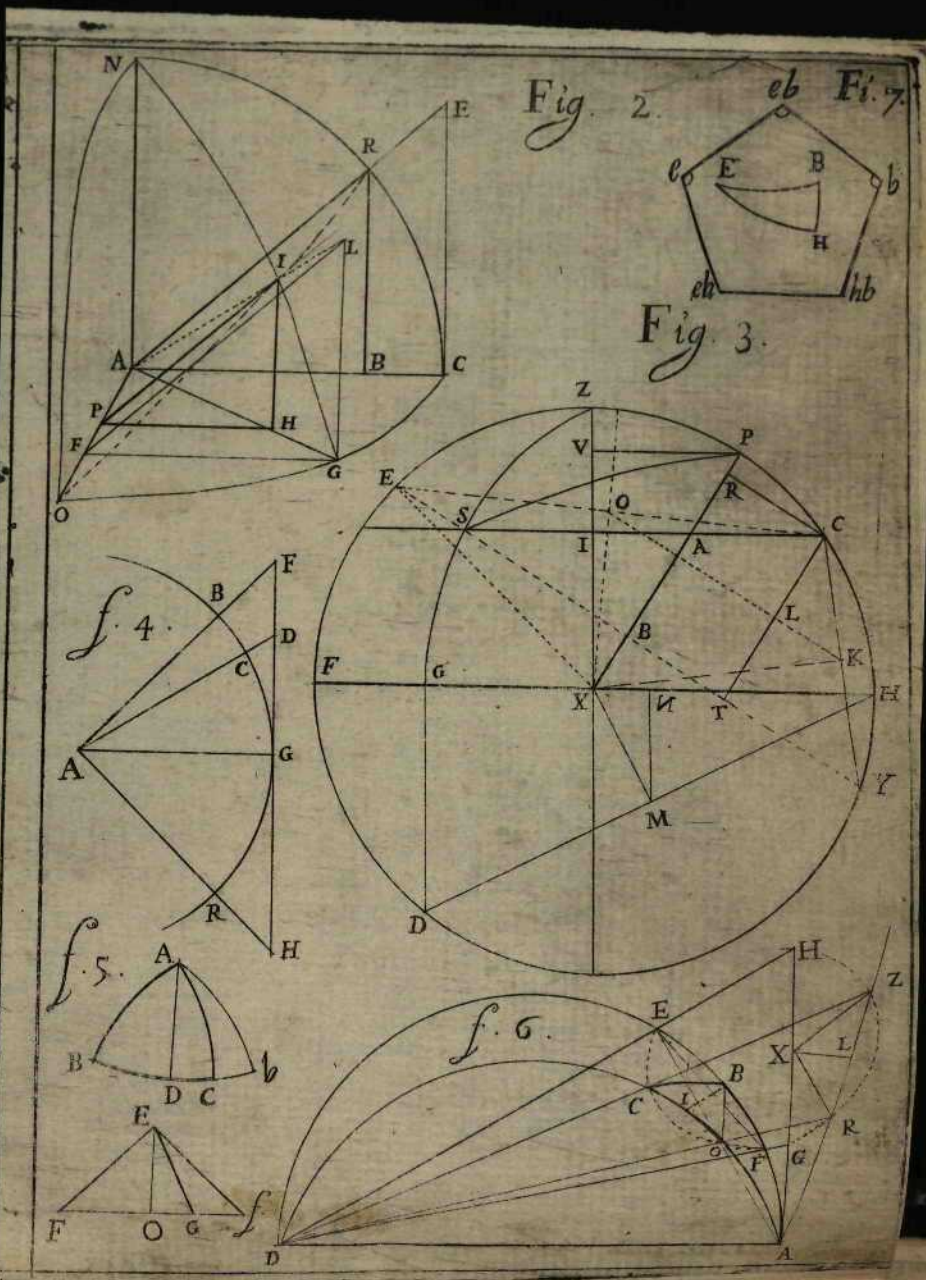
Fig. 2.
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