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FIVE-FIGURE TABLES

OF

MATHEMATICAL FUNCTIONS

COMPRISING

TABLES OF LOGARITHMS, POWERS OF NUMBERS, TRIGONOMETRIC, ELLIPTIC, AND OTHER TRANSCENDENTAL FUNCTIONS

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PREFACE.

THIS collection of Tables has been formed chiefly with a view to meet the requirements of workers in Physical Science and Applied Mathematics. It includes many tables which have not hitherto found a place in such collections, while those tables which are of use only in Navigation have been excluded.

For ordinary laboratory work four-figure tables of logarithms are at present generally employed. The small space they occupy renders them convenient to use, but they suffer from the defect that the accumulation of small errors frequently makes even the third significant figure in the result unreliable. For this reason five-figure tables are preferable.

Four-figure tables give directly the logarithm for three significant figures, and, by differences, the logarithm for four; while five-figure tables usually give directly the logarithm for four significant figures, and so occupy ten times the space of a four-figure table. A glance, however, at the table in the following pages will show that it is only in the first third of it that the rapid variation of the differences renders a direct tabulation for four significant figures desirable. This has not been done, but merely the *mean* differences for each row have been tabulated, and these differences may be used when results accurate to four figures only are desired. Results accurate to five figures are to be obtained by using the Table of Anti-logarithms; for it is precisely in that part of the Table of

Logarithms where the variation is most rapid that the variation in the Table of the Inverse Function is slowest, and *vice versâ.*

The conjoint use of these Tables, therefore, offers all the accuracy obtainable with the usual five-figure tables, with the expenditure of little more labour than is involved in consulting a four-figure table.

The principle stated above applies to several other pairs of Tables, such as those of Squares, Square Roots, Cubes, and Cube Roots; and by taking advantage of it, it has become possible to include a great number of tables within a moderate compass, without sacrificing convenience or accuracy.

Several of the Tables have been constructed specially for this collection, and some others appear for the first time in their present form. Every care has been taken, and it is hoped they will be found free from error.

J. BORTHWICK DALE.

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FIVE-FIGURE TABLES

OF

MATHEMATICAL FUNCTIONS.

EXPLANATION OF THE TABLES.

I.—Logarithms of Numbers.

The logarithms here tabulated are logarithms to the base 10, known as Briggian or Common Logarithms.

The logarithm of a number consists of two parts, an integral part and a fractional part. The integral part is called the *index*, or *characteristic*; the fractional part is called the *mantissa*.

The *characteristic* of a number *greater* than 1 is the number one less than the number of digits in the integral part of the given number.

The *characteristic* of a number *less* than 1 is negative and is the number one greater than the number of zeros following the decimal point.

Ex.—The characteristics of 5387, 53·87, 0·0005387, are 3, 1, and −4 respectively.

The *mantissæ* of all numbers having the same significant figures are the same.

To find the mantissa of a given number.

(*a*) If the number contains three significant figures, find the first two figures in the left-hand column of the table, and the third figure in the top row. The mantissa required will

be found in the row containing the first two figures and in the column under the third figure.

Ex.—Log 53·8 = 1·73078. Log 0·00538 = $\bar{3}$·73078.

The mantissa is always positive, and when it is preceded by a *negative* characteristic, the *negative sign* is written above the characteristic.

(*b*) If the number contains four or five significant figures, find the mantissa corresponding to the first three figures as before. In the top row under Mean Differences find the fourth figure, and in the column under it, in the row containing the first two figures will be found the difference to be added to the mantissa. If there is a fifth figure, take the nearest tenth of the number corresponding to it in the Mean Difference columns, and add to the mantissa.

Ex.—To find log 53·874.

Log 53·8	=	1·73078
Diff. for 7	=	57
Diff. for 4	=	3
Log 53·874	=	1·73138

Near the beginning of the table the differences are large and change rapidly, and unless the third significant figure is 4 or 5, the fifth figure of the mantissa obtained by using the mean differences will be incorrect. In this case the Table of Antilogarithms may be used, or the Principle of Proportional Parts.

Ex.—To find log 120·73.

Log 120	=	2·07918
Log 121	=	2·08279
Diff. for 1	=	361
Diff. for 0·73	=	361 × 0·73 = 264
Log 120·73	=	2·08182

The product 361 × 0·73 may be readily found by the Table of Proportional Parts at the end of the book.

To find the number corresponding to a given logarithm.

If the mantissa is found exactly in the tables, the first two significant figures of the number will be found in the same row at the left hand, and the third figure at the top of the

column. The decimal point may then be placed by noting the value of the characteristic.

If the mantissa is not found exactly in the tables, take out the next lower, and the three figures of the number belonging to it. Find the difference between this logarithm and the given one, and find the number corresponding to this difference in the same row under Mean Differences. If the difference is not found exactly, subtract the next lower, multiply the remainder by 10, and find the number corresponding to the product.

Ex.—

Given logarithm	= 1·73138	
Next lower logarithm	= 1·73078	= log 53·8
Diff.	= 60	
Next lower difference	= 57	= diff. for 7
	3	
	30	= diff. for 4

Therefore number is 53·874

II.—Antilogarithms.

In this table will be found the significant figures corresponding to given logarithms. The first two figures of the mantissa are found in the left-hand column, and the third in the top row. If there are more than three significant figures in the mantissa the corresponding differences will be found in the columns of Mean Differences.

Ex.—

Given logarithm	= 2·08182	
2·081	= log 120·50	
Diff. for 8	= 22	
Diff. for 2	= 1	
2·08182	= log 120·73	

Near the *end* of the table, the differences are large and change rapidly. Hence, unless the third figure of the mantissa be 4 or 5, use the Table of Logarithms or the Principle of Proportional Parts.

Use of the Tables of Logarithms and Antilogarithms.

These tables may be used to perform multiplication, division,

involution, and root extraction in accordance with the following propositions:—

(i.) $\text{Log } A + \log B = \log (A \times B)$
(ii.) $\text{Log } A - \log B = \log (A \div B)$
(iii.) $n \log A = \log A^n$
(iv.) $\frac{1}{n} \log A = \log \sqrt[n]{A}$

NOTE.—When multiplying or dividing a logarithm whose characteristic is negative, it is necessary to bear in mind that the mantissa is positive.

Ex. (i.) $\bar{3}{\cdot}73138 \times 3 = (-3 + 0{\cdot}73138) \times 3 = -9 + 2{\cdot}19414 = \bar{7}{\cdot}19414$
Ex. (ii.) $\bar{3}{\cdot}73138 \div 4 = (-3 + 0{\cdot}73138) \div 4 = (-4 + 1{\cdot}73138) \div 4 = \bar{1}{\cdot}43285$

III., IV., V., VI., VII.—POWERS OF NUMBERS.

These tables give the reciprocals, squares, and cubes of numbers between 1 and 10; the square roots of numbers between 1 and 100; and the cube roots of numbers between 1 and 1000.

The method of using them is essentially the same as that of using the Tables of Logarithms and Antilogarithms.

The cubes of numbers containing four or five significant figures should be found by logarithms or by the Tables of Cube Roots.

XI., XII., XIII.—TRIGONOMETRICAL FUNCTIONS.

These tables give the values of the natural sines, tangents, etc., for every third minute of the quadrant. The difference columns give the corrections for 1′ and 2′.

The left-hand column of degrees and the top row of minutes are to be followed when sines, tangents, and secants are taken out.

The right-hand column of degrees and bottom row of minutes are to be used when cosines, cotangents, and cosecants are taken out.

Note that for the three co-functions, differences are to be subtracted.

The integral part and decimal point are printed only in the columns headed 0′ and 33′.

XIV., XV., XVI.—Logarithmic Trigonometrical Functions.

These tables give the logarithms of the numbers contained in the three preceding tables increased by 10, in order to avoid negative characteristics.

The characteristic and decimal point are printed only in the columns headed 0′ and 30′.

Ex.—Find sin 37° 34′ 12″ and log sin 37° 34′ 12″.

Sin 37° 33′	=	0·60945	Log sin 37° 33′	=	9·78494
Diff. for 1′	=	23	Diff. for 1′	=	16
Diff. for 12″	=	5	Diff. for 12″	=	3
Sin 37° 34′ 12″	=	0·60973	Log sin 37° 34′ 12″	=	9·78513

When the values of the tangent, cotangent, secant, and cosecant are large and change rapidly, and are not given exactly in the tables, they should be found from the sine and cosine.

Small Angles.

The differences for the logarithmic sines and tangents of small angles are large and change rapidly. The values of the logarithms can be found by the following rules :—

(1) *To obtain the log sine.*

Reduce the angle to seconds, and to the logarithm of the number so obtained add 4·68557. From the sum subtract $\frac{1}{3}$ of the log secant diminished by 10.

(2) *To obtain the log tangent.*

Reduce the angle to seconds, and to the logarithm of the number so obtained add 4·68557. To the sum add $\frac{2}{3}$ of the log secant diminished by 10.

(3) *To obtain the angle, given the log sine.*

To the log sine add $\bar{5}$·31442 and $\frac{1}{3}$ of the corresponding log secant diminished by 10. The sum is the logarithm of the number of seconds in the angle.

(4) *To obtain the angle, given the log tangent.*

To the log tangent add $\bar{5}{\cdot}31442$ and subtract $\frac{2}{3}$ of the corresponding log secant diminished by 10. The remainder is the logarithm of the number of seconds in the angle.

VIII., XX.—Natural Logarithms.

This table gives the logarithms of numbers to the base e (= 2·7182818 . . .).

Every number may be expressed as the product of a number between 1 and 10, and some power of 10. The logarithm of the given number is the sum of the logarithms of the two factors.

Ex.—To find $\log_e 735{\cdot}2$ and $\log_e 0{\cdot}0007352$.

735·2	$= 7{\cdot}352 \times 10^2$		0·0007352		$= 7{\cdot}352 \times 10^{-4}$
Log. 7·35	=	1·99470	Log. 7·35	=	1·99470
Diff. for 2	=	27	Diff. for 2	=	27
Log. 10^2	=	4·60517	Log. 10^{-4}	=	$\bar{10}{\cdot}78966$
Log. 735·2	=	6·60014	Log 0·0007352	=	$\bar{8}{\cdot}78463$

XXI., XXII., XXIII.—Exponential and Hyperbolic Functions.

The values of e^x, e^{-x}, cosh x, sinh x are tabulated at intervals of 0·01 from $x = 1$ to $x = 3$, and at intervals of 0·1 from $x = 3$ to $x = 6$.

The values of e^x and e^{-x} for greater values of x may be found from the table for $\log_{10} e^x$. When $e^x = y$, $x = \log_e y$. Hence these tables may be regarded as tables of antilogarithms for the base e.

The hyperbolic functions are defined by the relations—

$$\cosh x = \tfrac{1}{2}(e^x + e^{-x}), \qquad \sinh x = \tfrac{1}{2}(e^x - e^{-x})$$
$$\tanh x = \sinh x \div \cosh x, \qquad \coth x = 1 \div \tanh x,$$
$$\operatorname{sech} x = 1 \div \cosh x, \qquad \operatorname{cech} x = 1 \div \sinh x.$$

When x is greater than 6, it is sufficiently accurate to take $\cosh x = \sinh x = \frac{1}{2}e^x$. The hyperbolic functions may be

connected with the trigonometric functions by means of the table for $u = \log \tan\left(\frac{\pi}{4} + \frac{x}{2}\right)$, for then $\tanh \frac{1}{2}u = \tanh \frac{1}{2}x$, and—

$$\cosh u = \sec x, \quad \sinh u = \tan x, \quad \tanh u = \sin x.$$

XXIV., XXV., XXVI.—Elliptic Functions.

These tables give the values of $F(k, \phi) = \int_0^\phi \frac{dx}{\sqrt{1 - k^2 \sin^2 x}}$ and $E(k, \phi) = \int_0^\phi \sqrt{1 - k^2 \sin^2 x}.dx$ for every degree of the *amplitude* ϕ, and every fifth degree of θ, when $\sin \theta = k$, the *modulus.*

Table XXI. gives the values of the *complete elliptic* functions $F_1 = F\left(k, \frac{\pi}{2}\right)$ and $E_1 = E\left(k, \frac{\pi}{2}\right)$, for every degree of $\theta = \sin^{-1} k$.

(N.B.—F_1 is now generally denoted by K.)

If $u = F(k, \phi)$, $\phi = \mathrm{am}(u, k)$.

$\mathrm{Sn}(u,k) = \sin \phi$, $\mathrm{cn}(u, k) = \cos \phi$, $\mathrm{dn}(u,k) = \sqrt{1 - k^2 \sin^2 \phi} = \Delta\phi$.

Note $\mathrm{sn}(u, 1) = \tanh u$, $\mathrm{cn}(u, 1) = \mathrm{dn}(u, 1) = \mathrm{sech}\, u$.

XXIX.—Zonal Surface Harmonics.

This table gives the values of the first seven harmonics for values of the argument x at intervals of 0·01.

$P_0(x) = 1.$ $\qquad P_1(x) = x.$

$P_2(x) = \frac{1}{2}(3x^2 - 1).$ $\qquad P_3(x) = \frac{1}{2}(5x^3 - 3x).$

$P_4(x) = \frac{1}{8}(35x^4 - 30x^2 + 3).$

$P_5(x) = \frac{1}{8}(63x^5 - 70x^3 + 15x).$

$P_6(x) = \frac{1}{16}(231x^6 - 315x^4 + 105x^2 - 5).$

$P_7(x) = \frac{1}{16}(429x^7 - 693x^5 + 315x^3 - 35x).$

XXX.—XXXIV.—Bessel Functions.

These tables give the values of $J_n(x)$ and also of $I_n(x) = \iota^{-n}J_n(\iota x)$ where $\iota \equiv \sqrt{-1}$.

XXXV.—Normal Error or Probability Integral.

This table gives the values of the integral $I = \frac{2}{\sqrt{\pi}}\int_0^x e^{-t^2}dt$.

XXVII.—Gamma Functions.

This table gives the values of $\log_{10}\Gamma(x) = \log_{10}\int_0^\infty e^{-t}t^{x-1}dt$,

for values of x between 1 and 2.

When x is greater than 2, the value may be obtained by using the formula of reduction—

$$\Gamma(x+1) = x\Gamma(x)$$

When x is large, the value of $\log_e \Gamma(x+1)$ is approximately given by—

$$\log_e \Gamma(x+1) = \log_e \sqrt{2\pi} + (x+\tfrac{1}{2})\log_e x - x + \frac{B_1}{1.2.x} - \frac{B_2}{3.4.x^3} + \frac{B_3}{5.6.x^5} - \ldots$$

XXVIII.—Logarithms of Factorials.

This table gives the values of $\log \Pi(n) = \log x!$ for integral values of x from $x = 1$ to $x = 100$,

When x is integral $\Gamma(x+1) = x!$

When x is large—

$$x! = \sqrt{(2\pi x)}x^x e^{-x}\left(1 + \frac{1}{12x} + \frac{1}{288x^2} + \ldots\right)$$

XXXVI.—Exponential, Cosine, and Sine Integrals.

These tables give the values of the exponential integrals $Ei(x) = \int_{-\infty}^{x} \frac{e^u}{u} du$, and $Ei(-x) = \int_{-\infty}^{-x} \frac{e^u}{u} du$; of the cosine integral $\int_{\infty}^{x} \frac{\cos u}{u} du$, and of the sine integral $\int_{0}^{x} \frac{\sin u}{u} du$.

The logarithmic integral $Li(x) = \int_{0}^{x} \frac{du}{\log u} = Ei(\log x)$. Hence its values may be obtained from those of the exponential integral.

X.—Bernoulli's Numbers.

These numbers are the coefficients in the expansion of $\frac{x}{2} \cdot \frac{e^x + 1}{e^x - 1}$ in the form—

$$1 + B_1 \frac{x^2}{2!} - B_2 \frac{x^4}{4!} + B_3 \frac{x^6}{6!} - B_4 \frac{x^8}{8!} + \ldots$$

[N.B.—The notation varies, the series of numbers being sometimes written $B_1, B_3, B_5 \ldots B_{2n-1}$ is the same as B_n in the table here printed.]

XXXVII.—Binomial Coefficients for Interpolation by Differences.

This table gives the values of the coefficients $\frac{t(t-1)}{1.2}$ and $\frac{t(t-1)(t-2)}{1.2.3}$ required in the interpolation formula.

$$f(x+t) = f(x) + t\Delta_1 f(x) + \frac{t(t-1)}{1.2}\Delta_2 f(x) + \frac{t(t-1)(t-2)}{1.2.3}\Delta_3 f(x) + \ldots$$

where
$$\Delta_1 f(x) \equiv f(x+1) - f(x)$$
$$\Delta_2 f(x) \equiv \Delta_1 f(x+1) - \Delta_1 f(x)$$

I.—LOGARITHMS OF NUMBERS.

#	0	1	2	3	4	5	6	7	8	9	Mean Differences 1	2	3	4	5	6	7	8	9
10	00000	00432	00860	01284	01703	02119	02531	02938	03342	03743	42	83	125	166	208	248	290	331	373
11	04139	04532	04922	05308	05690	06070	06446	06819	07188	07555	38	76	114	152	190	226	264	302	340
12	07918	08279	08636	08991	09342	09691	10037	10380	10721	11059	35	70	105	140	175	208	243	278	313
13	11394	11727	12057	12385	12710	13033	13354	13672	13988	14301	32	65	97	129	162	193	225	257	290
14	14613	14922	15229	15534	15836	16137	16435	16732	17026	17319	30	60	90	120	150	179	209	239	269
15	17609	17898	18184	18469	18752	19033	19312	19590	19866	20140	28	56	84	112	140	168	196	224	252
16	20412	20683	20952	21219	21484	21748	22011	22272	22531	22789	26	53	79	105	132	158	184	210	237
17	23045	23300	23553	23805	24055	24304	24551	24797	25042	25285	25	50	74	99	124	149	174	199	223
18	25527	25768	26007	26245	26482	26717	26951	27184	27416	27646	23	47	70	94	117	141	164	188	211
19	27875	28103	28330	28556	28780	29003	29226	29447	29667	29885	22	45	67	89	111	134	156	178	201
20	30103	30320	30535	30750	30963	31175	31387	31597	31806	32015	21	42	64	85	106	127	148	170	191
21	32222	32428	32634	32838	33041	33244	33445	33646	33846	34044	20	40	61	81	101	121	141	162	182
22	34242	34439	34635	34830	35025	35218	35411	35603	35793	35984	19	39	58	77	97	116	135	154	174
23	36173	36361	36549	36736	36922	37107	37291	37475	37658	37840	19	37	56	74	93	111	130	148	167
24	38021	38202	38382	38561	38739	38917	39094	39270	39445	39620	18	35	53	71	89	106	124	142	159
25	39794	39967	40140	40312	40483	40654	40824	40993	41162	41330	17	34	51	68	85	102	119	136	153
26	41497	41664	41830	41996	42160	42325	42488	42651	42813	42975	16	33	49	66	82	98	115	131	148
27	43136	43297	43457	43616	43775	43933	44091	44248	44404	44560	16	32	47	63	79	95	111	126	142
28	44716	44871	45025	45179	45332	45484	45637	45788	45939	46090	15	30	46	61	76	91	106	122	137
29	46240	46389	46538	46687	46835	46982	47129	47276	47422	47567	15	29	44	59	74	88	103	118	132
30	47712	47857	48001	48144	48287	48430	48572	48714	48855	48996	14	29	43	57	72	86	100	114	129
31	49136	49276	49415	49554	49693	49831	49969	50106	50243	50379	14	28	41	55	69	83	97	110	125
32	50515	50651	50786	50920	51055	51188	51322	51455	51587	51720	13	27	40	54	67	80	94	107	121
33	51851	51983	52114	52244	52375	52504	52634	52763	52892	53020	13	26	39	52	65	78	91	104	117
34	53148	53275	53403	53529	53656	53782	53908	54033	54158	54283	13	25	38	50	63	76	88	101	113
35	54407	54531	54654	54777	54900	55023	55145	55267	55388	55509	12	24	37	49	61	73	85	98	110
36	55630	55751	55871	55991	56110	56229	56348	56467	56585	56703	12	24	36	48	60	71	83	95	107
37	56820	56937	57054	57171	57287	57403	57519	57634	57749	57864	12	23	35	46	58	70	81	93	104
38	57978	58092	58206	58320	58433	58546	58659	58771	58883	58995	11	23	34	45	57	68	79	90	102
39	59106	59218	59329	59439	59550	59660	59770	59879	59988	60097	11	22	33	44	55	66	77	88	99

LOGARITHMS OF NUMBERS—*continued.*

MEAN DIFFERENCES.

	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
40	60206	60314	60423	60531	60638	60746	60853	60959	61066	61172	11	21	32	43	54	64	75	86	97
41	61278	61384	61490	61595	61700	61805	61909	62014	62118	62221	11	21	32	42	53	63	74	84	95
42	62325	62428	62531	62634	62737	62839	62941	63043	63144	63246	10	20	31	41	51	61	71	82	92
43	63347	63448	63548	63649	63749	63849	63949	64048	64147	64246	10	20	30	40	50	60	70	80	90
44	64345	64444	64542	64640	64738	64836	64933	65031	65128	65225	10	19	29	39	49	58	68	78	88
45	65321	65418	65514	65610	65706	65801	65896	65992	66087	66181	10	19	29	38	48	57	67	76	86
46	66276	66370	66464	66558	66652	66745	66839	66932	67025	67117	9	19	28	37	47	56	65	74	84
47	67210	67302	67394	67486	67578	67669	67761	67852	67943	68034	9	18	27	36	46	55	64	73	82
48	68124	68215	68305	68395	68485	68574	68664	68753	68842	68931	9	18	27	36	45	53	62	71	80
49	69020	69108	69197	69285	69373	69461	69548	69636	69723	69810	9	18	26	35	44	53	62	70	79
50	69897	69984	70070	70157	70243	70329	70415	70501	70586	70672	9	17	26	34	43	52	60	69	77
51	70757	70842	70927	71012	71096	71181	71265	71349	71433	71517	8	17	25	34	42	50	59	67	76
52	71600	71684	71767	71850	71933	72016	72099	72181	72263	72346	8	17	25	33	42	50	58	66	75
53	72428	72509	72591	72673	72754	72835	72916	72997	73078	73159	8	16	24	32	41	49	57	65	73
54	73239	73320	73400	73480	73560	73640	73719	73799	73878	73957	8	16	24	32	40	48	56	64	72
55	74036	74115	74194	74273	74351	74429	74507	74586	74663	74741	8	16	23	31	39	47	55	62	70
56	74819	74896	74974	75051	75128	75205	75282	75358	75435	75511	8	15	23	31	39	46	54	62	69
57	75587	75664	75740	75815	75891	75967	76042	76118	76193	76268	8	15	23	30	38	45	53	60	68
58	76343	76418	76492	76567	76641	76716	76790	76864	76938	77012	7	15	22	30	37	44	52	59	67
59	77085	77159	77232	77305	77379	77452	77525	77597	77670	77743	7	15	22	29	37	44	51	58	66
60	77815	77887	77960	78032	78104	78176	78247	78319	78390	78462	7	14	22	29	36	45	50	58	65
61	78533	78604	78675	78746	78817	78888	78958	79029	79099	79169	7	14	21	28	36	43	50	57	64
62	79239	79309	79379	79449	79518	79588	79657	79727	79796	79865	7	14	21	28	35	41	48	55	62
63	79934	80003	80072	80140	80209	80277	80346	80414	80482	80550	7	14	20	27	34	41	48	54	61
64	80618	80686	80754	80821	80889	80956	81023	81090	81158	81224	7	13	20	27	34	40	47	54	60
65	81291	81358	81425	81491	81558	81624	81690	81757	81823	81889	7	13	20	26	33	40	46	53	59
66	81954	82020	82086	82151	82217	82282	82347	82413	82478	82543	7	13	20	26	33	39	46	52	59
67	82607	82672	82737	82802	82866	82930	82995	83059	83123	83187	6	13	19	26	32	38	45	51	58
68	83251	83315	83378	83442	83506	83569	83632	83696	83759	83822	6	13	19	25	32	38	44	50	57
69	83885	83948	84011	84073	84136	84198	84261	84323	84386	84448	6	12	19	25	31	37	43	50	56

70	84510	84572	84634	84696	84757	84819	84880	84942	85003	85065	6	12	19	25	31	37	43	50	56
71	85126	85187	85248	85309	85370	85431	85491	85552	85612	85673	6	12	18	24	31	37	43	49	55
72	85733	85794	85854	85914	85974	86034	86094	86153	86213	86273	6	12	18	24	30	36	42	48	54
73	86332	86392	86451	86510	86570	86629	86688	86747	86806	86864	6	12	18	24	30	35	41	47	53
74	86923	86982	87040	87099	87157	87216	87274	87332	87390	87448	6	12	17	23	29	35	41	46	52
75	87506	87564	87622	87679	87737	87795	87852	87910	87967	88024	6	12	17	23	29	35	41	46	52
76	88081	88138	88195	88252	88309	88366	88423	88480	88536	88593	6	11	17	23	29	34	40	46	51
77	88649	88705	88762	88818	88874	88930	88986	89042	89098	89154	6	11	17	22	28	34	39	45	50
78	89209	89265	89321	89376	89432	89487	89542	89597	89653	89708	6	11	17	22	28	33	39	44	50
79	89763	89818	89873	89927	89982	90037	90091	90146	90200	90255	6	11	17	22	28	33	39	44	50
80	90309	90363	90417	90472	90526	90580	90634	90687	90741	90795	5	11	16	22	27	32	38	43	49
81	90849	90902	90956	91009	91062	91116	91169	91222	91275	91328	5	11	16	21	27	32	37	42	48
82	91381	91434	91487	91540	91593	91645	91698	91751	91803	91855	5	11	16	21	27	32	37	42	48
83	91908	91960	92012	92065	92117	92169	92221	92273	92324	92376	5	10	16	21	26	31	36	42	47
84	92428	92480	92531	92583	92634	92686	92737	92788	92840	92891	5	10	15	20	26	31	36	41	46
85	92942	92993	93044	93095	93146	93197	93247	93298	93349	93399	5	10	15	20	26	31	36	41	46
86	93450	93500	93551	93601	93651	93702	93752	93802	93852	93902	5	10	15	20	25	30	35	40	45
87	93952	94002	94052	94101	94151	94201	94250	94300	94349	94399	5	10	15	20	25	30	35	40	45
88	94448	94498	94547	94596	94645	94694	94743	94792	94841	94890	5	10	15	20	25	29	34	39	44
89	94939	94988	95036	95085	95134	95182	95231	95279	95328	95376	5	10	15	20	25	29	34	39	44
90	95424	95472	95521	95569	95617	95665	95713	95761	95809	95856	5	10	14	19	24	29	34	38	43
91	95904	95952	95999	96047	96095	96142	96190	96237	96284	96332	5	9	14	19	24	28	33	38	42
92	96379	96426	96473	96520	96567	96614	96661	96708	96755	96802	5	9	14	19	24	28	33	38	42
93	96848	96895	96942	96988	97035	97081	97128	97174	97220	97267	5	9	14	18	23	28	32	37	41
94	97313	97359	97405	97451	97497	97543	97589	97635	97681	97727	5	9	14	18	23	28	32	37	41
95	97772	97818	97864	97909	97955	98000	98046	98091	98137	98182	5	9	14	18	23	27	32	36	41
96	98227	98272	98318	98363	98408	98453	98498	98543	98588	98632	5	9	14	18	23	27	32	36	41
97	98677	98722	98767	98811	98856	98900	98945	98989	99034	99078	5	9	14	18	23	27	32	36	41
98	99123	99167	99211	99255	99300	99344	99388	99432	99476	99520	4	9	13	18	22	26	31	35	40
99	99564	99607	99651	99695	99739	99782	99826	99870	99913	99957	4	9	13	17	22	26	30	34	39
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**

MEAN DIFFERENCES.

II.—ANTILOGARITHMS.

	0	1	2	3	4	5	6	7	8	9	Mean Differences. 1	2	3	4	5	6	7	8	9
0·00	10000	10023	10046	10069	10093	10116	10139	10162	10186	10209	2	5	7	9	12	14	16	19	21
0·01	10233	10257	10280	10304	10328	10351	10375	10399	10423	10447	2	5	7	10	12	14	17	19	21
0·02	10471	10495	10520	10544	10568	10593	10617	10641	10666	10691	2	5	7	10	12	15	17	19	22
0·03	10715	10740	10765	10789	10814	10839	10864	10889	10914	10940	3	5	8	10	13	15	18	20	23
0·04	10965	10990	11015	11041	11066	11092	11117	11143	11169	11194	3	5	8	10	13	15	18	20	23
0·05	11220	11246	11272	11298	11324	11350	11376	11402	11429	11455	3	5	8	11	13	16	18	21	24
0·06	11482	11508	11535	11561	11588	11614	11641	11668	11695	11722	3	5	8	11	13	16	19	21	24
0·07	11749	11776	11803	11830	11858	11885	11912	11940	11967	11995	3	5	8	11	14	16	19	22	25
0·08	12023	12050	12078	12106	12134	12162	12190	12218	12246	12274	3	6	8	11	14	17	20	22	25
0·09	12303	12331	12359	12388	12417	12445	12474	12503	12531	12560	3	6	9	11	14	17	20	23	26
0·10	12589	12618	12647	12677	12706	12735	12764	12794	12823	12853	3	6	9	12	15	18	21	24	26
0·11	12882	12912	12942	12972	13002	13032	13062	13092	13122	13152	3	6	9	12	15	18	21	24	27
0·12	13183	13213	13243	13274	13305	13335	13366	13397	13428	13459	3	6	9	12	15	18	21	25	28
0·13	13490	13521	13552	13583	13614	13646	13677	13709	13740	13772	3	6	9	13	16	19	22	25	28
0·14	13804	13836	13868	13900	13932	13964	13996	14028	14060	14093	3	6	10	13	16	19	22	26	29
0·15	14125	14158	14191	14223	14256	14289	14322	14355	14388	14421	3	7	10	13	16	20	23	26	30
0·16	14454	14488	14521	14555	14588	14622	14655	14689	14723	14757	3	7	10	13	17	20	24	27	30
0·17	14791	14825	14859	14894	14928	14962	14997	15031	15066	15101	3	7	10	14	17	21	24	28	31
0·18	15136	15171	15205	15241	15276	15311	15346	15382	15417	15453	4	7	11	14	18	21	25	28	32
0·19	15488	15524	15560	15596	15631	15668	15704	15740	15776	15812	4	7	11	14	18	22	25	29	32
0·20	15849	15885	15922	15959	15996	16032	16069	16106	16144	16181	4	7	11	15	18	22	26	30	33
0·21	16218	16255	16293	16331	16368	16406	16444	16482	16520	16558	4	8	11	15	19	23	26	30	34
0·22	16596	16634	16672	16711	16749	16788	16827	16866	16904	16943	4	8	12	15	19	23	27	31	35
0·23	16982	17022	17061	17100	17140	17179	17219	17258	17298	17338	4	8	12	16	20	24	28	32	35
0·24	17378	17418	17458	17498	17539	17579	17620	17660	17701	17742	4	8	12	16	20	24	28	32	36
0·25	17783	17824	17865	17906	17947	17989	18030	18072	18113	18155	4	8	12	17	21	25	29	33	37
0·26	18197	18239	18281	18323	18365	18408	18450	18493	18535	18578	4	8	13	17	21	25	30	34	38
0·27	18621	18664	18707	18750	18793	18836	18880	18923	18967	19011	4	9	13	17	22	26	30	35	39
0·28	19055	19099	19143	19187	19231	19275	19320	19364	19409	19454	4	9	13	18	22	26	31	35	40
0·29	19498	19543	19588	19634	19679	19724	19770	19815	19861	19907	5	9	14	18	23	27	32	36	41

0·30	19958	19999	20045	20091	20137	20184	20230	20277	20324	20370	5	9	14	19	23	28	32	37	42
0·31	20417	20464	20512	20559	20606	20654	20701	20749	20797	20845	5	10	14	19	24	29	33	38	43
0·32	20893	20941	20989	21038	21086	21135	21184	21232	21281	21330	5	10	15	19	24	29	34	39	44
0·33	21380	21429	21478	21528	21577	21627	21677	21727	21777	21827	5	10	15	20	25	30	35	40	45
0·34	21878	21928	21979	22029	22080	22131	22182	22233	22284	22336	5	10	15	20	25	31	36	41	46
0·35	22387	22439	22491	22542	22594	22646	22699	22751	22803	22856	5	10	16	21	26	31	37	42	47
0·36	22909	22961	23014	23067	23121	23174	23227	23281	23335	23388	5	11	16	21	27	32	37	43	48
0·37	23442	23496	23550	23605	23659	23714	23768	23823	23878	23933	5	11	16	22	27	33	38	44	49
0·38	23988	24044	24099	24155	24210	24266	24322	24378	24434	24491	6	11	17	22	28	34	39	45	50
0·39	24547	24604	24660	24717	24774	24831	24889	24946	25003	25061	6	11	17	23	29	34	40	46	51
0·40	25119	25177	25235	25293	25351	25410	25468	25527	25586	25645	6	12	18	23	29	35	41	47	53
0·41	25704	25763	25823	25882	25942	26002	26062	26122	26182	26242	6	12	18	24	30	36	42	48	54
0·42	26303	26363	26424	26485	26546	26607	26669	26730	26792	26853	6	12	18	24	31	37	43	49	55
0·43	26915	26977	27040	27102	27164	27227	27290	27353	27416	27479	6	13	19	25	31	38	44	50	56
0·44	27542	27606	27669	27733	27797	27861	27925	27990	28054	28119	6	13	19	26	32	39	45	51	58
0·45	28184	28249	28314	28379	28445	28510	28576	28642	28708	28774	7	13	20	26	33	39	46	52	59
0·46	28840	28907	28973	29040	29107	29174	29242	29309	29376	29444	7	13	20	27	34	40	47	54	60
0·47	29512	29580	29648	29717	29785	29854	29923	29992	30061	30130	7	14	21	28	34	41	48	55	62
0·48	30200	30269	30339	30409	30479	30549	30620	30690	30761	30832	7	14	21	28	35	42	49	56	63
0·49	30903	30974	31046	31117	31189	31261	31333	31405	31477	31550	7	14	22	29	36	43	50	58	65
0·50	31623	31696	31769	31842	31915	31989	32063	32137	32211	32285	7	15	22	29	37	44	52	59	66
0·51	32359	32434	32509	32584	32659	32734	32810	32885	32961	33037	8	15	23	30	38	45	53	60	68
0·52	33113	33189	33266	33343	33420	33497	33574	33651	33729	33806	8	15	23	31	39	46	54	62	69
0·53	33884	33963	34041	34119	34198	34277	34356	34435	34514	34594	8	16	24	32	40	47	55	63	71
0·54	34674	34754	34834	34914	34995	35075	35156	35237	35318	35400	8	16	24	32	40	48	56	65	73
0·55	35481	35563	35645	35727	35810	35892	35975	36058	36141	36224	8	16	25	33	41	50	58	66	74
0·56	36308	36392	36475	36559	36644	36728	36813	36898	36983	37068	8	17	25	34	42	51	59	68	76
0·57	37154	37239	37325	37411	37497	37584	37670	37757	37844	37931	9	17	26	35	43	52	61	69	78
0·58	38019	38107	38194	38282	38371	38459	38548	38637	38726	38815	9	18	27	35	44	53	62	71	80
0·59	38905	38994	39084	39174	39264	39355	39446	39537	39628	39719	9	18	27	36	45	54	63	72	82
0·60	39811	39902	39994	40087	40179	40272	40365	40458	40551	40644	9	18	28	37	46	56	65	74	83
0·61	40738	40832	40926	41020	41115	41210	41305	41400	41495	41591	9	19	28	38	47	57	66	76	85
0·62	41687	41783	41879	41976	42073	42170	42267	42364	42462	42560	10	19	29	39	49	58	68	78	87
0·63	42658	42756	42855	42954	43053	43152	43251	43351	43451	43551	10	20	30	40	50	60	70	80	89
0·64	43652	43752	43853	43954	44055	44157	44259	44361	44463	44566	10	20	30	41	51	61	71	81	91
	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9

MEAN DIFFERENCES.

	0	1	2	3	4	5	6	7	8	9	Mean Differences. 1	2	3	4	5	6	7	8	9
0·85	44668	44771	44875	44978	45082	45186	45290	45394	45499	45604	10	21	31	42	52	62	73	83	94
0·86	45709	45814	45920	46026	46132	46238	46345	46452	46559	46666	11	21	32	43	53	64	75	85	96
0·87	46774	46881	46989	47098	47206	47315	47424	47534	47643	47753	11	22	33	44	54	65	76	87	98
0·88	47863	47973	48084	48195	48306	48417	48529	48641	48753	48865	11	22	33	45	57	67	78	89	100
0·89	48978	49091	49204	49317	49431	49545	49659	49774	49888	50003	11	23	34	46	57	68	80	91	103
0·70	50119	50234	50350	50466	50582	50699	50816	50933	51051	51168	12	23	35	47	58	70	81	93	105
0·71	51286	51404	51523	51642	51761	51880	52000	52119	52240	52360	12	24	36	48	60	72	83	96	108
0·72	52481	52602	52723	52845	52966	53088	53211	53333	53456	53580	12	24	37	49	61	73	85	98	110
0·73	53703	53827	53951	54075	54200	54325	54450	54576	54702	54828	13	25	38	50	63	75	88	100	113
0·74	54954	55081	55208	55335	55463	55590	55719	55847	55976	56105	13	26	38	51	64	77	90	102	115
0·75	56234	56364	56494	56624	56754	56885	57016	57148	57280	57412	13	26	39	52	66	79	92	105	118
0·76	57544	57677	57810	57943	58076	58210	58345	58479	58614	58749	13	27	40	54	67	80	94	107	121
0·77	58884	59020	59156	59293	59429	59566	59704	59841	59979	60117	14	27	41	55	69	82	96	110	123
0·78	60256	60395	60534	60674	60814	60954	61094	61235	61376	61518	14	28	42	56	70	84	98	112	126
0·79	61660	61802	61944	62087	62230	62373	62517	62661	62806	62951	14	29	43	58	72	86	101	115	130
0·80	63096	63241	63387	63533	63680	63826	63973	64121	64269	64417	15	29	44	59	74	88	103	118	132
0·81	64565	64714	64863	65013	65163	65313	65464	65615	65766	65917	15	30	45	60	75	90	105	120	135
0·82	66069	66222	66374	66527	66681	66834	66988	67143	67298	67453	15	31	46	62	77	92	108	123	139
0·83	67608	67764	67920	68077	68234	68391	68549	68707	68865	69024	16	32	47	63	79	95	110	126	142
0·84	69183	69343	69502	69663	69823	69984	70146	70307	70469	70632	16	32	48	64	81	97	113	129	145
0·85	70795	70958	71121	71285	71450	71614	71779	71945	72111	72277	17	33	50	66	83	99	116	132	149
0·86	72444	72611	72778	72946	73114	73282	73451	73621	73790	73961	17	34	51	68	85	101	118	135	152
0·87	74131	74302	74473	74645	74817	74989	75162	75336	75509	75683	17	35	52	69	87	104	121	138	156
0·88	75858	76033	76208	76384	76560	76736	76913	77090	77268	77446	18	36	53	71	89	107	125	142	160
0·89	77625	77804	77983	78163	78343	78524	78705	78886	79068	79250	18	36	54	72	91	109	127	145	163
0·90	79433	79616	79799	79983	80168	80353	80538	80724	80910	81096	19	37	56	74	93	111	130	148	167
0·91	81283	81470	81658	81846	82035	82224	82414	82604	82794	82985	19	38	57	76	95	113	132	151	170
0·92	83176	83368	83560	83753	83946	84140	84333	84528	84723	84918	19	39	58	78	97	116	136	155	175
0·93	85114	85310	85507	85704	85901	86099	86298	86497	86696	86896	20	40	59	79	99	119	139	158	178
0·94	87096	87297	87498	87700	87902	88105	88308	88512	88716	88920	20	41	61	81	102	122	142	162	183
0·95	89125	89331	89536	89743	89950	90157	90365	90573	90782	90991	21	42	62	83	104	125	146	166	187
0·96	91201	91411	91622	91833	92045	92257	92470	92683	92897	93111	21	42	64	85	106	127	149	170	191
0·97	93325	93541	93756	93972	94189	94406	94624	94842	95060	95280	22	43	65	87	109	130	152	174	195
0·98	95499	95719	95940	96161	96383	96605	96828	97051	97275	97499	22	44	67	89	111	133	155	178	200
0·99	97724	97949	98175	98401	98628	98855	99083	99312	99541	99770	23	46	68	91	114	137	160	182	205

SINES.

33′	36′	39′	42′	45′	48′	51′	54′	57′	60′	°	Mean Diff. 1′	2′
·00960	·01047	·01134	·01222	·01309	·01396	·01483	·01571	·01658	·01745	89	29	58
·02705	·02792	·02879	·02967	·03054	·03141	·03228	·03316	·03403	·03490	88	29	58
·04449	·04536	·04623	·04711	·04798	·04885	·04972	·05059	·05146	·05234	87	29	58
·06192	·06279	·06366	·06453	·06540	·06627	·06714	·06802	·06889	·06976	86	29	58
·07933	·08020	·08107	·08194	·08281	·08368	·08455	·08542	·08629	·08716	85	29	58
·09671	·09758	·09845	·09932	·10019	·10106	·10192	·10279	·10366	·10453	84	29	58
·11407	·11494	·11580	·11667	·11754	·11840	·11927	·12014	·12100	·12187	83	29	58
·13139	·13226	·13312	·13399	·13485	·13572	·13658	·13744	·13831	·13917	82	29	58
·14867	·14954	·15040	·15126	·15212	·15299	·15385	·15471	·15557	·15643	81	29	58
·16591	·16677	·16763	·16849	·16935	·17021	·17107	·17193	·17279	·17365	80	29	57
·18309	·18395	·18481	·18567	·18652	·18738	·18824	·18910	·18995	·19081	79	29	57
·20022	·20108	·20193	·20279	·20364	·20450	·20535	·20620	·20706	·20791	78	29	57
·21729	·21814	·21899	·21985	·22070	·22155	·22240	·22325	·22410	·22495	77	28	57
·23429	·23514	·23599	·23684	·23769	·23853	·23938	·24023	·24108	·24192	76	28	57
·25122	·25207	·25291	·25376	·25460	·25545	·25629	·25713	·25798	·25882	75	28	56
·26808	·26892	·26976	·27060	·27144	·27228	·27312	·27396	·27480	·27564	74	28	56
·28485	·28569	·28652	·28736	·28820	·28903	·28987	·29070	·29154	·29237	73	28	56
·30154	·30237	·30320	·30403	·30486	·30570	·30653	·30736	·30819	·30902	72	28	55
·31813	·31896	·31979	·32061	·32144	·32227	·32309	·32392	·32474	·32557	71	28	55
·33463	·33545	·33627	·33710	·33792	·33874	·33956	·34038	·34120	·34202	70	27	55
·35102	·35184	·35266	·35347	·35429	·35511	·35592	·35674	·35755	·35837	69	27	54
·36731	·36812	·36894	·36975	·37056	·37137	·37218	·37299	·37380	·37461	68	27	54
·38349	·38430	·38510	·38591	·38671	·38752	·38832	·38912	·38993	·39073	67	27	54
·39955	·40035	·40115	·40195	·40275	·40355	·40434	·40514	·40594	·40674	66	27	53
·41549	·41628	·41707	·41787	·41866	·41945	·42024	·42104	·42183	·42262	65	26	53
·43130	·43209	·43287	·43366	·43445	·43523	·43602	·43680	·43759	·43837	64	26	52
·44698	·44776	·44854	·44932	·45010	·45088	·45166	·45243	·45321	·45399	63	26	52
·46252	·46330	·46407	·46484	·46561	·46639	·46716	·46793	·46870	·46947	62	26	51
·47793	·47869	·47946	·48022	·48099	·48175	·48252	·48328	·48405	·48481	61	26	51
·49318	·49394	·49470	·49546	·49622	·49697	·49773	·49849	·49924	·50000	60	25	51
·50829	·50904	·50979	·51054	·51129	·51204	·51279	·51354	·51429	·51504	59	25	50
·52324	·52399	·52473	·52547	·52621	·52696	·52770	·52844	·52918	·52992	58	25	50
·53804	·53877	·53951	·54024	·54097	·54171	·54244	·54317	·54391	·54464	57	24	49
·55266	·55339	·55412	·55484	·55557	·55630	·55702	·55775	·55847	·55919	56	24	48
·56713	·56784	·56856	·56928	·57000	·57071	·57143	·57215	·57286	·57358	55	24	48
·58141	·58212	·58283	·58354	·58425	·58496	·58567	·58637	·58708	·58779	54	24	47
·59552	·59622	·59693	·59763	·59832	·59902	·59972	·60042	·60112	·60182	53	23	47
·60945	·61015	·61084	·61153	·61222	·61291	·61360	·61429	·61497	·61566	52	23	46
·62320	·62388	·62456	·62524	·62592	·62660	·62728	·62796	·62864	·62932	51	23	45
·63675	·63742	·63810	·63877	·63944	·64011	·64078	·64145	·64212	·64279	50	22	45
·65011	·65077	·65144	·65210	·65276	·65342	·65408	·65474	·65540	·65606	49	22	44
·66327	·66393	·66458	·66523	·66588	·66653	·66718	·66783	·66848	·66913	48	22	43
·67623	·67688	·67752	·67816	·67880	·67944	·68008	·68072	·68136	·68200	47	21	43
·68899	·68962	·69025	·69088	·69151	·69214	·69277	·69340	·69403	·69466	46	21	42
·70153	·70215	·70277	·70339	·70401	·70463	·70525	·70587	·70649	·70711	45	21	41
27′	24′	21′	18′	15′	12′	9′	6′	3′	0′	°	1′	2′

COSINES.

Mean Diff.

NATURAL

°	0′	3′	6′	9′	12′	15′	18′	21′	24′	27′	30′	Mean Diff. 1′	Mean Diff. 2′
45	·70711	·70772	·70834	·70896	·70957	·71019	·71080	·71141	·71203	·71264	·71325	20	41
46	·71934	·71995	·72055	·72116	·72176	·72236	·72297	·72357	·72417	·72477	·72537	20	40
47	·73135	·73195	·73254	·73314	·73373	·73432	·73491	·73551	·73610	·73669	·73728	20	40
48	·74314	·74373	·74431	·74489	·74548	·74606	·74664	·74722	·74780	·74838	·74896	20	39
49	·75471	·75528	·75585	·75642	·75700	·75756	·75813	·75870	·75927	·75984	·76041	19	38
50	·76604	·76661	·76717	·76772	·76828	·76884	·76940	·76996	·77051	·77107	·77162	19	37
51	·77715	·77769	·77824	·77879	·77934	·77988	·78043	·78098	·78152	·78206	·78261	18	36
52	·78801	·78855	·78908	·78962	·79016	·79069	·79122	·79176	·79229	·79282	·79335	18	36
53	·79864	·79916	·79968	·80021	·80073	·80125	·80178	·80230	·80282	·80334	·80386	17	35
54	·80902	·80953	·81004	·81055	·81106	·81157	·81208	·81259	·81310	·81361	·81412	17	34
55	·81915	·81965	·82015	·82065	·82115	·82165	·82214	·82264	·82314	·82363	·82413	17	33
56	·82904	·82953	·83001	·83050	·83098	·83147	·83195	·83244	·83292	·83340	·83389	16	32
57	·83867	·83915	·83962	·84009	·84057	·84104	·84151	·84198	·84245	·84292	·84339	16	31
58	·84805	·84851	·84897	·84943	·84989	·85035	·85081	·85127	·85173	·85218	·85264	15	31
59	·85717	·85762	·85806	·85851	·85896	·85941	·85985	·86030	·86074	·86119	·86163	15	30
60	·86603	·86646	·86690	·86733	·86777	·86820	·86863	·86906	·86949	·86993	·87036	14	29
61	·87462	·87504	·87546	·87589	·87631	·87673	·87715	·87756	·87798	·87840	·87882	14	28
62	·88295	·88336	·88377	·88417	·88458	·88499	·88539	·88580	·88620	·88661	·88701	14	27
63	·89101	·89140	·89180	·89219	·89259	·89298	·89337	·89376	·89415	·89454	·89493	13	26
64	·89879	·89918	·89956	·89994	·90032	·90070	·90108	·90146	·90183	·90221	·90259	13	25
65	·90631	·90668	·90704	·90741	·90778	·90814	·90851	·90887	·90924	·90960	·90996	12	24
66	·91355	·91390	·91425	·91461	·91496	·91531	·91566	·91601	·91636	·91671	·91706	12	23
67	·92050	·92085	·92119	·92152	·92186	·92220	·92254	·92287	·92321	·92355	·92388	11	23
68	·92718	·92751	·92784	·92816	·92849	·92881	·92913	·92945	·92978	·93010	·93042	11	22
69	·93358	·93389	·93420	·93452	·93483	·93514	·93544	·93575	·93606	·93637	·93667	10	21
70	·93969	·93999	·94029	·94058	·94088	·94118	·94147	·94176	·94206	·94235	·94264	10	20
71	·94552	·94580	·94609	·94637	·94665	·94693	·94721	·94749	·94777	·94805	·94832	9	19
72	·95106	·95133	·95159	·95186	·95213	·95240	·95266	·95293	·95319	·95345	·95372	9	18
73	·95630	·95656	·95681	·95707	·95732	·95757	·95782	·95807	·95832	·95857	·95882	8	17
74	·96126	·96150	·96174	·96198	·96222	·96246	·96269	·96293	·96316	·96340	·96363	8	16
75	·96593	·96615	·96638	·96660	·96682	·96705	·96727	·96749	·96771	·96793	·96815	7	15
76	·97030	·97051	·97072	·97093	·97113	·97134	·97155	·97176	·97196	·97217	·97237	7	14
77	·97437	·97457	·97476	·97496	·97515	·97534	·97553	·97573	·97592	·97611	·97630	6	13
78	·97815	·97833	·97851	·97869	·97887	·97905	·97922	·97940	·97958	·97975	·97992	6	12
79	·98163	·98179	·98196	·98212	·98229	·98245	·98261	·98277	·98294	·98310	·98325	5	11
80	·98481	·98496	·98511	·98526	·98541	·98556	·98570	·98585	·98600	·98614	·98629	5	10
81	·98769	·98782	·98796	·98809	·98823	·98836	·98849	·98863	·98876	·98889	·98902	4	9
82	·99027	·99039	·99051	·99063	·99075	·99087	·99098	·99110	·99122	·99133	·99144	4	8
83	·99255	·99265	·99276	·99286	·99297	·99307	·99317	·99327	·99337	·99347	·99357	3	7
84	·99452	·99461	·99470	·99479	·99488	·99497	·99506	·99514	·99523	·99531	·99540	3	6
85	·99619	·99627	·99635	·99642	·99649	·99657	·99664	·99671	·99678	·99685	·99692	2	5
86	·99756	·99762	·99768	·99774	·99780	·99786	·99792	·99797	·99803	·99808	·99813	2	4
87	·99863	·99867	·99872	·99876	·99881	·99885	·99889	·99893	·99897	·99901	·99905	1	3
88	·99939	·99942	·99945	·99948	·99951	·99953	·99956	·99959	·99961	·99963	·99966	1	2
89	·99985	·99986	·99988	·99989	·99990	·99991	·99993	·99994	·99995	·99995	·99996	0	1
°	60′	57′	54′	51′	48′	45′	42′	39′	36′	33′	30′	1′	2′

NATURAL

Mean Diff.

SINES—*continued.*

33′	36′	39′	42′	45′	48′	51′	54′	57′	60′	°	Mean Diff. 1′	2′
·71386	·71447	·71508	·71569	·71630	·71691	·71752	·71813	·71873	·71934	44	20	41
·72597	·72657	·72717	·72777	·72837	·72897	·72957	·73016	·73076	·73135	43	20	40
·73787	·73846	·73904	·73963	·74022	·74080	·74139	·74198	·74256	·74314	42	20	39
·74953	·75011	·75069	·75126	·75184	·75241	·75299	·75356	·75414	·75471	41	19	38
·76097	·76154	·76210	·76267	·76323	·76380	·76436	·76492	·76548	·76604	40	19	38
·77218	·77273	·77329	·77384	·77439	·77494	·77550	·77605	·77660	·77715	39	18	37
·78315	·78369	·78424	·78478	·78532	·78586	·78640	·78694	·78747	·78801	38	18	36
·79388	·79441	·79494	·79547	·79600	·79653	·79706	·79758	·79811	·79864	37	18	35
·80438	·80489	·80541	·80593	·80644	·80696	·80748	·80799	·80850	·80902	36	17	34
·81462	·81513	·81563	·81614	·81664	·81714	·81765	·81815	·81865	·81915	35	17	34
·82462	·82511	·82561	·82610	·82659	·82708	·82757	·82806	·82855	·82904	34	16	33
·83437	·83485	·83533	·83581	·83629	·83676	·83724	·83772	·83819	·83867	33	16	32
·84386	·84433	·84480	·84526	·84573	·84619	·84666	·84712	·84759	·84805	32	16	31
·85310	·85355	·85401	·85446	·85491	·85536	·85582	·85627	·85672	·85717	31	15	30
·86207	·86251	·86295	·86340	·86384	·86427	·86471	·86515	·86559	·86603	30	15	29
·87079	·87121	·87164	·87207	·87250	·87292	·87335	·87377	·87420	·87462	29	14	28
·87923	·87965	·88006	·88048	·88089	·88130	·88172	·88213	·88254	·88295	28	14	28
·88741	·88782	·88822	·88862	·88902	·88942	·88981	·89021	·89061	·89101	27	13	27
·89532	·89571	·89610	·89649	·89687	·89726	·89764	·89803	·89841	·89879	26	13	26
·90296	·90334	·90371	·90408	·90446	·90483	·90520	·90557	·90594	·90631	25	12	25
·91032	·91068	·91104	·91140	·91176	·91212	·91248	·91283	·91319	·91355	24	12	24
·91741	·91775	·91810	·91845	·91879	·91914	·91948	·91982	·92016	·92050	23	11	23
·92421	·92455	·92488	·92521	·92554	·92587	·92620	·92653	·92686	·92718	22	11	22
·93074	·93106	·93137	·93169	·93201	·93232	·93264	·93295	·93327	·93358	21	10	21
·93698	·93728	·93759	·93789	·93819	·93849	·93879	·93909	·93939	·93969	20	10	20
·94293	·94322	·94351	·94380	·94409	·94438	·94466	·94495	·94523	·94552	19	10	19
·94860	·94888	·94915	·94943	·94970	·94997	·95024	·95052	·95079	·95106	18	9	18
·95398	·95424	·95450	·95476	·95502	·95528	·95554	·95579	·95605	·95630	17	9	17
·95907	·95931	·95956	·95981	·96005	·96029	·96054	·96078	·96102	·96126	16	8	16
·96386	·96410	·96433	·96456	·96479	·96502	·96524	·96547	·96570	·96593	15	8	15
·96837	·96858	·96880	·96902	·96923	·96945	·96966	·96987	·97008	·97030	14	7	14
·97257	·97278	·87298	·97318	·97338	·97358	·97378	·97398	·97417	·97437	13	7	13
·97648	·97667	·97686	·97705	·97723	·97742	·97760	·97778	·97797	·97815	12	6	12
·98010	·98027	·98044	·98061	·98079	·98096	·98112	·98129	·98146	·98163	11	6	11
·98341	·98357	·98373	·98389	·98404	·98420	·98435	·98450	·98466	·98481	10	5	10
·98643	·98657	·98671	·98686	·98700	·98714	·98728	·98741	·98755	·98769	9	5	9
·98914	·98927	·98940	·98953	·98965	·98978	·98990	·99002	·99015	·99027	8	4	8
·99156	·99167	·99178	·99189	·99200	·99211	·99222	·99233	·99244	·99255	7	4	7
·99367	·99377	·99386	·99396	·99406	·99415	·99424	·99434	·99443	·99452	6	3	6
·99548	·99556	·99564	·99572	·99580	·99588	·99596	·99604	·99612	·99619	5	3	5
·99699	·99705	·99712	·99719	·99725	·99731	·99738	·99744	·99750	·99756	4	2	4
·99819	·99824	·99829	·99834	·99839	·99844	·99849	·99854	·99858	·99863	3	2	3
·99909	·99912	·99916	·99919	·99923	·99926	·99930	·99933	·99936	·99939	2	1	2
·99968	·99970	·99972	·99974	·99976	·99978	·99980	·99982	·99983	·99985	1	1	1
·99997	·99998	·99998	·99999	·99999	·99999	1·00000	1·00000	1·00000	1·00000	0	0	0
27′	24′	21′	18′	15′	12′	9′	6′	3′	0′	°	Mean Diff. 1′	2′

COSINES.

XII.—NATURAL

°	0′	3′	6′	9′	12′	15′	18′	21′	24′	27′	30′	Mean Diff. 1′	Mean Diff. 2′
0	·00000	·00087	·00175	·00262	·00349	·00436	·00524	·00611	·00698	·00785	·00873	29	58
1	·01746	·01833	·01920	·02007	·02095	·02182	·02269	·02357	·02444	·02531	·02619	29	58
2	·03492	·03579	·03667	·03754	·03842	·03929	·04016	·04104	·04191	·04279	·04366	29	58
3	·05241	·05328	·05416	·05503	·05591	·05678	·05766	·05854	·05941	·06029	·06116	29	58
4	·06993	·07080	·07168	·07256	·07344	·07431	·07519	·07607	·07695	·07782	·07870	29	58
5	·08749	·08837	·08925	·09013	·09101	·09189	·09277	·09365	·09453	·09541	·09629	29	59
6	·10510	·10599	·10687	·10775	·10863	·10952	·11040	·11128	·11217	·11305	·11394	29	59
7	·12278	·12367	·12456	·12544	·12633	·12722	·12810	·12899	·12988	·13076	·13165	30	59
8	·14054	·14143	·14232	·14321	·14410	·14499	·14588	·14678	·14767	·14856	·14945	30	59
9	·15838	·15928	·16017	·16107	·16196	·16286	·16376	·16465	·16555	·16645	·16734	30	60
10	·17633	·17723	·17813	·17903	·17993	·18083	·18173	·18263	·18353	·18444	·18534	30	60
11	·19438	·19529	·19619	·19710	·19801	·19891	·19982	·20073	·20164	·20254	·20345	30	60
12	·21256	·21347	·21438	·21529	·21621	·21712	·21804	·21895	·21986	·22078	·22169	30	61
13	·23087	·23179	·23271	·23363	·23455	·23547	·23639	·23731	·23823	·23916	·24008	31	61
14	·24933	·25026	·25118	·25211	·25304	·25397	·25490	·25583	·25676	·25769	·25862	31	62
15	·26795	·26888	·26982	·27076	·27169	·27263	·27357	·27451	·27545	·27638	·27732	31	62
16	·28675	·28769	·28864	·28958	·29053	·29147	·29242	·29337	·29432	·29526	·29621	32	63
17	·30573	·30669	·30764	·30860	·30955	·31051	·31147	·31242	·31338	·31434	·31530	32	64
18	·32492	·32588	·32685	·32782	·32878	·32975	·33072	·33169	·33266	·33363	·33460	32	65
19	·34433	·34530	·34628	·34726	·34824	·34922	·35020	·35118	·35216	·35314	·35412	33	65
20	·36397	·36496	·36595	·36694	·36793	·36892	·36991	·37090	·37190	·37289	·37388	33	66
21	·38386	·38487	·38587	·38687	·38787	·38888	·38988	·39089	·39190	·39290	·39391	34	67
22	·40403	·40504	·40606	·40707	·40809	·40911	·41013	·41115	·41217	·41319	·41421	34	68
23	·42447	·42551	·42654	·42757	·42860	·42963	·43067	·43170	·43274	·43378	·43181	34	69
24	·44523	·44627	·44732	·44837	·44942	·45047	·45152	·45257	·45362	·45467	·45573	35	70
25	·46631	·46737	·46843	·46950	·47056	·47163	·47270	·47377	·47483	·47590	·47698	36	71
26	·48773	·48881	·48989	·49098	·49206	·49315	·49423	·49532	·49640	·49749	·49858	36	72
27	·50953	·51063	·51173	·51283	·51393	·51503	·51614	·51724	·51835	·51946	·52057	37	73
28	·53171	·53283	·53395	·53507	·53620	·53732	·53844	·53957	·54070	·54183	·54296	37	75
29	·55431	·55545	·55659	·55774	·55888	·56003	·56117	·56232	·56347	·56462	·56577	38	77
30	·57735	·57851	·57968	·58085	·58201	·58318	·58435	·58552	·58670	·58787	·58905	39	78
31	·60086	·60205	·60324	·60443	·60562	·60681	·60801	·60921	·61040	·61160	·61280	40	79
32	·62487	·62608	·62730	·62852	·62973	·63095	·63217	·63340	·63462	·63584	·63707	41	81
33	·64941	·65065	·65189	·65314	·65438	·65563	·65688	·65813	·65938	·66063	·66189	42	83
34	·67451	·67578	·67705	·67832	·67960	·68088	·68215	·68343	·68471	·68600	·68728	43	85
35	·70021	·70151	·70281	·70412	·70542	·70673	·70804	·70935	·71066	·71198	·71329	44	87
36	·72654	·72788	·72921	·73055	·73189	·73323	·73457	·73592	·73726	·73861	·73996	45	89
37	·75355	·75492	·75629	·75767	·75904	·76042	·76180	·76318	·76456	·76594	·76733	46	92
38	·78129	·78269	·78410	·78551	·78692	·78834	·78975	·79117	·79259	·79401	·79544	47	95
39	·80978	·81123	·81268	·81413	·81558	·81703	·81849	·81995	·82141	·82287	·82434	48	97
40	·83910	·84059	·84208	·84357	·84507	·84656	·84806	·84956	·85107	·85257	·85408	50	99
41	·86929	·87082	·87236	·87389	·87543	·87698	·87852	·88007	·88162	·88317	·88473	52	103
42	·90040	·90199	·90357	·90516	·90674	·90834	·90993	·91153	·91313	·91473	·91633	53	107
43	·93252	·93415	·93578	·93742	·93906	·94071	·94235	·94400	·94565	·94731	·94896	55	110
44	·96569	·96738	·96907	·97076	·97246	·97416	·97586	·97756	·97927	·98098	·98270	57	113
°	60′	57′	54′	51′	48′	45′	42′	39′	36′	33′	30′	1′	2′

NATURAL

TANGENTS.

33'	36'	39'	42'	45'	48'	51'	54'	57'	60'	°	Mean Diff. 1'	2'
·00960	·01047	·01135	·01222	·01309	·01396	·01484	·01571	·01658	·01746	89	29	58
·02706	·02793	·02881	·02968	·03055	·03143	·03230	·03317	·03405	·03492	88	29	58
·04454	·04541	·04628	·04716	·04803	·04891	·04978	·05066	·05153	·05241	87	29	58
·06204	·06291	·06379	·06467	·06554	·06642	·06730	·06817	·06905	·06993	86	29	58
·07958	·08046	·08134	·08221	·08309	·08397	·08485	·08573	·08661	·08749	85	29	59
·09717	·09805	·09893	·09981	·10069	·10158	·10246	·10334	·10422	·10510	84	29	59
·11482	·11570	·11659	·11747	·11836	·11924	·12013	·12101	·12190	·12278	83	29	59
·13254	·13343	·13432	·13521	·13609	·13698	·13787	·13876	·13965	·14054	82	30	59
·15034	·15124	·15213	·15302	·15391	·15481	·15570	·15660	·15749	·15838	81	30	60
·16824	·16914	·17004	·17093	·17183	·17273	·17363	·17453	·17543	·17633	80	30	60
·18624	·18714	·18805	·18895	·18986	·19076	·19166	·19257	·19347	·19438	79	30	60
·20436	·20527	·20618	·20709	·20800	·20891	·20982	·21073	·21164	·21256	78	30	61
·22261	·22353	·22444	·22536	·22628	·22719	·22811	·22903	·22995	·23087	77	31	61
·24100	·24193	·24285	·24377	·24470	·24562	·24655	·24747	·24840	·24933	76	31	61
·25955	·26048	·26141	·26235	·26328	·26421	·26515	·26608	·26701	·26795	75	31	62
·27826	·27921	·28015	·28109	·28203	·28297	·28391	·28486	·28580	·28675	74	31	63
·29716	·29811	·29906	·30001	·30097	·30192	·30287	·30382	·30478	·30573	73	32	63
·31626	·31722	·31818	·31914	·32010	·32106	·32203	·32299	·32396	·32492	72	32	64
·33557	·33654	·33751	·33848	·33945	·34043	·34140	·34238	·34335	·34433	71	32	65
·35510	·35608	·35707	·35805	·35904	·36002	·36101	·36199	·36298	·36397	70	33	66
·37488	·37588	·37687	·37787	·37887	·37986	·38086	·38186	·38286	·38386	69	33	67
·39492	·39593	·39694	·39795	·39896	·39997	·40098	·40200	·40301	·40403	68	34	67
·41524	·41626	·41728	·41831	·41933	·42036	·42139	·42242	·42345	·42447	67	34	68
·43585	·43689	·43793	·43897	·44001	·44105	·44210	·44314	·44418	·44523	66	35	69
·45678	·45784	·45889	·45995	·46101	·46206	·46312	·46418	·46525	·46631	65	35	71
·47805	·47912	·48019	·48127	·48234	·48342	·48450	·48557	·48665	·48773	64	36	71
·49967	·50076	·50185	·50295	·50404	·50514	·50623	·50733	·50843	·50953	63	36	73
·52168	·52279	·52390	·52501	·52613	·52724	·52836	·52947	·53059	·53171	62	37	75
·54409	·54522	·54635	·54748	·54862	·54975	·55089	·55203	·55317	·55431	61	38	76
·56693	·56808	·56923	·57039	·57155	·57271	·57386	·57503	·57619	·57735	60	39	77
·59022	·59140	·59258	·59376	·59494	·59612	·59730	·59849	·59967	·60086	59	39	79
·61400	·61520	·61641	·61761	·61882	·62003	·62124	·62245	·62366	·62487	58	40	81
·63830	·63953	·64076	·64199	·64322	·64446	·64569	·64693	·64817	·64941	57	41	82
·66314	·66440	·66566	·66692	·66818	·66944	·67071	·67197	·67324	·67451	56	42	84
·68857	·68985	·69114	·69243	·69372	·69502	·69631	·69761	·69891	·70021	55	43	86
·71461	·71593	·71725	·71857	·71990	·72122	·72255	·72388	·72521	·72654	54	44	89
·74131	·74267	·74402	·74538	·74674	·74810	·74946	·75082	·75219	·75355	53	45	91
·76871	·77010	·77149	·77289	·77428	·77568	·77708	·77848	·77988	·78129	52	46	93
·79686	·79829	·79972	·80115	·80258	·80402	·80546	·80690	·80834	·80978	51	48	95
·82580	·82727	·82874	·83022	·83169	·83317	·83465	·83613	·83761	·83910	50	49	98
·85559	·85710	·85862	·86014	·86166	·86318	·86470	·86623	·86776	·86929	49	51	101
·88628	·88784	·88940	·89097	·89253	·89410	·89567	·89725	·89883	·90040	48	52	104
·91794	·91955	·92116	·92277	·92439	·92601	·92763	·92926	·93088	·93252	47	54	108
·95062	·95229	·95395	·95562	·95729	·95897	·96064	·96232	·96400	·96569	46	56	111
·98441	·98613	·98786	·98958	·99131	·99304	·99478	·99652	·99826	1·00000	45	58	115
27'	24'	21'	18'	15'	12'	9'	6'	3'	0'	°	Mean Diff. 1'	2'

COTANGENTS.

°	0′	3′	6′	9′	12′	15′	18′	21′	24′	27′	30′	1′	2′
45	1·00000	00175	00350	00525	00701	00876	01053	01229	01406	01583	01761	58	117
46	1·03553	03734	03915	04097	04279	04461	04644	04827	05010	05194	05378	61	121
47	1·07237	07425	07613	07801	07990	08179	08369	08559	08749	08940	09131	63	126
48	1·11061	11256	11452	11648	11844	12041	12238	12435	12633	12831	13029	66	131
49	1·15037	15240	15443	15647	15851	16056	16261	16466	16672	16878	17085	68	137
50	1·19175	19387	19599	19811	20024	20237	20451	20665	20879	21094	21310	71	142
51	1·23490	23710	23931	24153	24375	24597	24820	25044	25268	25492	25717	74	148
52	1·27994	28225	28456	28687	28919	29152	29385	29618	29853	30087	30323	78	155
53	1·32704	32946	33187	33430	33673	33916	34160	34405	34650	34896	35142	81	162
54	1·37638	37891	38145	38399	38653	38909	39165	39421	39679	39936	40195	85	169
55	1·42815	43080	43347	43614	43881	44149	44418	44688	44958	45229	45501	89	179
56	1·48256	48536	48816	49097	49378	49661	49944	50228	50512	50797	51084	94	189
57	1·53986	54281	54576	54873	55170	55467	55766	56065	56366	56667	56969	99	198
58	1·60033	60345	60657	60970	61283	61598	61914	62230	62548	62866	63185	105	210
59	1·66428	66757	67088	67419	67752	68085	68419	68754	69091	69428	69766	111	222
60	1·73205	73555	73905	74257	74610	74964	75319	75675	76032	76390	76749	118	236
61	1·80405	80777	81150	81524	81899	82276	82654	83033	83413	83794	84177	126	251
62	1·88073	88469	88867	89266	89667	90069	90472	90876	91282	91690	92098	134	268
63	1·96261	96685	97111	97538	97966	98396	98828	99261	99695	$\overline{00131}$	00569	143	287
64	2·05030	05485	05942	06400	06860	07321	07785	08250	08716	09184	09654	154	307
65	2·14451	14940	15432	15925	16420	16917	17416	17916	18419	18923	19430	166	331
66	2·24604	25132	25663	26196	26730	27267	27806	28348	28891	29437	29984	179	358
67	2·35585	36158	36733	37311	37891	38473	39058	39645	40235	40827	41421	194	388
68	2·47509	48132	48758	49386	50018	50652	51289	51929	52571	53217	53865		
69	2·60509	61190	61874	62561	63252	63945	64642	65342	66046	66752	67462		
70	2·74748	75496	76247	77002	77761	78523	79289	80059	80833	81610	82391		
71	2·90421	91246	92076	92910	93748	94591	95437	96288	97144	98004	98868		
72	3·07768	08685	09606	10532	11464	12400	13341	14288	15240	16197	17159		
73	3·27085	28109	29139	30174	31216	32264	33317	34377	35443	36516	37594		
74	3·48741	49894	51053	52219	53393	54573	55761	56957	58160	59370	60588		
75	3·73205	74512	75828	77152	78485	79827	81177	82537	83906	85284	86671		
76	4·01078	02574	04081	05599	07127	08666	10216	11778	13350	14934	16530		
77	4·33148	34879	36623	38381	40152	41936	43735	45548	47374	49215	51071		
78	4·70463	72490	74534	76595	78673	80769	82882	85013	87162	89330	91516		
79	5·14455	16863	19293	21744	24218	26715	29235	31778	34345	36936	39552		
80	5·67128	70037	72974	75941	78938	81966	85024	88114	91236	94390	97576		
81	6·31375	34961	38587	42253	45961	49710	53503	57339	61219	65144	69116		
82	7·11537	16071	20661	25310	30018	34786	39616	44509	49465	54487	59575		
83	8·14435	20352	26355	32446	38625	44896	51259	57718	64275	70931	77689		
84	9·51436	59490	67680	76009	84482	93101	10·019	10·108	10·199	10·291	10·385		
85	11·430	11·546	11·664	11·785	11·909	12·035	12·163	12·295	12·429	12·566	12·706		
86	14·301	14·482	14·669	14·860	15·056	15·257	15·464	15·676	15·895	16·119	16·350		
87	19·081	19·405	19·740	20·087	20·446	20·819	21·205	21·606	22·022	22·454	22·904		
88	28·636	29·371	30·145	30·960	31·821	32·730	33·694	34·715	35·801	36·956	38·188		
89	57·290	60·306	63·657	67·402	71·615	76·390	81·847	88·144	95·489	104·17	114·59		
°	60′	57′	54′	51′	48′	45′	42′	39′	36′	33′	30′	1′	2′

TANGENTS—*continued.*

33′	36′	39′	42′	45′	48′	51′	54′	57′	60′	°	Mean Diff. 1′	Mean Diff. 2′
1·01939	02117	02295	02474	02653	02832	03012	03192	03372	03553	44	60	119
1·05562	05747	05932	06117	06303	06489	06676	06862	07049	07237	43	62	124
1·09322	09514	09706	09899	10091	10285	10478	10672	10867	11061	42	64	128
1·13228	13428	13627	13828	14028	14229	14430	14632	14834	15037	41	67	133
1·17292	17500	17708	17916	18125	18334	18544	18754	18964	19175	40	70	139
1·21526	21742	21959	22176	22394	22612	22831	23050	23270	23490	39	73	145
1·25943	26169	26395	26622	26849	27077	27306	27535	27764	27994	38	76	151
1·30558	30795	31031	31269	31507	31745	31984	32224	32464	32704	37	79	159
1·35389	35637	35885	36134	36383	36633	36883	37134	37386	37638	36	83	166
1·40454	40714	40974	41235	41497	41759	42022	42286	42550	42815	35	87	175
1·45773	46046	46320	46595	46870	47146	47422	47699	47977	48256	34	92	183
1·51370	51658	51946	52235	52525	52816	53107	53400	53693	53986	33	97	193
1·57271	57575	57879	58184	58490	58797	59105	59414	59723	60033	32	102	204
1·63505	63826	64148	64471	64795	65120	65445	65772	66099	66428	31	108	216
1·70106	70446	70787	71129	71473	71817	72163	72509	72857	73205	30	115	229
1·77110	77471	77834	78198	78563	78929	79296	79665	80034	80405	29	122	243
1·84561	84946	85333	85720	86109	86499	86891	87283	87677	88073	28	130	259
1·92508	92920	93332	93746	94162	94579	94997	95417	95838	96261	27	139	277
2·01008	01449	01891	02335	02780	03227	03675	04125	04577	05030	26	148	297
2·10126	10600	11075	11552	12030	12511	12993	13477	13963	14451	25	159	318
2·19938	20449	20961	21475	21992	22510	23030	23553	24077	24604	24	172	345
2·30534	31086	31641	32197	32756	33317	33881	34447	35015	35585	23	186	373
2·42019	42618	43220	43825	44433	45043	45655	46270	46888	47509	22	203	405
2·54516	55170	55827	56487	57150	57815	58484	59156	59831	60509	21		
2·68175	68892	69612	70335	71062	71792	72526	73263	74004	74748	20		
2·83176	83965	84758	85555	86356	87161	87970	88783	89600	90421	19		
2·99738	$\overline{00611}$	$\overline{01489}$	$\overline{02372}$	$\overline{03260}$	$\overline{04152}$	$\overline{05049}$	$\overline{05950}$	$\overline{06857}$	$\overline{07768}$	18		
3·18127	19100	20079	21063	22053	23048	24049	25055	26067	27085	17		
3·38679	39771	40869	41973	43084	44202	45327	46458	47596	48741	16		
3·61814	63048	64289	65538	66796	68061	69335	70616	71907	73205	15		
3·88068	89474	90890	92316	93751	95196	96651	98117	99592	$\overline{01078}$	14		
4·18137	19756	21387	23030	24684	26352	28032	29724	31430	33148	13		
4·52941	54826	56726	58641	60572	62518	64480	66458	68452	70463	12		
4·93721	95945	98188	$\overline{00451}$	$\overline{02734}$	$\overline{05037}$	$\overline{07360}$	$\overline{09704}$	$\overline{12069}$	$\overline{14455}$	11		
5·42192	44857	47548	50264	53007	55777	58573	61397	64248	67128	10		
6·00797	04051	07340	10664	14023	17419	20851	24321	27829	31375	9		
6·73133	77199	81312	85475	89688	93952	98268	$\overline{02637}$	$\overline{07059}$	$\overline{11537}$	8		
7·64732	69957	75254	80622	86064	91582	97176	$\overline{02848}$	$\overline{08600}$	$\overline{14435}$	7		
8·84551	91520	98598	$\overline{05789}$	$\overline{13093}$	$\overline{20516}$	$\overline{28058}$	$\overline{35724}$	$\overline{43515}$	$\overline{51436}$	6		
10·481	10·579	10·678	10·780	10·883	10·988	11·095	11·205	11·316	11·430	5		
12·850	12·596	13·146	13·300	13·457	13·617	13·782	13·951	14·124	14·301	4		
16·587	16·832	17·084	17·343	17·611	17·886	18·171	18·464	18·768	19·081	3		
23·372	23·859	24·368	24·898	25·452	26·031	26·637	27·271	27·937	28·636	2		
39·506	40·917	42·433	44·066	45·829	47·740	49·816	52·081	54·561	57·290	1		
127·32	143·24	163·70	190·98	229·18	286·48	381·97	572·96	1145·9	Inf.	0		
27′	24′	21′	18′	15′	12′	9′	6′	3′	0′	°	1′	2′

COTANGENTS.

Mean Diff.

XIII.—NATURAL

°	0′	3′	6′	9′	12′	15′	18′	21′	24′	27′	30′	Mean Diff. 1′	Mean Diff. 2′
0	1·00000	00000	00000	00000	00001	00001	00001	00002	00002	00003	00004	0	0
1	1·00015	00017	00018	00020	00022	00024	00026	00028	00030	00032	00034	1	1
2	1·00061	00064	00067	00070	00074	00077	00081	00084	00088	00091	00095	1	3
3	1·00137	00142	00147	00151	00156	00161	00166	00171	00176	00182	00187	2	3
4	1·00244	00250	00257	00263	00269	00276	00282	00289	00296	00302	00309	2	4
5	1·00382	00390	00397	00405	00413	00421	00429	00438	00446	00454	00463	3	5
6	1·00551	00560	00569	00579	00588	00598	00608	00617	00627	00637	00647	3	6
7	1·00751	00762	00773	00784	00795	00806	00817	00828	00840	00851	00863	4	7
8	1·00983	00995	01008	01020	01033	01046	01059	01071	01084	01097	01111	4	9
9	1·01247	01261	01275	01289	01303	01317	01332	01346	01361	01376	01391	5	9
10	1·01543	01558	01574	01590	01606	01622	01638	01654	01670	01687	01703	5	11
11	1·01872	01889	01906	01924	01941	01959	01977	01995	02013	02031	02049	6	11
12	1·02234	02253	02272	02291	02311	02330	02349	02369	02388	02408	02428	6	13
13	1·02630	02651	02672	02693	02714	02735	02756	02777	02799	02820	02842	7	14
14	1·03061	03084	03106	03129	03152	03175	03197	03220	03244	03267	03290	8	15
15	1·03528	03552	03576	03601	03625	03650	03674	03699	03724	03749	03774	8	17
16	1·04030	04056	04082	04108	04135	04161	04188	04214	04241	04268	04295	9	18
17	1·04569	04597	04625	04653	04682	04710	04738	04767	04795	04824	04853	10	19
18	1·05146	05176	05206	05236	05266	05297	05327	05357	05388	05418	05449	10	20
19	1·05762	05794	05826	05858	05890	05922	05955	05987	06020	06052	06085	11	21
20	1·06418	06452	06486	06520	06554	06588	06622	06657	06691	06726	06761	11	23
21	1·07114	07150	07186	07223	07259	07295	07332	07368	07405	07442	07479	12	24
22	1·07853	07892	07930	07968	08006	08045	08084	08122	08161	08200	08239	13	26
23	1·08636	08676	08717	08757	08798	08839	08880	08920	08962	09003	09044	14	27
24	1·09464	09506	09549	09592	09635	09678	09721	09764	09808	09851	09895	14	29
25	1·10338	10383	10428	10473	10518	10564	10609	10655	10701	10747	10793	15	31
26	1·11260	11308	11355	11403	11451	11499	11547	11595	11643	11691	11740	16	32
27	1·12233	12283	12333	12383	12433	12484	12534	12585	12636	12687	12738	17	34
28	1·13257	13310	13362	13415	13468	13521	13575	13628	13682	13735	13789	18	36
29	1·14335	14391	14446	14502	14558	14614	14670	14726	14782	14839	14896	19	37
30	1·15470	15528	15587	15645	15704	15763	15822	15881	15940	16000	16059	20	39
31	1·16663	16725	16786	16848	16909	16971	17033	17095	17158	17220	17283	21	41
32	1·17918	17982	18047	18111	18176	18241	18307	18372	18437	18503	18569	22	43
33	1·19236	19304	19372	19440	19508	19576	19645	19713	19782	19851	19920	23	45
34	1·20622	20693	20764	20836	20907	20979	21051	21123	21195	21268	21341	24	48
35	1·22077	22152	22227	22302	22377	22453	22528	22604	22680	22756	22833	25	51
36	1·23607	23685	23764	23843	23922	24001	24081	24160	24240	24320	24400	26	53
37	1·25214	25296	25379	25462	25545	25628	25711	25795	25879	25963	26047	28	55
38	1·26902	26988	27075	27162	27250	27337	27425	27513	27601	27689	27778	29	58
39	1·28676	28767	28858	28950	29042	29133	29226	29318	29411	29504	29597	30	61
40	1·30541	30636	30732	30829	30925	31022	31119	31216	31313	31411	31509	32	65
41	1·32501	32602	32703	32804	32905	33007	33109	33211	33314	33416	33519	34	68
42	1·34563	34669	34775	34882	34988	35095	35203	35310	35418	35526	35634	36	71
43	1·36733	36844	36956	37068	37180	37293	37406	37519	37632	37746	37860	38	75
44	1·39016	39134	39251	39369	39487	39606	39725	39844	39963	40083	40203	40	79
°	60′	57′	54′	51′	48′	45′	42′	39′	36′	33′	30′	1′	2′

SECANTS.

33′	36′	39′	42′	45′	48′	51′	54′	57′	60′	°	1′	2′
1·00005	00005	00006	00007	00009	00010	00011	00012	00014	00015	89	0	1
1·00037	00039	00041	00044	00047	00049	00052	00055	00058	00061	88	1	2
1·00099	00103	00107	00111	00115	00120	00124	00128	00133	00137	87	1	3
1·00192	00198	00203	00209	00215	00220	00226	00232	00238	00244	86	2	4
1·00316	00323	00330	00337	00345	00352	00359	00367	00374	00382	85	3	5
1·00471	00480	00488	00497	00506	00515	00524	00533	00542	00551	84	3	6
1·00657	00667	00677	00688	00698	00708	00719	00730	00740	00751	83	3	7
1·00875	00886	00898	00910	00922	00934	00946	00958	00970	00983	82	4	8
1·01124	01137	01151	01164	01178	01191	01205	01219	01233	01247	81	5	9
1·01405	01420	01435	01450	01466	01481	01496	01512	01527	01543	80	5	10
1·01720	01736	01753	01769	01786	01803	01820	01837	01854	01872	79	6	11
1·02067	02085	02103	02122	02140	02159	02178	02196	02215	02234	78	6	12
1·02448	02468	02488	02508	02528	02548	02569	02589	02610	02630	77	7	13
1·02863	02885	02907	02928	02950	02972	02994	03017	03039	03061	76	7	15
1·03315	03337	03360	03384	03408	03432	03455	03479	03503	03528	75	8	16
1·03799	03825	03850	03875	03901	03927	03952	03978	04004	04030	74	9	17
1·04322	04349	04376	04403	04431	04458	04486	04514	04541	04569	73	9	19
1·04882	04911	04940	04969	04998	05028	05057	05087	05116	05146	72	10	20
1·05480	05511	05542	05573	05604	05636	05667	05699	05730	05762	71	10	21
1·06118	06151	06184	06217	06250	06283	06317	06350	06384	06418	70	11	22
1·06796	06831	06866	06901	06936	06972	07007	07043	07079	07114	69	12	23
1·07516	07553	07590	07627	07665	07702	07740	07778	07816	07853	68	13	25
1·08278	08318	08357	08397	08436	08476	08516	08556	08596	08636	67	13	26
1·09086	09127	09169	09211	09252	09294	09337	09379	09421	09464	66	14	27
1·09939	09982	10026	10071	10115	10159	10204	10248	10293	10338	65	15	29
1·10839	10885	10932	10978	11025	11072	11119	11166	11213	11260	64	16	31
1·11789	11838	11886	11936	11985	12034	12083	12133	12183	12233	63	16	33
1·12789	12841	12892	12944	12996	13048	13100	13152	13205	13257	62	17	35
1·13843	13897	13952	14006	14061	14115	14170	14225	14280	14335	61	18	37
1·14952	15009	15066	15124	15181	15239	15296	15354	15412	15470	60	19	38
1·16119	16179	16239	16299	16359	16420	16481	16541	16602	16663	59	20	40
1·17346	17409	17472	17535	17598	17662	17726	17790	17853	17918	58	21	42
1·18635	18701	18767	18834	18901	18967	19034	19102	19169	19236	57	22	45
1·19990	20059	20129	20199	20269	20339	20410	20480	20551	20622	56	23	47
1·21414	21487	21560	21633	21707	21781	21855	21929	22003	22077	55	25	49
1·22909	22986	23063	23140	23217	23295	23373	23450	23529	23607	54	26	51
1·24481	24561	24642	24723	24804	24886	24967	25049	25131	25214	53	27	54
1·26132	26216	26301	26387	26472	26557	26643	26729	26815	26902	52	28	57
1·27867	27956	28045	28134	28224	28314	28404	28495	28585	28676	51	30	60
1·29690	29784	29877	29971	30066	30160	30255	30350	30445	30541	50	31	63
1·31607	31705	31804	31903	32002	32101	32201	32301	32401	32501	49	33	66
1·33622	33726	33830	33934	34038	34142	34247	34352	34458	34563	48	35	69
1·35743	35852	35961	36070	36180	36290	36400	36511	36622	36733	47	37	73
1·37974	38089	38204	38319	38434	38550	38666	38783	38899	39016	46	38	77
1·40324	40444	40565	40687	40808	40930	41053	41175	41298	41421	45	40	81
27′	24′	21′	18′	15′	12′	9′	6′	3′	0′	°	1′	2′

Mean Diff.

COSECANTS.

Mean Diff.

NATURAL

°	0′	3′	6′	9′	12′	15′	18′	21′	24′	27′	30′	Mean Diff. 1′	Mean Diff. 2′
45	1·41421	41545	41669	41793	41918	42042	42168	42293	42419	42545	42672	41	83
46	1·43956	44086	44217	44347	44479	44610	44742	44875	45007	45141	45274	43	87
47	1·46628	46765	46903	47041	47180	47319	47458	47598	47738	47878	48019	46	93
48	1·49448	49593	49738	49884	50030	50177	50324	50471	50619	50767	50916	49	98
49	1·52425	52579	52782	52886	53041	53196	53351	53507	53663	53820	53977	52	103
50	1·55572	55734	55897	56060	56223	56387	56551	56716	56881	57047	57213	55	109
51	1·58902	59073	59245	59418	59590	59764	59938	60112	60287	60463	60639	58	116
52	1·62427	62609	62791	62974	63157	63341	63525	63710	63895	64081	64268	61	123
53	1·66164	66357	66550	66744	66938	67133	67329	67525	67722	67919	68117	65	130
54	1·70130	70335	70540	70746	70953	71160	71368	71576	71785	71995	72205	69	138
55	1·74345	74562	74781	75000	75219	75440	75661	75882	76105	76328	76552	74	147
56	1·78829	79061	79293	79527	79761	79995	80231	80467	80704	80942	81180	78	156
57	1·83608	83855	84103	84352	84601	84852	85103	85355	85608	85861	86116	83	167
58	1·88708	88972	89237	89503	89769	90037	90305	90575	90815	91116	91388	89	179
59	1·94160	94413	94726	95011	95296	95583	95870	96158	96448	96738	97029	96	191
60	2·00000	00303	00607	00912	01218	01525	01833	02143	02153	02765	03077	102	205
61	2·06267	06592	06918	07246	07575	07905	08236	08569	08903	09238	09574	110	220
62	2·13005	13356	13707	14060	14414	14770	15127	15485	15845	16206	16568	119	237
63	2·20269	20647	21026	21407	21790	22174	22559	22946	23334	23724	24116	128	256
64	2·28117	28526	28937	29349	29763	30179	30596	31015	31436	31858	32282	139	277
65	2·36620	37064	37509	37957	38406	38857	39311	39766	40222	40681	41142	150	301
66	2·45859	46342	46827	47314	47804	48295	48789	49284	49782	50282	50784	164	327
67	2·55930	56458	56988	57520	58054	58591	59130	59672	60217	60763	61313	179	358
68	2·66947	67525	68105	68689	69275	69864	70455	71050	71647	72247	72850		
69	2·79043	79679	80318	80960	81605	82254	82906	83561	84219	84880	85545		
70	2·92380	93083	93790	94500	95213	95931	96652	97377	98106	98838	99574		
71	3·07155	07936	08721	09510	10303	11101	11903	12709	13520	14335	15155		
72	3·23607	24478	25355	26237	27123	28015	28912	29814	30721	31633	32551		
73	3·42030	43010	43995	44986	45983	46986	47995	49010	50032	51060	52094		
74	3·62796	63903	65018	66140	67269	68405	69549	70700	71858	73024	74198		
75	3·86370	87633	88904	90184	91473	92770	94076	95392	96716	98050	99393		
76	4·13357	14809	16271	17744	19228	20723	22229	23746	25275	26814	28366		
77	4·44541	46228	47928	49642	51368	53109	54863	56632	58414	60211	62023		
78	4·80973	82956	84956	86973	89007	91058	93128	95215	97320	99443	01585		
79	5·24084	26448	28833	31241	33671	36124	38600	41099	43622	46169	48740		
80	5·75877	78742	81635	84558	87511	90495	93509	96555	99633	$\overline{02743}$	$\overline{05886}$		
81	6·39245	42787	46369	49991	53655	57361	61110	64902	68738	72620	76547		
82	7·18530	23019	27566	32171	36835	41560	46346	51194	56107	61085	66130		
83	8·20551	26425	32384	38431	44566	50793	57113	63528	70041	76653	83367		
84	9·56677	64687	72833	81119	89547	98123	10·068	10·157	10·248	10·340	10·433		
85	11·474	11·589	11·707	11·828	11·951	12·076	12·204	12·335	12·469	12·606	12·745		
86	14·336	14·517	14·703	14·893	15·089	15·290	15·496	15·708	15·926	16·150	16·380		
87	19·107	19·431	19·766	20·112	20·471	20·843	21·229	21·629	22·044	22·476	22·926		
88	28·654	29·388	30·161	30·976	31·836	32·746	33·708	34·730	35·815	36·970	38·202		
89	57·299	60·314	63·665	67·409	71·622	76·397	81·853	88·149	95·495	104·18	114·59		
°	60′	57′	54′	51′	48′	45′	42′	39′	36′	33′	30′	1′	2′

NATURAL

Mean Diff.

SECANTS—*continued.*

33′	36′	39′	42′	45′	48′	51′	54′	57′	60′	°	Mean' Diff. 1′	2′
1·42799	42926	43053	43181	43310	43438	43567	43696	43826	43956	44	43	86
1·45408	45542	45676	45811	45946	46082	46218	46354	46491	46628	43	45	90
1·48160	48301	48443	48586	48728	48871	49015	49159	49303	49448	42	47	95
1·51065	51215	51364	51515	51665	51817	51968	52120	52273	52425	41	50	100
1·54134	54292	54451	54610	54769	54929	55089	55250	55411	55572	40	53	106
1·57380	57547	57715	57883	58051	58221	58390	58560	58731	58902	39	56	112
1·60815	60992	61170	61348	61526	61705	61885	62065	62246	62427	38	59	119
1·64455	64643	64831	65020	65209	65399	65589	65780	65972	66164	37	63	126
1·68316	68515	68715	68915	69116	69318	69520	69723	69926	70130	36	67	134
1·72416	72628	72840	73053	73267	73481	73696	73911	74128	74345	35	71	143
1·76776	77001	77227	77454	77681	77910	78138	78368	78598	78829	34	76	151
1·81419	81659	81900	82142	82384	82627	82871	83116	83362	83608	33	81	161
1·86371	86627	86885	87142	87401	87661	87921	88183	88445	88708	32	86	173
1·91661	91935	92210	92486	92762	93040	93319	93598	93879	94160	31	92	187
1·97322	97615	97910	98205	98502	98799	99098	99398	99698	00000	30	99	198
2·03391	03706	04022	04339	04657	04977	05298	05619	05942	06267	29	106	213
2·09911	10250	10590	10931	11274	11617	11963	12309	12657	13005	28	114	232
2·16932	17297	17663	18031	18401	18772	19144	19517	19892	20269	27	123	247
2·24509	24903	25300	25697	26097	26498	26900	27304	27710	28117	26	133	267
2·32708	33135	33565	33996	34429	34863	35300	35738	36178	36620	25	144	289
2·41605	42070	42536	43005	43476	43948	44423	44900	45378	45859	24	157	314
2·51289	51795	52304	52815	53329	53845	54363	54883	55405	55930	23	171	343
2·61864	62419	62976	63535	64097	64662	65229	65799	66371	66947	22	187	375
2·73456	74065	74677	75292	75909	76530	77154	77780	78410	79043	21		
2·86213	86885	87560	88238	88920	89605	90293	90986	91681	92380	20		
3·00315	01059	01807	02559	03315	04075	04839	05607	06379	07155	19		
3·15979	16808	17641	18479	19322	20169	21021	21878	22740	23607	18		
3·33474	34403	35336	36276	37221	38171	39128	40089	41057	42030	17		
3·53134	54181	55234	56294	57361	58434	59514	60601	61695	62796	16		
3·75379	76568	77765	78970	80183	81404	82633	83871	85116	86370	15		
4·00745	02107	03479	04860	06251	07652	09063	10484	11915	13357	14		
4·29929	31503	33090	34689	36299	37923	39558	41206	42867	44541	13		
4·63849	65690	67545	69417	71303	73205	75123	77057	79007	80973	12		
5·03746	05926	08125	10344	12583	14842	17121	19421	21742	24084	11		
5·51337	53958	56605	59277	61976	64701	67454	70234	73041	75877	10		
6·09062	12273	15517	18797	22113	25464	28853	32279	35743	39245	9		
6·80521	84542	88612	92731	96900	01120	05392	09717	14096	18530	8		
7·71242	76424	81677	87001	92399	97873	03423	09052	14760	20551	7		
8·90186	97111	04146	11292	18553	25931	33430	41052	48800	56677	6		
10·529	10·626	10·725	10·826	10·929	11·034	11·140	11·249	11·360	11·474	5		
12·888	13·035	13·184	13·337	13·494	13·654	13·818	13·987	14·159	14·336	4		
16·618	16·862	17·113	17·372	17·639	17·914	18·198	18·492	18·794	19·107	3		
23·393	23·880	24·388	24·918	25·471	26·050	26·655	27·290	27·955	28·654	2		
39·519	40·930	42·445	44·077	45·840	47·750	49·826	52·090	54·570	57·299	1		
127·33	143·24	163·70	190·99	229·18	286·48	381·97	572·96	1145·9	Inf.	0		
27′	24′	21′	18′	15′	12′	9′	6′	3′	0′	°	1′	2′

COSECANTS.

Mean Diff.

XIV.—LOGARITHMIC

°	0′	3′	6′	9′	12′	15′	18′	21′	24′	27′	30′	Mean Diff. 1′	Mean Diff. 2′
0	Inf. Neg.	6·94085	7·24188	41797	54291	63982	71900	78594	84393	89509	94084		
1	8·24186	26304	28324	30255	32103	33875	35578	37217	38796	40320	41792		
2	8·54282	55354	56400	57421	58419	59395	60349	61282	62196	63091	63968		
3	8·71880	72597	73303	73997	74680	75353	76015	76667	77310	77943	78568		
4	8·84358	84897	85429	85955	86474	86987	87494	87995	88490	88980	89464	170	339
5	8·94030	94461	94887	95310	95728	96143	96553	96960	97363	97762	98157	137	275
6	9·01923	02283	02639	02992	03342	03690	04034	04376	04715	05052	05386	115	230
7	9·08589	08897	09202	09506	09807	10106	10402	10697	10990	11281	11570	99	198
8	9·14356	14624	14891	15157	15421	15683	15944	16203	16460	16716	16970	87	174
9	9·19433	19672	19909	20145	20380	20613	20845	21076	21306	21534	21761	78	155
10	9·23967	24181	24395	24607	24818	25028	25237	25445	25652	25858	26063	70	140
11	9·28060	28254	28448	28641	28833	29024	29214	29403	29591	29779	29966	63	127
12	9·31788	31966	32143	32319	32495	32670	32844	33018	33190	33362	33534	58	116
13	9·35209	35373	35536	35698	35860	36022	36182	36342	36502	36660	36819	54	107
14	9·38368	38519	38670	38821	38971	39121	39270	39418	39566	39713	39860	50	99
15	9·41300	41441	41582	41722	41861	42001	42140	42278	42416	42553	42690	46	93
16	9·44034	44166	44297	44428	44559	44689	44819	44948	45077	45206	45334	43	87
17	9·46594	46717	46841	46964	47086	47209	47330	47452	47573	47694	47814	41	81
18	9·48998	49115	49231	49347	49462	49577	49692	49806	49920	50034	50148	38	77
19	9·51264	51374	51484	51593	51702	51811	51919	52027	52135	52242	52350	36	72
20	9·53405	53509	53613	53716	53819	53922	54025	54127	54229	54331	54433	34	68
21	9·55433	55532	55630	55728	55826	55923	56021	56118	56215	56311	56408	32	65
22	9·57358	57451	57545	57638	57731	57824	57916	58008	58101	58192	58284	31	62
23	9·59188	59277	59366	59455	59543	59632	59720	59808	59895	59983	60070	29	59
24	9·60931	61016	61101	61186	61270	61354	61438	61522	61606	61689	61773	28	56
25	9·62595	62676	62757	62838	62918	62999	63079	63159	63239	63319	63398	27	54
26	9·64184	64262	64339	64417	64494	64571	64647	64724	64800	64877	64953	26	51
27	9·65705	65779	65853	65927	66001	66075	66148	66221	66295	66368	66441	25	49
28	9·67161	67232	67303	67374	67445	67515	67586	67656	67726	67796	67866	24	47
29	9·68557	68625	68694	68762	68829	68897	68965	69032	69100	69167	69234	23	45
30	9·69897	69963	70028	70093	70159	70224	70288	70353	70418	70482	70547	22	43
31	9·71184	71247	71310	71373	71435	71498	71560	71622	71685	71747	71809	21	42
32	9·72421	72482	72542	72602	72663	72723	72783	72843	72902	72962	73022	20	40
33	9·73611	73669	73727	73785	73843	73901	73959	74017	74074	74132	74189	19	39
34	9·74756	74812	74868	74924	74980	75036	75091	75147	75202	75258	75313	19	38
35	9·75859	75913	75967	76021	76075	76129	76182	76236	76289	76342	76395	18	36
36	9·76922	76974	77026	77078	77130	77181	77233	77285	77336	77387	77439	17	34
37	9·77946	77997	78047	78097	78147	78197	78246	78296	78346	78395	78445	17	33
38	9·78934	78983	79031	79079	79128	79176	79224	79272	79319	79367	79415	16	32
39	9·79887	79934	79981	80027	80074	80120	80166	80213	80259	80305	80351	15	31
40	9·80807	80852	80897	80942	80987	81032	81076	81121	81166	81210	81254	15	30
41	9·81694	81738	81781	81825	81868	81911	81955	81998	82041	82084	82126	14	29
42	9·82551	82593	82635	82677	82719	82761	82802	82844	82885	82927	82968	14	28
43	9·83378	83419	83459	83500	83540	83581	83621	83661	83701	83741	83781	13	27
44	9·84177	84216	84255	84295	84334	84373	84411	84450	84489	84528	84566	13	26
°	60′	57′	54′	51′	48′	45′	42′	39′	36′	33′	30′	1′	2′

SINES.

33′	36′	39′	42′	45′	48′	51′	54′	57′	60′	°	Mean Diff. 1′	2′
7·98223	02002	05478	08696	11693	14495	17123	19610	21958	24186	89		
8·43216	44594	45930	47226	48485	49708	50897	52055	53183	54282	88		
8·64827	65670	66497	67308	68104	68886	69654	70409	71151	71880	87		
8·79183	79789	80388	80978	81560	82134	82701	83261	83813	84358	86		
8·89943	90417	90885	91349	91807	92261	92710	93154	93594	94030	85	152	303
8·98549	98937	99322	99704	00082	00456	00828	01196	01561	01923	84	125	251
9·05717	06046	06372	06696	07018	07337	07653	07968	08280	08589	83	107	213
9·11857	12142	12425	12706	12985	13263	13539	13813	14085	14356	82	93	185
9·17223	17474	17724	17973	18220	18465	18709	18952	19193	19433	81	82	164
9·21987	22211	22435	22657	22878	23098	23317	23535	23752	23967	80	73	147
9·26267	26470	26672	26873	27073	27273	27471	27668	27864	28060	79	66	133
9·30151	30336	30521	30704	30887	31068	31250	31430	31609	31788	78	61	121
9·33704	33874	34043	34212	34380	34547	34713	34879	35044	35209	77	56	112
9·36976	37133	37289	37445	37600	37755	37909	38062	38215	38368	76	52	103
9·40006	40152	40297	40442	40586	40730	40873	41016	41158	41300	75	48	96
9·42826	42962	43098	43233	43367	43502	43635	43769	43901	44034	74	45	90
9·45462	45589	45716	45843	45969	46095	46220	46345	46469	46594	73	42	84
9·47934	48054	48173	48292	48411	48529	48647	48764	48881	48998	72	39	79
9·50261	50374	50486	50598	50710	50821	50933	51043	51154	51264	71	37	74
9·52456	52563	52669	52775	52881	52986	53092	53196	53301	53405	70	35	70
9·54534	54635	54735	54836	54936	55036	55136	55235	55334	55433	69	33	67
9·56504	56599	56695	56790	56886	56980	57075	57169	57264	57358	68	32	63
9·58375	58467	58557	58648	58739	58829	58919	59009	59098	59188	67	30	60
9·60157	60244	60331	60417	60503	60589	60675	60761	60846	60931	66	28	57
9·61856	61939	62021	62104	62186	62268	62350	62432	62513	62595	65	27	55
9·63478	63557	63636	63715	63794	63872	63950	64028	64106	64184	64	26	52
9·65029	65104	65180	65255	65331	65406	65481	65556	65630	65705	63	25	50
9·66513	66586	66658	66731	66803	66875	66946	67018	67090	67161	62	24	48
9·67936	68006	68075	68144	68213	68283	68351	68420	68489	68557	61	23	46
9·69301	69368	69434	69501	69567	69633	69699	69765	69831	69897	60	22	44
9·70611	70675	70739	70803	70867	70931	70994	71058	71121	71184	59	21	42
9·71870	71932	71994	72055	72116	72177	72238	72299	72360	72421	58	20	40
9·73081	73140	73200	73259	73318	73377	73435	73494	73552	73611	57	20	39
9·74246	74303	74360	74417	74474	74531	74587	74644	74700	74756	56	19	38
9·75368	75423	75478	75533	75587	75642	75696	75751	75805	75859	55	18	36
9·76448	76501	76554	76607	76660	76712	76765	76817	76870	76922	54	18	35
9·77490	77541	77592	77643	77694	77744	77795	77846	77896	77946	53	17	34
9·78494	78543	78592	78642	78691	78739	78788	78837	78886	78934	52	16	33
9·79463	79510	79558	79605	79652	79699	79746	79793	79840	79887	51	16	31
9·80397	80443	80489	80534	80580	80625	80671	80716	80762	80807	50	15	30
9·81299	81343	81387	81431	81475	81519	81563	81607	81651	81694	49	15	29
9·82169	82212	82255	82297	82340	82382	82424	82467	82509	82551	48	14	28
9·83010	83051	83092	83133	83174	83215	83256	83297	83338	83378	47	14	27
9·83821	83861	83901	83940	83980	84020	84059	84098	84138	84177	46	13	26
9·84605	84643	84682	84720	84758	84796	84835	84873	84911	84949	45	13	25
27′	24′	21′	18′	15′	12′	9′	6′	3′	0′	°	1′	2′

COSINES.

Mean Diff.

°	0′	3′	6′	9′	12′	15′	18′	21′	24′	27′	30′	Mean Diff. 1′	2′
45	9·84949	84986	85024	85062	85100	85137	85175	85212	85250	85287	85324	13	25
46	9·85693	85730	85766	85803	85839	85876	85912	85948	85984	86020	86056	12	24
47	9·86413	86448	86483	86518	86554	86589	86624	86659	86694	86728	86763	12	23
48	9·87107	87141	87175	87209	87243	87277	87311	87345	87378	87412	87446	11	23
49	9·87778	87811	87844	87877	87909	87942	87975	88007	88040	88072	88105	11	22
50	9·88425	88457	88489	88520	88552	88584	88615	88647	88678	88709	88741	10	21
51	9·89050	89081	89112	89142	89173	89203	89233	89264	89294	89324	89354	10	20
52	9·89653	89683	89712	89742	89771	89801	89830	89859	89888	89918	89947	10	19
53	9·90235	90263	90292	90320	90349	90377	90405	90434	90462	90490	90518	9	19
54	9·90796	90823	90851	90878	90906	90933	90960	90987	91014	91042	91069	9	18
55	9·91336	91363	91389	91416	91442	91469	91495	91521	91547	91573	91599	9	17
56	9·91857	91883	91908	91934	91959	91985	92010	92035	92060	92086	92111	8	17
57	9·92359	92384	92408	92433	92457	92482	92506	92530	92555	92579	92603	8	16
58	9·92842	92866	92889	92913	92936	92960	92983	93007	93030	93053	93077	8	16
59	9·93307	93329	93352	93375	93397	93420	93442	93465	93487	93510	93532	8	15
60	9·93753	93775	93797	93819	93840	93862	93884	93905	93927	93948	93970	7	14
61	9·94182	94203	94224	94245	94266	94286	94307	94328	94349	94369	94390	7	14
62	9·94593	94614	94634	94654	94674	94694	94714	94734	94753	94773	94793	7	13
63	9·94988	95007	95027	95046	95065	95084	95103	95122	95141	95160	95179	6	13
64	9·95366	95384	95403	95421	95440	95458	95476	95494	95513	95531	95549	6	12
65	9·95728	95745	95763	95780	95798	95815	95833	95850	95868	95885	95902	6	12
66	9·96073	96090	96107	96123	96140	96157	96174	96190	96207	96223	96240	6	11
67	9·96403	96419	96435	96451	96467	96483	96498	96514	96530	96546	96562	5	11
68	9·96717	96732	96747	96762	96778	96793	96808	96823	96838	96853	96868	5	10
69	9·97015	97030	97044	97059	97073	97087	97102	97116	97130	97145	97159	5	10
70	9·97299	97312	97326	97340	97353	97367	97381	97394	97408	97421	97435	5	9
71	9·97567	97580	97593	97606	97619	97632	97645	97657	97670	97683	97696	4	9
72	9·97821	97833	97845	97857	97870	97882	97894	97906	97918	97930	97942	4	8
73	9·98060	98071	98083	98094	98106	98117	98129	98140	98151	98162	98174	4	8
74	9·98284	98295	98306	98317	98327	98338	98349	98359	98370	98381	98391	4	7
75	9·98494	98505	98515	98525	98535	98545	98555	98565	98574	98584	98594	3	7
76	9·98690	98700	98709	98719	98728	98737	98746	98756	98765	98774	98783	3	6
77	9·98872	98881	98890	98898	98907	98916	98924	98933	98941	98950	98958	3	6
78	9·99040	99048	99056	99064	99072	99080	99088	99096	99104	99112	99119	3	5
79	9·99195	99202	99209	99217	99224	99231	99238	99245	99252	99260	99267	2	5
80	9·99335	99342	99348	99355	99362	99368	99375	99381	99388	99394	99400	2	4
81	9·99462	99468	99474	99480	99486	99492	99497	99503	99509	99515	99520	2	4
82	9·99575	99581	99586	99591	99596	99601	99607	99612	99617	99622	99627	2	3
83	9·99675	99680	99684	99689	99693	99698	99702	99707	99711	99716	99720	2	3
84	9·99761	99765	99769	99773	99777	99781	99785	99788	99792	99796	99800	1	3
85	9·99834	99838	99841	99844	99847	99851	99854	99857	99860	99863	99866	1	2
86	9·99894	99897	99899	99902	99904	99907	99909	99912	99914	99917	99919	1	2
87	9·99940	99942	99944	99946	99948	99950	99952	99954	99955	99957	99959	1	1
88	9·99974	99975	99976	99977	99979	99980	99981	99982	99983	99984	99985	0	1
89	9·99993	99994	99995	99995	99996	99996	99997	99997	99998	99998	99998	0	0
°	60′	57′	54′	51′	48′	45′	42′	39′	36′	33′	30′	1′	2′

SINES—*continued.*

33′	36′	39′	42′	45′	48′	51′	54′	57′	60′	°	Mean Diff. 1′	2′
9·85361	85399	85436	85473	85510	85547	85583	85620	85657	85693	**44**	12	25
9·86092	86128	86164	86200	86235	86271	86306	86342	86377	86413	**43**	12	24
9·86798	86832	86867	86902	86936	86970	87005	87039	87073	87107	**42**	11	23
9·87479	87513	87546	87579	87613	87646	87679	87712	87745	87778	**41**	11	22
9·88137	88169	88201	88234	88266	88298	88330	88362	88394	88425	**40**	11	21
9·88772	88803	88834	88865	88896	88927	88958	88989	89020	89050	**39**	10	21
9·89385	89415	89445	89475	89504	89534	89564	89594	89624	89653	**38**	10	20
9·89976	90005	90034	90063	90091	90120	90149	90178	90206	90235	**37**	10	19
9·90546	90574	90602	90630	90657	90685	90713	90741	90768	90796	**36**	9	19
9·91096	91123	91149	91176	91203	91230	91257	91283	91310	91336	**35**	9	18
9·91625	91651	91677	91703	91729	91755	91781	91806	91832	91857	**34**	9	17
9·92136	92161	92186	92211	92235	92260	92285	92310	92335	92359	**33**	8	17
9·92627	92651	92675	92699	92723	92747	92771	92795	92818	92842	**32**	8	16
9·93100	93123	93146	93169	93192	93215	93238	93261	93284	93307	**31**	8	15
9·93554	93577	93599	93621	93643	93665	93687	93709	93731	93753	**30**	7	15
9·93991	94012	94034	94055	94076	94098	94119	94140	94161	94182	**29**	7	14
9·94410	94431	94451	94472	94492	94513	94533	94553	94573	94593	**28**	7	14
9·94813	94832	94852	94871	94891	94911	94930	94949	94969	94988	**27**	7	13
9·95198	95217	95236	95254	95273	95292	95310	95329	95348	95366	**26**	6	12
9·95567	95585	95603	95621	95639	95657	95674	95692	95710	95728	**25**	6	12
9·95920	95937	95954	95971	95988	96005	96022	96039	96056	96073	**24**	6	11
9·96256	96273	96289	96305	96322	96338	96354	96370	96387	96403	**23**	5	11
9·96577	96593	96608	96624	96640	96655	96670	96686	96701	96717	**22**	5	10
9·96883	96898	96912	96927	96942	96957	96971	96986	97001	97015	**21**	5	10
9·97173	97187	97201	97215	97229	97243	97257	97271	97285	97299	**20**	5	9
9·97448	97461	97475	97488	97501	97515	97528	97541	97554	97567	**19**	4	9
9·97708	97721	97734	97746	97759	97771	97784	97796	97808	97821	**18**	4	8
9·97954	97966	97978	97989	98001	98013	98025	98036	98048	98060	**17**	4	8
9·98185	98196	98207	98218	98229	98240	98251	98262	98273	98284	**16**	4	7
9·98402	98412	98422	98433	98443	98453	98464	98474	98484	98494	**15**	3	7
9·98604	98614	98623	98633	98643	98652	98662	98671	98681	98690	**14**	3	6
9·98792	98801	98810	98819	98828	98837	98846	98855	98864	98872	**13**	3	6
9·98967	98975	98983	98991	99000	99008	99016	99024	99032	99040	**12**	3	5
9·99127	99135	99142	99150	99157	99165	99172	99180	99187	99195	**11**	2	5
9·99274	99281	99288	99294	99301	99308	99315	99322	99328	99335	**10**	2	5
9·99407	99413	99419	99425	99432	99438	99444	99450	99456	99462	**9**	2	4
9·99526	99532	99537	99543	99548	99554	99559	99565	99570	99575	**8**	2	4
9·99632	99637	99642	99647	99651	99656	99661	99666	99670	99675	**7**	2	3
9·99724	99728	99733	99737	99741	99745	99749	99753	99757	99761	**6**	1	3
9·99803	99807	99810	99814	99817	99821	99824	99828	99831	99834	**5**	1	2
9·99869	99872	99875	99878	99880	99883	99886	99889	99891	99894	**4**	1	2
9·99921	99923	99926	99928	99930	99932	99934	99936	99938	99940	**3**	1	1
9·99960	99962	99963	99965	99967	99968	99969	99971	99972	99974	**2**	0	1
9·99986	99987	99988	99989	99990	99990	99991	99992	99993	99993	**1**	0	1
9·99999	99999	99999	99999	00000	00000	00000	00000	00000	00000	**0**	0	0
27′	24′	21′	18′	15′	12′	9′	6′	3′	0′	°	1′	2′

COSINES.

Mean Diff.

XV.—LOGARITHMIC

°	0′	3′	6′	9′	12′	15′	18′	21′	24′	27′	30′	Mean Diff. 1′	Mean Diff. 2′
0	Inf. Neg.	6·94085	24188	41797	54291	63982	71900	78595	84394	89510	94086		
1	8·24192	26312	28332	30263	32112	33886	35590	37229	38809	40334	41807		
2	8·54308	55382	56429	57452	58451	59428	60384	61319	62234	63131	64009		
3	8·71940	72659	73366	74063	74748	75423	76087	76742	77387	78022	78649		
4	8·84464	85006	85540	86069	86591	87106	87616	88120	88618	89111	89598	171	341
5	8·94195	94630	95060	95486	95908	96325	96739	97150	97556	97959	98358	138	277
6	9·02162	02525	02885	03242	03597	03948	04297	04643	04987	05328	05666	117	223
7	9·08914	09227	09537	09845	10150	10454	10756	11056	11353	11649	11943	101	202
8	9·14780	15054	15327	15598	15867	16135	16401	16665	16928	17190	17450	89	178
9	9·19971	20216	20459	20701	20942	21182	21420	21657	21893	22127	22361	80	159
10	9·24632	24853	25073	25292	25510	25727	25943	26158	26372	26585	26797	72	144
11	9·28865	29067	29268	29468	29668	29866	30064	30261	30457	30652	30846	66	132
12	9·32747	32933	33119	33303	33487	33670	33853	34034	34215	34396	34576	61	122
13	9·36336	36509	36681	36852	37023	37193	37363	37532	37700	37868	38035	57	113
14	9·39677	39838	39999	40159	40319	40478	40636	40795	40952	41109	41266	53	106
15	9·42805	42957	43108	43258	43408	43558	43707	43855	44004	44151	44299	50	100
16	9·45750	45892	46035	46177	46319	46460	46601	46741	46881	47021	47160	47	94
17	9·48534	48669	48804	48939	49073	49207	49341	49474	49607	49740	49872	45	89
18	9·51178	51306	51435	51563	51691	51819	51946	52073	52200	52326	52452	42	85
19	9·53697	53820	53943	54065	54187	54309	54431	54552	54673	54794	54915	41	81
20	9·56107	56224	56342	56459	56576	56693	56810	56926	57042	57158	57274	39	78
21	9·58418	58531	58644	58757	58869	58981	59094	59205	59317	59429	59540	37	75
22	9·60641	60750	60859	60967	61076	61184	61292	61400	61508	61615	61722	36	72
23	9·62785	62890	62996	63101	63205	63310	63414	63519	63623	63726	63830	35	70
24	9·64858	64960	65062	65164	65265	65366	65467	65568	65669	65770	65870	34	67
25	9·66867	66966	67065	67163	67262	67360	67458	67556	67654	67752	67850	33	65
26	9·68818	68914	69010	69106	69202	69298	69393	69488	69584	69679	69774	32	64
27	9·70717	70810	70904	70997	71090	71184	71277	71370	71462	71555	71648	31	62
28	9·72567	72659	72750	72841	72932	73023	73114	73205	73295	73386	73476	30	61
29	9·74375	74465	74554	74643	74732	74821	74910	74998	75087	75176	75264	30	59
30	9·76144	76231	76319	76406	76493	76580	76668	76754	76841	76928	77015	29	58
31	9·77877	77963	78049	78135	78220	78306	78391	78476	78562	78647	78732	28	57
32	9·79579	79663	79747	79832	79916	80000	80084	80168	80251	80335	80419	28	56
33	9·81252	81335	81418	81500	81583	81666	81748	81831	81913	81996	82078	28	55
34	9·82899	82980	83062	83144	83225	83307	83388	83470	83551	83632	83713	27	54
35	9·84523	84603	84684	84764	84845	84925	85006	85086	85166	85247	85327	27	54
36	9·86126	86206	86285	86365	86445	86524	86603	86683	86762	86842	86921	26	53
37	9·87711	87790	87869	87948	88027	88105	88184	88262	88341	88420	88498	26	52
38	9·89281	89359	89437	89515	89593	89671	89749	89827	89905	89983	90061	26	52
39	9·90837	90914	90992	91069	91147	91224	91301	91379	91456	91533	91610	26	52
40	9·92381	92458	92535	92612	92689	92766	92843	92920	92996	93073	93150	26	51
41	9·93916	93993	94069	94146	94222	94299	94375	94452	94528	94604	94681	25	51
42	9·95444	95520	95596	95672	95748	95825	95901	95977	96053	96129	96205	25	51
43	9·96966	97042	97118	97193	97269	97345	97421	97497	97573	97649	97725	25	51
44	9·98484	98560	98635	98711	98787	98863	98939	99015	99090	99166	99242	25	51
°	60′	57′	54′	51′	48′	45′	42′	39′	36′	33′	30′	1′	2′

LOGARITHMIC

Mean Diff.

TANGENTS.

33′	36′	39′	42′	45′	48′	51′	54′	57′	60′	°	Mean Diff. 1′	2′
7·98225	02004	05481	08700	11696	14500	17133	19616	21964	24192	89		
8·43232	44611	45948	47245	48505	49729	50920	52079	53208	54308	88		
8·64870	65715	66543	67356	68154	68938	69708	70465	71208	71940	87		
8·79266	79875	80476	81068	81653	82230	82799	83361	83916	84464	86		
8·90080	90557	91029	91495	91957	92414	92866	93313	93756	94195	85	153	306
8·98753	99145	99534	99919	00301	00679	01055	01427	01796	02162	84	127	253
9·06002	06335	06666	06994	07320	07643	07964	08283	08600	08914	83	108	216
9·12235	12525	12813	13099	13384	13667	13948	14227	14504	14780	82	94	189
9·17708	17965	18221	18475	18728	18979	19229	19478	19725	19971	81	84	168
9·22593	22824	23054	23283	23510	23737	23962	24186	24410	24632	80	76	151
9·27008	27218	27427	27635	27842	28049	28254	28459	28662	28865	79	69	138
9·31040	31233	31425	31616	31806	31996	32185	32373	32561	32747	78	63	127
9·34755	34933	35111	35288	35464	35640	35815	35989	36163	36336	77	59	118
9·38202	38368	38534	38699	38863	39027	39190	39353	39515	39677	76	55	109
9·41422	41578	41733	41887	42041	42195	42348	42501	42653	42805	75	51	103
9·44446	44592	44738	44884	45029	45174	45319	45463	45606	45750	74	48	97
9·47299	47438	47576	47714	47852	47989	48126	48262	48398	48534	73	46	92
9·50004	50136	50267	50398	50529	50659	50789	50919	51048	51178	72	43	87
9·52578	52703	52829	52953	53078	53202	53327	53450	53574	53697	71	41	88
9·55035	55155	55275	55395	55514	55633	55752	55870	55989	56107	70	40	79
9·57389	57504	57619	57734	57849	57963	58077	58191	58304	58418	69	38	76
9·59651	59762	59872	59983	60093	60203	60313	60422	60531	60641	68	37	73
9·61830	61936	62043	62150	62256	62362	62468	62574	62680	62785	67	35	71
9·63934	64037	64140	64243	64346	64449	64552	64654	64756	64858	66	34	69
9·65971	66071	66171	66271	66371	66470	66570	66669	66768	66867	65	33	66
9·67947	68044	68142	68239	68336	68432	68529	68626	68722	68818	64	32	65
9·69868	69963	70058	70152	70247	70341	70435	70529	70623	70717	63	31	63
9·71740	71833	71925	72017	72109	72201	72293	72384	72476	72567	62	31	61
9·73567	73657	73747	73837	73927	74017	74107	74196	74286	74375	61	30	60
9·75353	75441	75529	75617	75705	75793	75881	75969	76056	76144	60	29	59
9·77101	77188	77274	77361	77447	77533	77619	77706	77791	77877	59	29	57
9·78817	78902	78987	79072	79156	79241	79326	79410	79495	79579	58	28	56
9·80502	80586	80669	80753	80836	80919	81003	81086	81169	81252	57	28	55
9·82161	82243	82325	82407	82489	82571	82653	82735	82817	82899	56	27	55
9·83795	83876	83957	84038	84119	84200	84280	84361	84442	84523	55	27	54
9·85407	85487	85567	85647	85727	85807	85887	85967	86046	86126	54	27	53
9·87000	87079	87158	87238	87317	87396	87475	87554	87633	87711	53	26	53
9·88577	88655	88733	88812	88890	88968	89046	89125	89203	89281	52	26	52
9·90138	90216	90294	90371	90449	90527	90604	90682	90759	90837	51	26	52
9·91688	91765	91842	91919	91996	92073	92150	92227	92304	92381	50	26	51
9·93227	93303	93380	93457	93533	93610	93687	93763	93840	93916	49	26	51
9·94757	94834	94910	94986	95062	95139	95215	95291	95368	95444	48	25	51
9·96281	96357	96433	96510	96586	96662	96738	96814	96890	96966	47	25	51
9·97801	97877	97953	98029	98104	98180	98256	98332	98408	98484	46	25	51
9·99318	99394	99469	99545	99621	99697	99773	99848	99924	00000	45	25	51
27′	24′	21′	18′	15′	12′	9′	6′	3′	0′	°	1′	2′

COTANGENTS.

Mean Diff.

°	0′	3′	6′	9′	12′	15′	18′	21′	24′	27′	30′	Mean Diff. 1′	Mean Diff. 2′
45	10·00000	00076	00152	00227	00303	00379	00455	00531	00606	00682	00758	25	51
46	10·01516	01592	01668	01744	01820	01896	01971	02047	02123	02199	02275	25	51
47	10·03034	03110	03186	03262	03338	03414	03490	03567	03643	03719	03795	25	51
48	10·04556	04632	04709	04785	04861	04938	05014	05090	05166	05243	05319	25	51
49	10·06084	06160	06237	06313	06390	06467	06543	06620	06697	06773	06850	26	51
50	10·07619	07696	07773	07850	07927	08004	08081	08158	08235	08312	08390	26	51
51	10·09163	09241	09318	09396	09473	09551	09629	09706	09784	09862	09939	26	52
52	10·10719	10797	10875	10954	11032	11110	11188	11267	11345	11423	11502	26	52
53	10·12289	12367	12446	12525	12604	12683	12762	12842	12921	13000	13079	26	53
54	10·13874	13954	14033	14113	14193	14273	14353	14433	14513	14593	14673	27	53
55	10·15477	15558	15639	15720	15800	15881	15962	16043	16124	16205	16287	27	54
56	10·17101	17183	17265	17347	17429	17511	17593	17675	17757	17839	17922	27	55
57	10·18748	18831	18914	18997	19081	19164	19247	19331	19414	19498	19581	28	55
58	10·20421	20505	20590	20674	20759	20844	20928	21013	21098	21183	21268	28	56
59	10·22123	22209	22294	22381	22467	22553	22639	22726	22812	22899	22985	29	57
60	10·23856	23944	24031	24119	24207	24295	24383	24471	24559	24647	24736	29	59
61	10·25625	25714	25804	25893	25983	26073	26163	26253	26343	26433	26524	30	60
62	10·27433	27524	27616	27707	27799	27891	27983	28075	28167	28260	28352	31	61
63	10·29283	29377	29471	29565	29659	29753	29848	29942	30037	30132	30226	31	63
64	10·31182	31278	31374	31471	31568	31664	31761	31858	31956	32053	32150	32	65
65	10·33138	33232	33331	33430	33530	33629	33729	33829	33929	34029	34130	33	66
66	10·35142	35244	35346	35448	35551	35654	35757	35860	35963	36066	36170	34	69
67	10·37215	37320	37426	37532	37638	37744	37850	37957	38064	38170	38278	35	71
68	10·39359	39468	39578	39687	39797	39907	40017	40128	40238	40349	40460	37	73
69	10·41582	41696	41809	41923	42037	42151	42266	42381	42496	42611	42726	38	76
70	10·43893	44011	44130	44248	44367	44486	44605	44725	44845	44965	45085	40	79
71	10·46303	46426	46550	46673	46798	46922	47047	47171	47297	47422	47548	41	83
72	10·48822	48952	49081	49211	49341	49471	49602	49733	49864	49996	50128	43	87
73	10·51466	51602	51738	51874	52011	52148	52286	52424	52562	52701	52840	46	92
74	10·54250	54394	54537	54681	54826	54971	55116	55262	55408	55554	55701	48	97
75	10·57195	57347	57499	57652	57805	57959	58113	58267	58422	58578	58734	51	103
76	10·60323	60485	60647	60810	60973	61137	61301	61466	61632	61798	61965	55	109
77	10·63664	63837	64011	64185	64360	64536	64712	64889	65067	65245	65424	59	118
78	10·67253	67439	67627	67815	68004	68194	68384	68575	68767	68960	69154	63	127
79	10·71135	71338	71541	71746	71951	72158	72365	72573	72782	72992	73203	69	138
80	10·75368	75590	75814	76038	76263	76490	76717	76946	77176	77407	77639	76	151
81	10·80029	80275	80522	80771	81021	81272	81525	81779	82035	82292	82550	84	168
82	10·85220	85496	85773	86052	86333	86616	86901	87187	87475	87765	88057	94	189
83	10·91086	91400	91717	92036	92357	92680	93006	93334	93665	93998	94334	108	216
84	10·97838	98204	98573	98945	99321	99699	$\overline{00081}$	$\overline{00466}$	$\overline{00855}$	$\overline{01247}$	$\overline{01642}$	127	253
85	11·05805	06244	06687	07134	07586	08043	08505	08971	09443	09920	10402	153	306
86	11·15536	16084	16639	17201	17770	18347	18932	19524	20125	20734	21351		
87	11·28060	28792	29535	30292	31062	31846	32644	33457	34285	35130	35991		
88	11·45692	46792	47921	49080	50271	51495	52755	54052	55389	56768	58193		
89	11·75808	78036	80384	82867	85500	88304	91300	94519	97996	$\overline{01775}$	$\overline{05914}$		
°	60′	57′	54′	51′	48′	45′	42′	39′	36′	33′	30′	1′	2′

TANGENTS—*continued.*

33′	36′	39′	42′	45′	48′	51′	54′	57′	60′	°	Mean Diff. 1′	Mean Diff. 2′
10·00834	00910	00985	01061	01137	01213	01289	01365	01440	01516	**44**	25	51
10·02351	02427	02503	02579	02655	02731	02807	02882	02958	03034	**43**	25	51
10·03871	03947	04023	04099	04175	04252	04328	04404	04480	04556	**42**	25	51
10·05396	05472	05548	05625	05701	05778	05854	05931	06007	06084	**41**	25	51
10·06927	07004	07080	07157	07234	07311	07388	07465	07542	07619	**40**	26	51
10·08467	08544	08621	08699	08776	08853	08931	09008	09086	09163	**39**	26	52
10·10017	10095	10173	10251	10329	10407	10485	10563	10641	10719	**38**	26	52
10·11580	11659	11738	11816	11895	11973	12052	12131	12210	12289	**37**	26	52
10·13158	13238	13317	13397	13476	13555	13635	13715	13794	13874	**36**	26	53
10·14753	14834	14914	14994	15075	15155	15236	15316	15397	15477	**35**	27	54
10·16368	16449	16530	16612	16693	16775	16856	16938	17020	17101	**34**	27	54
10·18004	18087	18169	18252	18334	18417	18500	18582	18665	18748	**33**	28	55
10·19665	19749	19832	19916	20000	20084	20168	20253	20337	20421	**32**	28	56
10·21353	21438	21524	21609	21694	21780	21865	21951	22037	22123	**31**	28	57
10·23072	23159	23246	23332	23420	23507	23594	23681	23769	23856	**30**	29	58
10·24824	24913	25002	25090	25179	25268	25357	25446	25535	25625	**29**	30	59
10·26614	26705	26795	26886	26977	27068	27159	27250	27341	27433	**28**	30	61
10·28445	28538	28630	28723	28816	38910	29003	29096	29190	29283	**27**	31	62
10·30321	30416	30512	30607	30702	30798	30894	30990	31086	31182	**26**	32	64
10·32248	32346	32444	32542	32640	32738	32837	32935	33034	33133	**25**	33	65
10·34230	34331	34432	34533	34634	34735	34836	34938	35040	35142	**24**	34	67
10·36274	36377	36481	36586	36690	36795	36899	37004	37110	37215	**23**	35	70
10·38385	38492	38600	38708	38816	38924	39033	39141	39250	39359	**22**	36	72
10·40571	40683	40795	40906	41019	41131	41243	41356	41469	41582	**21**	37	75
10·42842	42958	43074	43190	43307	43424	43541	43658	43776	43893	**20**	39	78
10·45206	45327	45448	45569	45691	45813	45935	46057	46180	46303	**19**	41	81
10·47674	47800	47927	48054	48181	48309	48437	48565	48694	48822	**18**	42	85
10·50260	50393	50526	50659	50793	50927	51061	51196	51331	51466	**17**	45	89
10·52979	53119	53259	53399	53540	53681	53823	53965	54108	54250	**16**	47	94
10·55849	55996	56145	56293	56442	56592	56742	56892	57043	57195	**15**	50	100
10·58891	59048	59205	59364	59522	59681	59841	60001	60162	60323	**14**	53	106
10·62132	62300	62468	62637	62807	62977	63148	63319	63491	63664	**13**	57	113
10·65604	65785	65966	66147	66330	66513	66697	66881	67067	67253	**12**	61	122
10·69348	69543	69739	59936	70134	70332	70532	70732	70933	71135	**11**	66	132
10·73415	73628	73842	74057	74273	74490	74708	74927	75147	75368	**10**	72	144
10·77873	78107	78343	78580	78818	79058	79299	79541	79784	80029	**9**	80	159
10·82810	83072	83335	83599	83865	84133	84402	84673	84946	85220	**8**	89	178
10·88351	88647	88944	89244	89546	89850	90155	90463	90773	91086	**7**	101	202
10·94672	95013	95357	95703	96052	96403	96758	97115	97475	97838	**6**	117	233
11·02041	02444	02850	03261	03675	04092	04514	04940	45370	05805	**5**	138	277
11·10889	11382	11880	12384	12894	13409	13931	14460	14994	15536	**4**	171	341
11·21978	22613	23258	23913	24577	25252	25937	26634	27341	28060	**3**		
11·36869	37766	38681	39616	40572	41549	42548	43571	44618	45692	**2**		
11·59666	61191	62771	64410	66114	67888	69737	71668	73688	75808	**1**		
12·10490	15606	21405	28100	36018	45709	58203	75812	$\overline{05915}$	Inf.	**0**		
27′	24′	21′	18′	15′	12′	9′	6′	3′	0′	°	1′	2′

COTANGENTS.

XVI.—LOGARITHMIC

°	0′	3′	6′	9′	12′	15′	18′	21′	24′	27′	30′	Mean Diff. 1′	Mean Diff. 2′
0	10·00000	00000	00000	00000	00000	00000	00001	00001	00001	00001	00002	0	0
1	10·00007	00007	00008	00009	00010	00010	00011	00012	00013	00014	00015	0	1
2	10·00026	00028	00029	00031	00032	00033	00035	00037	00038	00040	00041	0	1
3	10·00060	00062	00064	00066	00068	00070	00072	00074	00077	00079	00081	1	1
4	10·00106	00109	00111	00114	00117	00120	00122	00125	00128	00131	00134	1	2
5	10·00166	00169	00172	00176	00179	00183	00186	00190	00193	00197	00200	1	2
6	10·00239	00243	00247	00251	00255	00259	00263	00267	00272	00276	00280	1	3
7	10·00325	00330	00334	00339	00344	00349	00353	00358	00363	00368	00373	2	3
8	10·00425	00430	00435	00441	00446	00452	00457	00463	00468	00474	00480	2	4
9	10·00538	00544	00550	00556	00562	00568	00575	00581	00587	00593	00600	2	4
10	10·00665	00672	00678	00685	00692	00699	00706	00712	00719	00726	00733	2	5
11	10·00805	00813	00820	00828	00835	00843	00850	00858	00865	00873	00881	2	5
12	10·00960	00968	00976	00984	00992	01000	01009	01017	01025	01033	01042	3	5
13	10·01128	01136	01145	01154	01163	01172	01181	01190	01199	01208	01217	3	6
14	10·01310	01319	01329	01338	01348	01357	01367	01377	01386	01396	01406	3	6
15	10·01506	01516	01526	01536	01547	01557	01567	01578	01588	01598	01609	3	7
16	10·01716	01727	01738	01749	01760	01771	01782	01793	01804	01815	01826	4	7
17	10·01940	01952	01964	01975	01987	01999	02011	02022	02034	02046	02058	4	8
18	10·02179	02192	02204	02216	02229	02241	02254	02266	02279	02292	02304	4	8
19	10·02433	02446	02459	02472	02485	02499	02512	02525	02539	02552	02565	4	9
20	10·02701	02715	02729	02743	02757	02771	02785	02799	02813	02827	02841	5	9
21	10·02985	02999	03014	03029	03043	03058	03073	03088	03102	03117	03132	5	10
22	10·03283	03299	03314	03330	03345	03360	03376	03392	03407	03423	03438	5	10
23	10·03597	03613	03630	03646	03662	03678	03695	03711	03727	03744	03760	5	11
24	10·03927	03944	03961	03978	03995	04012	04029	04046	04063	04080	04098	6	11
25	10·04272	04290	04308	04326	04343	04361	04379	04397	04415	04433	04451	6	12
26	10·04634	04652	04671	04690	04708	04727	04746	04764	04783	04802	04821	6	12
27	10·05012	05031	05051	05070	05089	05109	05129	05148	05168	05187	05207	7	13
28	10·05407	05427	05447	05467	05487	05508	05528	05549	05569	05590	05610	7	14
29	10·05818	05839	05860	05881	05902	05924	05945	05966	05988	06009	06030	7	14
30	10·06247	06269	06291	06313	06335	06357	06379	06401	06423	06446	06468	7	15
31	10·06693	06716	06739	06762	06785	06808	06831	06854	06877	06900	06923	8	15
32	10·07158	07182	07205	07229	07253	07277	07301	07325	07349	07373	07397	8	16
33	10·07641	07665	07690	07715	07740	07765	07789	07814	07839	07864	07889	8	17
34	10·08143	08168	08194	08219	08245	08271	08297	08323	08349	08375	08401	9	17
35	10·08664	08690	08717	08743	08770	08797	08824	08851	08877	08904	08931	9	18
36	10·09204	09232	09259	09287	09315	09343	09370	09398	09426	09454	09482	9	19
37	10·09765	09794	09822	09851	09880	09909	09937	09966	09995	10024	10053	10	19
38	10·10347	10376	10406	10436	10466	10496	10525	10555	10585	10615	10646	10	20
39	10·10950	10980	11011	11042	11073	11104	11135	11166	11197	11228	11259	10	21
40	10·11575	11606	11638	11670	11702	11734	11766	11799	11831	11863	11895	11	21
41	10·12222	12255	12288	12321	12354	12387	12421	12454	12487	12521	12554	11	22
42	10·12893	12927	12961	12995	13030	13064	13098	13133	13168	13202	13237	11	23
43	10·13587	13623	13658	13694	13729	13765	13800	13836	13872	13908	13944	12	24
44	10·14307	14343	14380	14417	14453	14490	14527	14564	14601	14639	14676	12	25
°	60′	57′	54′	51′	48′	45′	42′	39′	36′	33′	30′	1′	2′

SECANTS.

33′	36′	39′	42′	45′	48′	51′	54′	57′	60′	°	Mean Diff. 1′	2′
10·00002	00002	00003	00003	00004	00004	00005	00005	00006	00007	89	0	0
10·00016	00017	00018	00019	00020	00021	00023	00024	00025	00026	88	0	1
10·00043	00045	00046	00048	00050	00052	00054	00056	00058	00060	87	1	1
10·00083	00086	00088	00091	00093	00096	00098	00101	00103	00106	86	1	2
10·00137	00140	00143	00146	00149	00153	00156	00159	00162	00166	85	1	2
10·00204	00208	00212	00215	00219	00223	00227	00231	00235	00239	84	1	3
10·00284	00289	00293	00298	00302	00307	00311	00316	00320	00325	83	2	3
10·00378	00383	00388	00393	00399	00404	00409	00414	00419	00425	82	2	3
10·00485	00491	00497	00503	00508	00514	00520	00526	00532	00538	81	2	4
10·00606	00612	00619	00625	00632	00638	00645	00652	00658	00665	80	2	4
10·00740	00748	00755	00762	00769	00776	00783	00791	00798	00805	79	2	5
10·00888	00896	00904	00912	00920	00928	00936	00944	00952	00960	78	3	5
10·01050	01059	01067	01076	01084	01093	01102	01110	01119	01128	77	3	6
10·01226	01235	01244	01254	01263	01272	01281	01291	01300	01310	76	3	6
10·01416	01426	01435	01445	01455	01465	01475	01485	01495	01506	75	3	7
10·01619	01630	01641	01651	01662	01673	01683	01694	01705	01716	74	4	7
10·01838	01849	01860	01871	01883	01894	01906	01917	01929	01940	73	4	8
10·02070	02082	02094	02106	02118	02130	02143	02155	02167	02179	72	4	8
10·02317	02330	02343	02355	02368	02381	02394	02407	02420	02433	71	4	9
10·02579	02592	02606	02619	02633	02647	02660	02674	02688	02701	70	5	9
10·02855	02870	02884	02898	02913	02927	02941	02956	02970	02985	69	5	10
10·03147	03162	03177	03192	03207	03222	03238	03253	03268	03283	68	5	10
10·03454	03470	03486	03502	03517	03533	03549	03565	03581	03597	67	5	11
10·03777	03793	03810	03826	03843	03860	03877	03893	03910	03927	66	6	11
10·04115	04132	04150	04167	04185	04202	04220	04237	04255	04272	65	6	12
10·04469	04487	04506	04524	04542	04560	04579	04597	04616	04634	64	6	12
10·04840	04859	04878	04897	04916	04935	04954	04973	04993	05012	63	6	13
10·05227	05247	05266	05286	05306	05326	05346	05366	05386	05407	62	7	13
10·05631	05651	05672	05693	05714	05734	05755	05776	05797	05818	61	7	14
10·06052	06073	06095	06116	06138	06160	06181	06203	06225	06247	60	7	14
10·06490	06513	06535	06558	06580	06603	06625	06648	06671	06693	59	8	15
10·06947	06970	06993	07017	07040	07064	07087	07111	07134	07158	58	8	16
10·07421	07445	07470	07494	07518	07543	07567	07592	07616	07641	57	8	16
10·07914	07940	07965	07990	08015	08041	08066	08092	08117	08143	56	8	17
10·08427	08453	08479	08505	08531	08558	08584	08611	08637	08664	55	9	17
10·08958	08986	09013	09040	09067	09094	09122	09149	09177	09204	54	9	18
10·09510	09538	09566	09595	09623	09651	09680	09708	09737	09765	53	9	19
10·10082	10112	10141	10170	10199	10229	10258	10288	10317	10347	52	10	19
10·10676	10706	10736	10767	10797	10827	10858	10888	10919	10950	51	10	20
10·11291	11322	11353	11385	11416	11448	11479	11511	11543	11575	50	10	21
10·11928	11960	11993	12025	12058	12091	12123	12156	12189	12222	49	11	22
10·12588	12622	12655	12689	12723	12757	12791	12825	12859	12893	48	11	23
10·13272	13306	13341	13376	13411	13446	13482	13517	13552	13587	47	12	23
10·13980	14016	14052	14088	14124	14161	14197	14234	14270	14307	46	12	24
10·14713	14750	14788	14825	14863	14900	14938	14976	15014	15051	45	13	25
27′	24′	21′	18′	15′	12′	9′	6′	3′	0′	°	1′	2′

COSECANTS. Mean Diff

°	0′	3′	6′	9′	12′	15′	18′	21′	24′	27′	30′	Mean Diff. 1′	Mean Diff. 2′
45	10·15051	15089	15127	15165	15204	15242	15280	15318	15357	15395	15434	13	25
46	10·15823	15862	15902	15941	15980	16020	16060	16099	16139	16179	16219	13	26
47	10·16622	16662	16703	16744	16785	16826	16867	16908	16949	16990	17032	14	27
48	10·17449	17491	17533	17576	17618	17660	17703	17745	17788	17831	17874	14	28
49	10·18306	18349	18393	18437	18481	18525	18569	18613	18657	18701	18746	15	29
50	10·19193	19238	19284	19329	19375	19420	19466	19511	19557	19603	19649	15	30
51	10·20113	20160	20207	20254	20301	20348	20395	20442	20490	20537	20585	16	31
52	10·21066	21114	21163	21212	21261	21309	21358	21408	21457	21506	21555	16	33
53	10·22054	22104	22154	22205	22256	22306	22357	22408	22459	22510	22561	17	34
54	10·23078	23130	23183	23235	23288	23340	23393	23146	23199	23552	23605	18	35
55	10·24141	24195	24249	24304	24358	24413	24467	24522	24577	24632	24687	18	36
56	10·25244	25300	25356	25413	25469	25526	25583	25640	25697	25754	25811	19	38
57	10·26389	26448	26506	26565	26623	26682	26741	26800	26860	26919	26978	20	39
58	10·27579	27640	27701	27762	27823	27884	27945	28006	28068	28130	28191	20	40
59	10·28816	28879	28942	29006	29069	29133	29197	29261	29325	29389	29453	21	42
60	10·30103	30169	30235	30301	30367	30433	30499	30566	30632	30699	30766	22	44
61	10·31443	31511	31580	31649	31717	31787	31856	31925	31994	32064	32134	23	46
62	10·32839	32910	32982	33054	33125	33197	33269	33342	33414	33487	33559	24	48
63	10·34295	34370	34444	34519	34594	34669	34745	34820	34896	34971	35047	25	50
64	10·35816	35894	35972	36050	36128	36206	36285	36364	36443	36522	36602	26	52
65	10·37405	37487	37568	37650	37732	37814	37896	37979	38061	38144	38227	27	55
66	10·39069	39154	39239	39325	39411	39497	39583	39669	39756	39843	39930	28	57
67	10·40812	40902	40991	41081	41171	41261	41352	41443	41533	41625	41716	30	60
68	10·42642	42736	42831	42925	43020	43114	43210	43305	43401	43496	43592	32	63
69	10·44567	44666	44765	44864	44964	45064	45164	45265	45365	45466	45567	33	67
70	10·46595	46699	46804	46908	47014	47119	47225	47331	47437	47544	47650	35	70
71	10·48736	48846	48957	49067	49179	49290	49402	49514	49626	49739	49852	37	74
72	10·51002	51119	51236	51353	51471	51589	51708	51827	51946	52066	52186	39	79
73	10·53406	53531	53655	53780	53905	54031	54157	54284	54411	54538	54666	42	84
74	10·55966	56099	56231	56365	56498	56633	56767	56902	57038	57174	57310	45	90
75	10·58700	58842	58984	59127	59270	59414	59558	59703	59848	59994	60140	48	96
76	10·61632	61785	61938	62091	62245	62100	62555	62711	62867	63024	63181	52	103
77	10·64791	64956	65121	65287	65453	65620	65788	65957	66126	66296	66466	56	112
78	10·68212	68391	68570	68750	68932	69113	69296	69479	69664	69849	70034	61	121
79	10·71940	72136	72332	72529	72727	72927	73127	73328	73530	73733	73937	66	133
80	10·76033	76248	76465	76683	76902	77122	77343	77565	77789	78013	78239	73	147
81	10·80567	80807	81048	81291	81535	81780	82027	82276	82526	82777	83030	82	164
82	10·85644	85915	86187	86461	86737	87015	87294	87575	87858	88143	88430	93	185
83	10·91411	91720	92032	92347	92663	92982	93304	93628	93954	94283	94614	107	213
84	10·98077	98439	98804	99172	99544	99918	$\overline{00}296$	$\overline{00}678$	$\overline{01}063$	$\overline{01}451$	$\overline{01}843$	125	251
85	11·05970	06406	06846	07290	07739	08193	08651	09115	09583	10057	10536	152	303
86	11·15642	16187	16739	17299	17866	18440	19022	19612	20211	20817	21432		
87	11·28120	28849	29591	30346	31114	31896	32692	33503	34330	35173	36032		
88	11·45718	46817	47945	49103	50292	51515	52774	54070	55406	56784	58208		
89	11·75814	78042	80390	82872	85505	88307	91304	94522	97998	$\overline{01}777$	$\overline{05}916$		
°	60′	57′	54′	51′	48′	45′	42′	39′	36′	33′	30′	1′	2′

SECANTS—*continued.*

33′	36′	39′	42′	45′	48′	51′	54′	57′	60′	°	Mean Diff. 1′	Mean Diff. 2′
10·15472	15511	15550	15589	15627	15666	15705	15745	15784	15823	44	13	26
10·16259	16299	16339	16379	16419	16460	16500	16541	16581	16622	43	13	27
10·17073	17115	17156	17198	17239	17281	17323	17365	17407	17449	42	14	28
10·17916	17959	18002	18045	18089	18132	18175	18219	18262	18306	41	14	29
10·18790	18834	18879	18924	18968	19013	19058	19103	19148	19193	40	15	30
10·19695	19741	19787	19834	19880	19926	19973	20019	20066	20113	39	15	31
10·20633	20681	20728	20776	20824	20872	20921	20969	21017	21066	38	16	32
10·21605	21654	21704	21754	21803	21853	21903	21953	22003	22054	37	17	33
10·22613	22664	22715	22767	22819	22870	22922	22974	23026	23078	36	17	34
10·23658	23711	23764	23818	23871	23925	23979	24033	24087	24141	35	18	36
10·24742	24798	24853	24909	24964	25020	25076	25132	25188	25244	34	19	38
10·25868	25926	25983	26041	26099	26157	26215	26273	26331	26389	33	19	39
10·27038	27098	27157	27217	27277	27337	27398	27458	27518	27579	32	20	40
10·28253	28315	28378	28440	28502	28565	28627	28690	28753	28816	31	21	42
10·29518	29582	29647	29712	29776	29841	29907	29972	30037	30103	30	22	43
10·30833	30900	30968	31035	31103	31171	31238	31306	31375	31443	29	23	45
10·32204	32274	32344	32414	32485	32555	32626	32697	32768	32839	28	24	47
10·33632	33705	33779	33852	33925	33999	34073	34147	34221	34295	27	25	49
10·35123	35200	35276	35353	35429	35506	35583	35661	35738	35816	26	26	51
10·36681	36761	36841	36921	37001	37082	37162	37243	37324	37405	25	27	54
10·38311	38394	38478	38562	38646	38730	38814	38899	38984	39069	24	28	56
10·40017	40105	40192	40280	40368	40457	40545	40634	40723	40812	23	29	59
10·41808	41899	41992	42084	42176	42269	42362	42455	42549	42642	22	31	62
10·43689	43785	43882	43979	44077	44174	44272	44370	44468	44567	21	32	65
10·45669	45771	45873	45975	46078	46181	46284	46387	46491	46595	20	34	68
10·47758	47865	47973	48081	48189	48298	48407	48516	48626	48736	19	36	72
10·49966	50080	50194	50308	50423	50538	50653	60769	50885	51002	18	38	77
10·52306	52427	52548	52670	52791	52914	53036	53159	53283	53406	17	41	81
10·54794	54923	55052	55181	55311	55441	55572	55703	55834	55966	16	43	87
10·57447	57584	57722	57860	57999	58139	58278	58418	58559	58700	15	46	93
10·60287	60434	60582	60730	60879	61029	61179	61330	61481	61632	14	50	99
10·63340	63498	63658	63818	63978	64140	64302	64464	64627	64791	13	54	107
10·66638	66810	66982	67156	67330	67505	67681	67857	68034	68212	12	58	116
10·70221	70409	70597	70786	70976	71167	71359	71552	71746	71940	11	63	127
10·74142	74348	74555	74763	74972	75182	75393	75605	75819	76033	10	70	140
10·78466	78694	78924	79155	79387	79620	79855	80091	80328	80567	9	78	155
10·83284	83540	83797	84056	84317	84579	84843	85109	85376	85644	8	87	174
10·88719	89010	89303	89598	89894	90193	90494	90798	91103	91411	7	99	198
10·94948	95285	95624	95966	96310	96658	97008	97361	97717	98077	6	115	230
11·02238	02637	03040	03447	03857	04272	04690	05113	05539	05970	5	137	275
11·11020	11510	12005	12506	13013	13526	14045	14571	15103	15642	4	170	339
11·22057	22690	23333	23985	24647	25320	26003	26697	27403	28120	3		
11·36909	37804	38718	39651	40605	41581	42579	43600	44646	45718	2		
11·59680	61204	62783	64422	66125	67897	69745	71676	73696	75814	1		
12·10491	15607	21406	28100	36018	45709	58203	75812	$0\overline{5915}$	Inf.	0		
27′	24′	21′	18′	15′	12′	9′	6′	3′	0′	°	1′	2′

COSECANTS.

Mean Diff.

XVII.—CIRCULAR MEASURE.

DIFFERENCES.

°	0′	6′	12′	18′	24′	30′	36′	42′	48′	54′				
0	·00000	·00175	·00349	·00524	·00698	·00873	·01047	·01222	·01396	·01571	1′	29	10″	5
1	·01745	·01920	·02094	·02269	·02443	·02618	·02793	·02967	·03142	·03316	2′	58	20″	10
2	·03491	·03665	·03840	·04014	·04189	·04363	·04538	·04712	·04887	·05061	3′	87	30″	15
3	·05236	·05411	·05585	·05760	·05934	·06109	·06283	·06458	·06632	·06807	4′	116	40″	19
4	·06981	·07156	·07330	·07505	·07679	·07854	·08029	·08203	·08378	·08552	5′	145	50″	24
5	·08727	·08901	·09076	·09250	·09425	·09599	·09774	·09948	·10123	·10297				
6	·10472	·10647	·10821	·10996	·11170	·11345	·11519	·11694	·11868	·12043				
7	·12217	·12392	·12566	·12741	·12915	·13090	·13265	·13439	·13614	·13788				
8	·13963	·14137	·14312	·14486	·14661	·14835	·15010	·15184	·15359	·15533				
9	·15708	·15882	·16057	·16232	·16406	·16581	·16755	·16930	·17104	·17279				
10	·17453	·17628	·17802	·17977	·18151	·18326	·18500	·18675	·18850	·19024				
11	·19199	·19373	·19548	·19722	·19897	·20071	·20246	·20420	·20595	·20769				
12	·20944	·21118	·21293	·21468	·21642	·21817	·21991	·22166	·22340	·22515				
13	·22689	·22864	·23038	·23213	·23387	·23562	·23736	·23911	·24086	·24260				
14	·24435	·24609	·24784	·24958	·25133	·25307	·25482	·25656	·25831	·26005				
15	·26180	·26354	·26529	·26704	·26878	·27053	·27227	·27402	·27576	·27751				
16	·27925	·28100	·28274	·28449	·28623	·28798	·28972	·29147	·29322	·29496				
17	·29671	·29845	·30020	·30194	·30369	·30543	·30718	·30892	·31067	·31241				
18	·31416	·31590	·31765	·31940	·32114	·32289	·32463	·32638	·32812	·32987				
19	·33161	·33336	·33510	·33685	·33859	·34034	·34208	·34383	·34558	·34732				
20	·34907	·35081	·35256	·35430	·35605	·35779	·35954	·36128	·36303	·36477				
21	·36652	·36826	·37001	·37176	·37350	·37525	·37699	·37874	·38048	·38223				
22	·38397	·38572	·38746	·38921	·39095	·39270	·39444	·39619	·39794	·39968				
23	·40143	·40317	·40492	·40666	·40841	·41015	·41190	·41364	·41539	·41713				
24	·41888	·42062	·42237	·42412	·42586	·42761	·42935	·43110	·43284	·43459				
25	·43633	·43808	·43982	·44157	·44331	·44506	·44680	·44855	·45029	·45204				
26	·45379	·45553	·45728	·45902	·46077	·46251	·46426	·46600	·46775	·46949				
27	·47124	·47298	·47473	·47647	·47822	·47997	·48171	·48346	·48520	·48695				
28	·48869	·49044	·49218	·49393	·49567	·49742	·49916	·50091	·50265	·50440				
29	·50615	·50789	·50964	·51138	·51313	·51487	·51662	·51836	·52011	·52185				
30	·52360	·52534	·52709	·52883	·53058	·53233	·53407	·53582	·53756	·53931	1′	29	10″	5
31	·54105	·54280	·54454	·54629	·54803	·54978	·55152	·55327	·55501	·55676	2′	58	20″	10
32	·55851	·56025	·56200	·56374	·56549	·56723	·56898	·57072	·57247	·57421	3′	87	30″	15
33	·57596	·57770	·57945	·58119	·58294	·58469	·58643	·58818	·58992	·59167	4′	116	40″	19
34	·59341	·59516	·59690	·59865	·60039	·60214	·60388	·60563	·60737	·60912	5′	145	50″	24
35	·61087	·61261	·61436	·61610	·61785	·61959	·62134	·62308	·62483	·62657				
36	·62832	·63006	·63181	·63355	·63530	·63705	·63879	·64054	·64228	·64403				
37	·64577	·64752	·64926	·65101	·65275	·65450	·65624	·65799	·65973	·66148				
38	·66323	·66497	·66672	·66846	·67021	·67195	·67370	·67544	·67719	·67893				
39	·68068	·68242	·68417	·68591	·68766	·68941	·69115	·69290	·69464	·69639				
40	·69813	·69988	·70162	·70337	·70511	·70686	·70860	·71035	·71209	·71384				
41	·71558	·71733	·71908	·72082	·72257	·72431	·72606	·72780	·72955	·73129				
42	·73304	·73478	·73653	·73827	·74002	·74176	·74351	·74526	·74700	·74875				
43	·75049	·75224	·75398	·75573	·75747	·75922	·76096	·76271	·76445	·76620				
44	·76794	·76969	·77144	·77318	·77493	·77667	·77842	·78016	·78191	·78365				
45	·78540	·78714	·78889	·79063	·79238	·79412	·79587	·79762	·79936	·80111				
46	·80285	·80460	·80634	·80809	·80983	·81158	·81332	·81507	·81681	·81856				
47	·82030	·82205	·82380	·82554	·82729	·82903	·83078	·83252	·83427	·83601				
48	·83776	·83950	·84125	·84299	·84474	·84648	·84823	·84998	·85172	·85347				
49	·85521	·85696	·85870	·86045	·86219	·86394	·86568	·86743	·86917	·87092				
50	·87266	·87441	·87616	·87790	·87965	·88139	·88314	·88488	·88663	·88837				
51	·89012	·89186	·89361	·89535	·89710	·89884	·90059	·90234	·90408	·90583				
52	·90757	·90932	·91106	·91281	·91455	·91630	·91804	·91979	·92153	·92328				
53	·92502	·92677	·92852	·93026	·93201	·93375	·93550	·93724	·93899	·94073				
54	·94248	·94422	·94597	·94771	·94946	·95120	·95295	·95470	·95644	·95819				
55	·95993	·96168	·96342	·96517	·96691	·96866	·97040	·97215	·97389	·97564				
56	·97738	·97913	·98088	·98262	·98437	·98611	·98786	·98960	·99135	·99309				
57	·99484	·99658	·99833	1·00007	1·00182	1·00356	1·00531	1·00706	1·00880	1·01055				
58	1·01229	1·01404	1·01578	1·01753	1·01927	1·02102	1·02276	1·02451	1·02625	1·02800				
59	1·02974	1·03149	1·03323	1·03498	1·03673	1·03847	1·04022	1·04196	1·04371	1·04545				
°	0′	6′	12′	18′	24′	30′	36′	42′	48′	54′				

DIFFERENCES.

CIRCULAR MEASURE—*continued.*

°	0′	6′	12′	18′	24′	30′	36′	42′	48′	54′	Differences.			
60	1·04720	1·04894	1·05069	1·05243	1·05418	1·05592	1·05767	1·05941	1·06116	1·06291	1′	29	10″	5
61	1·06465	1·06640	1·06814	1·06989	1·07163	1·07338	1·07512	1·07687	1·07861	1·08036	2′	58	20″	10
62	1·08210	1·08385	1·08559	1·08734	1·08909	1·09083	1·09258	1·09432	1·09607	1·09781	3′	87	30″	15
63	1·09956	1·10130	1·10305	1·10479	1·10654	1·10828	1·11003	1·11177	1·11352	1·11527	4′	116	40″	19
64	1·11701	1·11876	1·12050	1·12225	1·12399	1·12574	1·12748	1·12923	1·13097	1·13272	5′	145	50″	24
65	1·13446	1·13621	1·13795	1·13970	1·14145	1·14319	1·14494	1·14668	1·14843	1·15017				
66	1·15192	1·15366	1·15541	1·15715	1·15890	1·16064	1·16239	1·16413	1·16588	1·16763				
67	1·16937	1·17112	1·17286	1·17461	1·17635	1·17810	1·17984	1·18159	1·18333	1·18508				
68	1·18682	1·18857	1·19031	1·19206	1·19381	1·19555	1·19730	1·19904	1·20079	1·20253				
69	1·20428	1·20602	1·20777	1·20951	1·21126	1·21300	1·21475	1·21649	1·21824	1·21999				
70	1·22173	1·22348	1·22522	1·22697	1·22871	1·23046	1·23220	1·23395	1·23569	1·23744				
71	1·23918	1·24093	1·24267	1·24442	1·24617	1·24791	1·24966	1·25140	1·25315	1·25489				
72	1·25664	1·25838	1·26013	1·26187	1·26362	1·26536	1·26711	1·26885	1·27060	1·27235				
73	1·27409	1·27584	1·27758	1·27933	1·28107	1·28282	1·28456	1·28631	1·28805	1·28980				
74	1·29154	1·29329	1·29503	1·29678	1·29852	1·30027	1·30202	1·30376	1·30551	1·30725				
75	1·30900	1·31074	1·31249	1·31423	1·31598	1·31772	1·31947	1·32121	1·32296	1·32470				
76	1·32645	1·32820	1·32994	1·33169	1·33343	1·33518	1·33692	1·33867	1·34041	1·34216				
77	1·34390	1·34565	1·34739	1·34914	1·35088	1·35263	1·35438	1·35612	1·35787	1·35961				
78	1·36136	1·36310	1·36485	1·36659	1·36834	1·37008	1·37183	1·37357	1·37532	1·37706				
79	1·37881	1·38056	1·38230	1·38405	1·38579	1·38754	1·38928	1·39103	1·39277	1·39452				
80	1·39626	1·39801	1·39975	1·40150	1·40324	1·40499	1·40674	1·40848	1·41023	1·41197				
81	1·41372	1·41546	1·41721	1·41895	1·42070	1·42244	1·42419	1·42593	1·42768	1·42942				
82	1·43117	1·43292	1·43466	1·43641	1·43815	1·43990	1·44164	1·44339	1·44513	1·44688				
83	1·44862	1·45037	1·45211	1·45386	1·45560	1·45735	1·45910	1·46084	1·46259	1·46433				
84	1·46608	1·46782	1·46957	1·47131	1·47306	1·47480	1·47655	1·47829	1·48004	1·48178				
85	1·48353	1·48528	1·48702	1·48877	1·49051	1·49226	1·49400	1·49575	1·49749	1·49924				
86	1·50098	1·50273	1·50447	1·50622	1·50796	1·50971	1·51146	1·51320	1·51495	1·51669				
87	1·51844	1·52018	1·52193	1·52367	1·52542	1·52716	1·52891	1·53065	1·53240	1·53414				
88	1·53589	1·53764	1·53938	1·54113	1·54287	1·54462	1·54636	1·54811	1·54985	1·55160				
89	1·55334	1·55509	1·55683	1·55858	1·56032	1·56207	1·56382	1·56556	1·56731	1·56905				

XVIII.—CONVERSION OF TIME AND ANGULAR MEASURE.

° ′ ″	Ho. Min. Sec.	Min. Sec. Ter.	Min. Sec. Ter.	° ′ ″	′ ″ ‴	Ho.	°
1	0	4	1	0	15	1	15
2	0	8	2	0	30	2	30
3	0	12	3	0	45	3	45
4	0	16	4	1	0	4	60
5	0	20	5	1	15	5	75
6	0	24	6	1	30	6	90
7	0	28	7	1	45	7	105
8	0	32	8	2	0	8	120
9	0	36	9	2	15	9	135
10	0	40	10	2	30	10	150
20	1	20	20	5	0	20	300
30	2	0	30	7	30		
40	2	40	40	10	0		
50	3	20	50	12	30		
60	4	0					
70	4	40					
80	5	20					
90	6	0					
100	6	40					
200	13	20					
300	20	0					

XIX.—DECIMAL EQUIVALENTS.

FRACTIONS OF JULIAN YEAR OF 365¼ DAYS.

′ MIN. SEC.	° HOUR. MIN.	″ SEC.	° HOUR.	SEC.	DAY.	MIN.	DAY.	HOUR.	DAY.	DAY.	YEAR.	HOUR.	YEAR.	MIN.	YEAR.
				1	·000012	1	·000694	1	·041667	1	·002738	1	·000114	1	·000002
				2	·000023	2	·001389	2	·083333	2	·005476	2	·000228	2	·000004
1	·016667	1	·000278	3	·000035	3	·002083	3	·125000	3	·008214	3	·000342	3	·000006
2	·033333	2	·000556	4	·000046	4	·002778	4	·166667	4	·010951	4	·000456	4	·000008
3	·050000	3	·000833	5	·000058	5	·003472	5	·208333	5	·013689	5	·000570	5	·000010
4	·066667	4	·001111	6	·000069	6	·004167	6	·250000	6	·016426	6	·000684	6	·000011
5	·083333	5	·001389	7	·000081	7	·004861	7	·291667	7	·019165	7	·000799	7	·000013
6	·100000	6	·001667	8	·000093	8	·005555	8	·333333	8	·021903	8	·000913	8	·000015
7	·116667	7	·001944	9	·000104	9	·006250	9	·375000	9	·024641	9	·001027	9	·000017
8	·133333	8	·002222	10	·000116	10	·006944	10	·416667	10	·027379	10	·001141	10	·000019
9	·150000	9	·002500	20	·000231	20	·013889	20	·833333	20	·054757	20	·002282	20	·000038
10	·166667	10	·002778	30	·000347	30	·020833			30	·082136			30	·000057
20	·333333	20	·005556	40	·000463	40	·027778			40	·109514			40	·000076
30	·500000	30	·008333	50	·000579	50	·034722			50	·136893			50	·000095
40	·666667	40	·011111							60	·164271				
50	·833333	50	·013889							70	·191650				
										80	·219028				
										90	·246407				
										100	·273785				
										200	·547570				
										300	·821355				

XX.—NATURAL LOGARITHMS.

	0	1	2	3	4	5	6	7	8	9	Mean Differences. 1	2	3	4	5	6	7	8	·9
1·0	·00000	·00995	·01980	·02956	·03922	·04879	·05827	·06766	·07696	·08618	95	191	286	381	477	572	667	762	858
1·1	·09531	·10436	·11333	·12222	·13103	·13976	·14842	·15700	·16551	·17395	87	174	261	348	435	522	609	696	783
1·2	·18232	·19062	·19885	·20701	·21511	·22314	·23111	·23902	·24686	·25464	80	160	240	320	400	480	560	640	720
1·3	·26236	·27003	·27763	·28518	·29267	·30010	·30748	·31481	·32208	·32930	74	148	222	296	371	445	519	593	667
1·4	·33647	·34359	·35066	·35767	·36464	·37156	·37844	·38526	·39204	·39878	69	138	207	276	345	414	483	552	621
1·5	·40547	·41211	·41871	·42527	·43178	·43825	·44469	·45108	·45742	·46373	65	129	194	258	323	387	452	516	581
1·6	·47000	·47623	·48243	·48858	·49470	·50078	·50682	·51282	·51879	·52473	61	121	182	242	303	364	424	485	546
1·7	·53063	·53649	·54232	·54812	·55389	·55962	·56531	·57098	·57661	·58222	57	114	172	239	286	343	400	458	515
1·8	·58779	·59333	·59884	·60432	·60977	·61519	·62058	·62594	·63127	·63658	54	108	162	216	271	325	379	433	487
1·9	·64185	·64710	·65233	·65752	·66269	·66783	·67294	·67803	·68310	·68813	51	103	154	205	257	308	359	410	462
2·0	·69315	·69813	·70310	·70804	·71295	·71784	·72271	·72755	·73237	·73716	49	98	146	195	244	293	342	390	439
2·1	·74194	·74669	·75142	·75612	·76081	·76547	·77011	·77473	·77932	·78390	47	93	140	186	233	278	326	372	419
2·2	·78846	·79299	·79751	·80200	·80648	·81093	·81536	·81978	·82418	·82855	45	89	133	178	223	267	312	356	401
2·3	·83291	·83725	·84157	·84587	·85015	·85442	·85866	·86289	·86710	·87129	43	85	128	171	214	255	298	341	383
2·4	·87547	·87963	·88377	·88789	·89200	·89609	·90016	·90422	·90826	·91228	41	82	123	164	205	244	285	326	367
2·5	·91629	·92028	·92426	·92822	·93216	·93609	·94001	·94391	·94779	·95166	39	78	117	156	197	236	275	314	353
2·6	·95551	·95935	·96317	·96698	·97078	·97456	·97833	·98208	·98582	·98954	38	75	113	150	189	227	264	302	339
2·7	·99325	·99695	1·00063	1·00430	1·00796	1·01160	1·01523	1·01885	1·02245	1·02604	36	73	109	146	182	218	255	291	328
2·8	1·02962	·03318	·03674	·04028	·04380	·04732	·05082	·05431	·05779	·06126	35	70	106	141	176	210	245	281	316
2·9	1·06471	·06815	·07158	·07500	·07841	·08181	·08519	·08856	·09192	·09527	34	68	102	136	170	203	237	271	305
3·0	1·09861	·10194	·10526	·10856	·11186	·11514	·11841	·12168	·12493	·12817	33	66	99	132	165	196	229	262	295
3·1	1·13140	·13462	·13783	·14103	·14422	·14740	·15057	·15373	·15688	·16002	32	63	95	127	160	191	223	255	286
3·2	1·16315	·16627	·16938	·17248	·17557	·17865	·18173	·18479	·18784	·19089	31	62	92	123	154	185	216	246	277
3·3	1·19392	·19695	·19996	·20297	·20597	·20896	·21194	·21491	·21788	·22083	30	60	89	119	150	180	210	239	269
3·4	1·22378	·22671	·22964	·23256	·23547	·23837	·24127	·24415	·24703	·24990	29	58	87	116	145	174	203	232	261
3·5	1·25276	·25562	·25846	·26130	·26413	·26695	·26976	·27257	·27536	·27815	28	56	85	113	141	169	197	226	254
3·6	1·28093	·28371	·28647	·28923	·29198	·29473	·29746	·30019	·30291	·30563	27	55	82	109	138	165	192	219	247
3·7	1·30833	·31103	·31372	·31641	·31909	·32176	·32442	·32708	·32972	·33237	27	53	80	106	134	161	187	214	240
3·8	1·33500	·33763	·34025	·34286	·34547	·34807	·35067	·35325	·35584	·35841	26	52	78	104	130	156	182	208	234
3·9	1·36098	·36354	·36609	·36864	·37118	·37372	·37624	·37877	·38128	·38379	25	50	76	101	127	152	177	203	228

NATURAL LOGARITHMS—*continued.*

	0	1	2	3	4	5	6	7	8	9	Mean Differences. 1	2	3	4	5	6	7	8	9
4·0	1·38629	·38879	·39128	·39377	·39624	·39872	·40118	·40364	·40610	·40854	25	49	74	99	124	148	173	198	222
4·1	1·41099	·41342	·41585	·41828	·42070	·42311	·42552	·42792	·43031	·43270	24	48	72	96	121	145	169	193	217
4·2	1·43508	·43746	·43984	·44220	·44456	·44692	·44927	·45161	·45395	·45629	23	47	70	94	118	141	165	188	212
4·3	1·45862	·46094	·46326	·46557	·46787	·47018	·47247	·47476	·47705	·47933	23	46	69	92	115	138	161	184	207
4·4	1·48160	·48387	·48614	·48840	·49065	·49290	·49515	·49739	·49962	·50185	23	45	68	90	113	135	158	180	203
4·5	1·50408	·50630	·50851	·51072	·51293	·51513	·51732	·51951	·52170	·52388	22	44	66	88	110	132	154	176	198
4·6	1·52606	·52823	·53039	·53256	·53471	·53687	·53902	·54116	·54330	·54543	22	43	65	86	108	129	151	172	194
4·7	1·54756	·54969	·55181	·55393	·55604	·55814	·56025	·56235	·56444	·56653	21	42	63	84	106	127	148	169	190
4·8	1·56862	·57070	·57277	·57485	·57691	·57898	·58104	·58309	·58515	·58719	21	41	62	82	103	124	144	165	185
4·9	1·58924	·59127	·59331	·59534	·59737	·59939	·60141	·60342	·60543	·60744	20	40	61	81	101	121	141	162	182
5·0	1·60944	·61144	·61343	·61542	·61741	·61939	·62137	·62334	·62531	·62728	20	40	59	79	99	119	139	158	178
5·1	1·62924	·63120	·63315	·63511	·63705	·63900	·64094	·64287	·64481	·64673	19	39	58	78	97	116	136	155	175
5·2	1·64866	·65058	·65250	·65441	·65632	·65823	·66013	·66203	·66393	·66582	19	38	57	76	96	115	134	153	172
5·3	1·66771	·66959	·67147	·67335	·67523	·67710	·67896	·68083	·68269	·68455	19	37	56	75	94	112	131	150	168
5·4	1·68640	·68825	·69010	·69194	·69378	·69562	·69745	·69928	·70111	·70293	18	37	55	74	92	110	129	147	166
5·5	1·70475	·70656	·70838	·71019	·71199	·71380	·71560	·71740	·71919	·72098	18	36	54	72	90	108	126	144	162
5·6	1·72277	·72455	·72633	·72811	·72988	·73166	·73342	·73519	·73695	·73871	18	35	53	71	89	106	124	142	159
5·7	1·74047	·74222	·74397	·74572	·74746	·74920	·75094	·75267	·75440	·75613	17	35	52	70	87	104	122	139	157
5·8	1·75786	·75953	·76130	·76302	·76473	·76644	·76815	·76985	·77156	·77326	17	34	51	68	86	103	120	137	154
5·9	1·77495	·77665	·77834	·78002	·78171	·78339	·78507	·78675	·78842	·79009	17	34	50	67	84	101	118	134	151
6·0	1·79176	·79342	·79509	·79675	·79840	·80006	·80171	·80336	·80500	·80665	17	33	50	66	83	99	116	132	149
6·1	1·80829	·80993	·81156	·81319	·81482	·81645	·81808	·81970	·82132	·82294	16	33	49	65	82	98	114	130	147
6·2	1·82455	·82616	·82777	·82938	·83098	·83258	·83418	·83578	·83737	·83896	16	32	48	64	80	96	112	128	144
6·3	1·84055	·84214	·84372	·84530	·84688	·84845	·85003	·85160	·85317	·85473	16	32	47	63	79	95	111	126	142
6·4	1·85630	·85786	·85942	·86097	·86253	·86408	·86563	·86718	·86872	·87026	16	31	47	62	78	93	109	124	140
6·5	1·87180	·87334	·87487	·87641	·87794	·87947	·88099	·88251	·88403	·88555	15	31	46	61	77	92	107	122	138
6·6	1·88707	·88858	·89010	·89160	·89311	·89462	·89612	·89762	·89912	·90061	15	30	45	60	76	91	106	121	136
6·7	1·90211	·90360	·90509	·90658	·90806	·90954	·91102	·91250	·91398	·91545	15	30	44	59	74	89	104	118	133
6·8	1·91692	·91839	·91986	·92132	·92279	·92425	·92571	·92716	·92862	·93007	15	29	44	58	73	88	102	117	131
6·9	1·93152	·93297	·93442	·93586	·93730	·93874	·94018	·94162	·94305	·94448	14	29	43	58	72	86	101	115	130

7·0	1·94591	·94734	·94876	·95019	·95161	·95303	·95445	·95586	·95727	·95869	14	28	43	57	71	85	99	114	128
7·1	1·96009	·96150	·96291	·96431	·96571	·96711	·96851	·96991	·97130	·97269	14	28	42	56	70	84	98	112	126
7·2	1·97408	·97547	·97685	·97824	·97962	·98100	·98238	·98376	·98513	·98650	14	28	41	55	69	83	97	110	124
7·3	1·98787	·98924	·99061	·99198	·99334	·99470	·99606	·99742	·99877	2·00013	14	27	41	54	68	82	95	109	122
7·4	2·00148	·00283	·00418	·00553	·00687	·00821	·00956	·01089	·01223	·01357	13	27	40	54	67	80	94	107	121
7·5	2·01490	·01624	·01757	·01890	·02022	·02155	·02287	·02419	·02551	·02683	13	27	40	53	67	80	93	106	120
7·6	2·02815	·02946	·03078	·03209	·03340	·03471	·03601	·03732	·03862	·03992	13	26	39	52	66	79	92	105	118
7·7	2·04122	·04252	·04381	·04511	·04640	·04769	·04898	·05027	·05156	·05284	13	26	39	52	65	77	90	103	116
7·8	2·05412	·05540	·05668	·05796	·05924	·06051	·06179	·06306	·06433	·06560	13	25	38	51	64	76	89	102	114
7·9	2·06686	·06813	·06939	·07065	·07191	·07317	·07443	·07568	·07694	·07819	13	25	38	50	63	76	88	101	113
8·0	2·07944	·08069	·08194	·08318	·08443	·08567	·08691	·08815	·08939	·09063	12	25	37	50	62	74	87	99	112
8·1	2·09186	·09310	·09433	·09556	·09679	·09802	·09924	·10047	·10169	·10291	12	25	37	49	62	74	86	98	111
8·2	2·10413	·10535	·10657	·10779	·10900	·11021	·11142	·11263	·11384	·11505	12	24	36	48	61	73	85	97	109
8·3	2·11626	·11746	·11866	·11986	·12106	·12226	·12346	·12465	·12585	·12704	12	24	36	48	60	72	84	96	108
8·4	2·12823	·12942	·13061	·13180	·13298	·13417	·13535	·13653	·13771	·13889	12	24	35	47	59	71	83	94	106
8·5	2·14007	·14124	·14242	·14359	·14476	·14593	·14710	·14827	·14943	·15060	12	23	35	47	59	70	82	94	105
8·6	2·15176	·15292	·15409	·15524	·15640	·15756	·15871	·15987	·16102	·16217	12	23	35	46	58	70	81	93	104
8·7	2·16332	·16447	·16562	·16677	·16791	·16905	·17020	·17134	·17248	·17361	11	23	34	46	57	68	80	91	103
8·8	2·17475	·17589	·17702	·17816	·17929	·18042	·18155	·18267	·18380	·18493	11	23	34	45	57	68	79	90	102
8·9	2·18605	·18717	·18830	·18942	·19054	·19165	·19277	·19389	·19500	·19611	11	22	34	45	56	67	78	90	101
9·0	2·19722	·19834	·19944	·20055	·20166	·20276	·20387	·20497	·20607	·20717	11	22	33	44	56	67	78	89	100
9·1	2·20827	·20937	·21047	·21157	·21266	·21375	·21485	·21594	·21703	·21812	11	22	33	44	55	66	77	88	99
9·2	2·21920	·22029	·22138	·22246	·22354	·22462	·22570	·22678	·22786	·22894	11	22	32	43	54	65	76	86	97
9·3	2·23001	·23109	·23216	·23324	·23431	·23538	·23645	·23751	·23858	·23965	11	21	32	43	54	64	75	86	96
9·4	2·24071	·24177	·24284	·24390	·24496	·24601	·24707	·24813	·24918	·25024	11	21	32	42	53	64	74	85	95
9·5	2·25129	·25234	·25339	·25444	·25549	·25654	·25759	·25863	·25968	·26072	11	21	32	42	53	63	74	84	95
9·6	2·26176	·26280	·26384	·26488	·26592	·26696	·26799	·26903	·27006	·27109	10	21	31	42	52	62	73	83	94
9·7	2·27213	·27316	·27419	·27521	·27624	·27727	·27829	·27932	·28034	·28136	10	21	31	41	52	62	72	82	93
9·8	2·28238	·28340	·28442	·28544	·28646	·28747	·28849	·28950	·29051	·29152	10	20	31	41	51	61	71	82	92
9·9	2·29253	·29354	·29455	·29556	·29657	·29757	·29858	·29958	·30058	·30158	10	20	30	40	51	61	71	81	91
	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9

MEAN DIFFERENCES.

XXI.—EXPONENTIAL AND HYPERBOLIC FUNCTIONS.

x	e^x	e^{-x}	Cosh x	Sinh x	x	e^x	e^{-x}	Cosh x	Sinh x
·00	1·00000	1·00000	1·00000	·00000	·50	1·64872	·60653	1·12763	·52110
·01	1·01005	·99005	1·00005	·01000	·51	1·66529	·60050	1·13289	·53240
·02	1·02021	·98020	1·00020	·02000	·52	1·68203	·59452	1·13827	·54375
·03	1·03045	·97045	1·00045	·03000	·53	1·69893	·58860	1·14377	·55516
·04	1·04081	·96080	1·00080	·04001	·54	1·71601	·58275	1·14938	·56663
·05	1·05127	·95123	1·00125	·05002	·55	1·73325	·57695	1·15510	·57815
·06	1·06184	·94177	1·00180	·06004	·56	1·75067	·57121	1·16094	·58973
·07	1·07251	·93239	1·00245	·07006	·57	1·76827	·56553	1·16690	·60137
·08	1·08329	·92312	1·00320	·08009	·58	1·78604	·55990	1·17297	·61307
·09	1·09417	·91393	1·00405	·09012	·59	1·80399	·55433	1·17916	·62483
·10	1·10517	·90484	1·00500	·10017	·60	1·82212	·54881	1·18547	·63665
·11	1·11628	·89583	1·00606	·11022	·61	1·84043	·54335	1·19189	·64854
·12	1·12750	·88692	1·00721	·12029	·62	1·85893	·53794	1·19844	·66049
·13	1·13883	·87810	1·00846	·13037	·63	1·87761	·53259	1·20510	·67251
·14	1·15027	·86936	1·00982	·14046	·64	1·89648	·52729	1·21189	·68459
·15	1·16183	·86071	1·01127	·15056	·65	1·91554	·52205	1·21879	·69675
·16	1·17351	·85214	1·01283	·16068	·66	1·93479	·51685	1·22582	·70897
·17	1·18530	·84366	1·01448	·17082	·67	1·95424	·51171	1·23297	·72126
·18	1·19722	·83527	1·01624	·18097	·68	1·97388	·50662	1·24025	·73363
·19	1·20925	·82696	1·01810	·19115	·69	1·99372	·50158	1·24765	·74607
·20	1·22140	·81873	1·02007	·20134	·70	2·01375	·49659	1·25517	·75858
·21	1·23368	·81058	1·02213	·21155	·71	2·03399	·49164	1·26282	·77117
·22	1·24608	·80252	1·02430	·22178	·72	2·05443	·48675	1·27059	·78384
·23	1·25860	·79453	1·02657	·23203	·73	2·07508	·48191	1·27850	·79659
·24	1·27125	·78663	1·02894	·24231	·74	2·09594	·47711	1·28652	·80941
·25	1·28403	·77880	1·03141	·25261	·75	2·11700	·47237	1·29468	·82232
·26	1·29693	·77105	1·03399	·26294	·76	2·13828	·46767	1·30297	·83530
·27	1·30996	·76338	1·03667	·27329	·77	2·15977	·46301	1·31139	·84838
·28	1·32313	·75578	1·03946	·28367	·78	2·18147	·45841	1·31994	·86153
·29	1·33643	·74826	1·04235	·29408	·79	2·20340	·45384	1·32862	·87478
·30	1·34986	·74082	1·04534	·30452	·80	2·22554	·44933	1·33743	·88811
·31	1·36343	·73345	1·04844	·31499	·81	2·24791	·44486	1·34638	·90152
·32	1·37713	·72615	1·05164	·32549	·82	2·27050	·44043	1·35547	·91503
·33	1·39097	·71892	1·05495	·33602	·83	2·29332	·43605	1·36468	·92863
·34	1·40495	·71177	1·05836	·34659	·84	2·31637	·43171	1·37404	·94233
·35	1·41907	·70469	1·06188	·35719	·85	2·33965	·42741	1·38353	·95612
·36	1·43333	·69768	1·06550	·36783	·86	2·36316	·42316	1·39316	·97000
·37	1·44773	·69073	1·06923	·37850	·87	2·38691	·41895	1·40293	·98398
·38	1·46228	·68386	1·07307	·38921	·88	2·41090	·41478	1·41284	·99806
·39	1·47698	·67706	1·07702	·39996	·89	2·43513	·41066	1·42289	1·01224
·40	1·49182	·67032	1·08107	·41075	·90	2·45960	·40657	1·43309	1·02652
·41	1·50682	·66365	1·08523	·42158	·91	2·48432	·40252	1·44342	1·04090
·42	1·52196	·65705	1·08950	·43246	·92	2·50929	·39852	1·45390	1·05539
·43	1·53726	·65051	1·09388	·44337	·93	2·53451	·39455	1·46453	1·06998
·44	1·55271	·64404	1·09837	·45434	·94	2·55998	·39063	1·47530	1·08468
·45	1·56831	·63763	1·10297	·46534	·95	2·58571	·38674	1·48623	1·09948
·46	1·58407	·63128	1·10768	·47640	·96	2·61170	·38289	1·49729	1·11440
·47	1·59999	·62500	1·11250	·48750	·97	2·63794	·37908	1·50851	1·12943
·48	1·61607	·61878	1·11743	·49865	·98	2·66446	·37531	1·51988	1·14457
·49	1·63232	·61263	1·12247	·50985	·99	2·69123	·37158	1·53141	1·15983
·50	1·64872	·60653	1·12763	·52110	1·00	2·71828	·36788	1·54308	1·17520

EXPONENTIAL AND HYPERBOLIC FUNCTIONS—*continued.*

x	e^x	e^{-x}	Cosh x	Sinh x	x	e^x	e^{-x}	Cosh x	Sinh x
1·00	2·71828	·36788	1·54308	1·17520	**1·50**	4·48169	·22313	2·35241	2·12928
1·01	2·74560	·36422	1·55491	1·19069	**1·51**	4·52673	·22091	2·37382	2·15291
1·02	2·77319	·36059	1·56689	1·20630	**1·52**	4·57223	·21871	2·39547	2·17676
1·03	2·80107	·35701	1·57904	1·22203	**1·53**	4·61818	·21654	2·41736	2·20082
1·04	2·82922	·35345	1·59134	1·23788	**1·54**	4·66459	·21438	2·43949	2·22510
1·05	2·85765	·34994	1·60379	1·25386	**1·55**	4·71147	·21225	2·46186	2·24961
1·06	2·88637	·34646	1·61641	1·26996	**1·56**	4·75882	·21014	2·48148	2·27434
1·07	2·91538	·34301	1·62919	1·28619	**1·57**	4·80665	·20805	2·50735	2·29930
1·08	2·94468	·33960	1·64214	1·30254	**1·58**	4·85496	·20598	2·53047	2·32449
1·09	2·97427	·33622	1·65525	1·31903	**1·59**	4·90375	·20393	2·55384	2·34991
1·10	3·00417	·33287	1·66852	1·33565	**1·60**	4·95303	·20190	2·57746	2·37557
1·11	3·03436	·32956	1·68196	1·35240	**1·61**	5·00281	·19989	2·60135	2·40146
1·12	3·06485	·32628	1·69557	1·36929	**1·62**	5·05309	·19790	2·62549	2·42760
1·13	3·09566	·32303	1·70934	1·38631	**1·63**	5·10387	·19593	2·64990	2·45397
1·14	3·12677	·31982	1·72329	1·40347	**1·64**	5·15517	·19398	2·67457	2·48059
1·15	3·15819	·31664	1·73741	1·42078	**1·65**	5·20698	·19205	2·69951	2·50746
1·16	3·18993	·31349	1·75171	1·43822	**1·66**	5·25931	·19014	2·72472	2·53459
1·17	3·22199	·31037	1·76618	1·45581	**1·67**	5·31217	·18825	2·75021	2·56196
1·18	3·25437	·30728	1·78083	1·47355	**1·68**	5·36556	·18637	2·77596	2·58959
1·19	3·28708	·30422	1·79565	1·49143	**1·69**	5·41948	·18452	2·80200	2·61748
1·20	3·32012	·30119	1·81066	1·50946	**1·70**	5·47395	·18268	2·82832	2·64563
1·21	3·35348	·29820	1·82584	1·52764	**1·71**	5·52896	·18087	2·85491	2·67405
1·22	3·38719	·29523	1·84121	1·54598	**1·72**	5·58453	·17907	2·88180	2·70273
1·23	3·42123	·29229	1·85676	1·56447	**1·73**	5·64065	·17728	2·90897	2·73168
1·24	3·45561	·28938	1·87250	1·58311	**1·74**	5·69734	·17552	2·93643	2·76091
1·25	3·49034	·28650	1·88842	1·60192	**1·75**	5·75460	·17377	2·96419	2·79041
1·26	3·52542	·28365	1·90454	1·62088	**1·76**	5·81244	·17204	2·99224	2·82020
1·27	3·56085	·28083	1·92084	1·64001	**1·77**	5·87085	·17033	3·02059	2·85026
1·28	3·59664	·27804	1·93734	1·65930	**1·78**	5·92986	·16864	3·04925	2·88061
1·29	3·63279	·27527	1·95403	1·67876	**1·79**	5·98945	·16696	3·07821	2·91125
1·30	3·66930	·27253	1·97091	1·69838	**1·80**	6·04965	·16530	3·10747	2·94217
1·31	3·70617	·26982	1·98800	1·71818	**1·81**	6·11045	·16365	3·13705	2·97340
1·32	3·74342	·26714	2·00528	1·73814	**1·82**	6·17186	·16203	3·16694	3·00492
1·33	3·78104	·26448	2·02276	1·75828	**1·83**	6·23389	·16041	3·19715	3·03674
1·34	3·81904	·26185	2·04044	1·77860	**1·84**	6·29654	·15882	3·22768	3·06886
1·35	3·85743	·25924	2·05833	1·79909	**1·85**	6·35982	·15724	3·25853	3·10129
1·36	3·89619	·25666	2·07643	1·81977	**1·86**	6·42374	·15567	3·28970	3·13403
1·37	3·93535	·25411	2·09473	1·84062	**1·87**	6·48830	·15412	3·32121	3·16709
1·38	3·97490	·25158	2·11324	1·86166	**1·88**	6·55350	·15259	3·35305	3·20046
1·39	4·01485	·24908	2·13196	1·88289	**1·89**	6·61937	·15107	3·38522	3·23415
1·40	4·05520	·24660	2·15090	1·90430	**1·90**	6·68589	·14957	3·41773	3·26816
1·41	4·09596	·24414	2·17005	1·92591	**1·91**	6·75309	·14808	3·45058	3·30250
1·42	4·13712	·24171	2·18942	1·94770	**1·92**	6·82096	·14661	3·48378	3·33718
1·43	4·17870	·23931	2·20900	1·96970	**1·93**	6·88951	·14515	3·51733	3·37218
1·44	4·22070	·23693	2·22881	1·99188	**1·94**	6·95875	·14370	3·55123	3·40752
1·45	4·26311	·23457	2·24884	2·01428	**1·95**	7·02869	·14227	3·58548	3·44321
1·46	4·30596	·23224	2·26910	2·03686	**1·96**	7·09933	·14086	3·62009	3·47923
1·47	4·34924	·22993	2·28958	2·05965	**1·97**	7·17068	·13946	3·65507	3·51561
1·48	4·39295	·22764	2·31029	2·08265	**1·98**	7·24274	·13807	3·69041	3·55234
1·49	4·43710	·22537	2·33123	2·10586	**1·99**	7·31553	·13670	3·72611	3·58942
1·50	4·48169	·22313	2·35241	2·12928	**2·00**	7·38906	·13534	3·76220	3·62686

EXPONENTIAL AND HYPERBOLIC FUNCTIONS—*continued.*

x	e^x	e^{-x}	Cosh x	Sinh x	x	e^x	e^{-x}	Cosh x	Sinh x
2·0	7·38906	·13534	3·76220	3·62686	**4·0**	54·5982	·01832	27·3082	27·2899
2·1	8·16617	·12246	4·14431	4·02186	**4·1**	60·3403	·01657	30·1784	30·1619
2·2	9·02501	·11080	4·56791	4·45711	**4·2**	66·6863	·01500	33·3507	33·3357
2·3	9·97418	·10026	5·03722	4·93696	**4·3**	73·6998	·01357	36·8567	36·8431
2·4	11·0232	·09072	5·55695	5·46623	**4·4**	81·4509	·01228	40·7316	40·7193
2·5	12·1825	·08208	6·13229	6·05020	**4·5**	90·0171	·01111	45·0141	45·0030
2·6	13·4637	·07427	6·76900	6·69473	**4·6**	99·4843	·01005	49·7472	49·7371
2·7	14·8797	·06721	7·47347	7·40626	**4·7**	109·947	·00910	54·9781	54·9690
2·8	16·4446	·06081	8·25273	8·19192	**4·8**	121·510	·00823	60·7593	60·7511
2·9	18·1741	·05502	9·11458	9·05956	**4·9**	134·290	·00745	67·1486	67·1412
3·0	20·0855	·04979	10·0677	10·0179	**5·0**	148·413	·00674	74·2099	74·2032
3·1	22·1980	·04505	11·1215	11·0765	**5·1**	164·022	·00610	82·0140	82·0079
3·2	24·5325	·04076	12·2866	12·2459	**5·2**	181·272	·00552	90·6388	90·6333
3·3	27·1126	·03688	13·5747	13·5379	**5·3**	200·337	·00499	100·171	100·167
3·4	29·9641	·03337	14·9987	14·9654	**5·4**	221·406	·00452	110·705	110·701
3·5	33·1155	·03020	16·5728	16·5426	**5·5**	244·692	·00409	122·348	122·344
3·6	36·5982	·02732	18·3128	18·2855	**5·6**	270·426	·00370	135·215	135·211
3·7	40·4473	·02472	20·2360	20·2113	**5·7**	298·867	·00335	149·435	149·432
3·8	44·7012	·02237	22·3618	22·3394	**5·8**	330·300	·00303	165·151	165·148
3·9	49·4024	·02024	24·7113	24·6911	**5·9**	365·037	·00274	182·520	182·517
4·0	54·5982	·01832	27·3082	27·2899	**6·0**	403·429	·00248	201·716	201·713

XXII.—Log$_{10}e^x$

x	0	·1	·2	·3	·4	·5	·6	·7	·8	·9
1	·43429	·47772	·52115	·56458	·60801	·65144	·69487	·73830	·78173	·82516
2	·86859	·91202	·95545	·99888	1·04231	1·08574	1·12917	1·17260	1·21602	1·25945
3	1·30288	1·34631	1·38974	1·43317	1·47660	1·52003	1·56346	1·60689	1·65032	1·69375
4	1·73718	1·78061	1·82404	1·86747	1·91090	1·95433	1·99775	2·04118	2·08461	2·12804
5	2·17147	2·21490	2·25833	2·30176	2·34519	2·38862	2·43205	2·47548	2·51891	2·56234
6	2·60577	2·64920	2·69263	2·73606	2·77948	2·82291	2·86634	2·90977	2·95320	2·99663
7	3·04006	3·08349	3·12692	3·17035	3·21378	3·25721	3·30064	3·34407	3·38750	3·43093
8	3·47436	3·51779	3·56121	3·60464	3·64807	3·69150	3·73493	3·77836	3·82179	3·86522
9	3·90865	3·95208	3·99551	4·03894	4·08237	4·12580	4·16923	4·21266	4·25609	4·29952
10	4·34294									
		·01	·02	·03	·04	·05	·06	·07	·08	·09
Differences		434	869	1303	1737	2171	2606	3040	3474	3909

XXIII.—$u = (\text{LOG}_e \text{ TAN } \left(45^\circ + \frac{\phi}{2}\right)) = gd^{-1}\phi.$

φ	u	φ	u	φ	u	φ	u
°		°		°		°	
0·0	·00000	22·5	·40320	45·0	·88137	67·5	1·61489
0·5	·00873	23·0	·41266	45·5	·89377	68·0	1·63794
1·0	·01745	23·5	·42216	46·0	·90628	68·5	1·66148
1·5	·02618	24·0	·43169	46·5	·91890	69·0	1·68557
2·0	·03491	24·5	·44127	47·0	·93163	69·5	1·71020
2·5	·04365	25·0	·45088	47·5	·94449	70·0	1·73542
3·0	·05238	25·5	·46052	48·0	·95747	70·5	1·76124
3·5	·06112	26·0	·47021	48·5	·97057	71·0	1·78771
4·0	·06987	26·5	·47994	49·0	·98381	71·5	1·81486
4·5	·07862	27·0	·48972	49·5	·99718	72·0	1·84273
5·0	·08738	27·5	·49953	50·0	1·01068	72·5	1·87136
5·5	·09614	28·0	·50939	50·5	1·02433	73·0	1·90079
6·0	·10491	28·5	·51930	51·0	1·03812	73·5	1·93107
6·5	·11369	29·0	·52925	51·5	1·05207	74·0	1·96226
7·0	·12248	29·5	·53925	52·0	1·06616	74·5	1·99441
7·5	·13128	30·0	·54931	52·5	1·08042	75·0	2·02759
8·0	·14008	30·5	·55941	53·0	1·09483	75·5	2·06187
8·5	·14890	31·0	·56956	53·5	1·10942	76·0	2·09732
9·0	·15773	31·5	·57977	54·0	1·12418	76·5	2·13404
9·5	·16657	32·0	·59003	54·5	1·13911	77·0	2·17212
10·0	·17543	32·5	·60035	55·0	1·15423	77·5	2·21167
10·5	·18429	33·0	·61073	55·5	1·16954	78·0	2·25280
11·0	·19318	33·5	·62116	56·0	1·18505	78·5	2·29566
11·5	·20207	34·0	·63166	56·5	1·20076	79·0	2·34040
12·0	·21099	34·5	·64222	57·0	1·21667	79·5	2·38719
12·5	·21992	35·0	·65284	57·5	1·23281	80·0	2·43625
13·0	·22886	35·5	·66352	58·0	1·24916	80·5	2·48779
13·5	·23783	36·0	·67428	58·5	1·26574	81·0	2·54209
14·0	·24681	36·5	·68510	59·0	1·28257	81·5	2·59947
14·5	·25582	37·0	·69599	59·5	1·29963	82·0	2·66031
15·0	·26484	37·5	·70695	60·0	1·31696	82·5	2·72504
15·5	·27389	38·0	·71799	60·5	1·33454	83·0	2·79422
16·0	·28295	38·5	·72910	61·0	1·35240	83·5	2·86850
16·5	·29204	39·0	·74029	61·5	1·37055	84·0	2·94870
17·0	·30116	39·5	·75156	62·0	1·38899	84·5	3·03586
17·5	·31030	40·0	·76291	62·5	1·40773	85·0	3·13130
18·0	·31946	40·5	·77434	63·0	1·42679	85·5	3·23678
18·5	·32865	41·0	·78586	63·5	1·44618	86·0	3·35467
19·0	·33786	41·5	·79747	64·0	1·46591	86·5	3·48830
19·5	·34711	42·0	·80917	64·5	1·48600	87·0	3·64253
20·0	·35638	42·5	·82096	65·0	1·50645	87·5	3·82492
20·5	·36568	43·0	·83284	65·5	1·52730	88·0	4·04813
21·0	·37501	43·5	·84482	66·0	1·54855	88·5	4·33585
21·5	·38438	44·0	·85690	66·5	1·57022	89·0	4·74135
22·0	·39377	44·5	·86909	67·0	1·59232	89·5	5·43451
						90·0	Inf.

XXIV.—ELLIPTIC

ϕ	$\theta = 0°$	$\theta = 5°$	$\theta = 10°$	$\theta = 15°$	$\theta = 20°$	$\theta = 25°$	$\theta = 30°$	$\theta = 35°$	$\theta = 40°$	$\theta = 45°$
1°	·01745	·01745	·01745	·01745	·01745	·01745	·01745	·01745	·01745	·01745
2	·03491	·03491	·03491	·03491	·03491	·03491	·03491	·03491	·03491	·03491
3	·05236	·05236	·05236	·05236	·05236	·05236	·05237	·05237	·05237	·05237
4	·06981	·06981	·06981	·06982	·06982	·06982	·06983	·06983	·06984	·06984
5	·08727	·08727	·08727	·08727	·08728	·08729	·08729	·08730	·08731	·08732
6	·10472	·10472	·10473	·10473	·10474	·10475	·10477	·10478	·10480	·10482
7	·12217	·12218	·12218	·12219	·12221	·12223	·12225	·12227	·12230	·12233
8	·13963	·13963	·13964	·13966	·13968	·13971	·13974	·13978	·13981	·13985
9	·15708	·15708	·15710	·15712	·15715	·15719	·15724	·15729	·15735	·15740
10	·17453	·17454	·17456	·17459	·17464	·17469	·17475	·17482	·17490	·17498
11	·19199	·19200	·19202	·19206	·19212	·19220	·19228	·19237	·19247	·19258
12	·20944	·20945	·20949	·20954	·20962	·20971	·20982	·20994	·21007	·21021
13	·22689	·22691	·22695	·22702	·22712	·22724	·22738	·22753	·22770	·22787
14	·24435	·24436	·24442	·24451	·24463	·24478	·24495	·24514	·24535	·24556
15	·26180	·26182	·26189	·26200	·26215	·26233	·26254	·26278	·26303	·26330
16	·27925	·27928	·27936	·27949	·27967	·27989	·28015	·28044	·28075	·28107
17	·29671	·29674	·29684	·29699	·29721	·29748	·29779	·29813	·29850	·29889
18	·31416	·31420	·31431	·31450	·31475	·31507	·31544	·31585	·31629	·31675
19	·33161	·33166	·33179	·33201	·33231	·33268	·33312	·33360	·33412	·33466
20	·34907	·34912	·34927	·34953	·34988	·35031	·35082	·35138	·35199	·35262
21	·36652	·36658	·36676	·36706	·36746	·36796	·36855	·36920	·36990	·37063
22	·38397	·38404	·38425	·38459	·38505	·38563	·38630	·38705	·38786	·38871
23	·40143	·40151	·40174	·40213	·40266	·40331	·40408	·40494	.40587	·40683
24	·41888	·41897	·41924	·41968	·42027	·42102	·42189	·42287	·42392	·42503
25	·43633	·43643	·43674	·43723	·43791	·43875	·43973	·44081	·44203	·44328
26	·45379	·45390	·45424	·45479	·45555	·45650	·45761	·45885	·46020	·46161
27	·47124	·47137	·47174	·47236	·47321	·47427	·47551	·47690	·47841	·48000
28	·48869	·48883	·48925	·48994	·49089	·49207	·49345	·49500	·49669	·49846
29	·50615	·50630	·50677	·50753	·50858	·50988	·51142	·51315	·51503	·51700
30	·52360	·52377	·52428	·52513	·52628	·52773	·52943	·53134	·53343	·53562
31	·54105	·54124	·54181	·54273	·54401	·54560	·54747	·54959	·55189	·55432
32	·55851	·55871	·55933	·56035	·56175	·56349	·56555	·56788	·57042	·57310
33	·57596	·57619	·57686	·57797	·57950	·58141	·58367	·58623	·58902	·59197
34	·59341	·59366	·59439	·59561	·59727	·59936	·60183	·60463	·60769	·61093
35	·61087	·61113	·61193	·61325	·61506	·61734	·62003	·62308	·62643	·62998
36	·62832	·62861	·62948	·63090	·63287	·63534	·63827	·64159	·64524	·64912
37	·64577	·64609	·64702	·64857	·65070	·65337	·65655	·66016	·66413	·66836
38	·66323	·66356	·66457	·66624	·66854	·67144	·67487	·67879	·68309	·68769
39	·68068	·68104	·68213	·68393	·68641	·68953	·69324	·69747	·70214	·70713
40	·69813	·69852	·69969	·70162	·70429	·70765	·71165	·71622	·72126	·72667
41	·71558	·71600	·71726	·71933	·72219	·72580	·73010	·73502	·74047	·74632
42	·73304	·73349	·73483	·73704	·74011	·74398	·74860	·75389	·75976	·76608
43	·75049	·75097	·75240	·75477	·75805	·76219	·76714	·77282	·77914	·78594
44	·76794	·76846	·76998	·77251	·77600	·78013	·78573	·79182	·79860	·80592
45	·78540	·78594	·78756	·79025	·79398	·79871	·80437	·81088	·81815	·82302

FUNCTIONS. $F(\theta, \phi)$.

$\theta = 50°$	$\theta = 55°$	$\theta = 60°$	$\theta = 65°$	$\theta = 70°$	$\theta = 75°$	$\theta = 80°$	$\theta = 85°$	$\theta = 90°$	ϕ
·01745	·01745	·01745	·01745	·01745	·01745	·01745	·01745	·01745	1°
·03491	·03491	·03491	·03491	·03491	·03491	·03491	·03491	·03491	2
·05237	·05238	·05238	·05238	·05238	·05238	·05238	·05238	·05238	3
·06985	·06985	·06986	·06986	·06986	·06987	·06987	·06987	·06987	4
·08733	·08734	·08735	·08736	·08736	·08737	·08737	·08738	·08738	5
·10483	·10485	·10486	·10488	·10489	·10490	·10491	·10491	·10491	6
·12235	·12238	·12240	·12242	·12244	·12246	·12247	·12248	·12248	7
·13989	·13993	·13997	·14000	·14003	·14005	·14007	·14008	·14008	8
·15746	·15751	·15757	·15761	·15765	·15769	·15771	·15772	·15773	9
·17505	·17513	·17520	·17526	·17532	·17537	·17540	·17542	·17543	10
·19268	·19278	·19288	·19296	·19304	·19310	·19314	·19317	·19318	11
·21034	·21047	·21059	·21071	·21080	·21088	·21094	·21098	·21099	12
·22804	·22821	·22836	·22851	·22863	·22873	·22880	·22885	·22886	13
·24578	·24599	·24618	·24636	·24652	·24664	·24674	·24680	·24681	14
·26356	·26382	·26406	·26428	·26448	·26463	·26475	·26482	·26484	15
·28139	·28171	·28200	·28227	·28251	·28270	·28284	·28293	·28295	16
·29927	·29965	·30001	·30034	·30062	·30085	·30102	·30112	·30116	17
·31721	·31766	·31809	·31848	·31881	·31909	·31929	·31942	·31946	18
·33520	·33574	·33624	·33670	·33710	·33742	·33766	·33781	·33786	19
·35326	·35388	·35447	·35501	·35548	·35586	·35615	·35632	·35638	20
·37137	·37210	·37279	·37342	·37396	·37441	·37474	·37494	·37501	21
·38956	·39040	·39119	·39192	·39255	·39307	·39346	·39369	·39377	22
·40782	·40878	·40969	·41053	·41126	·41186	·41230	·41257	·41266	23
·42614	·42724	·42829	·42925	·43008	·43077	·43128	·43159	·43169	24
·44455	·44580	·44699	·44808	·44904	·44982	·45040	·45075	·45088	25
·46304	·46445	·46580	·46704	·46812	·46901	·46967	·47008	·47021	26
·48161	·48320	·48472	·48612	·48735	·48835	·48910	·48956	·48972	27
·50027	·50206	·50377	·50534	·50672	·50785	·50870	·50922	·50939	28
·51902	·52102	·52293	·52470	·52624	·52752	·52847	·52905	·52925	29
·53787	·54009	·54223	·54420	·54593	·54736	·54843	·54908	·54931	30
·55681	·55928	·56166	·56386	·56579	·56739	·56858	·56931	·56956	31
·57586	·57860	·58123	·58367	·58582	·58760	·58893	·58975	·59003	32
·59501	·59803	·60095	·60365	·60604	·60802	·60950	·61042	·61073	33
·61427	·61760	·62082	·62381	·62646	·62865	·63029	·63131	·63166	34
·63364	·63730	·64085	·64415	·64707	·64950	·65132	·65245	·65284	35
·65313	·65715	·66104	·66468	·66790	·67058	·67260	·67385	·67428	36
·67273	·67713	·68141	·68540	·68895	·69191	·69414	·69552	·69599	37
·69246	·69727	·70195	·70633	·71023	·71349	·71594	·71747	·71799	38
·71232	·71756	·72267	·72746	·73175	·73533	·73804	·73972	·74029	39
·73231	·73801	·74358	·74882	·75352	·75745	·76043	·76228	·76291	40
·75243	·75862	·76469	·77041	·77555	·77987	·78313	·78517	·78586	41
·77269	·77940	·78600	·79224	·79786	·80258	·80617	·80841	·80917	42
·79308	·80035	·80752	·81432	·82045	·82562	·82954	·83200	·83284	43
·81362	·82149	·82926	·83665	·84333	·84898	·85329	·85598	·85690	44
·83431	·84281	·85122	·85925	·86653	·87270	·87741	·88037	·88137	45

ϕ	$\theta=0°$	$\theta=5°$	$\theta=10°$	$\theta=15°$	$\theta=20°$	$\theta=25°$	$\theta=30°$	$\theta=35°$	$\theta=40°$	$\theta=45°$
46°	·80285	·80343	·80515	·80801	·81198	·81701	·82305	·83001	·83779	·84623
47	·82030	·82092	·82275	·82578	·82999	·83535	·84178	·84920	·85752	·86656
48	·83776	·83841	·84035	·84356	·84803	·85371	·86055	·86846	·87734	·88701
49	·85521	·85590	·85795	·86135	·86609	·87211	·87937	·88779	·89725	·90759
50	·87266	·87339	·87556	·87915	·88416	·89054	·89825	·90719	·91725	·92829
51	·89012	·89088	·89317	·89697	·90226	·90901	·91716	·92665	·93735	·94912
52	·90757	·90838	·91078	·91479	·92037	·92750	·93613	·94618	·95755	·97007
53	·92502	·92587	·92841	·93262	·93850	·94603	·95514	·96578	·97784	·99115
54	·94248	·94337	·94603	·95047	·95666	·96458	·97420	·98545	·99822	1·01237
55	·95993	·96086	·96366	·96832	·97483	·98317	·99331	1·00519	1·01871	1·03371
56	·97738	·97836	·98130	·98618	·99302	1·00179	1·01247	1·02499	1·03928	1·05519
57	·99484	·99586	·99894	1·00406	1·01123	1·02044	1·03167	1·04487	1·05996	1·07680
58	1·01229	1·01336	1·01658	1·02194	1·02946	1·03912	1·05092	1·06481	1·08073	1·09854
59	1·02974	1·03086	1·03423	1·03981	1·04770	1·05783	1·07021	1·08482	1·10159	1·12042
60	1·04720	1·04837	1·05188	1·05774	1·06597	1·07657	1·08955	1·10190	1·12256	1·14243
61	1·06465	1·06587	1·06954	1·07566	1·08425	1·09534	1·10894	1·12504	1·14361	1·16457
62	1·08210	1·08338	1·08720	1·09358	1·10255	1·11414	1·12837	1·14525	1·16476	1·18685
63	1·09956	1·10088	1·10486	1·11151	1·12087	1·13296	1·14784	1·16552	1·18601	1·20926
64	1·11701	1·11839	1·12253	1·12945	1·13920	1·15182	1·16735	1·18586	1·20735	1·23180
65	1·13446	1·13590	1·14020	1·14740	1·15755	1·17070	1·18691	1·20626	1·22877	1·25447
66	1·15192	1·15340	1·15787	1·16536	1·17592	1·18961	1·20651	1·22672	1·25029	1·27727
67	1·16937	1·17091	1·17555	1·18333	1·19430	1·20854	1·22615	1·24724	1·27190	1·30020
68	1·18682	1·18842	1·19324	1·20130	1·21269	1·22750	1·24583	1·26782	1·29359	1·32325
69	1·20428	1·20593	1·21092	1·21928	1·23110	1·24648	1·26555	1·28846	1·31537	1·34642
70	1·22173	1·22345	1·22861	1·23727	1·24953	1·26548	1·28530	1·30915	1·33723	1·36972
71	1·23918	1·24096	1·24630	1·25527	1·26796	1·28451	1·30509	1·32990	1·35917	1·39313
72	1·25664	1·25847	1·26400	1·27328	1·28641	1·30356	1·32491	1·35070	1·38118	1·41666
73	1·27409	1·27599	1·28169	1·29129	1·30488	1·32263	1·34477	1·37155	1·40328	1·44030
74	1·29154	1·29350	1·29939	1·30930	1·32335	1·34172	1·36466	1·39244	1·42544	1·46404
75	1·30900	1·31102	1·31710	1·32733	1·34184	1·36083	1·38457	1·41339	1·44767	1·48788
76	1·32645	1·32853	1·33480	1·34535	1·36034	1·37996	1·40452	1·43437	1·46997	1·51183
77	1·34390	1·34605	1·35251	1·36339	1·37884	1·39911	1·42449	1·45540	1·49232	1·53586
78	1·36136	1·36356	1·37022	1·38143	1·39736	1·41827	1·44449	1·47647	1·51474	1·55999
79	1·37881	1·38108	1·38793	1·39947	1·41588	1·43744	1·46451	1·49757	1·53721	1·58419
80	1·39626	1·39860	1·40565	1·41752	1·43442	1·45663	1·48455	1·51870	1·55973	1·60848
81	1·41372	1·41612	1·42336	1·43557	1·45296	1·47583	1·50462	1·53987	1·58230	1·63283
82	1·43117	1·43364	1·44108	1·45362	1·47150	1·49504	1·52470	1·56106	1·60491	1·65725
83	1·44862	1·45115	1·45879	1·47168	1·49005	1·51426	1·54479	1·58228	1·62756	1·68172
84	1·46608	1·46867	1·47651	1·48974	1·50861	1·53350	1·56490	1·60352	1·65024	1·70625
85	1·48353	1·48619	1·49423	1·50781	1·52717	1·55273	1·58503	1·62478	1·67295	1·73082
86	1·50098	1·50371	1·51195	1·52587	1·54574	1·57198	1·60516	1·64605	1·69569	1·75542
87	1·51844	1·52123	1·52968	1·54394	1·56431	1·59123	1·62530	1·66734	1·71844	1·78006
88	1·53589	1·53875	1·54740	1·56200	1·58288	1·61048	1·64545	1·68864	1·74121	1·80472
89	1·55334	1·55627	1·56512	1·58007	1·60145	1·62974	1·66560	1·70994	1·76399	1·82939
90	1·57080	1·57379	1·58284	1·59814	1·62003	1·64900	1·68575	1·73125	1·78677	1·85407

F(θ, ϕ)—*continued.*

$\theta = 50°$	$\theta = 55°$	$\theta = 60°$	$\theta = 65°$	$\theta = 70°$	$\theta = 75°$	$\theta = 80°$	$\theta = 85°$	$\theta = 90°$	ϕ
·85515	·86431	·87342	·88213	·89005	·89678	·90193	·90517	·90628	46°
·87614	·88601	·89585	·90529	·91390	·92124	·92687	·93042	·93163	47
·89729	·90791	·91853	·92875	·93811	·94610	·95226	·95614	·95747	48
·91860	·93001	·94146	·95252	·96267	·97139	·97810	·98235	·98381	49
·94008	·95232	·96465	·97660	·98762	·99711	1·00444	1·00909	1·01068	50
·96171	·97484	·98811	1·00102	1·01297	1·02329	1·03129	1·03638	1·03812	51
·98352	·99759	1·01185	1·02578	1·03872	1·04995	1·05868	1·06425	1·06616	52
1·00550	1·02055	1·03587	1·05089	1·06491	1·07711	1·08665	1·09274	1·09483	53
1·02765	1·04374	1·06018	1·07637	1·09155	1·10481	1·11521	1·12188	1·12418	54
1·04998	1·06716	1·08479	1·10223	1·11865	1·13307	1·14442	1·15171	1·15423	55
1·07248	1·09082	1·10971	1·12848	1·14624	1·16190	1·17430	1·18229	1·18505	56
1·09517	1·11472	1·13494	1·15513	1·17433	1·19136	1·20488	1·21364	1·21667	57
1·11803	1·13886	1·16050	1·18220	1·20295	1·22145	1·23623	1·24582	1·24916	58
1·14108	1·16325	1·18638	1·20970	1·23212	1·25223	1·26837	1·27890	1·28257	59
1·16432	1·18788	1·21254	1·23764	1·26186	1·28371	1·30135	1·31292	1·31696	60
1·18773	1·21277	1·23916	1·26604	1·29219	1·31594	1·33524	1·34795	1·35240	61
1·21134	1·23792	1·26606	1·29490	1·32314	1·34896	1·37008	1·38407	1·38899	62
1·23513	1·26332	1·29332	1·32425	1·35473	1·38281	1·40594	1·42135	1·42679	63
1·25910	1·28898	1·32094	1·35409	1·38699	1·41753	1·44288	1·45989	1·46591	64
1·28326	1·31491	1·34893	1·38443	1·41994	1·45316	1·48098	1·49977	1·50645	65
1·30760	1·34109	1·37728	1·41529	1·45360	1·48976	1·52031	1·54112	1·54855	66
1·33212	1·36753	1·40600	1·44668	1·48800	1·52738	1·56096	1·58404	1·59232	67
1·35683	1·39423	1·43510	1·47860	1·52317	1·56606	1·60303	1·62868	1·63794	68
1·38171	1·42119	1·46457	1·51107	1·55913	1·60586	1·64661	1·67518	1·68557	69
1·40677	1·44840	1·49441	1·54410	1·59591	1·64684	1·69181	1·72372	1·73542	70
1·43200	1·47587	1·52463	1·57768	1·63352	1·68905	1·73877	1·77450	1·78771	71
1·45739	1·50359	1·55522	1·61182	1·67198	1·73256	1·78759	1·82774	1·84273	72
1·48296	1·53155	1·58618	1·64653	1·71132	1·77743	1·83844	1·88370	1·90079	73
1·50867	1·55974	1·61750	1·68180	1·75155	1·82371	1·89146	1·94267	1·96226	74
1·53455	1·58817	1·64918	1·71763	1·79269	1·87145	1·94682	2·00499	2·02759	75
1·56056	1·61682	1·68120	1·75401	1·83473	1·92073	2·00470	2·07106	2·09732	76
1·58672	1·64569	1·71356	1·79094	1·87768	1·97157	2·06529	2·14136	2·17212	77
1·61302	1·67476	1·74625	1·82840	1·92154	2·02403	2·12878	2·21644	2·25280	78
1·63943	1·70403	1·77924	1·86637	1·96630	2·07813	2·19538	2·29694	2·34040	79
1·66597	1·73347	1·81253	1·90484	2·01193	2·13390	2·26527	2·38365	2·43625	80
1·69261	1·76309	1·84609	1·94377	2·05840	2·19131	2·33866	2·47748	2·54209	81
1·71935	1·79286	1·87991	1·98313	2·10568	2·25035	2·41569	2·57954	2·66031	82
1·74618	1·82278	1·91395	2·02290	2·15371	2·31097	2·49648	2·69109	2·79422	83
1·77309	1·85281	1·94821	2·06303	2·20244	2·37309	2·58105	2·81362	2·94870	84
1·80006	1·88296	1·98264	2·10348	2·25178	2·43658	2·66935	2·94869	3·13130	85
1·82710	1·91320	2·01723	2·14421	2·30166	2·50129	2·76116	3·09782	3·35467	86
1·85418	1·94351	2·05194	2·18515	2·35198	2·56703	2·85612	3·26198	3·64253	87
1·88129	1·97388	2·08674	2·22627	2·40265	2·63357	2·95366	3·44116	4·04813	88
1·90843	2·00429	2·12161	2·26750	2·45354	2·70068	3·05304	3·63279	4·74135	89
1·93558	2·03472	2·15652	2·30879	2·50455	2·76806	3·15339	3·83174	Inf.	90

XXV.—ELLIPTIC

ϕ	$\theta = 0°$	$\theta = 5°$	$\theta = 10°$	$\theta = 15°$	$\theta = 20°$	$\theta = 25°$	$\theta = 30°$	$\theta = 35°$	$\theta = 40°$	$\theta = 45°$
1°	·01745	·01745	·01745	·01745	·01745	·01745	·01745	·01745	·01745	·01745
2	·03491	·03491	·03491	·03491	·03491	·03491	·03490	·03490	·03490	·03490
3	·05236	·05236	·05236	·05236	·05236	·05236	·05235	·05235	·05235	·05235
4	·06981	·06981	·06981	·06981	·06981	·06980	·06980	·06979	·06979	·06978
5	·08727	·08727	·08726	·08726	·08725	·08725	·08724	·08723	·08722	·08721
6	·10472	·10472	·10471	·10471	·10470	·10469	·10467	·10466	·10464	·10462
7	·12217	·12217	·12216	·12215	·12214	·12212	·12210	·12207	·12205	·12202
8	·13963	·13962	·13961	·13960	·13957	·13955	·13951	·13948	·13944	·13940
9	·15708	·15707	·15706	·15704	·15700	·15696	·15692	·15687	·15681	·15676
10	·17453	·17453	·17451	·17447	·17443	·17438	·17431	·17424	·17417	·17409
11	·19199	·19198	·19195	·19191	·19185	·19178	·19169	·19160	·19150	·19140
12	·20944	·20943	·20939	·20934	·20926	·20917	·20906	·20894	·20881	·20868
13	·22689	·22688	·22683	·22676	·22667	·22655	·22641	·22626	·22609	·22593
14	·24435	·24433	·24427	·24419	·24406	·24392	·24374	·24355	·24335	·24314
15	·26180	·26178	·26171	·26160	·26145	·26127	·26106	·26083	·26058	·26032
16	·27925	·27923	·27914	·27901	·27883	·27861	·27836	·27807	·27777	·27746
17	·29671	·29667	·29658	·29642	·29620	·29594	·29563	·29529	·29493	·29455
18	·31416	·31412	·31401	·31382	·31357	·31325	·31289	·31248	·31205	·31161
19	·33161	·33157	·33143	·33121	·33092	·33055	·33012	·32965	·32914	·32862
20	·34907	·34901	·34886	·34860	·34825	·34783	·34733	·34678	·34619	·34558
21	·36652	·36646	·36628	·36598	·36558	·36509	·36451	·36387	·36319	·36249
22	·38397	·38390	·38370	·38336	·38290	·38233	·38167	·38093	·38015	·37934
23	·40143	·40135	·40111	·40073	·40020	·39955	·39880	·39796	·39707	·39614
24	·41888	·41879	·41852	·41809	·41749	·41676	·41590	·41496	·41394	·41289
25	·43633	·43623	·43593	·43514	·43477	·43394	·43298	·43191	·43076	·42958
26	·45379	·45367	·45333	·45278	·45203	·45110	·45002	·44882	·44753	·44620
27	·47124	·47111	·47074	·47012	·46928	·46824	·46703	·46569	·46425	·46276
28	·48869	·48855	·48813	·48745	·48651	·48536	·48402	·48252	·48092	·47926
29	·50615	·50599	·50553	·50477	·50373	·50245	·50097	·49931	·49753	·49569
30	·52360	·52343	·52292	·52208	·52094	·51953	·51788	·51605	·51409	·51205
31	·54105	·54086	·54030	·53938	·53813	·53657	·53476	·53275	·53059	·52834
32	·55851	·55830	·55768	·55667	·55530	·55360	·55161	·54940	·54703	·54456
33	·57596	·57573	·57506	·57396	·57245	·57059	·56842	·56600	·56341	·56070
34	·59341	·59317	·59243	·59123	·58959	·58756	·58520	·58256	·57972	·57677
35	·61087	·61060	·60980	·60850	·60672	·60451	·60194	·59907	·59598	·59276
36	·62832	·62803	·62716	·62575	·62382	·62143	·61864	·61552	·61217	·60868
37	·64577	·64546	·64452	·64300	·64091	·63832	·63530	·63193	·62830	·62451
38	·66323	·66289	·66188	·66023	·65798	·65519	·65193	·64828	·64436	·64027
39	·68068	·68031	·67923	·67746	·67503	·67203	·66851	·66459	·66035	·65594
40	·69813	·69774	·69658	·69467	·69207	·68884	·68506	·68081	·67628	·67153
41	·71558	·71517	·71392	·71188	·70909	·70562	·70157	·69703	·69214	·68703
42	·73304	·73259	·73126	·72907	·72609	·72238	·71804	·71318	·70793	·70245
43	·75049	·75001	·74859	·74626	·74307	·73910	·73446	·72927	·72365	·71778
44	·76794	·76744	·76592	·76343	·76003	·75580	·75085	·74530	·73931	·73303
45	·78540	·78486	·78324	·78059	·77697	·77247	·76720	·76128	·75489	·74819

FUNCTIONS. $E(\theta, \phi)$.

$\theta = 50°$	$\theta = 55°$	$\theta = 60°$	$\theta = 65°$	$\theta = 70°$	$\theta = 75°$	$\theta = 80°$	$\theta = 85°$	$\theta = 90°$	ϕ
·01745	·01745	·01745	·01745	·01745	·01745	·01745	·01745	·01745	1°
·03490	·03490	·03490	·03490	·03490	·03490	·03490	·03490	·03490	2
·05235	·05234	·05234	·05234	·05234	·05234	·05234	·05234	·05234	3
·06978	·06978	·06977	·06977	·06976	·06976	·06976	·06976	·06976	4
·08720	·08719	·08718	·08718	·08717	·08716	·08716	·08716	·08716	5
·10461	·10459	·10458	·10456	·10455	·10454	·10453	·10453	·10453	6
·12199	·12197	·12195	·12192	·12190	·12189	·12188	·12187	·12187	7
·13936	·15932	·13929	·13925	·13923	·13920	·13919	·13918	·13917	8
·15670	·15665	·15660	·15655	·15651	·15648	·15645	·15644	·15643	9
·17401	·17394	·17387	·17381	·17375	·17371	·17367	·17365	·17365	10
·19130	·19120	·19110	·19102	·19095	·19089	·19084	·19082	·19081	11
·20855	·20842	·20830	·20819	·20809	·20801	·20796	·20792	·20791	12
·22576	·22559	·22544	·22530	·22518	·22508	·22501	·22497	·22495	13
·24293	·24272	·24253	·24236	·24221	·24209	·24200	·24194	·24192	14
·26006	·25981	·25957	·25936	·25917	·25902	·25891	·25884	·25882	15
·27714	·27684	·27655	·27629	·27606	·27588	·27575	·27567	·27564	16
·29418	·29381	·29347	·29315	·29288	·29267	·29250	·29241	·29237	17
·31116	·31073	·31032	·30995	·30963	·30937	·30917	·30906	·30902	18
·32809	·32758	·32710	·32666	·32629	·32598	·32575	·32561	·32557	19
·34496	·34437	·34381	·34330	·34286	·34250	·34224	·34207	·34202	20
·36178	·36109	·36044	·35985	·35934	·35892	·35862	·35843	·35837	21
·37853	·37773	·37699	·37631	·37572	·37525	·37490	·37468	·37461	22
·39521	·39431	·39345	·39268	·39201	·39146	·39106	·39081	·39073	23
·41183	·41080	·40983	·40895	·40819	·40757	·40711	·40683	·40674	24
·42838	·42722	·42612	·42513	·42426	·42356	·42304	·42273	·42262	25
·44486	·44355	·44232	·44120	·44023	·43944	·43885	·43849	·43837	26
·46126	·45980	·45842	·45716	·45607	·45518	·45453	·45413	·45399	27
·47759	·47595	·47441	·47301	·47180	·47081	·47007	·46962	·46947	28
·49383	·49202	·49031	·48875	·48740	·48629	·48548	·48498	·48481	29
·51000	·50799	·50609	·50437	·50287	·50165	·50074	·50019	·50000	30
·52608	·52386	·52177	·51986	·51821	·51686	·51586	·51525	·51504	31
·54207	·53964	·53733	·53524	·53341	·53193	·53082	·53015	·52992	32
·55798	·55531	·55278	·55048	·54848	·54684	·54563	·54489	·54464	33
·57379	·57087	·56811	·56559	·56340	·56161	·56028	·55947	·55919	34
·58952	·58634	·58332	·58057	·57818	·57622	·57477	·57388	·57358	35
·60515	·60169	·59841	·59541	·59280	·59067	·58909	·58811	·58779	36
·62068	·61693	·61337	·61011	·60727	·60495	·60323	·60217	·60182	37
·63612	·63206	·62820	·62467	·62159	·61907	·61720	·61605	·61566	38
·65146	·64707	·64290	·63908	·63574	·63302	·63099	·62974	·62932	39
·66671	·66197	·65746	·65334	·64974	·64679	·64459	·64324	·64279	40
·68185	·67675	·67189	·66745	·66356	·66038	·65801	·65655	·65606	41
·69688	·69140	·68619	·68140	·67722	·67379	·67124	·66966	·66913	42
·71182	·70594	·70034	·69520	·69070	·68701	·68426	·68257	·68200	43
·72665	·72036	·71435	·70884	·70401	·70005	·69710	·69527	·69466	44
·74137	·73465	·72822	·72232	·71715	·71289	·70972	·70777	·70711	45

ϕ	$\theta=0°$	$\theta=5°$	$\theta=10°$	$\theta=15°$	$\theta=20°$	$\theta=25°$	$\theta=30°$	$\theta=35°$	$\theta=40°$	$\theta=45°$
46°	·80285	·80228	·80056	·79775	·79390	·78911	·78350	·77721	·77040	·76326
47	·82030	·81969	·81787	·81489	·81081	·80573	·79977	·79308	·78584	·77824
48	·83776	·83711	·83518	·83202	·82770	·82231	·81599	·80890	·80121	·79313
49	·85521	·85453	·85249	·84914	·84457	·83887	·83217	·82466	·81651	·80794
50	·87266	·87194	·86979	·86626	·86142	·85539	·84832	·84036	·83173	·82265
51	·89012	·88936	·88709	·88336	·87826	·87189	·86442	·85601	·84689	·83728
52	·90757	·90677	·90438	·90045	·89507	·88836	·88048	·87161	·86197	·85182
53	·92502	·92418	·92166	·91753	·91187	·90481	·89650	·88715	·87698	·86627
54	·94248	·94159	·93895	·93460	·92865	·92122	·91248	·90264	·89193	·88063
55	·95993	·95900	·95622	·95166	·94541	·93761	·92843	·91807	·90680	·89490
56	·97738	·97641	·97350	·96872	·96216	·95397	·94433	·93345	·92160	·90908
57	·99484	·99381	·99077	·98576	·97889	·97030	·96019	·94878	·93634	·92318
58	1·01229	1·01122	1·00803	1·00279	·99560	·98661	·97602	·96405	·95100	·93719
59	1·02974	1·02863	1·02529	1·01981	1·01229	1·00289	·99180	·97928	·96560	·95111
60	1·04720	1·04603	1·04255	1·03683	1·02897	1·01915	1·00756	·99445	·98013	·96495
61	1·06465	1·06343	1·05980	1·05383	1·04563	1·03538	1·02327	1·00957	·99460	·97871
62	1·08210	1·08084	1·07705	1·07083	1·06228	1·05158	1·03895	1·02165	1·00900	·99238
63	1·09956	1·09824	1·09430	1·08781	1·07891	1·06776	1·05459	1·03967	1·02334	1·00598
64	1·11701	1·11564	1·11154	1·10479	1·09553	1·08392	1·07020	1·05465	1·03762	1·01949
65	1·13446	1·13304	1·12878	1·12176	1·11213	1·10005	1·08577	1·06958	1·05183	1·03293
66	1·15192	1·15043	1·14601	1·13873	1·12871	1·11616	1·10132	1·08447	1·06599	1·04629
67	1·16937	1·16783	1·16324	1·15568	1·14529	1·13225	1·11683	1·09932	1·08009	1·05957
68	1·18682	1·18523	1·18047	1·17263	1·16185	1·14832	1·13231	1·11412	1·09143	1·07279
69	1·20428	1·20262	1·19769	1·18957	1·17839	1·16437	1·14776	1·12888	1·10812	1·08593
70	1·22173	1·22002	1·21491	1·20650	1·19493	1·18040	1·16318	1·14360	1·12205	1·09901
71	1·23918	1·23741	1·23213	1·22343	1·21145	1·19640	1·17857	1·15828	1·13594	1·11202
72	1·25664	1·25481	1·24935	1·24034	1·22796	1·21239	1·19394	1·17293	1·14977	1·12497
73	1·27409	1·27220	1·26656	1·25726	1·24446	1·22837	1·20928	1·18754	1·16356	1·13786
74	1·29154	1·28959	1·28377	1·27417	1·26094	1·24432	1·22459	1·20211	1·17731	1·15068
75	1·30900	1·30698	1·30097	1·29107	1·27742	1·26026	1·23989	1·21666	1·19101	1·16346
76	1·32645	1·32437	1·31818	1·30796	1·29389	1·27619	1·25516	1·23117	1·20467	1·17618
77	1·34390	1·34176	1·33538	1·32486	1·31035	1·29210	1·27041	1·24566	1·21830	1·18885
78	1·36136	1·35915	1·35258	1·34174	1·32680	1·30800	1·28565	1·26012	1·23189	1·20148
79	1·37881	1·37654	1·36978	1·35862	1·34325	1·32389	1·30086	1·27456	1·24544	1·21407
80	1·39626	1·39393	1·38698	1·37550	1·35968	1·33976	1·31606	1·28897	1·25897	1·22661
81	1·41372	1·41132	1·40417	1·39238	1·37611	1·35563	1·33124	1·30336	1·27246	1·23912
82	1·43117	1·42871	1·42137	1·40925	1·39254	1·37148	1·34641	1·31773	1·28594	1·25159
83	1·44862	1·44610	1·43856	1·42612	1·40896	1·38733	1·36157	1·33209	1·29939	1·26404
84	1·46608	1·46349	1·45575	1·44299	1·42537	1·40317	1·37672	1·34643	1·31282	1·27646
85	1·48353	1·48087	1·47294	1·45985	1·44178	1·41900	1·39186	1·36076	1·32623	1·28886
86	1·50098	1·49826	1·49013	1·47671	1·45819	1·43483	1·40699	1·37508	1·33963	1·30124
87	1·51844	1·51565	1·50732	1·49357	1·47459	1·45066	1·42211	1·38939	1·35302	1·31360
88	1·53589	1·53304	1·52451	1·51043	1·49100	1·46648	1·43723	1·40369	1·36640	1·32596
89	1·55334	1·55042	1·54170	1·52729	1·50740	1·48230	1·45235	1·41799	1·37977	1·33830
90	1·57080	1·56781	1·55889	1·54415	1·52380	1·49811	1·46746	1·43229	1·39314	1·35064

E(θ, φ)—continued.

θ = 50°	θ = 55°	θ = 60°	θ = 65°	θ = 70°	θ = 75°	θ = 80°	θ = 85°	= 90°	φ
·75599	·74881	·74195	·73564	·73010	·72554	·72215	·72005	·71934	46°
·77050	·76285	·75553	·74879	·74287	·73800	·73436	·73211	·73135	47
·78490	·77676	·76896	·76177	·75546	·75025	·74636	·74396	·74314	48
·79920	·79054	·78225	·77459	·76786	·76230	·75815	·75558	·75471	49
·81338	·80419	·79538	·78724	·78007	·77414	·76971	·76697	·76604	50
·82746	·81772	·80836	·79971	·79208	·78578	·78106	·77814	·77715	51
·84143	·83111	·82120	·81202	·80391	·79720	·79218	·78907	·78801	52
·85529	·84438	·83388	·82415	·81554	·80842	·80307	·79976	·79864	53
·86904	·85752	·84641	·83610	·82698	·81941	·81374	·81021	·80902	54
·88269	·87052	·85879	·84788	·83822	·83020	·82417	·82042	·81915	55
·89622	·88340	·87101	·85949	·84926	·84076	·83436	·83039	·82904	56
·90965	·89614	·88308	·87092	·86011	·85110	·84432	·84010	·83867	57
·92297	·90876	·89500	·88217	·87075	·86122	·85404	·84957	·84805	58
·93619	·92125	·90677	·89325	·88119	·87112	·86352	·85878	·85717	59
·94930	·93362	·91839	·90415	·89144	·88080	·87276	·86773	·86603	60
·96231	·94586	·92986	·91488	·90148	·89025	·88175	·87643	·87462	61
·97521	·95797	·94118	·92543	·91132	·89948	·89049	·88486	·88295	62
·98802	·96996	·95236	·93581	·92096	·90848	·89898	·89303	·89101	63
1·00072	·98183	·96339	·94602	·93041	·91725	·90723	·90094	·89879	64
1·01333	·99358	·97427	·95606	·93965	·92580	·91523	·90858	·90631	65
1·02585	1·00522	·98502	·96593	·94870	·93412	·92297	·91595	·91355	66
1·03827	1·01674	·99562	·97564	·95756	·94222	·93047	·92305	·92050	67
1·05060	1·02815	1·00609	·98518	·96622	·95010	·93771	·92987	·92718	68
1·06284	1·03945	1·01643	·99456	·97469	·95775	·94470	·93642	·93358	69
1·07500	1·05064	1·02664	1·00379	·98298	·96519	·95144	·94270	·93969	70
1·08707	1·06173	1·03672	1·01286	·99108	·97240	·95793	·94870	·94552	71
1·09907	1·07272	1·04668	1·02178	·99900	·97940	·96417	·95442	·95106	72
1·11098	1·08362	1·05651	1·03056	1·00674	·98619	·97016	·95987	·95630	73
1·12283	1·09442	1·06624	1·03919	1·01431	·99278	·97590	·96503	·96126	74
1·13460	1·10513	1·07586	1·04769	1·02172	·99916	·98141	·96992	·96593	75
1·14631	1·11577	1·08537	1·05607	1·02896	1·00534	·98667	·97453	·97030	76
1·15795	1·12632	1·09478	1·06432	1·03605	1·01133	·99170	·97887	·97437	77
1·16954	1·13680	1·10410	1·07245	1·04300	1·01714	·99650	·98293	·97815	78
1·18107	1·14721	1·11333	1·08047	1·04981	1·02277	1·00107	·98671	·98163	79
1·19255	1·15755	1·12249	1·08839	1·05648	1·02823	1·00543	·99023	·98481	80
1·20399	1·16784	1·13156	1·09621	1·06304	1·03354	1·00958	·99348	·98769	81
1·21538	1·17807	1·14057	1·10395	1·06948	1·03870	1·01354	·99646	·99027	82
1·22673	1·18825	1·14952	1·11161	1·07582	1·04372	1·01731	·99920	·99255	83
1·23805	1·19839	1·15841	1·11920	1·08207	1·04863	1·02091	1·00168	·99452	84
1·24934	1·20850	1·16726	1·12673	1·08825	1·05343	1·02436	1·00394	·99619	85
1·26061	1·21857	1·17606	1·13421	1·09435	1·05813	1·02768	1·00598	·99756	86
1·27186	1·22862	1·18484	1·14165	1·10041	1·06277	1·03089	1·00784	·99863	87
1·28310	1·23865	1·19359	1·14906	1·10642	1·06735	1·03401	1·00954	·99939	88
1·29432	1·24867	1·20233	1·15645	1·11241	1·07188	1·03708	1·01113	·99985	89
1·30554	1·25868	1·21106	1·16383	1·11838	1·07641	1·04011	1·01266	1·00000	90

XXVI.—COMPLETE ELLIPTIC FUNCTIONS.

θ	F_1	E_1	θ	F_1	E_1	θ	F_1	E_1
0°	1·57080	1·57080	30°	1·68575	1·46746	60°	2·15652	1·21106
1	1·57092	1·57068	31	1·69411	1·46077	61	2·18421	1·20154
2	1·57127	1·57032	32	1·70284	1·45391	62	2·21319	1·19205
3	1·57187	1·56972	33	1·71192	1·44687	63	2·24355	1·18259
4	1·57271	1·56888	34	1·72139	1·43966	64	2·27538	1·17318
5	1·57379	1·56781	35	1·73125	1·43229	65	2·30879	1·16383
6	1·57511	1·56650	36	1·74150	1·42476	66	2·34390	1·15455
7	1·57668	1·56495	37	1·75217	1·41707	67	2·38087	1·14535
8	1·57849	1·56316	38	1·76326	1·40924	68	2·41984	1·13624
9	1·58054	1·56114	39	1·77479	1·40126	69	2·46100	1·12725
10	1·58284	1·55889	40	1·78677	1·39314	70	2·50455	1·11838
11	1·58539	1·55640	41	1·79922	1·38489	71	2·55073	1·10964
12	1·58820	1·55368	42	1·81216	1·37650	72	2·59982	1·10106
13	1·59125	1·55073	43	1·82560	1·36800	73	2·65214	1·09265
14	1·59457	1·54755	44	1·83957	1·35938	74	2·70807	1·08443
15	1·59814	1·54415	45	1·85407	1·35064	75	2·76806	1·07641
16	1·60198	1·54052	46	1·86915	1·34181	76	2·83267	1·06861
17	1·60608	1·53667	47	1·88481	1·33287	77	2·90256	1·06106
18	1·61045	1·53260	48	1·90108	1·32384	78	2·97857	1·05378
19	1·61510	1·52831	49	1·91800	1·31473	79	3·06173	1·04679
20	1·62003	1·52380	50	1·93558	1·30554	80	3·15339	1·04011
21	1·62523	1·51908	51	1·95386	1·29628	81	3·25530	1·03379
22	1·63073	1·51415	52	1·97288	1·28695	82	3·36987	1·02784
23	1·63652	1·50901	53	1·99267	1·27757	83	3·50042	1·02231
24	1·64260	1·50366	54	2·01327	1·26815	84	3·65186	1·01724
25	1·64900	1·49811	55	2·03472	1·25868	85	3·83174	1·01266
26	1·65570	1·49237	56	2·05706	1·24918	86	4·05276	1·00865
27	1·66272	1·48643	57	2·08036	1·23966	87	4·33865	1·00526
28	1·67006	1·48029	58	2·10466	1·23013	88	4·74271	1·00258
29	1·67773	1·47397	59	2·13002	1·22059	89	5·43491	1·00075
						90	Inf.	1·00000

XXVII.—Log Γ(x).

x	0	1	2	3	4	5	6	7	8	9
1·0	$\bar{1}$·9( )	9753	9513	9280	9053	8834	8621	8415	8215	8021
1·1	$\bar{1}$·97834	7653	7478	7310	7147	6990	6839	6694	6554	6421
1·2	$\bar{1}$·96292	6169	6052	5940	5833	5732	5636	5545	5459	5378
1·3	$\bar{1}$·95302	5231	5165	5104	5047	4995	4948	4905	4868	4834
1·4	$\bar{1}$·94805	4781	4761	4745	4734	4726	4724	4725	4731	4741
1·5	$\bar{1}$·94754	4772	4794	4820	4850	4884	4921	4963	5008	5057
1·6	$\bar{1}$·95110	5167	5227	5291	5359	5430	5505	5583	5665	5750
1·7	$\bar{1}$·95839	5931	6027	6126	6229	6335	6444	6556	6672	6791
1·8	$\bar{1}$·96913	7038	7167	7298	7433	7571	7712	7856	8004	8154
1·9	$\bar{1}$·98307	8463	8622	8784	8949	9117	9288	9462	9638	9818

XXVIII.—Log Γ(x + 1).

x	Log Γ(x + 1)	x	Log Γ(x + 1)	x	Log Γ(x + 1)	x	Log Γ(x + 1)
1	·00000	26	26·60562	51	66·19065	76	111·27543
2	·30103	27	28·03698	52	67·90665	77	113·16192
3	·77815	28	29·48414	53	69·63092	78	115·05401
4	1·38021	29	30·94654	54	71·36332	79	116·95164
5	2·07918	30	32·42366	55	73·10368	80	118·85473
6	2·85733	31	33·91502	56	74·85187	81	120·76321
7	3·70243	32	35·42017	57	76·60774	82	122·67703
8	4·60552	33	36·93869	58	78·37117	83	124·59610
9	5·55976	34	38·47016	59	80·14202	84	126·52038
10	6·55976	35	40·01423	60	81·92017	85	128·44980
11	7·60116	36	41·57054	61	83·70550	86	130·38430
12	8·68034	37	43·13874	62	85·49790	87	132·32382
13	9·79128	38	44·71852	63	87·29724	88	134·26830
14	10·94041	39	46·30959	64	89·10342	89	136·21769
15	12·11650	40	47·91165	65	90·91633	90	138·17194
16	13·32062	41	49·52443	66	92·73587	91	140·13098
17	14·55107	42	51·14768	67	94·56195	92	142·09477
18	15·80634	43	52·78115	68	96·39446	93	144·06325
19	17·08509	44	54·42460	69	98·23331	94	146·03638
20	18·38612	45	56·07781	70	100·07841	95	148·01410
21	19·70834	46	57·74057	71	101·92966	96	149·99637
22	21·05077	47	59·41267	72	103·78700	97	151·98314
23	22·41249	48	61·09391	73	105·65032	98	153·97437
24	23·79271	49	62·78410	74	107·51955	99	155·97000
25	25·19065	50	64·48307	75	109·39461	100	157·97000

XXIX.—ZONAL SURFACE HARMONICS.

x	$P_1(x)$	$P_2(x)$	$P_3(x)$	$P_4(x)$	$P_5(x)$	$P_6(x)$	$P_7(x)$
·00	+·00	−·50000	−·00000	+·37500	+·00000	−·31250	+·00000
·01	+·01	−·49985	−·01500	+·37463	+·01874	−·31184	−·02186
·02	+·02	−·49940	−·02998	+·37350	+·03743	−·30988	−·04359
·03	+·03	−·49865	−·04493	+·37163	+·05601	−·30661	−·06509
·04	+·04	−·49760	−·05984	+·36901	+·07444	−·30205	−·08624
·05	+·05	−·49625	−·07469	+·36565	+·09266	−·29622	−·10693
·06	+·06	−·49460	−·08946	+·36156	+·11062	−·28913	−·12703
·07	+·07	−·49265	−·10414	+·35673	+·12826	−·28081	−·14644
·08	+·08	−·49040	−·11872	+·35118	+·14555	−·27130	−·16506
·09	+·09	−·48785	−·13318	+·34491	+·16242	−·26063	−·18278
·10	+·10	−·48500	−·14750	+·33794	+·17883	−·24883	−·19949
·11	+·11	−·48185	−·16167	+·33027	+·19473	−·23595	−·21511
·12	+·12	−·47840	−·17568	+·32191	+·21008	−·22204	−·22955
·13	+·13	−·47465	−·18951	+·31287	+·22482	−·20715	−·24271
·14	+·14	−·47060	−·20314	+·30318	+·23891	−·19133	−·25453
·15	+·15	−·46625	−·21656	+·29284	+·25232	−·17465	−·26492
·16	+·16	−·46160	−·22976	+·28187	+·26499	−·15716	−·27383
·17	+·17	−·45665	−·24272	+·27028	+·27688	−·13894	−·28119
·18	+·18	−·45140	−·25542	+·25809	+·28796	−·12005	−·28695
·19	+·19	−·44585	−·26785	+·24533	+·29818	−·10057	−·29107
·20	+·20	−·44000	−·28000	+·23200	+·30752	−·08058	−·29352
·21	+·21	−·43385	−·29185	+·21813	+·31593	−·06014	−·29426
·22	+·22	−·42740	−·30338	+·20375	+·32339	−·03936	−·29327
·23	+·23	−·42065	−·31458	+·18887	+·32986	−·01830	−·29055
·24	+·24	−·41360	−·32544	+·17352	+·33531	+·00294	−·28610
·25	+·25	−·40625	−·33594	+·15771	+·33972	+·02428	−·27992
·26	+·26	−·39860	−·34606	+·14149	+·34307	+·04562	−·27203
·27	+·27	−·39065	−·35579	+·12488	+·34532	+·06687	−·26246
·28	+·28	−·38240	−·36512	+·10789	+·34647	+·08795	−·25124
·29	+·29	−·37385	−·37403	+·09057	+·34650	+·10875	−·23843
·30	+·30	−·36500	−·38250	+·07294	+·34539	+·12918	−·22407
·31	+·31	−·35585	−·39052	+·05503	+·34312	+·14915	−·20824
·32	+·32	−·34640	−·39808	+·03688	+·33970	+·16856	−·19100
·33	+·33	−·33665	−·40516	+·01851	+·33512	+·18732	−·17244
·34	+·34	−·32660	−·41174	−·00004	+·32937	+·20534	−·15266
·35	+·35	−·31625	−·41781	−·01872	+·32245	+·22251	−·13176
·36	+·36	−·30560	−·42336	−·03752	+·31438	+·23875	−·10984
·37	+·37	−·29465	−·42837	−·05638	+·30514	+·25397	−·08704
·38	+·38	−·28340	−·43282	−·07528	+·29477	+·26808	−·06347
·39	+·39	−·27185	−·43670	−·09416	+·28326	+·28100	−·03927
·40	+·40	−·26000	−·44000	−·11300	+·27064	+·29264	−·01459
·41	+·41	−·24785	−·44270	−·13175	+·25693	+·30291	+·01042
·42	+·42	−·23540	−·44478	−·15036	+·24215	+·31176	+·03561
·43	+·43	−·22265	−·44623	−·16880	+·22633	+·31909	+·06082
·44	+·44	−·20960	−·44704	−·18702	+·20951	+·32486	+·08587
·45	+·45	−·19625	−·44719	−·20497	+·19172	+·32898	+·11060
·46	+·46	−·18260	−·44666	−·22261	+·17301	+·33141	+·13483
·47	+·47	−·16865	−·44544	−·23989	+·15341	+·33209	+·15838
·48	+·48	−·15440	−·44352	−·25676	+·13298	+·33098	+·18107
·49	+·49	−·13985	−·44088	−·27316	+·11177	+·32804	+·20272
·50	+·50	−·12500	−·43750	−·28906	+·08984	+·32324	+·22314

ZONAL SURFACE HARMONICS—*continued.*

x	$P_1(x)$	$P_2(x)$	$P_3(x)$	$P_4(x)$	$P_5(x)$	$P_6(x)$	$P_7(x)$
·51	+·51	−·10985	−·43387	−·30440	+·06726	+·31655	+·24217
·52	+·52	−·09440	−·42848	−·31912	+·04409	+·30796	+·25961
·53	+·53	−·07865	−·42281	−·33317	+·02041	+·29747	+·27530
·54	+·54	−·06260	−·41634	−·34649	−·00372	+·28506	+·28906
·55	+·55	−·04625	−·40906	−·35904	−·02819	+·27077	+·30074
·56	+·56	−·02960	−·40096	−·37074	−·05294	+·25460	+·31016
·57	+·57	−·01265	−·39202	−·38155	−·07786	+·23660	+·31719
·58	+·58	+·00460	−·38222	−·39140	−·10285	+·21681	+·32169
·59	+·59	+·02215	−·37155	−·40024	−·12781	+·19528	+·32353
·60	+·60	+·04000	−·36000	−·40800	−·15264	+·17210	+·32260
·61	+·61	+·05815	−·34755	−·41462	−·17721	+·14733	+·31880
·62	+·62	+·07660	−·33418	−·42004	−·20142	+·12109	+·31207
·63	+·63	+·09535	−·31988	−·42418	−·22512	+·09348	+·30232
·64	+·64	+·11440	−·30464	−·42700	−·24819	+·06462	+·28954
·65	+·65	+·13375	−·28844	−·42841	−·27049	+·03467	+·27371
·66	+·66	+·15340	−·27126	−·42836	−·29188	+·00379	+·25483
·67	+·67	+·17335	−·25309	−·42676	−·31220	−·02785	+·23295
·68	+·68	+·19360	−·23392	−·42356	−·33131	−·06006	+·20813
·69	+·69	+·21415	−·21373	−·41869	−·34903	−·09261	+·18049
·70	+·70	+·23500	−·19250	−·41206	−·36520	−·12529	+·15016
·71	+·71	+·25615	−·17022	−·40361	−·37964	−·15782	+·11731
·72	+·72	+·27760	−·14688	−·39327	−·39217	−·18994	+·08217
·73	+·73	+·29935	−·12246	−·38095	−·40260	−·22136	+·04499
·74	+·74	+·32140	−·09694	−·36659	−·41074	−·25175	+·00609
·75	+·75	+·34375	−·07031	−·35010	−·41638	−·28078	−·03418
·76	+·76	+·36640	−·04256	−·33140	−·41931	−·30807	−·07541
·77	+·77	+·38935	−·01367	−·31043	−·41932	−·33325	−·11713
·78	+·78	+·41260	+·01638	−·28709	−·41618	−·35589	−·15881
·79	+·79	+·43615	+·04760	−·26131	−·40966	−·37557	−·19987
·80	+·80	+·46000	+·08000	−·23300	−·39952	−·39180	−·23965
·81	+·81	+·48415	+·11360	−·20208	−·38552	−·40409	−·27743
·82	+·82	+·50860	+·14842	−·16847	−·36739	−·41193	−·31240
·83	+·83	+·53335	+·18447	−·13207	−·34489	−·41475	−·34368
·84	+·84	+·55840	+·22176	−·09281	−·31774	−·41198	−·37033
·85	+·85	+·58375	+·26031	−·05060	−·28566	−·40300	−·39130
·86	+·86	+·60940	+·30014	−·00534	−·24838	−·38716	−·40545
·87	+·87	+·63535	+·34126	+·04305	−·20559	−·36379	−·41156
·88	+·88	+·66160	+·38368	+·09467	−·15699	−·33217	−·40829
·89	+·89	+·68815	+·42742	+·14960	−·10228	−·29156	−·39423
·90	+·90	+·71500	+·47250	+·20794	−·04114	−·24116	−·36782
·91	+·91	+·74215	+·51893	+·26978	+·02676	−·18018	−·32743
·92	+·92	+·76960	+·56672	+·33522	+·10175	−·10774	−·27129
·93	+·93	+·79735	+·61589	+·40435	+·18417	−·02295	−·19749
·94	+·94	+·82540	+·66646	+·47728	+·27438	+·07512	−·10404
·95	+·95	+·85375	+·71844	+·55409	+·37274	+·18745	+·01123
·96	+·96	+·88240	+·77184	+·63489	+·47962	+·31506	+·15060
·97	+·97	+·91135	+·82668	+·71978	+·59539	+·45899	+·31650
·98	+·98	+·94060	+·88298	+·80886	+·72045	+·62035	+·51151
·99	+·99	+·97015	+·94075	+·90223	+·85518	+·80029	+·73838
1·00	+1·00	+1·00000	+1·00000	+1·00000	+1·00000	+1·00000	+1·00000

XXX.—BESSEL FUNCTIONS.

x	$J_0(x)$	$J_1(x)$	x	$J_0(x)$	$J_1(x)$	x	$J_0(x)$	$J_1(x)$
0·0	+1·00000	+·00000	5·0	−·17760	−·32758	10·0	−·24594	+·04347
0·1	+·99750	+·04994	5·1	−·14433	−·33710	10·1	−·24903	+·01840
0·2	+·99002	+·09950	5·2	−·11029	−·34322	10·2	−·24962	−·00662
0·3	+·97763	+·14832	5·3	−·07580	−·34596	10·3	−·24772	−·03132
0·4	+·96040	+·19603	5·4	−·04121	−·34534	10·4	−·24337	−·05547
0·5	+·93847	+·24227	5·5	−·00684	−·34144	10·5	−·23665	−·07885
0·6	+·91200	+·28670	5·6	+·02697	−·33433	10·6	−·22764	−·10123
0·7	+·88120	+·32900	5·7	+·05992	−·32415	10·7	−·21644	−·12240
0·8	+·84629	+·36884	5·8	+·09170	−·31103	10·8	−·20320	−·14217
0·9	+·80752	+·40595	5·9	+·11203	−·29514	10·9	−·18806	−·16035
1·0	+·76520	+·44005	6·0	+·15065	−·27668	11·0	−·17119	−·17679
1·1	+·71962	+·47090	6·1	+·17729	−·25586	11·1	−·15277	−·19133
1·2	+·67113	+·49829	6·2	+·20175	−·23292	11·2	−·13299	−·20385
1·3	+·62009	+·52202	6·3	+·22381	−·20809	11·3	−·11207	−·21426
1·4	+·56686	+·51195	6·4	+·24331	−·18164	11·4	−·09021	−·22245
1·5	+·51183	+·55794	6·5	+·26009	−·15384	11·5	−·06765	−·22838
1·6	+·45540	+·56990	6·6	+·27404	−·12498	11·6	−·04462	−·23200
1·7	+·39798	+·57777	6·7	+·28506	−·09534	11·7	−·02133	−·23330
1·8	+·33999	+·58152	6·8	+·29310	−·06522	11·8	+·00197	−·23228
1·9	+·28182	+·58116	6·9	+·29810	−·03490	11·9	+·02505	−·22898
2·0	+·22389	+·57672	7·0	+·30008	−·00468	12·0	+·04769	−·22345
2·1	+·16661	+·56829	7·1	+·29905	+·02515	12·1	+·06967	−·21575
2·2	+·11036	+·55596	7·2	+·29507	+·05433	12·2	+·09077	−·20598
2·3	+·05554	+·53987	7·3	+·28822	+·08257	12·3	+·11080	−·19426
2·4	+·00251	+·52019	7·4	+·27860	+·10963	12·4	+·12956	−·18071
2·5	−·04838	+·49709	7·5	+·26634	+·13525	12·5	+·14688	−·16548
2·6	−·09680	+·47082	7·6	+·25160	+·15921	12·6	+·16261	−·14874
2·7	−·14245	+·44160	7·7	+·23456	+·18131	12·7	+·17659	−·13066
2·8	−·18504	+·40971	7·8	+·21541	+·20136	12·8	+·18870	−·11143
2·9	−·22431	+·37543	7·9	+·19436	+·21918	12·9	+·19884	−·09125
3·0	−·26005	+·33906	8·0	+·17165	+·23464	13·0	+·20693	−·07032
3·1	−·29206	+·30092	8·1	+·14752	+·24761	13·1	+·21289	−·04885
3·2	−·32019	+·26134	8·2	+·12222	+·25800	13·2	+·21669	−·02707
3·3	−·34430	+·22066	8·3	+·09601	+·26574	13·3	+·21830	−·00518
3·4	−·36430	+·17923	8·4	+·06916	+·27079	13·4	+·21773	+·01660
3·5	−·38013	+·13738	8·5	+·04194	+·27312	13·5	+·21499	+·03805
3·6	−·39177	+·09547	8·6	+·01462	+·27275	13·6	+·21013	+·05896
3·7	−·39923	+·05383	8·7	−·01252	+·26972	13·7	+·20322	+·07914
3·8	−·40256	+·01282	8·8	−·03923	+·26407	13·8	+·19434	+·09839
3·9	−·40183	−·02724	8·9	−·06525	+·25590	13·9	+·18358	+·11652
4·0	−·39715	−·06604	9·0	−·09033	+·24531	14·0	+·17107	+·13338
4·1	−·38867	−·10327	9·1	−·11424	+·23243	14·1	+·15695	+·14878
4·2	−·37656	−·13865	9·2	−·13675	+·21741	14·2	+·14137	+·16261
4·3	−·36101	−·17190	9·3	−·15766	+·20041	14·3	+·12449	+·17473
4·4	−·34226	−·20278	9·4	−·17677	+·18163	14·4	+·10648	+·18503
4·5	−·32054	−·23106	9·5	−·19393	+·16126	14·5	+·08754	+·19343
4·6	−·29614	−·25655	9·6	−·20898	+·13952	14·6	+·06786	+·19985
4·7	−·26933	−·27908	9·7	−·22180	+·11664	14·7	+·04764	+·20425
4·8	−·24043	−·29850	9·8	−·23228	+·09284	14·8	+·02708	+·20660
4·9	−·20974	−·31469	9·9	−·24034	+·06837	14·9	+·00639	+·20688
5·0	−·17760	−·32758	10·0	−·24594	+·04347	15·0	−·01422	+·20510

XXXI.—BESSEL FUNCTIONS—*continued.*

x	$J_0(x)$	$J_1(x)$	$J_2(x)$	$J_3(x)$	$J_4(x)$	$J_5(x)$	$J_6(x)$	$J_7(x)$	$J_8(x)$	$J_9(x)$	$J_{10}(x)$	$J_{11}(x)$	$J_{12}(x)$
0	1·00000	·00000	·00000	·00000	·00000	·00000	·00000	·00000	·00000	·00000	·00000	·00000	·00000
1	+·76520	+·44005	+·11490	+·01956	+·00248	+·00025	+·00002	·00000	·00000	·00000	·00000	·00000	·00000
2	+·22389	+·57672	+·35283	+·12894	+·03400	+·00704	+·00120	+·00017	+·00002	·00000	·00000	·00000	·00000
3	−·26005	+·33906	+·48609	+·30906	+·13203	+·04303	+·01139	+·00255	+·00049	+·00008	·00001	+·00000	·00000
4	−·39715	−·06604	+·36413	+·43017	+·28113	+·13209	+·04909	+·01518	+·00403	+·00094	+·00020	+·00004	+·00001
5	−·17760	−·32758	+·04657	+·36483	+·39123	+·26114	+·13105	+·05338	+·01841	+·00552	+·00147	+·00035	+·00008
6	+·15065	−·27668	−·24287	+·11477	+·35764	+·36209	+·24584	+·12959	+·05653	+·02117	+·00696	+·00205	+·00055
7	+·30008	−·00468	−·30142	−·16756	+·15780	+·34790	+·33920	+·23358	+·12797	+·05892	+·02354	+·00833	+·00266
8	+·17165	+·23464	−·11299	−·29113	−·10536	+·18577	+·33758	+·32059	+·22345	+·12632	+·06077	+·02560	+·00962
9	−·09033	+·24531	+·14485	−·18094	−·26547	−·05504	+·20432	+·32746	+·30507	+·21488	+·12469	+·06222	+·02739
10	−·24594	+·04347	+·25463	+·05838	−·21960	−·23406	−·01446	+·21671	+·31785	+·29186	+·20749	+·12312	+·06337
11	−·17119	−·17679	+·13905	+·22735	−·01504	−·23829	−·20158	+·01838	+·22497	+·30886	+·28043	+·20101	+·12160
12	+·04769	−·22345	−·08493	+·19514	+·18250	−·07347	−·24372	−·17025	+·04510	+·23038	+·30048	+·27041	+·19528
13	+·20693	−·07032	−·21774	+·00332	+·21928	+·13162	−·11803	−·24057	−·14105	+·06698	+·23378	+·29269	+·26154
14	+·17107	+·13338	−·15202	−·17681	+·07624	+·22038	+·08117	−·15080	−·23197	−·11431	+·08501	+·23575	+·28545
15	−·01422	+·20510	+·04157	−·19402	−·11918	+·13046	+·20615	+·03446	−·17398	−·22005	−·09007	+·09995	+·23667
16	−·17490	+·09040	+·18620	−·04385	−·20264	−·05747	+·16672	+·18251	−·00702	−·18953	−·20621	−·06822	+·11240
17	−·16985	−·09767	+·15836	+·13493	−·11074	−·18704	+·00072	+·18755	+·15374	−·04286	−·19911	−·19140	−·04857
18	−·01336	−·18799	−·00753	+·18632	+·06964	−·15537	−·15596	+·05140	+·19593	+·12276	−·07317	−·20406	−·17624
19	+·14663	−·10570	−·15776	+·07249	+·18065	+·00357	−·17877	−·11648	+·09294	+·19474	+·09155	−·09837	−·20546
20	+·16702	+·06683	−·16034	−·09890	+·13067	+·15117	−·05509	−·18422	−·07387	+·12513	+·18648	+·06136	−·11899

XXXII.—BESSEL FUNCTIONS—*continued.*

x	$I_0(x)$	$I_1(x)$	$I_2(x)$	$I_3(x)$	$I_4(x)$	$I_5(x)$	$I_6(x)$	$I_7(x)$	$I_8(x)$	$I_9(x)$	$I_{10}(x)$	$I_{11}(x)$
0·0	1·0000	·00000	·00000	·00000	·00000	·00000	·00000	·00000	·00000	·00000	·00000	·00000
0·2	1·0100	·10050	·00502	·00017	·00000	·00000	·00000	·00000	·00000	·00000	·00000	·00000
0·4	1·0404	·20403	·02027	·00135	·00007	·00000	·00000	·00000	·00000	·00000	·00000	·00000
0·6	1·0920	·31370	·04637	·00460	·00034	·00002	·00000	·00000	·00000	·00000	·00000	·00000
0·8	1·1665	·43286	·08435	·01110	·00110	·00009	·00001	·00000	·00000	·00000	·00000	·00000
1·0	1·2661	·56516	·13575	·02217	·00274	·00027	·00002	·00000	·00000	·00000	·00000	·00000
1·2	1·3937	·71468	·20260	·03936	·00580	·00069	·00007	·00001	·00000	·00000	·00000	·00000
1·4	1·5534	·88609	·28755	·06452	·01103	·00152	·00018	·00002	·00000	·00000	·00000	·00000
1·6	1·7500	1·0848	·39397	·09989	·01937	·00304	·00040	·00005	·00000	·00000	·00000	·00000
1·8	1·9896	1·3172	·52604	·14819	·03208	·00562	·00083	·00010	·00001	·00000	·00000	·00000
2·0	2·2796	1·5906	·68895	·21274	·05073	·00983	·00160	·00022	·00003	·00000	·00000	·00000
2·2	2·6291	1·9141	·88906	·29763	·07734	·01637	·00292	·00045	·00006	·00001	·00000	·00000
2·4	3·0493	2·2981	1·1342	·40787	·11448	·02626	·00508	·00085	·00012	·00002	·00000	·00000
2·6	3·5533	2·7554	1·4337	·54963	·16537	·04079	·00850	·00153	·00024	·00003	·00000	·00000
2·8	4·1573	3·3011	1·7994	·73048	·23408	·06169	·01377	·00266	·00045	·00007	·00001	·00000
3·0	4·8808	3·9534	2·2452	·95975	·32571	·09121	·02168	·00447	·00081	·00013	·00002	·00000
3·2	5·7472	4·7343	2·7883	1·2489	·44665	·13226	·03332	·00729	·00141	·00024	·00004	·00001
3·4	6·7848	5·6701	3·4495	1·6119	·60490	·18861	·05015	·01160	·00237	·00043	·00007	·00001
3·6	8·0277	6·7927	4·2540	2·0661	·81046	·26509	·07411	·01806	·00389	·00075	·00013	·00002
3·8	9·5169	8·1404	5·2325	2·6326	1·0758	·36784	·10776	·02755	·00624	·00127	·00023	·00004
4·0	11·302	9·7595	6·4222	3·3373	1·4163	·50472	·15446	·04133	·00981	·00209	·00040	·00007
4·2	13·442	11·706	7·8684	4·2120	1·8513	·68571	·21863	·06105	·01514	·00337	·00068	·00013
4·4	16·010	14·046	9·6258	5·2955	2·4046	·92342	·30598	·08894	·02299	·00534	·00113	·00022
4·6	19·093	16·863	11·761	6·6355	3·1060	1·2338	·42389	·12798	·03440	·00832	·00183	·00037
4·8	22·794	20·253	14·355	8·2903	3·9921	1·6369	·58191	·18210	·05080	·01277	·00293	·00061
5·0	27·240	24·336	17·506	10·331	5·1082	2·1580	·79229	·25649	·07412	·01932	·00458	·00100

XXXIII.—ROOTS OF $J_n(x) = 0$.

	$n = 0$	$n = 1$	$n = 2$	$n = 3$	$n = 4$	$n = 5$
1	2·405	3·832	5·135	6·379	7·586	8·780
2	5·520	7·016	8·417	9·760	11·064	12·339
3	8·654	10·173	11·620	13·017	14·373	15·700
4	11·792	13·323	14·796	16·224	17·616	18·982
5	14·931	16·470	17·960	19·410	20·827	22·220
6	18·071	19·616	21·117	22·583	24·018	25·431
7	21·212	22·760	24·270	25·749	27·200	28·628
8	24·353	25·903	27·421	28·909	30·371	31·813
9	27·494	29·047	30·571	32·050	33·512	34·983

ROOTS OF $J_0(x) = 0$, AND $J_1(x) = 0$.

	$\frac{x}{\pi}$ FOR $J_0(x) = 0$	$\frac{x}{\pi}$ FOR $J_1(x) = 0$		$\frac{x}{\pi}$ FOR $J_0(x) = 0$	$\frac{x}{\pi}$ FOR $J_1(x) = 0$
1	0·7655	1·2179	**7**	6·7519	7·2448
2	1·7571	2·2330	**8**	7·7516	8·2454
3	2·7546	3·2383	**9**	8·7514	9·2459
4	3·7534	4·2411	**10**	9·7513	10·2463
5	4·7527	5·2428	**11**	10·7512	11·2466
6	5·7522	6·2439	**12**	11·7511	12·2469

XXXIV.—$J_{i+\frac{1}{2}}(x)$.

$2n$	$J_n(x) \times \sqrt{\frac{\pi x}{2}}$
1	$\sin x$
3	$\frac{\sin x}{x} - \cos x$
5	$\left(\frac{3}{x^2} - 1\right) \sin x - \frac{3}{x} \cos x$
7	$\left(\frac{15}{x^3} - \frac{6}{x}\right) \sin x - \left(\frac{15}{x^2} - 1\right) \cos x$
9	$\left(\frac{105}{x^4} - \frac{45}{x^2} + 1\right) \sin x - \left(\frac{105}{x^3} - \frac{10}{x}\right) \cos x$
11	$\left(\frac{945}{x^5} - \frac{420}{x^3} + \frac{15}{x}\right) \sin x - \left(\frac{945}{x^4} - \frac{105}{x^2} + 1\right) \cos x$
−1	$\cos x$
−3	$-\sin x - \frac{\cos x}{x}$
−5	$\frac{3}{x} \sin x + \left(\frac{3}{x^2} - 1\right) \cos x$
−7	$-\left(\frac{15}{x^2} - 1\right) \sin x - \left(\frac{15}{x^3} - \frac{6}{x}\right) \cos x$
−9	$\left(\frac{105}{x^3} - \frac{10}{x}\right) \sin x + \left(\frac{105}{x^4} - \frac{45}{x^2} + 1\right) \cos x$
−11	$-\left(\frac{945}{x^4} - \frac{105}{x^2} + 1\right) \sin x - \left(\frac{945}{x^5} - \frac{420}{x^3} + \frac{15}{x}\right) \cos x$

XXXV.—$I = \frac{2}{\sqrt{\pi}} \int_0^x e^{-x^2} dt$

x	I	x	I	x	I	x	I	x	I	x	I
·01	·01128	·51	·52924	1·01	·84681	1·51	·96728	2·01	·99552	2·51	·99961
·02	·02256	·52	·53790	1·02	·85084	1·52	·96841	2·02	·99572	2·52	·99963
·03	·03384	·53	·54646	1·03	·85478	1·53	·96952	2·03	·99591	2·53	·99965
·04	·04511	·54	·55494	1·04	·85865	1·54	·97059	2·04	·99609	2·54	·99967
·05	·05637	·55	·56332	1·05	·86244	1·55	·97162	2·05	·99626	2·55	·99969
·06	·06762	·56	·57162	1·06	·86614	1·56	·97263	2·06	·99642	2·56	·99971
·07	·07886	·57	·57982	1·07	·86977	1·57	·97360	2·07	·99658	2·57	·99972
·08	·09008	·58	·58792	1·08	·87333	1·58	·97455	2·08	·99673	2·58	·99974
·09	·10128	·59	·59594	1·09	·87680	1·59	·97546	2·09	·99688	2·59	·99975
·10	·11246	·60	·60386	1·10	·88021	1·60	·97635	2·10	·99702	2·60	·99976
·11	·12362	·61	·61168	1·11	·88353	1·61	·97721	2·11	·99715	2·61	·99978
·12	·13476	·62	·61941	1·12	·88679	1·62	·97804	2·12	·99728	2·62	·99979
·13	·14587	·63	·62705	1·13	·88997	1·63	·97884	2·13	·99741	2·63	·99980
·14	·15695	·64	·63459	1·14	·89308	1·64	·97962	2·14	·99753	2·64	·99981
·15	·16800	·65	·64203	1·15	·89612	1·65	·98038	2·15	·99764	2·65	·99982
·16	·17901	·66	·64938	1·16	·89910	1·66	·98110	2·16	·99775	2·66	·99983
·17	·18999	·67	·65663	1·17	·90200	1·67	·98181	2·17	·99785	2·67	·99984
·18	·20093	·68	·66378	1·18	·90484	1·68	·98249	2·18	·99795	2·68	·99985
·19	·21184	·69	·67084	1·19	·90761	1·69	·98315	2·19	·99805	2·69	·99986
·20	·22270	·70	·67780	1·20	·91031	1·70	·98379	2·20	·99814	2·70	·99987
·21	·23352	·71	·68467	1·21	·91296	1·71	·98441	2·21	·99822	2·71	·99987
·22	·24430	·72	·69143	1·22	·91553	1·72	·98500	2·22	·99831	2·72	·99988
·23	·25502	·73	·69810	1·23	·91805	1·73	·98558	2·23	·99839	2·73	·99989
·24	·26570	·74	·70468	1·24	·92051	1·74	·98613	2·24	·99846	2·74	·99989
·25	·27633	·75	·71116	1·25	·92290	1·75	·98667	2·25	·99854	2·75	·99990
·26	·28690	·76	·71754	1·26	·92524	1·76	·98719	2·26	·99861	2·76	·99991
·27	·29742	·77	·72382	1·27	·92751	1·77	·98769	2·27	·99867	2·77	·99991
·28	·30788	·78	·73001	1·28	·92973	1·78	·98817	2·28	·99874	2·78	·99992
·29	·31828	·79	·73610	1·29	·93190	1·79	·98864	2·29	·99880	2·79	·99992
·30	·32863	·80	·74210	1·30	·93401	1·80	·98909	2·30	·99886	2·80	·99992
·31	·33891	·81	·74800	1·31	·93606	1·81	·98952	2·31	·99891	2·81	·99993
·32	·34913	·82	·75381	1·32	·93807	1·82	·98994	2·32	·99897	2·82	·99993
·33	·35928	·83	·75952	1·33	·94002	1·83	·99035	2·33	·99902	2·83	·99994
·34	·36936	·84	·76514	1·34	·94191	1·84	·99074	2·34	·99906	2·84	·99994
·35	·37938	·85	·77067	1·35	·94376	1·85	·99111	2·35	·99911	2·85	·99994
·36	·38933	·86	·77610	1·36	·94556	1·86	·99147	2·36	·99915	2·86	·99995
·37	·39921	·87	·78144	1·37	·94731	1·87	·99182	2·37	·99920	2·87	·99995
·38	·40901	·88	·78669	1·38	·94902	1·88	·99216	2·38	·99924	2·88	·99995
·39	·41874	·89	·79184	1·39	·95067	1·89	·99248	2·39	·99928	2·89	·99996
·40	·42839	·90	·79691	1·40	·95229	1·90	·99279	2·40	·99931	2·90	·99996
·41	·43797	·91	·80188	1·41	·95385	1·91	·99309	2·41	·99935	2·91	·99996
·42	·44747	·92	·80677	1·42	·95538	1·92	·99338	2·42	·99938	2·92	·99996
·43	·45689	·93	·81156	1·43	·95686	1·93	·99366	2·43	·99941	2·93	·99997
·44	·46623	·94	·81627	1·44	·95830	1·94	·99392	2·44	·99944	2·94	·99997
·45	·47548	·95	·82089	1·45	·95970	1·95	·99418	2·45	·99947	2·95	·99997
·46	·48466	·96	·82542	1·46	·96105	1·96	·99443	2·46	·99950	2·96	·99997
·47	·49375	·97	·82987	1·47	·96237	1·97	·99466	2·47	·99952	2·97	·99997
·48	·50275	·98	·83423	1·48	·96365	1·98	·99489	2·48	·99955	2·98	·99997
·49	·51167	·99	·83851	1·49	·96490	1·99	·99511	2·49	·99957	2·99	·99998
·50	·52050	1·00	·84270	1·50	·96611	2·00	·99532	2·50	·99959	3·00	·99998
										∞	1·00000

XXXVI.—Ei($\pm x$), Ci(x), Si(x).

x	Ei(x)	Ei($-x$)	Ci(x)	Si(x)	x	Ei(x)	Ei($-x$)	Ci(x)	Si(x)
·00	$-\infty$	$-\infty$	$-\infty$	+·00000	·50	+·45422	−·55977	−·17778	+·49311
·01	−4·01793	−4·03793	−4·02798	+·01000	·51	+·48703	−·54782	−·16045	+·50269
·02	−3·31471	−3·35471	−3·33491	+·02000	·52	+·51953	−·53622	−·14355	+·51225
·03	−2·89912	−2·95912	−2·92957	+·03000	·53	+·55173	−·52495	−·12707	+·52180
·04	−2·60126	−2·68126	−2·64206	+·04000	·54	+·58365	−·51400	−·11099	+·53133
·05	−2·36789	−2·46790	−2·41914	+·04999	·55	+·61529	−·50336	−·09530	+·54084
·06	−2·17528	−2·29531	−2·23709	+·05999	·56	+·64668	−·49302	−·07999	+·55033
·07	−2·01080	−2·15084	−2·08327	+·06998	·57	+·67782	−·48296	−·06504	+·55981
·08	−1·86688	−2·02694	−1·95011	+·07997	·58	+·70873	−·47317	−·05044	+·56927
·09	−1·73866	−1·91874	−1·83275	+·08996	·59	+·73941	−·46365	−·03619	+·57871
·10	−1·62281	−1·82292	−1·72787	+·09994	·60	+·76988	−·45438	−·02227	+·58813
·11	−1·51696	−1·73711	−1·63308	+·10993	·61	+·80015	−·44535	−·00868	+·59753
·12	−1·41935	−1·65954	−1·54665	+·11990	·62	+·83023	−·43656	+·00461	+·60691
·13	−1·32866	−1·58890	−1·46723	+·12988	·63	+·86012	−·42800	+·01758	+·61627
·14	−1·24384	−1·52415	−1·39379	+·13985	·64	+·88984	−·41965	+·03026	+·62561
·15	−1·16409	−1·46446	−1·32552	+·14981	·65	+·91939	−·41152	+·04265	+·63494
·16	−1·08873	−1·40919	−1·26176	+·15977	·66	+·94878	−·40359	+·05476	+·64424
·17	−1·01723	−1·35778	−1·20196	+·16973	·67	+·97802	−·39585	+·06659	+·65351
·18	−·94915	−1·30980	−1·14567	+·17968	·68	+1·00712	−·38831	+·07816	+·66277
·19	−·88410	−1·26486	−1·09253	+·18962	·69	+1·03608	−·38095	+·08946	+·67201
·20	−·82176	−1·22265	−1·04221	+·19956	·70	+1·06491	−·37377	+·10051	+·68122
·21	−·76187	−1·18290	−·99444	+·20949	·71	+1·09361	−·36676	+·11132	+·69041
·22	−·70420	−1·14538	−·94899	+·21941	·72	+1·12220	−·35992	+·12188	+·69958
·23	−·64853	−1·10988	−·90566	+·22933	·73	+1·15068	−·35324	+·13220	+·70873
·24	−·59470	−1·07624	−·86427	+·23923	·74	+1·17906	−·34671	+·14230	+·71785
·25	−·54254	−1·04428	−·82466	+·24913	·75	+1·20733	−·34034	+·15216	+·72695
·26	−·49193	−1·01389	−·78671	+·25903	·76	+1·23551	−·33412	+·16181	+·73603
·27	−·44274	−·98493	−·75029	+·26891	·77	+1·26360	−·32803	+·17124	+·74508
·28	−·39486	−·95731	−·71529	+·27878	·78	+1·29161	−·32209	+·18046	+·75411
·29	−·34820	−·93092	−·68161	+·28865	·79	+1·31954	−·31628	+·18947	+·76312
·30	−·30267	−·90568	−·64917	+·29850	·80	+1·34740	−·31060	+·19828	+·77210
·31	−·25819	−·88151	−·61790	+·30835	·81	+1·37518	−·30504	+·20689	+·78105
·32	−·21468	−·85834	−·58771	+·31819	·82	+1·40290	−·29961	+·21530	+·78998
·33	−·17210	−·83610	−·55855	+·32801	·83	+1·43056	−·29430	+·22353	+·79888
·34	−·13036	−·81475	−·53036	+·33782	·84	+1·45816	−·28910	+·23157	+·80776
·35	−·08943	−·79422	−·50308	+·34763	·85	+1·48571	−·28402	+·23942	+·81661
·36	−·04926	−·77446	−·47666	+·35742	·86	+1·51322	−·27905	+·24710	+·82544
·37	−·00979	−·75544	−·45107	+·36720	·87	+1·54067	−·27418	+·25460	+·83424
·38	+·02901	−·73711	−·42625	+·37696	·88	+1·56809	−·26941	+·26192	+·84301
·39	+·06718	−·71944	−·40218	+·38672	·89	+1·59547	−·26475	+·26908	+·85175
·40	+·10477	−·70238	−·37881	+·39646	·90	+1·62281	−·26018	+·27607	+·86047
·41	+·14179	−·68591	−·35611	+·40619	·91	+1·65013	−·25571	+·28289	+·86916
·42	+·17828	−·67000	−·33406	+·41591	·92	+1·67741	−·25134	+·28956	+·87782
·43	+·21427	−·65461	−·31262	+·42561	·93	+1·70468	−·24705	+·29606	+·88646
·44	+·24979	−·63973	−·29178	+·43529	·94	+1·73192	−·24285	+·30242	+·89506
·45	+·28486	−·62533	−·27149	+·44497	·95	+1·75915	−·23874	+·30861	+·90364
·46	+·31950	−·61139	−·25175	+·45463	·96	+1·78636	−·23471	+·31466	+·91219
·47	+·35374	−·59788	−·23253	+·46427	·97	+1·81356	−·23076	+·32056	+·92070
·48	+·38759	−·58478	−·21380	+·47390	·98	+1·84075	−·22689	+·32632	+·92919
·49	+·42108	−·57209	−·19556	+·48351	·99	+1·86793	−·22310	+·33193	+·93765
·50	+·45422	−·55977	−·17778	+·49311	1·00	+1·89512	−·21938	+·33740	+·94608

Ei($\pm x$), Ci(x), Si(x)—*continued.*

x	Ei(x)	Ei($-x$)	Ci(x)	Si(x)	x	Ci(x)	Si(x)
1·0	+1·89512	−·21938	+·33740	+·94608	20	+·0444	+1·5482
1·1	+2·16738	−·18599	+·38487	+1·02869	25	−·0068	+1·5315
1·2	+2·44209	−·15841	+·42046	+1·10805	30	−·0330	+1·5668
1·3	+2·72140	−·13545	+·44574	+1·18396	35	−·0115	+1·5969
1·4	+3·00721	−·11622	+·46201	+1·25623	40	+·0190	+1·5870
1·5	+3·30129	−·10002	+·47036	+1·32468	45	+·0186	+1·5587
1·6	+3·60532	−·08631	+·47173	+1·38918	50	−·0056	+1·5516
1·7	+3·92096	−·07465	+·46697	+1·44959	55	−·0182	+1·5707
1·8	+4·24987	−·06471	+·45681	+1·50582	60	−·0048	+1·5867
1·9	+4·59371	−·05620	+·44194	+1·55778	65	+·0128	+1·5775
2·0	+4·95423	−·04890	+·42298	+1·60541	70	+·0109	+1·5616
2·1	+5·33324	−·04261	+·40051	+1·64870	75	−·0053	+1·5586
2·2	+5·73261	−·03719	+·37507	+1·68762	80	−·0124	+1·5723
2·3	+6·15438	−·03250	+·34718	+1·72221	85	−·0019	+1·5824
2·4	+6·60067	−·02844	+·31729	+1·75249	90	+·0100	+1·5757
2·5	+7·07377	−·02491	+·28587	+1·77852	95	+·0071	+1·5630
2·6	+7·57611	−·02185	+·25334	+1·80039	100	−·0051	+1·5622
2·7	+8·11035	−·01918	+·22008	+1·81821	110	−·0003	+1·5799
2·8	+8·67930	−·01685	+·18649	+1·83210	120	+·0048	+1·5640
2·9	+9·28602	−·01482	+·15290	+1·84219	130	−·0071	+1·5737
3·0	+9·93383	−·01305	+·11963	+1·84865	140	+·0070	+1·5721
3·1	+10·6263	−·01149	+·08699	+1·85166	150	−·0048	+1·5662
3·2	+11·3673	−·01013	+·05526	+1·85140	160	+·0014	+1·5769
3·3	+12·1610	−·00894	+·02468	+1·84808	170	+·0020	+1·5653
3·4	+13·0121	−·00789	−·00152	+1·84191	180	−·0044	+1·5741
3·5	+13·9254	−·00697	−·03213	+1·83313	190	+·0052	+1·5704
3·6	+14·9063	−·00616	−·05797	+1·82195	200	−·0044	+1·5684
3·7	+15·9606	−·00545	−·08190	+1·80862	300	−·0033	+1·5709
3·8	+17·0948	−·00482	−·10378	+1·79339	400	−·0021	+1·5721
3·9	+18·3157	−·00427	−·12350	+1·77650	500	−·0009	+1·5726
4·0	+19·6309	−·00378	−·14098	+1·75820	600	+·0001	+1·5725
4·1	+21·0485	−·00335	−·15617	+1·73874	700	+·0008	+1·5720
4·2	+22·5774	−·00297	−·16901	+1·71837	800	+·0011	+1·5714
4·3	+24·2274	−·00263	−·17951	+1·69732	900	+·0011	+1·5707
4·4	+26·0090	−·00234	−·18766	+1·67583	1000	+·0008	+1·5702
4·5	+27·9337	−·00207	−·19349	+1·65414	2000	+·0005	+1·5710
4·6	+30·0141	−·00184	−·19705	+1·63246	3000	+·0001	+1·5711
4·7	+32·2639	−·00164	−·19839	+1·61101	4000	−·0002	+1·5710
4·8	+34·6979	−·00145	−·19760	+1·58998	5000	−·0002	+1·5708
4·9	+37·3325	−·00129	−·19478	+1·56956	6000	−·0001	+1·5706
5·0	+40·1853	−·00115	−·19003	+1·54993	7000	+·0001	+1·5707
6	+85·990	−·00036	−·06806	+1·42469	8000	+·0001	+1·5708
7	+191·50	−·00012	+·07670	+1·45460	9000	+·0001	+1·5709
8	+440·38	−·00004	+·12243	+1·57419	10,000	−·0000	+1·5709
9	+1037·9	−·00001	+·05535	+1·66504	100,000	+·0000	+1·5708
10	+2492·2	−·00000	−·04546	+1·65835	1,000,000	−·0000	+1·5708
11	+6071·4	−·00000	−·08956	+1·57831			
12	+14960	·00000	−·04978	+1·50497			
13	+37198	·00000	+·02676	+1·49936			
14	+93193	·00000	+·06940	+1·55621			
15	+234956	·00000	+·04628	+1·61819			

XXXVII.—BINOMIAL COEFFICIENTS FOR INTERPOLATION BY DIFFERENCES.

t	Coeffs. of Δ_2	Coeffs. of Δ_3	t	Coeffs. of Δ_2	Coeffs. of Δ_3	t	Coeffs. of Δ_2	Coeffs. of Δ_3	t	Coeffs. of Δ_2	Coeffs. of Δ_3
·01	−·005	+·003	·26	−·096	+·056	·51	−·125	+·062	·76	−·091	+·038
·02	−·010	+·006	·27	−·099	+·057	·52	−·125	+·062	·77	−·089	+·036
·03	−·015	+·010	·28	−·101	+·058	·53	−·125	+·061	·78	−·086	+·035
·04	−·019	+·013	·29	−·103	+·059	·54	−·124	+·060	·79	−·083	+·033
·05	−·024	+·015	·30	−·105	+·060	·55	−·124	+·060	·80	−·080	+·032
·06	−·028	+·018	·31	−·107	+·060	·56	−·124	+·059	·81	−·077	+·031
·07	−·033	+·021	·32	−·109	+·061	·57	−·123	+·058	·82	−·074	+·029
·08	−·037	+·024	·33	−·111	+·062	·58	−·122	+·058	·83	−·071	+·028
·09	−·041	+·026	·34	−·112	+·062	·59	−·121	+·057	·84	−·067	+·026
·10	−·045	+·028	·35	−·114	+·063	·60	−·120	+·056	·85	−·064	+·024
·11	−·049	+·031	·36	−·115	+·063	·61	−·119	+·055	·86	−·060	+·023
·12	−·053	+·033	·37	−·117	+·063	·62	−·118	+·054	·87	−·057	+·021
·13	−·057	+·035	·38	−·118	+·064	·63	−·117	+·053	·88	−·053	+·020
·14	−·060	+·037	·39	−·119	+·064	·64	−·115	+·052	·89	−·049	+·018
·15	−·064	+·039	·40	−·120	+·064	·65	−·114	+·051	·90	−·045	+·016
·16	−·067	+·041	·41	−·121	+·064	·66	−·112	+·050	·91	−·041	+·015
·17	−·071	+·043	·42	−·122	+·064	·67	−·111	+·049	·92	−·037	+·013
·18	−·074	+·045	·43	−·123	+·064	·68	−·109	+·048	·93	−·033	+·012
·19	−·077	+·046	·44	−·123	+·064	·69	−·107	+·047	·94	−·028	+·010
·20	−·080	+·048	·45	−·124	+·064	·70	−·105	+·045	·95	−·024	+·008
·21	−·083	+·049	·46	−·124	+·064	·71	−·103	+·044	·96	−·019	+·007
·22	−·086	+·051	·47	−·125	+·064	·72	−·101	+·043	·97	−·015	+·005
·23	−·089	+·052	·48	−·125	+·063	·73	−·099	+·042	·98	−·010	+·003
·24	−·091	+·053	·49	−·125	+·063	·74	−·096	+·040	·99	−·005	+·002
·25	−·094	+·055	·50	−·125	+·063	·75	−·094	+·039	1·00	−·000	+·000

XXXVIII.—PROPORTIONAL PARTS.

	×·1	×·2	×·3	×·4	×·5	×·6	×·7	×·8	×·9
10	1·0	2·0	3·0	4·0	5·0	6·0	7·0	8·0	9·0
11	1·1	2·2	3·3	4·4	5·5	6·6	7·7	8·8	9·9
12	1·2	2·4	3·6	4·8	6·0	7·2	8·4	9·6	10·8
13	1·3	2·6	3·9	5·2	6·5	7·8	9·1	10·4	11·7
14	1·4	2·8	4·2	5·6	7·0	8·4	9·8	11·2	12·6
15	1·5	3·0	4·5	6·0	7·5	9·0	10·5	12·0	13·5
16	1·6	3·2	4·8	6·4	8·0	9·6	11·2	12·8	14·4
17	1·7	3·4	5·1	6·8	8·5	10·2	11·9	13·6	15·3
18	1·8	3·6	5·4	7·2	9·0	10·8	12·6	14·4	16·2
19	1·9	3·8	5·7	7·6	9·5	11·4	13·3	15·2	17·1
20	2·0	4·0	6·0	8·0	10·0	12·0	14·0	16·0	18·0
21	2·1	4·2	6·3	8·4	10·5	12·6	14·7	16·8	18·9
22	2·2	4·4	6·6	8·8	11·0	13·2	15·4	17·6	19·8
23	2·3	4·6	6·9	9·2	11·5	13·8	16·1	18·4	20·7
24	2·4	4·8	7·2	9·6	12·0	14·4	16·8	19·2	21·6
25	2·5	5·0	7·5	10·0	12·5	15·0	17·5	20·0	22·5
26	2·6	5·2	7·8	10·4	13·0	15·6	18·2	20·8	23·4
27	2·7	5·4	8·1	10·8	13·5	16·2	18·9	21·6	24·3
28	2·8	5·6	8·4	11·2	14·0	16·8	19·6	22·4	25·2
29	2·9	5·8	8·7	11·6	14·5	17·4	20·3	23·2	26·1
30	3·0	6·0	9·0	12.0	15·0	18·0	21·0	24·0	27·0
31	3·1	6·2	9·3	12·4	15·5	18·6	21·7	24·8	27·9
32	3·2	6·4	9·6	12·8	16·0	19·2	22·4	25·6	28·8
33	3·3	6·6	9·9	13·2	16·5	19·8	23·1	26·4	29·7
34	3·4	6·8	10·2	13·6	17·0	20·4	23·8	27·2	30·6
35	3·5	7·0	10·5	14·0	17·5	21·0	24·5	28·0	31·5
36	3·6	7·2	10·8	14·4	18·0	21·6	25·2	28·8	32·4
37	3·7	7·4	11·1	14·8	18·5	22·2	25·9	29·6	33·3
38	3·8	7·6	11·4	15·2	19·0	22·8	26·6	30·4	34·2
39	3·9	7·8	11·7	15·6	19·5	23·4	27·3	31·2	35·1
40	4·0	8·0	12·0	16·0	20·0	24·0	28·0	32·0	36·0
41	4·1	8·2	12·3	16·4	20·5	24·6	28·7	32·8	36·9
42	4·2	8·4	12·6	16·8	21·0	25·2	29·4	33·6	37·8
43	4·3	8·6	12·9	17·2	21·5	25·8	30·1	34·4	38·7
44	4·4	8·8	13·2	17·6	22·0	26·4	30·8	35·2	39·6
45	4·5	9·0	13·5	18·0	22·5	27·0	31·5	36·0	40·5
46	4·6	9·2	13·8	18·4	23·0	27·6	32·2	36·8	41·4
47	4·7	9·4	14·1	18·8	23·5	28·2	32·9	37·6	42·3
48	4·8	9·6	14·4	19·2	24·0	28·8	33·6	38·4	43·2
49	4·9	9·8	14·7	19·6	24·5	29·4	34·3	39·2	44·1
50	5·0	10·0	15·0	20·0	25·0	30·0	35·0	40·0	45·0
51	5·1	10·2	15·3	20·4	25·5	30·6	35·7	40·8	45·9
52	5·2	10·4	15·6	20·8	26·0	31·2	36·4	41·6	46·8
53	5·3	10·6	15·9	21·2	26·5	31·8	37·1	42·4	47·7
54	5·4	10·8	16·2	21·6	27·0	32·4	37·8	43·2	48·6

PROPORTIONAL PARTS—*continued.*

	× ·1	× ·2	× ·3	× ·4	× ·5	× ·6	× ·7	× ·8	× ·9
55	5·5	11·0	16·5	22·0	27·5	33·0	38·5	44·0	49·5
56	5·6	11·2	16·8	22·4	28·0	33·6	39·2	44·8	50·4
57	5·7	11·4	17·1	22·8	28·5	34·2	39·9	45·6	51·3
58	5·8	11·6	17·4	23·2	29·0	34·8	40·6	46·4	52·2
59	5·9	11·8	17·7	23·6	29·5	35·4	41·3	47·2	53·1
60	6·0	12·0	18·0	24·0	30·0	36·0	42·0	48·0	54·0
61	6·1	12·2	18·3	24·4	30·5	36·6	42·7	48·8	54·9
62	6·2	12·4	18·6	24·8	31·0	37·2	43·4	49·6	55·8
63	6·3	12·6	18·9	25·2	31·5	37·8	44·1	50·4	56·7
64	6·4	12·8	19·2	25·6	32·0	38·4	44·8	51·2	57·6
65	6·5	13·0	19·5	26·0	32·5	39·0	45·5	52·0	58·5
66	6·6	13·2	19·8	26·4	33·0	39·6	46·2	52·8	59·4
67	6·7	13·4	20·1	26·8	33·5	40·2	46·9	53·6	60·3
68	6·8	13·6	20·4	27·2	34·0	40·8	47·6	54·4	61·2
69	6·9	13·8	20·7	27·6	34·5	41·4	48·3	55·2	62·1
70	7·0	14·0	21·0	28·0	35·0	42·0	49·0	56·0	63·0
71	7·1	14·2	21·3	28·4	35·5	42·6	49·7	56·8	63·9
72	7·2	14·4	21·6	28·8	36·0	43·2	50·4	57·6	64·8
73	7·3	14·6	21·9	29·2	36·5	43·8	51·1	58·4	65·7
74	7·4	14·8	22·2	29·6	37·0	44·4	51·8	59·2	66·6
75	7·5	15·0	22·5	30·0	37·5	45·0	52·5	60·0	67·5
76	7·6	15·2	22·8	30·4	38·0	45·6	53·2	60·8	68·4
77	7·7	15·4	23·1	30·8	38·5	46·2	53·9	61·6	69·3
78	7·8	15·6	23·4	31·2	39·0	46·8	54·6	62·4	70·2
79	7·9	15·8	23·7	31·6	39·5	47·4	55·3	63·2	71·1
80	8·0	16·0	24·0	32 0	40·0	48·0	56·0	64·0	72·0
81	8·1	16·2	24·3	32·4	40·5	48·6	56·7	64·8	72·9
82	8·2	16·4	24·6	32·8	41·0	49·2	57·4	65·6	73·8
83	8·3	16·6	24·9	33·2	41·5	49·8	58·1	66·4	74·7
84	8·4	16·8	25·2	33·6	42·0	50·4	58·8	67·2	75·6
85	8·5	17·0	25·5	34·0	42·5	51·0	59·5	68·0	76·5
86	8·6	17·2	25·8	34·4	43·0	51·6	60·2	68·8	77·4
87	8·7	17·4	26·1	34·8	43·5	52·2	60·9	69·6	78·3
88	8·8	17·6	26·4	35·2	44·0	52·8	61·6	70·4	79·2
89	8·9	17·8	26·7	35·6	44·5	53·4	62·3	71·2	80·1
90	9·0	18·0	27·0	36·0	45·0	54·0	63·0	72·0	81·0
91	9·1	18·2	27·3	36·4	45·5	54·6	63·7	72·8	81·9
92	9·2	18·4	27·6	36·8	46·0	55·2	64·4	73·6	82·8
93	9·3	18·6	27·9	37·2	46·5	55·8	65·1	74·4	83·7
94	9·4	18·8	28·2	37·6	47·0	56·4	65·8	75·2	84·6
95	9·5	19·0	28·5	38·0	47·5	57·0	66·5	76·0	85·5
96	9·6	19·2	28·8	38·4	48·0	57·6	67·2	76·8	86·4
97	9·7	19·4	29·1	38·8	48·5	58·2	67·9	77·6	87·3
98	9·8	19·6	29·4	39·2	49·0	58·8	68·6	78·4	88·2
99	9·9	19·8	29·7	39·6	49·5	59·4	69·3	79·2	89·1

XXXIX.—NUMBERS USED IN CALCULATIONS.

π = Ratio of Circumference of a Circle to Diameter.
e = Base of Natural Logarithms.

	Numbers.	Logarithms.
$\pi =$	3·14159 26536	0·49714 98727
$2\pi =$	6·28318 53072	0·79817 98684
$4\pi =$	12·56637 06144	1·09920 98640
$\frac{1}{2}\pi =$	1·57079 63268	0·19611 98770
$\frac{1}{3}\pi =$	1·04719 75512	0·02002 86180
$\frac{1}{4}\pi =$	0·78539 81634	$\bar{1}$·89508 98814
$\frac{1}{6}\pi =$	0·52359 87756	$\bar{1}$·71899 86223
$\frac{1}{180}\pi =$	0·01745 32925	$\bar{2}$·24187 73676
$\frac{1}{10800}\pi =$	0·00029 08882	$\bar{4}$·46372 61172
$\frac{1}{648000}\pi =$	0·00000 48481	$\bar{6}$·68557 48668
$\frac{4}{3}\pi =$	4·18879 02048	0·62208 86093
$1 \div \pi =$	0·31830 98862	$\bar{1}$·50285 01273
$180 \div \pi =$	57·29577 95131	1·75812 26324
$648000 \div \pi =$	206264·80625	5·31442 51332
$1 \div 4\pi =$	0·07957 74715	$\bar{2}$·90079 01360
$1 \div 6\pi =$	0·05305 16477	$\bar{2}$·72469 88769
$\pi^2 =$	9·86960 44011	0·99429 97454
$1 \div \pi^2 =$	0·10132 11836	$\bar{1}$ 00570 02546
$\sqrt{\pi} =$	1·77245 38509	0·24857 49363
$1 \div \sqrt{\pi} =$	0 56418 95835	$\bar{1}$·75142 50637
$\sqrt[3]{\pi} =$	1·46459 18876	0·16571 66242
$\sqrt[3]{\pi^2} =$	2 14502 93971	0·33143 32485
$\sqrt[3]{(6 \div \pi)} =$	1·24070 09818	0·09366 71259
$\sqrt[3]{(6\pi^2)} =$	3·89777 70897	0·59081 69986
$\sqrt[3]{(36\pi)} =$	4·83597 58620	0·68448 41244

e = 2·71828 18285
$\text{Log}_{10} e$ = ·43429 44819
$\text{Log}_e 10$ = 2·30258 50930

$e^{\cdot 001} = 1{\cdot}0010005$	$e^{-\cdot 001} = {\cdot}9990005$
$e^{\cdot 002} = 1{\cdot}0020020$	$e^{-\cdot 002} = {\cdot}9980020$
$e^{\cdot 003} = 1{\cdot}0030045$	$e^{-\cdot 003} = {\cdot}9970045$
$e^{\cdot 004} = 1{\cdot}0040080$	$e^{-\cdot 004} = {\cdot}9960080$
$e^{\cdot 005} = 1{\cdot}0050125$	$e^{-\cdot 005} = {\cdot}9950125$
$e^{\cdot 006} = 1{\cdot}0060180$	$e^{-\cdot 006} = {\cdot}9940180$
$e^{\cdot 007} = 1{\cdot}0070245$	$e^{-\cdot 007} = {\cdot}9930245$
$e^{\cdot 008} = 1{\cdot}0080320$	$e^{-\cdot 008} = {\cdot}9920320$
$e^{\cdot 009} = 1{\cdot}0090405$	$e^{-\cdot 009} = {\cdot}9910405$
$e^{\cdot 000pqr} = 1{\cdot}000pqr$	$e^{-\cdot 000pqr} = 1 - {\cdot}000pqr$

$e^{\pi} = 2{\cdot}3141 \times 10$

$e^{2\pi} = 5{\cdot}3549 \times 10^{2}$

$e^{3\pi} = 1{\cdot}2392 \times 10^{4}$

$e^{4\pi} = 2{\cdot}8675 \times 10^{5}$

$e^{5\pi} = 6{\cdot}6356 \times 10^{6}$

$e^{-\pi} = 4{\cdot}3214 \times 10^{-2}$

$e^{-2\pi} = 1{\cdot}8674 \times 10^{-3}$

$e^{-3\pi} = 8{\cdot}0699 \times 10^{-5}$

$e^{-4\pi} = 3{\cdot}4873 \times 10^{-6}$

$e^{-5\pi} = 1{\cdot}5070 \times 10^{-7}$

$e^{\frac{\pi}{2}} = 4{\cdot}8105$

$e^{\frac{3\pi}{2}} = 1{\cdot}1132 \times 10^{2}$

$e^{\frac{5\pi}{2}} = 2{\cdot}5760 \times 10^{3}$

$e^{\frac{7\pi}{2}} = 5{\cdot}9610 \times 10^{4}$

$e^{\frac{9\pi}{2}} = 1{\cdot}3794 \times 10^{6}$

$e^{-\frac{\pi}{2}} = 2{\cdot}0788 \times 10^{-1}$

$e^{-\frac{3\pi}{2}} = 8{\cdot}9833 \times 10^{-3}$

$e^{-\frac{5\pi}{2}} = 3{\cdot}8820 \times 10^{-4}$

$e^{-\frac{7\pi}{2}} = 1{\cdot}6776 \times 10^{-5}$

$e^{-\frac{9\pi}{2}} = 7{\cdot}2495 \times 10^{-7}$

$e^{\frac{\pi}{4}} = 2{\cdot}1933$

$e^{\frac{3\pi}{4}} = 1{\cdot}0551 \times 10$

$e^{\frac{5\pi}{4}} = 5{\cdot}0754 \times 10$

$e^{\frac{7\pi}{4}} = 2{\cdot}4415 \times 10^{2}$

$e^{\frac{9\pi}{4}} = 1{\cdot}1745 \times 10^{3}$

$e^{\frac{11\pi}{4}} = 5{\cdot}6498 \times 10^{3}$

$e^{\frac{13\pi}{4}} = 2{\cdot}7178 \times 10^{4}$

$e^{\frac{15\pi}{4}} = 1{\cdot}3074 \times 10^{5}$

$e^{\frac{17\pi}{4}} = 6{\cdot}2893 \times 10^{5}$

$e^{\frac{19\pi}{4}} = 3{\cdot}0205 \times 10^{6}$

$e^{-\frac{\pi}{4}} = 4{\cdot}5594 \times 10^{-1}$

$e^{-\frac{3\pi}{4}} = 9{\cdot}4780 \times 10^{-2}$

$e^{-\frac{5\pi}{4}} = 1{\cdot}9703 \times 10^{-2}$

$e^{-\frac{7\pi}{4}} = 4{\cdot}0958 \times 10^{-3}$

$e^{-\frac{9\pi}{4}} = 8{\cdot}5144 \times 10^{-4}$

$e^{-\frac{11\pi}{4}} = 1{\cdot}7700 \times 10^{-4}$

$e^{-\frac{13\pi}{4}} = 3{\cdot}6794 \times 10^{-5}$

$e^{-\frac{15\pi}{4}} = 7{\cdot}6487 \times 10^{-6}$

$e^{-\frac{17\pi}{4}} = 1{\cdot}5900 \times 10^{-6}$

$e^{-\frac{19\pi}{4}} = 3{\cdot}3053 \times 10^{-7}$

EULER'S NUMBERS E_n.

$$2/(e^{x} + e^{-x}) = 1 + \Sigma(-1)^{n} E_n x^{2n}/(2n)!$$

$E_1 = 1$

$E_2 = 5$

$E_3 = 6{\cdot}1 \times 10$

$E_4 = 1{\cdot}385 \times 10^{3}$

$E_5 = 5{\cdot}0521 \times 10^{4}$

$E_6 = 2{\cdot}702765 \times 10^{6}$

$E_7 = 1{\cdot}99360981 \times 10^{8}$

$E_8 = 1{\cdot}9391512145 \times 10^{10}$

$E_9 = 2{\cdot}404879675441 \times 10^{12}$

EULER'S CONSTANT

$$\gamma = \underset{n=\infty}{\mathrm{Lt}} \left(\frac{1}{1} + \frac{1}{2} + \frac{1}{3} + \ldots + \frac{1}{n} - \log_e n\right)$$

$$= {\cdot}57721\ \ 56649$$

VALUES OF S_n, s_n, T_n, V_n.

$$S_n = 1^{-n} + 2^{-n} + 3^{-n} + \ldots \qquad T_n = 1^{-n} + 3^{-n} + 5^{-n} + \ldots$$
$$s_n = 1^{-n} - 2^{-n} + 3^{-n} - \ldots \qquad V_n = 1^{-n} - 3^{-n} + 5^{-n} + \ldots$$

n	S_n	s_n	T_n
1	∞	·69314 71806	∞
2	1·64493 40668	·82246 70334	1·23370 05501
3	1·20205 69032	·90154 26774	1·05179 97903
4	1·08232 32337	·94703 28295	1·01467 80316
5	1·03692 77551	·97211 97704	1·00452 37628
6	1·01734 30620	·98555 10913	1·00144 70766
7	1·00834 92774	·99259 38199	1·00047 15487
8	1·00407 73562	·99623 30019	1·00015 51790
9	1·00200 83928	·99809 42975	1·00005 13452
10	1·00099 45751	·99903 95076	1·00001 70414
11	1·00049 41886	·99951 71435	1·00000 56661
12	1·00024 60866	·99975 76851	1·00000 18858
13	1·00012 27133	·99987 85428	1·00000 06281
14	1·00006 12481	·99993 91703	1·00000 02092
15	1·00003 05882	·99996 95512	1·00000 00697
16	1·00001 52823	·99998 47642	1·00000 00232
17	1·00000 76372	·99999 23783	1·00000 00077
18	1·00000 38173	·99999 61879	1·00000 00026
19	1·00000 19082	·99999 80935	1·00000 00009
20	1·00000 09540	·99999 90466	1·00000 00003

$$V_{2n+1} = (\tfrac{1}{2}\pi)^{2n+1} E_n / 2(2n)!$$

ENGLISH AND METRIC EQUIVALENTS.

1 Metre (0° C.)	= 39·370113 inches (62° F.)
1 Square metre	= 10·7639 square feet
1 Cubic decimetre	= 61·024 cubic inches
1 Litre	= 1·7598 pints
1 Kilogram	= 2·2046223 pounds (avoir.)
1 Gramme	= 15·4323564 grains

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1 Yard	= 0·914399 metres
1 Cubic inch	= 16·387 cubic centimetres
1 Gallon	= 4·5459631 litres
1 Pound (avoir.)	= 0·45359243 kilograms

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