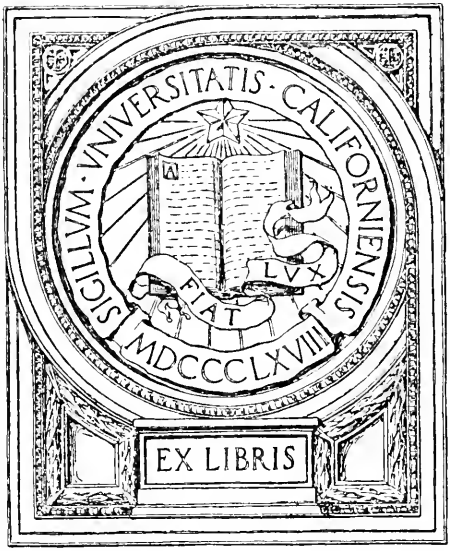

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LOGARITHMIC, TRIGONOMETRIC,

AND OTHER

MATHEMATICAL TABLES.

BY

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PREFACE.

In the accompanying tables, greater accuracy without increased space or labor is attained by using a mark [⌢] to represent the addition of half a unit to any final figure over which it may be placed, each logarithmic and trigonometric value being thus tabulated to the nearest half-unit.

Accuracy in tabulated values has been sought for by careful comparison with the tables of Schron, Bruhn, and Bremiker.

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Henry H. Ludlow.

New York City, April 15, 1890.

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TABLE I.

LOGARITHMS OF NUMBERS.

1. Contents and Arrangement. Table I. contains the mantissas of the common logarithms of integers from 1 to 11009 inclusive.

The mantissas are given to 5 decimal places, except for integers from 10000 to 11009, for which they are given to 6 places.

Since mantissas are, in general, incommensurable with unity, figures beyond the last place in the table are omitted. When the omitted part is $\frac{1}{4}$ or more, and less than $\frac{3}{4}$, of the *tabular unit* (i.e. the unit of the last place of the table), the symbol ⌢, called *half-mark*, is placed over the last figure, indicating that $\frac{1}{2}$ the tabular unit should be added. When the omitted part is $\frac{3}{4}$ or more of the tabular unit, the last figure has been increased by unity.

Thus,	32 201 24	is tabulated		32 201
	18 041 26	"	"	18 041̂
	40 908 74	"	"	40 908̂
	51 321 76	"	"	51 322

The *half-mark* is used to reduce the error due to omitting part of the mantissa, without increasing the size of the table. It limits such errors to $\frac{1}{4}$ the tabular unit.

On page 1 integers from 1 to 100 are arranged in order in columns. On the right of each number is its logarithm.

On pages 2 to 21, inclusive, integers from 1000 to 11009 are given with the mantissas of their logarithms.

All, except the last figure of each number, appear in the left-hand columns, arranged in order downward; and the last figure of each is in the top and bottom horizontal lines, both of which begin with 0 and increase toward the right.

In the column headed 0 the complete mantissas are given The last three figures are printed in full, but the first two are not when they are the same as the corresponding ones above. In the other columns the last three figures only of the mantissas are printed, the others being supplied from the column headed 0 on the same horizontal line or above it, except where an asterisk occurs, in which case the first two figures lie in the line next below.

By this arrangement integers from 100 to 1100 form the left-hand columns of pages 2 to 21, and immediately to the right of each, in the column headed 0, is the mantissa of its logarithm, since the mantissa is not affected by multiplying the number by 10.

2. To find the Logarithm of any Positive Number. Conceive the decimal point in the number to be moved, if necessary, so as to give an integral part of 4 places.

If the *auxiliary* number thus formed is entire, take the mantissa directly from the table.

If the *auxiliary* number has a fractional part, take the mantissa of its integral part, and to it add the product of the difference between it and the next greater mantissa in the table, by the fractional part. This method is based upon the assumption that the mantissa changes uniformly with the number, which is not strictly correct, and the result is only a near approximation. The difference between two consecutive mantissas in the table is called the *tabular difference*, and is denoted by D.

The characteristic of the common logarithm of any number *greater* than unity is positive and one less than the number of places of figures in the *integral* part of the number.

The characteristic of the common logarithm of any positive number *less* than unity is negative and numerically one greater than the number of consecutive zeros that immediately follow the decimal point when the number is in the form of a

decimal fraction. In this case the negative sign is placed over the characteristic to show that it alone is negative, the mantissa being always positive; thus,

$$\log 0.012 = 2.07918 = -2 + .07918,$$

and is frequently written $8.07918 - 10$.

Examples.

1. Find log 46.75. The *auxiliary* number is 4675. Opposite to 467, left-hand column, and from the column headed 5 take 978, to which prefix 66 from the column headed 0, giving log $46.75 = 1.66978$.

2. Find log 0.04679. Opposite to 467, from column headed 9, take $01\hat{5} = 0155$, to which prefix 67 from the 0 column and line next below, giving log $0.04679 = 2.670155$ or $8.670155 - 10$.

3. Find log 4.6793.

$$\log 4.679 = 0.67015\hat{}$$
$$D \times .3 = 9 \times .3 = 2.7 = \quad \hat{2}$$
$$\log 4.6793 = 0.67018$$

4. Find log 73.8142.

$$\log 73.81 = 1.86811\hat{}$$
$$6 \times .42 = 2.52 = \quad \hat{2}$$
$$\log 73.8142 = 1.86814$$

To facilitate the multiplication of D by a decimal fraction, proportional parts of D are given in the column headed P. P., on the right of each page, from which the product may be taken.

Thus, to determine $6 \times .42$ we have, from P. P. under 6,

$$\text{P. P. } .4 = 2.4$$
$$\text{P. P. } .02 = .12$$
$$\text{P. P. } .42 = 2.52 \text{ or } \hat{2}$$

5. log 903091 = 5.95573.
6. log 839.372 = 2.92395̂.
7. log .0043483 = $\bar{3}$.63832.
8. log .000025939 = $\bar{5}$.41395̂.
9. log 1.00016 = 0.000069̂. (Use table beyond 10000.)
10. log .1100118 = $\bar{1}$.04144.

3. To find the Number corresponding to any Logarithm. If the given mantissa is found in the table, take the corresponding *auxiliary* number; if not, take the *auxiliary* number corresponding to the tabular mantissa nearest to, and smaller than, the given. Subtract the tabular mantissa from the given, and divide the difference by the corresponding tabular difference. Annex the quotient to the *auxiliary* number already found, and place the decimal point as indicated by the characteristic.

The tables of proportional parts facilitate the determination of the quotient to be annexed.

Examples.

1. $\log N = 2.86935$ $\quad N = 740.3$

2. $\log N = 2.86937$

$.86935$ = the next less tabular mantissa, giving 7402.

difference $= 2$ $\quad D = 6$

In P. P. under 6 we find 1.8 gives 3

Hence, .18 " 03

Therefore, 1.98 gives 33

The auxiliary number is 740233, and $N = 740.233$

3. $\log N = \bar{1}.99841$, $\quad N = .99635$

4. $\log N = \bar{3}.71936$, $\quad N = .0052404$

5. $\log N = \bar{2}.007329$, $\quad N = .0101702$

(Use table beyond 1000.)

General Properties of Logarithms.

4. 1°. *The logarithm of any product is equal to the sum of the logarithms of its factors.*

2°. *The logarithm of any quotient is equal to the logarithm of the dividend minus that of the divisor.*

3°. *The logarithm of any power of any number is equal to the logarithm of the number multiplied by the exponent of the power.*

4°. *The logarithm of any root of any number is equal to the logarithm of the number divided by the index of the root.*

Applications.

5. When the mantissa of a subtrahend is greater than that of the minuend, unity is added to that of the minuend and subtracted from its characteristic.

Thus, $\log \frac{.0103}{97} = \log .0103 - \log 97$

$$\begin{array}{rl} \log & .0103 = 2.01283 \\ \text{“} & 97. \quad = 1.98677 \\ \hline \log \frac{.0103}{97} & = \bar{4}.02606 \end{array} \qquad \frac{.0103}{97} = .00010618$$

6. To multiply or divide a logarithm with a negative characteristic, multiply or divide its characteristic and mantissa separately; and in case of division, add to the characteristic the smallest negative integer necessary to make it exactly divisible by the divisor, and add the corresponding positive integer to the mantissa.

Thus,

$$\log \left(\frac{97}{103}\right)^5 = 5\,(\bar{1}.97393) = \bar{5} + 4.86967 = \bar{1}.86967.$$

$$\log \sqrt[7]{\frac{97}{103}} = \frac{1}{7}(\bar{1}.97393) = \frac{1}{7}(\bar{7} + 6.97393) = \bar{1}.99627.$$

Exercises.

With logarithms determine:

1. $\sqrt[3]{\frac{3}{2}} = 1.12473.$

2. $\frac{22 \times 8^2}{\sqrt{121}} = 128.$

3. $0.456 \times 0.03217 = 0.0146697.$

4. $(0.0567)^4 = .000010336.$

5. $\frac{\sqrt[5]{.0009374}}{\sqrt[3]{.0026193}} = 1.7988.$

6. $-\ 0.0124^{4} = 0.00000002364.$
7. $-\ 0.421^{-3} = -\ 13.4015.$
8. $79965000^{-\frac{1}{3}} = 0.0023206.$
9. $1.216^{-\frac{1}{7}} = 0.97245.$
10. $0.2042^{\frac{1}{2}} = 0.4519.$
11. $0.000204^{-\frac{1}{3}} = 16.99.$
12. $-\ 592.1^{-\frac{1}{3}} = -\ 0.1190.$
13. $12^{2.37} = 361.13.$
14. $-\ 72^{\frac{49}{58}} =$ Imaginary.
15. $0.01024^{\frac{1.33}{2.07}} = 0.05267.$
16. $0.00231^{-\frac{1.7}{3.5}} = 19.078.$

7. **The Arithmetical Complement** of a logarithm is the remainder after subtracting it from 10.

Thus, a. c. log N = 10 − log N.
Hence, − log N = a. c. log N − 10.

Therefore, *any logarithm may be subtracted by adding its arithmetical complement minus* 10.

Examples.

1. $\log\left(\frac{.413 \times 3027.}{.002854}\right) =$

+ log .413.	$= \bar{1}.61595$
+ log 3027.	$= 3.48101$
+ a. c. log .002854 − 10	$= 2.54454\hat{1}$
	$5.64150\hat{0}$

2. $\log\left(\frac{276.3 \times 4.1924}{99}\right) =$

+ log 276.3	$= 2.44138$
+ log 4.1924	$= 0.62246$
+ a. c. log 99. − 10	$= 8.00436\hat{6} - 10$
	$= 1.06818\hat{8}$

8. Negative Numbers have no common logarithms, but indicated operations upon their numerical values may be performed by logarithms, and the sign of the result determined by combining the signs of the numbers and those of operation. To follow the signs through the logarithmic work, the subscript n is generally written with its logarithm when the sign of a factor is negative.

Examples.

With logarithms determine:

1. $\dfrac{(-109)(3027)(-41.3)}{(57.23)(-47.1)(2.3415)}$.

log	109.	$= 2.03742_n$
log	3027.	$= 3.48101$
log	41.3	$= 1.61595_n$
a. c. log	57.23	$= 8.24237 - 10$
a. c. log	47.1	$= 8.32698_n - 10$
a. c. log	2.3415	$= 9.63050 - 10$
		3.33424_n

Ans. -2158.9

2. $\dfrac{87\sqrt[3]{-0.056}}{-2.7856} = 11.9486.$

3. $\dfrac{\sqrt[2]{\frac{2}{5}}\sqrt[3]{6^2}}{(-\frac{10}{3})^2} = 0.18795.$

4. $\dfrac{(32)^{\frac{1}{5}}\sqrt{115}\sqrt[3]{-0.016}}{(-1146)^{\frac{2}{3}}(0.0051)^2} = -536.66.$

TABLE II.

MATHEMATICAL CONSTANTS.

Part I. gives the logarithmic constants M, $\frac{1}{M}$ and e to 10 places, with logarithms to 8 places. The auxiliary tables on the left enable us to find the Napierian logarithm of a number from its common logarithm without laborious multiplication. Thus § 1, given $\log 321 = 2.50650$, we have

2.	4.60 517 018
.5	1.15 129 254
.006	.01 381 551
.0005	.00 115 129
.00000	.00 001 151
$\therefore \log_e 321 =$	4.77 144 105

In such computation it is usually sufficiently accurate to keep one place of figures more than is required in the result.

The auxiliary table on the right is for the reverse of this process.

Part II. gives circular and spherical constants to 8 places, with logarithms to 8 places.

Part III. gives angular constants to 8 places, with their logarithms to 8 places. They are principally useful in changing the angular unit.

TABLES III AND IV.

LOGARITHMS OF SINES, COSINES, TANGENTS AND COTANGENTS.

(The explanation of Table III follows that of Table IV.)

10. Table IV contains the common logarithms of the sine, cosine, tangent and cotangent of all angles at intervals of $1'$ from 0° to 90°.

Except the tangents from 45° to 90°, and the cotangents from 0° to 45°, each function is less than unity, and its common logarithm is negative. To avoid minus signs in the table, 10 is arbitrarily added to each negative characteristic.

The table is arranged with reference to the angles. Those from 0° to 45° are placed, in order, downward in the left-hand column of each page, with degrees at the top of the page; those from 45° to 90°, in order, upward in the right-hand column, with degrees at the bottom of the page, each angle between 45° and 90° on the same line with its complementary angle. The values of the logarithmic functions, each on the same line with its angle, are arranged in columns with names at the top for angles between 0° and 45°, and at the bottom for angles between 45° and 90°.

Each column headed D gives the *tabular difference*—i e. difference between consecutive tabulated values—for the column on its left.

Let α be the angular interval, then $n\alpha$ and $(n+1)\,\alpha$ are consecutive angles of the table. By (6), Trigonometry, we have

$$\tan n\alpha = \frac{1}{\cot n\alpha}, \quad \text{and} \quad \tan (n+1)\,\alpha = \frac{1}{\cot (n+1)\,\alpha};$$

$$\therefore \quad \frac{\tan (n+1)\,\alpha}{\tan n\alpha} = \frac{\cot n\alpha}{\cot (n+1)\,\alpha};$$

or, applying logarithms to both members,

$$\log \tan (n+1)\,\alpha - \log \tan n\alpha = \log \cot n\alpha - \log \cot (n+1)\,\alpha.$$

That is, *the logarithmic tangent and logarithmic cotangent have a common tabular difference.* The column of their common differences is usually arranged between the columns of these logarithms.

11. To find the Logarithmic Sine, Cosine, Tangent or Cotangent of any Angle ϕ.

If ϕ is in the table, take the number on the same line with it, and from the proper column. Thus,

$\log \sin 19^\circ\ 55' = 9.53231 - 10$, $\log \cos 19^\circ\ 55' = 9.97321 - 10$;
$\log \tan 19^\circ\ 54' = 9.55870 - 10$, $\log \cot 19^\circ\ 54' = 0.44129$;
$\log \sin 66^\circ\ 19' = 9.96179 - 10$, $\log \cos 66^\circ\ 19' = 9.60388 - 10$;
$\log \tan 66^\circ\ 19' = 0.35791$, $\log \cot 66^\circ\ 19' = 9.64209 - 10$.

If ϕ lies between two consecutive tabular angles, take the function for the lesser angle, and correct it by the approximate principle, that small changes of the angle are proportional to the corresponding changes of their logarithmic functions. Auxiliary tables of proportional parts facilitate the solution of this proportion. Thus, to find $\log \sin 73^\circ\ 12'\ 53''$, and $\log \cos 49^\circ\ 33'\ 32''$:

$\log \sin 73^\circ\ 12'$		$9.98105 - 10$,	$\log \cos 49^\circ\ 33'$		$9.81210 - 10$
Diff. 4 P.P.	$50''$	$+ 3.3$	Diff. 15 P.P.	$30''$	$- 7.5$
P.P.	$3''$	$+ .2$	P.P.	$2''$	$- 0.5$
$\log \sin 73^\circ\ 12'\ 53''$		$9.98109 - 10$,	$\log \cos 49^\circ\ 33'\ 32''$		$9.81202 - 10$

The algebraic sign of the correction is determined by observing whether or not the required function increases as the angle increases. The corrections are carried out one place of decimals farther than the numbers in the table, and the value of the total correction then taken to the nearest unit in the last place of the table.

Examples.

$\log \sin 73^\circ\ 29'\ 14'' = 9.98171 - 10$, $\log \tan 37^\circ\ 28'\ 31'' = 9.88459 - 10$;
$\log \cos\ 9^\circ\ 58'\ 33'' = 9.99338 - 10$, $\log \cot 65^\circ\ 21'\ 45'' = 9.66146 - 10$;
$\log \cot 87^\circ\ 57'\ 59'' = 8.55034 - 10$, $\log \tan 65^\circ\ 21'\ 45'' = 0.33854$.

If ϕ is not in the first quadrant, the function should be reduced to the first quadrant. The logarithm of its numerical value may then be taken from the table. Thus,

$$\sin 210^\circ\ 17' = -\sin 30^\circ\ 17'.$$

Hence, numerically, $\log \sin 210^\circ\ 17' = \log \sin 30^\circ\ 17'$;
or, $\log \sin 210^\circ\ 17' = 9.70267 - 10$.
Similarly, $\log \tan 115^\circ\ 33' = \log \cot 25^\circ\ 33'$;
or, $\log \tan 115^\circ\ 33' = 0.32053$.
Similarly, $\log \sin 115^\circ\ 33' = 9.95530 - 10$.

When it is necessary to consider the sign of a negative function the subscript n is used. Thus,

$$\log \sin 210^\circ\ 17' = 9.70267_n - 10.$$
$$\log \sin 115^\circ\ 33' = 9.95530 - 10.$$
$$\log \tan 115^\circ\ 33' = 0.32053_n.$$

Examples.

1. $\log \sin 235^\circ\ 19'\ 23'' = \bar{1}.91507_n$.
2. $\log \cos 329^\circ\ 26'\ 41'' = \bar{1}.93507$.
3. $\log \tan 136^\circ\ 14'\ 22'' = \bar{1}.98120_n$.
4. $\log \cot 317^\circ\ 33'\ 33'' = 0.03885_n$.
5. $\log \sin -37^\circ\ 43'\ 05'' = \bar{1}.78659_n$.
6. $\log \cos -430^\circ\ 22' = \bar{1}.52634$.
7. $\log \cot \frac{\pi}{6} = 0.23856$.
8. $\log \cot 1 = \bar{1}.80750$.
9. $\log \cos -\frac{3\pi}{4} = \bar{1}.84948_n$.
10. $\log \tan -8\pi = -\infty$.

12. To find the Logarithmic Secant, Cosecant, Versine and Coversine of any Angle ϕ.

These are not given in the table, but from § 51, Trigonometry, we have

$$\sec \phi = \frac{1}{\cos \phi}, \qquad \operatorname{cosec} \phi = \frac{1}{\sin \phi},$$

$$\operatorname{vers} \phi = 1 - \cos \phi, \qquad \operatorname{covers} \phi = 1 - \sin \phi.$$

Hence,

$$\log \sec \phi = -\log \cos \phi, \qquad \log \operatorname{cosec} \phi = -\log \sin \phi,$$

$$\log \operatorname{vers} \phi = \log (1 - \cos \phi), \quad \log \operatorname{covers} \phi = \log (1 - \sin \phi).$$

Thus,

$$\log \sec 66^\circ\ 19' = 10 - 9.60388 = 0.39612.$$

$$\log \operatorname{cosec} 66^\circ\ 19' = 10 - 9.96179 = 0.03821.$$

$$\log \operatorname{vers} 66^\circ\ 19' = \log (1 - 0.40168) = \log 0.59832 = \bar{1}.77693\hat{3} = 9.77693\hat{3} - 10.$$

$$\log \operatorname{covers} 66^\circ\ 19' = \log (1 - 0.91578) = \log (0.08422) = \bar{2}.9254\hat{1} = 8.9254\hat{1} - 10.$$

Examples.

1. $\log \sec 12^\circ\ 25' = 0.01028.$
2. $\log \operatorname{cosec} 12^\circ\ 25' = 0.66752.$
3. $\log \operatorname{vers} 63^\circ\ 35' = \bar{1}.74437.$
4. $\log \operatorname{covers} 63^\circ\ 35' = \bar{1}.01878.$
5. $\log \sec 235^\circ\ 19'\ 30'' = 0.2449\hat{4}_n.$
6. $\log \operatorname{cosec} - 430^\circ\ 22' = 0.0260\hat{1}_n.$
7. $\log \operatorname{vers} (1\tfrac{2}{3} - \pi) = \bar{1}.9563\hat{0}.$
8. $\log \operatorname{covers} - 1.72 = \bar{2}.0457\hat{1}.$
9. $\log \sec - \frac{13\pi}{4} = 0.1505\hat{1}.$
10. $\log \operatorname{cosec} \frac{2\pi - 7}{4} = 0.7489\hat{8}_n.$

11. log sec 1.57079632 $= -\infty$.
12. log covers (-645°) $= \bar{2}.53237$.
13. log covers $44^\circ\ 22'$ $= \bar{1}.47826$.
14. log vers 130° $= 0.21558$.
15. log vers $27^\circ\ 22'$ $= \bar{1}.04887$.
16. log vers 15° $= \bar{2}.53237$.
17. log covers $7^\circ\ 31'\ 55''$ $= \bar{1}.93898$.

Log vers and log covers may also be determined from (43), Trigonometry.

$$\text{vers } \phi = 2 \sin^2 \tfrac{1}{2}\phi, \qquad \text{covers } \phi = 2 \sin^2 \tfrac{1}{2}(90^\circ - \phi).$$

Hence,

$$\log \text{vers } \phi = \log 2 + 2 \log \sin \tfrac{1}{2}\phi.$$
$$\log \text{covers } \phi = \log 2 + 2 \log \sin \tfrac{1}{2}(90^\circ - \phi).$$

13. To find ϕ from its Logarithmic Sine, Cosine, Tangent or Cotangent.—If the given value is not found in the proper column, take from the table the angle corresponding to the lesser of the two consecutive values between which it lies. Subtract this lesser value from the given value, and find the angular correction corresponding to this difference. The angular correction is found by the same principle, and by a process the reverse of that used in finding the correction of a function for an intermediate angle. Thus,

To find ϕ when $\log \cos \phi = 9.92657 - 10$
$\log \cos 32^\circ\ 24' = 9.92651 - 10$

$-45''$	6 D 8
$32^\circ\ 23'\ 15''$	

If cos ϕ is positive, we have

$$\phi = 32^\circ\ 23'\ 15'', \qquad \text{and} \qquad \phi = 360^\circ - (32^\circ\ 23'\ 15'').$$

If cos ϕ is negative, we have

$$\phi = 180^\circ - (32^\circ\ 23'\ 15''), \quad \text{and} \quad \phi = 180^\circ + 32^\circ\ 23'\ 15'').$$

Examples.

Find all positive values of $\phi < 360°$:

1. When $\log \sin \phi = 9.76541 - 10$.
   Ans. $35° 38' 15''$ and $144° 21' 45''$.

2. When $\log \cos \phi = 9.51059_n - 10$.
   Ans. $108° 54' 25''$ and $251° 5' 35''$.

3. When $\log \tan \phi = 0.56644$.
   Ans. $74° 49' 2''$ and $254° 49' 2''$.

4. When $\log \cot \phi = 9.43263_n - 10$.
   Ans. $105° 9' 6''$ and $285° 9' 6''$.

14. To find ϕ from its Logarithmic Secant, Cosecant, Versine or Coversine.—By means of formulas § 51, Trigonometry, logarithmic secants, cosecants, versines and coversines may be expressed in terms of logarithmic cosines or sines, from which ϕ may be found as above. Thus,

Given $\log \sec \phi = 0.04891$,

we have

$$\cos \phi = \frac{1}{\sec \phi}; \quad \therefore \log \cos \phi = -\log \sec \phi;$$

$$\therefore \log \cos \phi = -0.04891 = \underline{9.95109 - 10}$$

$$26° 42' \qquad\qquad 6\,D \quad \hat{6}$$

$$-\ 55''$$

$$\underline{26° 41' 5''}$$

$$\therefore \phi = 26° 41' 5'' \quad \text{and} \quad 333° 18' 55''.$$

Similarly, ϕ may be determined from any of its trigonometric functions. Thus:

Having $\text{vers } \phi = 1.2346$,

then, $\cos \phi = 1 - \text{vers } \phi = -0.2346$

$\therefore \log \cos \phi = \log (0.2346)_n = 1.37033_n$

$76^\circ\ 26'$ $\quad$ $\hat{4}\ \mathrm{D}\ 5\hat{2}$

$-\ 5''$

$76^\circ\ 25'\ 55''$

$\therefore \phi = 103^\circ\ 34'\ 5''$ and $256^\circ\ 25'\ 55''$.

The required angle will be $\phi < 90^\circ$, or $180^\circ - \phi$, or $180^\circ + \phi$, or $360^\circ - \phi$, according to the quadrant in which the trigonometric function lies. There will always be two positive angles less than 360°.

Examples.

Find all positive values of ϕ less than 360°:

1. When $\log \sec \phi = .05846$.
   Ans. $29^\circ\ 4'\ 0''$ and $330^\circ\ 56'\ 0''$.
2. When $\log \operatorname{cosec} \phi = .02610$.
   Ans. $70^\circ\ 20'$ and $109^\circ\ 40'$
3. When $\log \text{vers } \phi = 9.04891 - 10$.
   Ans. $27^\circ\ 22'\ 5''$ and $332^\circ\ 37'\ 55''$.
4. When $\log \text{covers } \phi = 9.93898 - 10$.
   Ans. $7^\circ\ 31'\ 55''$ and $172^\circ\ 28'\ 5''$.

Find in degree-measure from the table of logarithmic sines, etc., all positive values, less than 360°, for each of the following angles:

5. $\sin^{-1}[-.23]$. *Ans.* $193^\circ\ 17'\ 50''$, $346^\circ\ 42'\ 10''$.
6. $\cos^{-1}\frac{5}{8}$. *Ans.* $51^\circ\ 19'\ 4''$, $308^\circ\ 40'\ 56''$.
7. $\tan^{-1}[-\frac{4}{5}]$. *Ans.* $141^\circ\ 20'\ 25''$, $321^\circ\ 20'\ 25''$.
8. $\cot^{-1}.72$. *Ans.* $54^\circ\ 14'\ 46''$, $234^\circ\ 14'\ 46''$.
9. $\sec^{-1}[-1.4]$. *Ans.* $135^\circ\ 35'\ 5''$, $224^\circ\ 24'\ 55''$.
10. $\operatorname{cosec}^{-1}3.5$. *Ans.* $16^\circ\ 36'\ 5''$, $163^\circ\ 23'\ 55''$.

11. vers $^{-1}\frac{1}{4}$. *Ans.* 31° 0′ 12″, 328° 59′ 48″.

12. covers $^{-1}1.3$. *Ans.* 342° 32′ 33″, 197° 27′ 27″.

13. cosec $^{-1}[\pm 5.7588]$. *Ans.* 10°, 170°, 190°, 350°.

14. cosec $^{-1} - 2$. *Ans.* 210°, 330°.

15. In seeking angles from the tables, extreme values of logarithmic functions may arise.

If $\log \sin \phi = 0 - 10 = -10$,

we have

$$\sin \phi = 10^{-10}, \quad \text{and} \quad \phi = 10^{-10}.$$

In which case ϕ is practically, though not absolutely, zero. With a radius of 100 miles it intercepts an arc of

$$10^{-8} \text{ mi.} = .00062 \text{ in.}$$

If $\log \cos \phi = -10$,

ϕ is the complement of the value just considered, and is practically 90°.

If $\log \tan \phi = -10$,

ϕ is practically zero.

If $\log \cot \phi = -10$,

ϕ is practically 90°.

If $\log \sin \phi = 10 - 10 = 0$, $\sin \phi = 1$ and $\phi = 90°$.
If $\log \cos \phi = 0$, $\cos \phi = 1$ and $\phi = 0°$.
If $\log \tan \phi = 0$, $\tan \phi = 1$ and $\phi = 45°$.
If $\log \cot \phi = 0$, $\cot \phi = 1$ and $\phi = 45°$.
If $\log \tan \phi = 10$, $\tan \phi = 10^{10}$; $\therefore \cot \phi = 10^{-10}$, and ϕ is practically 90°.
If $\log \cot \phi = 10$, $\cot \phi = 10^{10}$; $\therefore \tan \phi = 10^{-10}$, and ϕ is practically zero.

TABLE III.

LOGARITHMIC SINES AND TANGENTS OF ANGLES LESS THAN 3°.

16. It has been assumed that small changes in the angle are proportional to the corresponding changes of any one of its functions. If this approximate principle were exact, the *tabular difference* for each function would be constant, since it corresponds to a constant small change of angle. Hence the accuracy of this principle is the greater, the more slowly the tabular difference changes.

To insure sufficient accuracy of interpolation in finding logarithmic sines and tangents of small angles, and the reverse, the values of

$$S = \log\left(\frac{\sin\phi}{\phi''}\right), \qquad T = \log\left(\frac{\tan\phi}{\phi''}\right),$$

$$S' = \log\left(\frac{\phi''}{\sin\phi}\right), \quad \text{and} \quad T' = \log\left(\frac{\phi''}{\tan\phi}\right),$$

computed at intervals of 1′ from 0° to 3° (those of S and T being increased by 10), and are given in Table III. The first four figures of T and T' are the same as those of S and S' respectively. These quantities change so slowly and regularly that the ordinary method of interpolation gives very accurate results.

Given ϕ, to find $\log\sin\phi$ and $\log\tan\phi$ accurately, when $\phi < 3°$.

$$\sin\phi = \phi''\frac{\sin\phi}{\phi''}, \qquad \text{and} \qquad \tan\phi = \phi''\frac{\tan\phi}{\phi''};$$

$$\therefore \log\sin\phi = \log\phi'' + \log\left(\frac{\sin\phi}{\phi''}\right) = \log\phi'' + S,$$

$$\log\tan\phi = \log\phi'' + \log\left(\frac{\tan\phi}{\phi''}\right) = \log\phi'' + T.$$

Hence, to find the logarithmic sine or tangent, add to the common logarithm of the number of seconds in ϕ, the corresponding value of S or T.

The angles are expressed in degrees and minutes, also in seconds.

Examples.

1. Find accurately log sin 1° 7′ 47″.3. Look in the table for 1° 7′ = 4020″.

$$\phi'' = 4020'' + 47''.3 = 4067''.3, \quad \log \phi'' = 3.6093\hat{0}$$
$$S \quad 4.6855\hat{4} - 10$$
$$\log \sin 1^\circ\ 7'\ 47''.3 = \hat{2}.29485$$

The ordinary method gives $\hat{2}.2948\hat{3}$

2. Find accurately log sin 0° 42′ 24″.7. *Ans.* $\hat{2}.09120$

3. Find accurately log tan 1° 51′ 21″.4. *Ans.* $\hat{2}.51059$

To find log cot ϕ accurately, when ϕ is less than 3°. Since $\cot \phi = \frac{1}{\tan \phi}$, we have

$$\log \cot \phi = -\log \tan \phi,$$

which may be found as above indicated. Thus,

$$\log \cot 1^\circ\ 51'\ 21''.4 = 10 - 8.51059 = 1.48941.$$

When $87^\circ < \phi < 90^\circ$, find log cos ϕ and log cot ϕ by determining their equals, respectively, log sin $(90^\circ - \phi)$ and log tan $(90^\circ - \phi)$.

17. Given log sin ϕ or log tan ϕ, to find ϕ accurately, when $\phi < 3^\circ$.

The above method might be reversed, but the following is more convenient:

$$\phi'' = \sin \phi \frac{\phi''}{\sin \phi} \quad \text{and} \quad \phi'' = \tan \phi \frac{\phi''}{\tan \phi};$$

$$\therefore \log \phi'' = \log \sin \phi + \log \left(\frac{\phi''}{\sin \phi}\right) = \log \sin \phi + S',$$

$$\log \phi'' = \log \tan \phi + \log \left(\frac{\phi''}{\tan \phi}\right) = \log \tan \phi + T'.$$

Hence, to find log ϕ'' add S' to log sin ϕ, or T'' to log tan ϕ; ϕ'' may then be found from Table I.*

Examples.

1. Given log tan $\phi = 7.55641 - 10$, find ϕ accurately.

ϕ lies between $720'' = 12'$ and $780'' = 13'$, both of which have the same value of T''.

$$\begin{array}{rl} \log \tan \phi & 7.55641 - 10 \\ T'' & 5.31442\hat{2} \\ \hline \log \phi'' = & 2.87083\hat{3} \\ \hline & 2\,D\ \hat{5} \end{array}$$

$$\therefore\ \phi'' = 742''.74 = 0^\circ\ 12'\ 22''.75$$

2. Given log sin $\phi = 6.83214 - 10$, find ϕ accurately.

Ans. $0^\circ\ 2'\ 20''.14$.

3. Given log sin $\phi = 8.65815 - 10$, find ϕ accurately.

Ans. $2^\circ\ 36'\ 31''.3$.

4. Given long tan $\phi = 8.42973 - 10$, find ϕ accurately.

Ans. $1^\circ\ 32'\ 26''.9$.

From log cot ϕ we have $-$ log tan ϕ, from which ϕ may be determined.

When $87^\circ < \phi < 90^\circ$, log cos ϕ and log cot ϕ equal, respectively, log sin $(90^\circ - \phi)$ and log tan $(90^\circ - \phi)$ from which $90^\circ - \phi$ may be found as above.

---

* Since $\phi'' = \dfrac{180 \times 60 \times 60}{\pi}\,\phi$, we have

$$\frac{\sin \phi}{\phi''} = \frac{\sin \phi}{\phi}\,\frac{\pi}{180 \times 60 \times 60}, \quad \text{and} \quad \frac{\tan \phi}{\phi''} = \frac{\tan \phi}{\phi}\,\frac{\pi}{180 \times 60 \times 60}.$$

Hence, $\lim_{\phi'' = 0} \left[\dfrac{\sin \phi}{\phi''}\right] = \lim \left[\dfrac{\tan \phi}{\phi''}\right] = \dfrac{\pi}{64800}$.

$\log \left(\dfrac{\pi}{64800}\right) = \bar{5}.68557\hat{7}$, the common initial value of S and T.

$\log \left(\dfrac{64800}{\pi}\right) = 4.31442\hat{2}$, the common initial value of S' and T'.

TABLE V.

18. Contains the values of the *sines*, *cosines*, *tangents* and *cotangents* of all angles at intervals of 10′, from 0° to 90°, computed to four decimal places.

In the construction of this table, denote by x the angular interval in radians. Since x is small, $\frac{\sin x}{x}$ is near its limiting value, unity, and we have, approximately,

$$\sin x = x. \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (a)^*$$

Since the interval is 10′, we have, approximately,

$$x = \text{r-meas } 10' = 0.002908882 = \sin 10'.$$

Hence,

$$\cos 10' = \sqrt{1 - \sin^2 10'} = \sqrt{(1 + \sin 10')\,(1 - \sin 10')};$$

or, $\qquad \cos 10' = 0.999995769.$

From (56) and (58), Trigonometry, by transposition, we have

$$\sin(\alpha + \beta) = 2 \sin\alpha \cos\beta - \sin(\alpha - \beta),$$
$$\cos(\alpha + \beta) = 2 \cos\alpha \cos\beta - \cos(\alpha - \beta).$$

---

* Since $\pi = 3.14159265359$, we have, by computing sin 1°, sin 10′ and sin 1′ from (73),

r-meas 1° = 0.0174533,	sin 1° = 0.0174524;
r-meas 10′ = 0.002908821,	sin 10′ = 0.002908817;
r-meas 1′ = 0.000290888 2087,	sin 1′ = 0.000290888 2082;

hence, we see that $\sin x = x$ is accurate to the 5th place if x does not exceed 1°, to the 8th place if x does not exceed 10′, and to the 11th place if x does not exceed 1′.

Hence, we may write with practical accuracy,

$$\sin 1' = \text{r-meas } 1', \quad \text{and} \quad \sin 1'' = \text{r-meas } 1''.$$

If ϕ be any angle given in radians, and required in minutes or seconds,

$$\phi' = \frac{\phi}{\text{r-meas } 1'}, \quad \text{and} \quad \phi'' = \frac{\phi}{\text{r-meas } 1''};$$

or, reducing by the above approximate relations,

$$\phi' = \frac{\phi}{\sin 1'}, \quad \text{and} \quad \phi'' = \frac{\phi}{\sin 1''}.$$

Put $\beta = 10'$, and then put $\alpha = 10'$, $\alpha = 20'$, $\alpha = 30'$, etc., in succession, giving

$$\begin{aligned}
\sin 20' &= 2 \sin 10' \cos 10' - \sin 0 &&= 0.005817739,\\
\sin 30' &= 2 \sin 20' \cos 10' - \sin 10' &&= 0.008726547,\\
\sin 40' &= 2 \sin 30' \cos 10' - \sin 20' &&= 0.011635256,\\
\text{etc.} &= \text{etc} &&= \text{etc.}\\
\cos 20' &= 2 \cos^2 10' - \cos 0 &&= 0.999983076,\\
\cos 30' &= 2 \cos 20' \cos 10' - \cos 10' &&= 0.999961921,\\
\cos 40' &= 2 \cos 30' \cos 10' - \cos 20' &&= 0.999932306.\\
\text{etc.} &= \text{etc.} &&= \text{etc.}
\end{aligned}$$

This process may be continued to 45°. As each computation depends on those preceding it, the work should be checked at intervals by separate computations. For this purpose (72), Trigonometry, may be written

$$\sin(\alpha + \beta) = \frac{\sin \alpha - \sin \beta}{\sin(\alpha - \beta)}(\sin \alpha + \sin \beta);$$

in which put $90° + \alpha$ for α, giving, after reduction,

$$\cos(\alpha + \beta) = \frac{\cos \alpha - \sin \beta}{\cos(\alpha - \beta)}(\cos \alpha + \sin \beta).$$

From these formulas we may recompute the sine and cosine of 2°, 3°, etc., by making $\beta = 1°$, and in succession $\alpha = 1°$, $\alpha = 2°$, etc.

The *tangents* and *cotangents* of angles from 0° to 45° may now be computed from their sines and cosines by (4) and (5), Trigonometry.

The sines, cosines, tangents and cotangents of angles from 45° to 90° are, respectively, the cosines, sines, cotangents and tangents of their complements, which are between 0° and 45°.

The table is arranged with reference to the angles. Those from 0° to 45° are placed, in order, downward in the left-hand column of each page; those from 45° to 90°, in order, upward in the right-hand column, each angle between 45° and 90° on the same line with its complementary angle between 0° and 45°.

The values of the functions, each on the same line with its angle, are arranged in columns, with names at the top for angles between 0° and 45°, and their complementary names at the bottom for the complementary angles between 45° and 90°.

Required functions or angles may be taken directly from the table if the given angles or functions correspond exactly with those in the table.

If a given angle lies between two consecutive angles in the table, the required function may be interpolated by the method used in the table of common logarithms of numbers, assuming that small differences of the function are proportional to the corresponding differences of the angle. The solution of the proportion is facilitated by auxiliary tables of *proportional parts*, each headed with its tabular difference.

Thus, to find sin 31° 27′ and cot 47° 44′, we have

sin 31° 20′	0.5200	cot 47° 40′	0.9110
D. 25 P.P. 7′	17̂	D.* 53 P.P. 4′	− 21.2
sin 31° 27′	0.5217̂	cot 47° 44′	0.9089

The reverse process is entirely analogous. Thus, to find $\cos^{-1} 0.3162$, and $\tan^{-1} 1.2014$, seek in the table the nearest functions less than those given.

$\cos^{-1}$	0.3162	$\tan^{-1}$	1.2014
cos 71° 40′	3145̂	tan 50° 10′	1.1988
D. 2̂7	16̂	D. 7̂1	26
− 6′	16.5	3′.6	$10 \times \frac{26}{7\hat{1}} = 3.\hat{6}$
71° 34′		50° 13′.6	

If the question relates to secant, cosecant, versed-sine or coversed-sine, it may be reduced to a question of sine or cosine by (7), (8), (2) or (3), § 51, Trigonometry.

If the given angle is not in the first quadrant its required function should be reduced to the first quadrant [§ 56, Trig.]. A required angle, if not restricted to the first quadrant, may be

* The correction is negative, since the cotangent decreases as the angle increases.

the angle, denoted by ϕ, taken from the table, or $180^\circ - \phi$, or $180^\circ + \phi$, or $360^\circ - \phi$, depending upon the sign of the function. Two values of ϕ, both positive and less than 360°, may always be found. [Trigonometry.]

Examples.

1. Find the following functions:

$\sin 53^\circ\ 25'.8$	$= 0.8031.$	$\cos 351^\circ\ 38'.4$	$= 0.9894.$
$\cos 61^\circ\ 53'.2$	$= 0.4712.$	$\tan 308^\circ\ 21'.6$	$= -1.2635.$
$\sec 63^\circ\ 22'.2$	$= 2.2309.$	$\cot 188^\circ\ 26'.1$	$= -6.7441.$
$\operatorname{cosec} 37^\circ\ 49'.7$	$= 1.6305.$	$\sec 292^\circ\ 35'.5$	$= 2.6031.$
$\operatorname{vers} 31^\circ\ 10'.3$	$= 0.1444.$	$\operatorname{cosec} 149^\circ\ 39'.1$	$= 1.9792.$
$\operatorname{covers} 72^\circ\ 12'.5$	$= 0.0478.$	$\operatorname{vers} 152^\circ\ 43'.3$	$= 1.8888.$
$\sin 244^\circ\ 57'.1$	$= -0.9059.$	$\operatorname{covers} 263^\circ\ 17.2$	$= 1.9931.$

2. Find the following inverse functions less than 90°:

$\sin^{-1} 0.9842.$	*Ans.* $79^\circ\ 48'.$
$\cot^{-1} 0.4321.$	*Ans.* $66^\circ\ 37'.8.$
$\sec^{-1} 3.7255.$	*Ans.* $74^\circ\ 25'.9.$
$\operatorname{cosec}^{-1} 1.5398.$	*Ans.* $40^\circ\ 30'.$
$\operatorname{vers}^{-1} 0.0125.$	*Ans.* $9^\circ\ 4'.5.$
$\operatorname{covers}^{-1} 0\ 3964.$	*Ans.* $37^\circ\ 7'.7.$
$\operatorname{vers}^{-1} 0.8407.$	*Ans.* $80^\circ\ 50'.$

3. Find for the following inverse functions all positive values less than 360°:

$$\cos^{-1} .6557 = \begin{cases} 49^\circ\ 1'\ 36'' \\ 310\ 58\ 24 \end{cases}$$

$$\sin^{-1}[-0.4572] = \begin{cases} 207^\circ\ 12'\ 25'' \\ 332\ 47\ 35 \end{cases}$$

$$\tan^{-1}[-3] = \begin{cases} 108^\circ\ 26'\ 6'' \\ 288\ 26\ 6 \end{cases}$$

$$\cot^{-1} 1.25 = \begin{cases} 38^\circ\ 39'\ 34'' \\ 218\ 39\ 34 \end{cases}$$

$$\operatorname{vers}^{-1} 1.6325 = \begin{cases} 129^\circ\ 14' \\ 230\ 46 \end{cases}$$

$$\operatorname{covers}^{-1} 0.2311 = \begin{cases} 50^\circ\ 15'\ 24'' \\ 129\ 44\ 36 \end{cases}$$

$$\sec^{-1} 2.9371 = \begin{cases} 70^\circ\ 5'\ 39'' \\ 289\ 54\ 21 \end{cases}$$

$$\operatorname{cosec}^{-1}[-1.4139] = \begin{cases} 225^\circ\ 0'\ 45'' \\ 314\ 59\ 15 \end{cases}$$

19. At the end of Table IV is a table for passing from sexagesimal to r-measure of any angle. Thus to find the r-measure of 264° 13′ 58″, we have

200°	3.490658
60°	1.046197
4°	.069813
10′	.002909
3′	.000872
50″	.000242
8″	.000039

264° 13′ 58″ = 4.610732 radians.

The table may be easily reversed to obtain sexagesimal from r-measure. Thus to find the angle 1 :

	1.000000
50°	0.872664
D.	.127335
7°	.122173
	.005162
10″	.002909
	.002253
7′	.002036
	.000217
40″	.000194
	.000023
4″	.000019
	4
0″.9	4

giving 57° 17′ 44″.9.

20. Tabular Errors.—Considering the half-mark, the *error of any tabulated value* cannot exceed $\frac{1}{4}$ the tabular unit, but may be positive or negative. The correction for interpolating a value is subject to a like error. The *error of any interpolated value*, neglecting that due to the method of interpolation, is the algebraic sum of these two errors and cannot exceed $\frac{1}{2}$ the tabular unit.

The error of the sum of n interpolated numbers is the algebraic sum of their several errors, and cannot exceed $\frac{n}{2}$ tabular units.

A computed angle is liable to error due to error in the value of the logarithmic [or natural] function by which the angle is found from the table. An error of p tabular units gives an angular error of $\frac{p}{D}$ times the angular interval of the table. This angular error is the less, the greater the value of D, or the more rapidly the function changes with respect to the angle. Hence, a rapidly changing function is preferable for the computation of angles.

The tangent and cotangent of any angle change more rapidly than its sine and cosine. The sine changes more rapidly than the cosine for angles between 0° and 45°; the cosine more rapidly than the sine for angles between 45° and 90°.

TABLE VI.

21. Table VI contains the squares and square roots of integers from 1 to 1000 inclusive.

Trigonometric Formulæ

are arranged for reference as follow:

Chord of arc $\phi R = 2R \sin \frac{1}{2}\phi$.
Height of arc ϕR from its chord $= R \operatorname{vers} \frac{1}{2}\phi$.
$\operatorname{vers} \phi = 1 - \cos \phi$. $\operatorname{covers} \phi = 1 - \sin \phi$.

$\sin\phi = \frac{1}{\operatorname{cosec}\phi} =$	$\cos\phi = \frac{1}{\sec\phi} =$	$\tan\phi = \frac{1}{\cot\phi} =$
$\frac{\cos\phi}{\cot\phi}$.	$\frac{\sin\phi}{\tan\phi}$.	$\frac{\sin\phi}{\cos\phi}$.
$\cos\phi \tan\phi$.	$\sin\phi \cot\phi$.	$\sin\phi \sec\phi$.
$\frac{\tan\phi}{\sec\phi}$.	$\frac{\cot\phi}{\operatorname{cosec}\phi}$.	$\frac{\sec\phi}{\operatorname{cosec}\phi}$.
$\sqrt{1-\cos^2\phi}$.	$\sqrt{1-\sin^2\phi}$.	$\sqrt{\sec^2\phi - 1}$.
$\frac{1}{\sqrt{1+\cot^2\phi}}$.	$\frac{1}{\sqrt{1+\tan^2\phi}}$.	$\frac{1}{\sqrt{\operatorname{cosec}^2\phi - 1}}$.
$\frac{\tan\phi}{\sqrt{1+\tan^2\phi}}$.	$\frac{\cot\phi}{\sqrt{1+\cot^2\phi}}$.	$\frac{\sin\phi}{\sqrt{1-\sin^2\phi}}$.
$\frac{\sqrt{\sec^2\phi - 1}}{\sec\phi}$.	$\frac{\sqrt{\operatorname{cosec}^2\phi - 1}}{\operatorname{cosec}\phi}$.	$\frac{\sqrt{1-\cos^2\phi}}{\cos\phi}$.
$\sqrt{\frac{1-\cos 2\phi}{2}}$.	$\sqrt{\frac{1+\cos 2\phi}{2}}$.	$\sqrt{\frac{1-\cos 2\phi}{1+\cos 2\phi}}$.
$2\sin\frac{1}{2}\phi\cos\frac{1}{2}\phi$.	$\cos^2\frac{1}{2}\phi - \sin^2\frac{1}{2}\phi$.	$\frac{\sin 2\phi}{1+\cos 2\phi}$.
$1 - 2\sin^2(45^\circ - \frac{1}{2}\phi)$.	$1 - 2\sin^2\frac{1}{2}\phi$.	$\frac{1-\cos 2\phi}{\sin 2\phi}$.
$2\sin^2(45^\circ + \frac{1}{2}\phi) - 1$.	$2\cos^2\phi\frac{1}{2} - 1$.	$\cot\phi - 2\cot 2\phi$.
$\frac{2\tan\frac{1}{2}\phi}{1+\tan^2\frac{1}{2}\phi}$.	$\frac{\cot\frac{1}{2}\phi - \tan\frac{1}{2}\phi}{\cot\frac{1}{2}\phi + \tan\frac{1}{2}\phi}$.	$\frac{2\tan\frac{1}{2}\phi}{1-\tan^2\frac{1}{2}\phi}$.
$\frac{2}{\cot\frac{1}{2}\phi + \tan\frac{1}{2}\phi}$.	$\frac{1}{1+\tan\phi\tan\frac{1}{2}\phi}$.	$\frac{2}{\cot\frac{1}{2}\phi - \tan\frac{1}{2}\phi}$.
$\frac{1-\tan^2(45^\circ - \frac{1}{2}\phi)}{1+\tan^2(45^\circ - \frac{1}{2}\phi)}$.	$\frac{1-\tan^2\frac{1}{2}\phi}{1+\tan^2\frac{1}{2}\phi}$.	$\frac{2\cot\frac{1}{2}\phi}{\cot^2\frac{1}{2}\phi - 1}$.

Functions of 2α, 3α and 4α.

$$\sin 2\alpha = 2 \sin \alpha \cos \alpha.$$

$$\cos 2\alpha = \cos^2 \alpha - \sin^2 \alpha = 1 - 2 \sin^2 \alpha = 2 \cos^2 \alpha - 1$$
$$= 2 \sin (45^\circ - \alpha) \cos (45^\circ - \alpha).$$

$$\tan 2\alpha = \frac{2 \tan \alpha}{1 - \tan^2 \alpha} = \frac{\sin \alpha \cos \alpha}{\sin (45^\circ - \alpha) \cos (45^\circ - \alpha)}.$$

$$\cot 2\alpha = \frac{\cot^2 \alpha - 1}{2 \cot \alpha} = \tfrac{1}{2} \cot \alpha - \tfrac{1}{2} \tan \alpha.$$

$$\text{versin } 2\alpha = 1 - \cos 2\alpha = 2 \sin^2 \alpha.$$

$$\text{coversin } 2\alpha = 1 - 2 \sin \alpha \cos \alpha = 2 \sin^2 (45^\circ - \alpha).$$

$$\sec 2\alpha = \frac{1}{\cos^2 \alpha - \sin^2 \alpha} = \tfrac{1}{2} \sec (45^\circ - \alpha) \operatorname{cosec} (45^\circ - \alpha).$$

$$\operatorname{cosec} 2\alpha = \frac{1}{2 \sin \alpha \cos \alpha} = \tfrac{1}{2} \sec \alpha \operatorname{cosec} \alpha.$$

$$\sin 3\alpha = 3 \sin \alpha - 4 \sin^3 \alpha. \qquad \cos 3\alpha = 4 \cos^3 \alpha - 3 \cos \alpha.$$

$$\tan 3\alpha = \frac{3 \tan \alpha - \tan^3 \alpha}{1 - 3 \tan^2 \alpha}. \qquad \cot 3\alpha = \frac{\cot^3 \alpha - 3 \cot \alpha}{3 \cot^2 \alpha - 1}.$$

$$\sin 4\alpha = 4 \sin \alpha \cos \alpha - 8 \sin^3 \alpha \cos \alpha.$$

$$\cos 4\alpha = 8 \cos^4 \alpha - 8 \cos^2 \alpha + 1.$$

$$\tan 4\alpha = \frac{4 \tan \alpha - 4 \tan^3 \alpha}{1 - 6 \tan^2 \alpha + \tan^4 \alpha}. \qquad \cot 4\alpha = \frac{\cot^4 \alpha - 6 \cot \alpha + 1}{4 \cot^3 \alpha - 4 \cot \alpha}.$$

Functions of $\frac{\alpha}{2}$.

$$\sin \frac{\alpha}{2} = \pm \sqrt{\frac{1 - \cos \alpha}{2}}. \qquad \cos \frac{\alpha}{2} = \pm \sqrt{\frac{1 + \cos \alpha}{2}}.$$

$$\tan \frac{\alpha}{2} = \pm \sqrt{\frac{1 - \cos \alpha}{1 + \cos \alpha}} = \frac{\sin \alpha}{1 + \cos \alpha} = \frac{1 - \cos \alpha}{\sin \alpha}.$$

Functions of Two Angles, α and β.

$$\sin(\alpha \pm \beta) = \sin\alpha\cos\beta \pm \cos\alpha\sin\beta.$$

$$\cos(\alpha \pm \beta) = \cos\alpha\cos\beta \mp \sin\alpha\sin\beta.$$

$$\tan(\alpha \pm \beta) = \frac{\tan\alpha \pm \tan\beta}{1 \mp \tan\alpha\tan\beta}.$$

$$\cot(\alpha \pm \beta) = \frac{\cot\alpha\cot\beta \mp 1}{\cot\beta \pm \cot\alpha}.$$

$$\sin(\alpha+\beta) + \sin(\alpha-\beta) = 2\sin\alpha\cos\beta.$$

$$\sin(\alpha+\beta) - \sin(\alpha-\beta) = 2\cos\alpha\sin\beta.$$

$$\cos(\alpha-\beta) + \cos(\alpha+\beta) = 2\cos\alpha\cos\beta.$$

$$\cos(\alpha-\beta) - \cos(\alpha+\beta) = 2\sin\alpha\sin\beta.$$

$$\sin\alpha + \sin\beta = 2\sin\tfrac{1}{2}(\alpha+\beta)\cos\tfrac{1}{2}(\alpha-\beta).$$

$$\sin\alpha - \sin\beta = 2\cos\tfrac{1}{2}(\alpha+\beta)\sin\tfrac{1}{2}(\alpha-\beta).$$

$$\cos\beta + \cos\alpha = 2\cos\tfrac{1}{2}(\alpha+\beta)\cos\tfrac{1}{2}(\alpha-\beta).$$

$$\cos\beta - \cos\alpha = 2\sin\tfrac{1}{2}(\alpha+\beta)\sin\tfrac{1}{2}(\alpha-\beta).$$

$$\tan\alpha \pm \tan\beta = \frac{\sin(\alpha \pm \beta)}{\cos\alpha\cos\beta}.$$

$$\cot\beta \pm \cot\alpha = \frac{\sin(\alpha \pm \beta)}{\sin\alpha\sin\beta}.$$

$$\frac{\sin\alpha + \sin\beta}{\sin\alpha - \sin\beta} = \frac{\tan\tfrac{1}{2}(\alpha+\beta)}{\tan\tfrac{1}{2}(\alpha-\beta)}.$$

$$\frac{\sin\alpha + \sin\beta}{\sin(\alpha+\beta)} = \frac{\sin(\alpha-\beta)}{\sin\alpha - \sin\beta}.$$

$$\frac{\cos\beta + \cos\alpha}{\cos\beta - \cos\alpha} = \cot\tfrac{1}{2}(\alpha+\beta)\cot\tfrac{1}{2}(\alpha-\beta).$$

$$\frac{\tan\alpha + \tan\beta}{\tan\alpha - \tan\beta} = \frac{\cot\beta + \cot\alpha}{\cot\beta - \cot\alpha} = \frac{\sin(\alpha+\beta)}{\sin(\alpha-\beta)}.$$

Developments of Trigonometric Functions.

$$\sin\phi = \phi - \frac{\phi^3}{\lfloor\underline{3}} + \frac{\phi^5}{\lfloor\underline{5}} - \frac{\phi^7}{\lfloor\underline{7}} + \text{etc.} \qquad \cos\phi = 1 - \frac{\phi^2}{\lfloor\underline{2}} + \frac{\phi^4}{\lfloor\underline{4}} - \frac{\phi^6}{\lfloor\underline{6}} + \text{etc.}$$

$$\tan\phi = \phi + \frac{\phi^3}{3} + \frac{2\phi^5}{15} + \frac{17\phi^7}{315} + \frac{62\phi^9}{2835} + \text{etc.}$$

$$\cot\phi = \frac{1}{\phi} - \frac{\phi}{3} - \frac{\phi^3}{45} - \frac{2\phi^5}{945} - \frac{\phi^7}{4725} - \text{etc.}$$

$$\sec\phi = 1 + \frac{\phi^2}{\lfloor\underline{2}} + \frac{5\phi^4}{\lfloor\underline{4}} + \frac{61\phi^6}{\lfloor\underline{6}} + \frac{1385\phi^8}{\lfloor\underline{8}} + \text{etc.}$$

$$\operatorname{cosec}\phi = \frac{1}{\phi} + \frac{\phi}{\lfloor\underline{3}} + \frac{7\phi^3}{3\lfloor\underline{5}} + \frac{31\phi^5}{3\lfloor\underline{7}} + \frac{381\phi^7}{5\lfloor\underline{9}} + \text{etc.}$$

$\lfloor\underline{n} = 1.2.3.\ldots.n.$ $\quad \lfloor\underline{4} = 24.$ $\quad \lfloor\underline{5} = 120.$ $\quad \lfloor\underline{6} = 720.$

$\lfloor\underline{7} = 5040.$ $\quad \lfloor\underline{8} = 40320.$ $\quad \lfloor\underline{9} = 362880.$

Powers of $\sin\alpha$ and $\cos\alpha$.

$$\sin^2\alpha = \frac{1 - \cos 2\alpha}{2}. \qquad \cos^2\alpha = \frac{\cos 2\alpha + 1}{2}.$$

$$\sin^3\alpha = \frac{\sin\alpha - \cos 2\alpha \sin\alpha}{2} = \frac{3\sin\alpha - \sin 3\alpha}{4}.$$

$$\cos^3\alpha = \frac{\cos 2\alpha \cos\alpha + \cos\alpha}{2} = \frac{\cos 3\alpha + 3\cos\alpha}{4}.$$

$$\sin^4\alpha = \frac{3 - 4\cos 2\alpha + \cos 4\alpha}{8}.$$

$$\cos^4\alpha = \frac{\cos 4\alpha + 4\cos 2\alpha + 3}{8}.$$

Relations between Parts of Plane Triangles.

Notation. a, b and c denote sides, and A, B and C their respective opposite angles. Δ = area of triangle. $a + b + c = s$. $A + B + C = S$. R = radius of circumscribed circle. r = radius of inscribed circle.

Right Plane Triangles. $C = 90°$.

$a = c \sin A.$ $\qquad a = b \tan A.$

$b = c \cos A.$ $\qquad b = a \cot A.$

$c^2 = a^2 + b^2.$ $\qquad \Delta = \frac{ab}{2}.$

Oblique Plane Triangles.

$$\Delta = \frac{bc}{2} \sin A = \sqrt{\tfrac{1}{2}s(\tfrac{1}{2}s - a)(\tfrac{1}{2}s - b)(\tfrac{1}{2}s - c)} = \frac{abc}{4R} = \frac{sr}{2}.$$

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}.$$

$$a + b : a - b :: \tan \tfrac{1}{2}(A + B) : \tan \tfrac{1}{2}(A - B).$$

$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}. \qquad \cos \tfrac{1}{2}A = \sqrt{\frac{\tfrac{1}{2}s(\tfrac{1}{2}s - a)}{bc}}.$$

$$\sin \tfrac{1}{2}A = \sqrt{\frac{(\tfrac{1}{2}s - b)(\tfrac{1}{2}s - c)}{bc}}. \quad \tan \tfrac{1}{2}A = \sqrt{\frac{(\tfrac{1}{2}s - b)(\tfrac{1}{2}s - c)}{\tfrac{1}{2}s(\tfrac{1}{2}s - a)}}.$$

Relations between Parts of Trihedrals.

Notation. α, β and γ denote face-angles, and A, B and C their respective opposite dihedrals.

$$\alpha + \beta + \gamma = s. \qquad A + B + C = S.$$

Right Trihedrals. $A = 90°$.

$\cos \alpha = \cos \beta \cos \gamma.$ $\qquad \cos \alpha = \cot B \cot C.$

$\sin \beta = \sin \alpha \sin B.$ $\qquad \sin \beta = \tan \gamma \cot C.$

$\sin \gamma = \sin \alpha \sin C.$ $\qquad \sin \gamma = \tan \beta \cot B.$

$\cos B = \cos \beta \sin C.$ $\qquad \cos B = \cot \alpha \tan \gamma.$

$\cos C = \cos \gamma \sin B.$ $\qquad \cos C = \cot \alpha \tan \beta.$

Oblique Trihedrals.

$$\frac{\sin\alpha}{\sin A} = \frac{\sin\beta}{\sin B} = \frac{\sin\gamma}{\sin C}.$$

$$\cos\alpha = \cos\beta\cos\gamma + \sin\beta\sin\gamma\cos A.$$

$$\cos A = -\cos B\cos C + \sin B\sin C\cos\alpha.$$

$$\cot\alpha\sin\gamma = \cos\gamma\cos B + \sin B\cot A.$$

$$\sin\tfrac{1}{2}A = \sqrt{\frac{\sin(\tfrac{1}{2}s-\beta)\sin(\tfrac{1}{2}s-\gamma)}{\sin\beta\sin\gamma}}.$$

$$\cos\tfrac{1}{2}A = \sqrt{\frac{\sin\tfrac{1}{2}s\sin(\tfrac{1}{2}s-\alpha)}{\sin\beta\sin\gamma}}.$$

$$\tan\tfrac{1}{2}A = \sqrt{\frac{\sin(\tfrac{1}{2}s-\beta)\sin(\tfrac{1}{2}s-\gamma)}{\sin\tfrac{1}{2}s\sin(\tfrac{1}{2}s-\alpha)}}.$$

$$\sin\tfrac{1}{2}\alpha = \sqrt{\frac{-\cos\tfrac{1}{2}S\cos(\tfrac{1}{2}S-A)}{\sin B\sin C}}.$$

$$\cos\tfrac{1}{2}\alpha = \sqrt{\frac{\cos(\tfrac{1}{2}S-B)\cos(\tfrac{1}{2}S-C)}{\sin B\sin C}}.$$

$$\tan\tfrac{1}{2}\alpha = \sqrt{\frac{-\cos\tfrac{1}{2}S\cos(\tfrac{1}{2}S-A)}{\cos(\tfrac{1}{2}S-B)\cos(\tfrac{1}{2}S-C)}}.$$

Napier's Analogies.

$$\cos\tfrac{1}{2}(\alpha+\beta) : \cos\tfrac{1}{2}(\alpha-\beta) :: \cot\tfrac{1}{2}C : \tan\tfrac{1}{2}(A+B).$$

$$\sin\tfrac{1}{2}(\alpha+\beta) : \sin\tfrac{1}{2}(\alpha-\beta) :: \cot\tfrac{1}{2}C : \tan\tfrac{1}{2}(A-B).$$

$$\cos\tfrac{1}{2}(A+B) : \cos\tfrac{1}{2}(A-B) :: \tan\tfrac{1}{2}\gamma : \tan\tfrac{1}{2}(\alpha+\beta).$$

$$\sin\tfrac{1}{2}(A+B) : \sin\tfrac{1}{2}(A-B) :: \tan\tfrac{1}{2}\gamma : \tan\tfrac{1}{2}(\alpha-\beta).$$

Spherical Triangles.

Notation. a, b and c denote sides subtending face-angles α, β and γ, respectively, of the corresponding trihedral. A, B and C denote their respective opposite dihedrals. E = spherical excess of triangle in radians. Δ = area of triangle. R = radius of sphere.

$$a = R\alpha. \qquad b = R\beta. \qquad c = R\gamma.$$

$$E = \frac{\pi}{180}(A + B + C - 180^\circ). \qquad \Delta = ER^2.$$

When a, b, c and R are given, E may be computed directly from the face-angles α, β and γ, by the formula

$$\tan \tfrac{1}{4}E = \sqrt{\tan \tfrac{1}{4}s \tan \tfrac{1}{2}(\tfrac{1}{2}s - \alpha) \tan \tfrac{1}{2}(\tfrac{1}{2}s - \beta) \tan \tfrac{1}{2}(\tfrac{1}{2}s - \gamma)}.$$

TABLE I.

COMMON, OR BRIGGS',

LOGARITHMS OF NUMBERS.

FROM 1 TO 11009.

N.	Log.	N.	Log.	N.	Log.	N.	Log.	N.	Log.
0	$-\infty$	**20**	1.30 103	**40**	1.60 206	**60**	1.77 815	**80**	1.90 309
1	0.00 000	21	1.32 222	41	1.61 278	61	1.78 533	81	1.90 848
2	.30 103	22	.34 242	42	.62 325	62	.79 239	82	.91 381
3	.47 712	23	.36 173	43	.63 347	63	.79 934	83	.91 908
4	0.60 206	24	1.38 021	44	1.64 345	64	1.80 618	84	1.92 428
5	.69 897	25	.39 794	45	.65 321	65	.81 291	85	.92 942
6	.77 815	26	.41 497	46	.66 276	66	.81 954	86	.93 450
7	0.84 510	27	1.43 136	47	1.67 210	67	1.82 607	87	1.93 952
8	.90 309	28	.44 716	48	.68 124	68	.83 251	88	.94 448
9	.95 424	29	.46 240	49	.69 019	69	.83 885	89	.94 939
10	1.00 000	**30**	1.47 712	**50**	1.69 897	**70**	1.84 510	**90**	1.95 424
11	1.04 139	31	1.49 136	51	1.70 757	71	1.85 126	91	1.95 904
12	.07 918	32	.50 515	52	.71 600	72	.85 733	92	.96 379
13	.11 394	33	.51 851	53	.72 427	73	.86 332	93	.96 848
14	1.14 613	34	1.53 148	54	1.73 239	74	1.86 923	94	1.97 313
15	.17 609	35	.54 407	55	.74 036	75	.87 506	95	.97 772
16	.20 412	36	.55 630	56	.74 819	76	.88 081	96	.98 227
17	1.23 045	37	1.56 820	57	1.75 587	77	1.88 649	97	1.98 677
18	.25 527	38	.57 978	58	.76 343	78	.89 209	98	.99 122
19	.27 875	39	.59 106	59	.77 085	79	.89 762	99	.99 563
20	1.30 103	**40**	1.60 206	**60**	1.77 815	**80**	1.90 309	**100**	2.00 000
N.	**Log.**	**N.**	**Log.**	**N.**	**Log.**	**N.**	**Log**	**N.**	**Log.**

N.	0	1	2	3	4	5	6	7	8	9	P. P.			
100	00 000	043	087	130	173	216	260	303	346	389				
101	432	475	518	561	604	646	689	732	775	817				
102	860	902	945	987	*030	*072	*114	*157	*199	*241	43	43	42	41
103	01 283	326	368	410	452	494	536	578	619	661	.1	4.3	4.3	4.2	4.1
104	703	745	787	828	870	911	953	994	*036	*077	.2	8.7	8.6	8.4	8.2
105	02 119	160	201	243	284	325	366	407	448	489	.3	13.0	12.9	12.6	12.3
106	530	571	612	653	694	735	775	816	857	898	.4	17.4	17.2	16.8	16.4
107	938	979	*019	*060	*100	*141	*181	*222	*262	*302	.5	21.7	21.5	21.0	20.5
108	03 342	382	422	463	503	543	583	623	663	703	.6	26.1	25.8	25.2	24.6
109	742	782	822	862	901	941	981	020	060	100	.7	30.4	30.1	29.4	28.7
110	04 139	178	218	257	297	336	375	415	454	493	.8	34.8	34.4	33.6	32.8
111	532	571	610	649	688	727	766	805	844	883	.9	39.1	38.7	37.8	36.9
112	922	960	999	*038	*076	*115	*154	*192	*231	*269				
113	05 308	346	384	423	461	499	538	576	614	652	40	40	39	38
114	690	728	766	804	842	880	918	956	994	*032	.1	4.0	4.0	3.9	3.8
115	06 070	107	145	183	220	258	296	333	371	408	.2	8.1	8.0	7.8	7.6
116	446	483	520	558	595	632	670	707	744	781	.3	12.1	12.0	11.7	11.4
117	818	855	893	930	967	*004	*040	*077	*114	*151	.4	16.2	16.0	15.6	15.2
118	07 188	225	261	298	335	372	408	445	481	518	.5	20.2	20.0	19.5	19.0
119	554	591	627	664	700	737	773	809	845	882	.6	24.3	24.0	23.4	22.8
120	918	954	990	*026	*062	*098	*134	*170	*206	*242	.7	28.3	28.0	27.3	26.6
121	08 278	314	350	386	422	457	493	529	564	600	.8	32.4	32.0	31.2	30.4
122	636	671	707	742	778	813	849	884	920	955	.9	36.4	36.0	35.1	34.2
123	990	*026	*061	*096	*131	*166	*202	*237	*272	*307					
124	09 342	377	412	447	482	517	552	586	621	656	37	37	36	35
125	691	725	760	795	830	864	899	933	968	*002	.1	3.7	3.7	3.6	3.5
126	10 037	071	106	140	174	209	243	277	312	346	.2	7.5	7.4	7.2	7.0
127	380	414	448	483	517	551	585	619	653	687	.3	11.2	11.1	10.8	10.5
128	721	755	789	822	856	890	924	958	991	*025	.4	15.0	14.8	14.4	14.0
129	11 059	092	126	160	193	227	260	294	327	361	.5	18.7	18.5	18.0	17.5
130	394	427	461	494	528	561	594	627	661	694	.6	22.5	22.2	21.6	21.0
131	727	760	793	826	859	892	925	958	991	*024	.7	26.2	25.9	25.2	24.5
132	12 057	090	123	156	189	221	254	287	320	352	.8	30.0	29.6	28.8	28.0
133	385	418	450	483	515	548	580	613	645	678	.9	33.7	33.3	32.4	31.5
134	710	743	775	807	840	872	904	937	969	*001					
135	13 033	065	097	130	162	194	226	258	290	322	34	34	33	32
136	354	386	417	449	481	513	545	577	608	640	.1	3.4	3.4	3.3	3.2
137	672	703	735	767	798	830	862	893	925	956	.2	6.9	6.8	6.6	6.4
138	988	*019	*051	*082	*113	*145	*176	*207	*239	*270	.3	10.3	10.2	9.9	9.6
139	14 301	332	364	395	426	457	488	519	550	582	.4	13.8	13.6	13.2	12.8
140	613	644	675	706	736	767	798	829	860	891	.5	17.2	17.0	16.5	16.0
141	922	952	983	*014	*045	*075	*106	*137	*167	*198	.6	20.7	20.4	19.8	19.2
142	15 229	259	290	320	351	381	412	442	473	503	.7	24.1	23.8	23.1	22.4
143	533	564	594	624	655	685	715	745	776	806	.8	27.6	27.2	26.4	25.6
144	836	866	896	926	956	987	*017	*047	*077	*107	.9	31.0	30.6	29.7	28.8
145	16 137	166	196	226	256	286	316	346	376	405					
146	435	465	494	524	554	584	613	643	672	702	31	31	30	29
147	731	761	791	820	849	879	908	938	967	997	.1	3.1	3.1	3.0	2.9
148	17 026	055	085	114	143	172	202	231	260	289	.2	6.3	6.2	6.0	5.8
149	318	348	377	406	435	464	493	522	551	580	.3	9.4	9.3	9.0	8.7
150	609	638	667	696	725	753	782	811	840	869	.4	12.6	12.4	12.0	11.6
N.	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	.5	15.7	15.5	15.0	14.5
											.6	18.9	18.6	18.0	17.4
											.7	22.0	21.7	21.0	20.3
											.8	25.2	24.8	24.0	23.2
											.9	28.3	27.9	27.0	26.1

P. P.

N.	0	1	2	3	4	5	6	7	8	9	P. P.
150	17 609	638	667	696	725	753	782	811	840	869	
151	897	926	955	984	*012	*041	*070	*098	*127	*156	29 28 27
152	18 184	213	241	270	298	327	355	384	412	440	.1 2.9 2.8 2.7
153	469	497	526	554	582	611	639	667	695	724	.2 5.8 5.6 5.4
154	752	780	808	836	864	893	921	949	977	*005	.3 8.7 8.4 8.1
155	19 033	061	089	117	145	173	201	229	256	284	4 11.6 11.2 10.8
156	312	340	368	396	423	451	479	507	534	562	.5 14.5 14.0 13.5
157	590	617	645	673	700	728	755	783	810	838	.6 17.4 16.8 16.2
158	865	893	920	948	975	*003	*030	*057	*085	*112	.7 20.3 19.6 18.9
159	20 139	167	194	221	249	276	303	330	357	385	.8 23.2 22.4 21.6
160	412	439	466	493	520	547	574	601	628	655	.9 26.1 25.2 24.3
161	682	709	736	763	790	817	844	871	898	924	
162	951	978	*005	*032	*058	*085	*112	*139	*165	*192	26 26
163	21 219	245	272	298	325	352	378	405	431	458	.1 2.6 2.6
164	484	511	537	564	590	616	643	669	695	722	.2 5.3 5.2
165	748	774	801	827	853	880	906	932	958	984	.3 7.9 7.8
166	22 011	037	063	089	115	141	167	193	219	245	.4 10.6 10 4
167	271	297	323	349	375	401	427	453	479	505	.5 13.2 13.0
168	531	557	582	608	634	660	686	711	737	763	.6 15.9 15.6
169	788	814	840	865	891	917	942	968	994	*019	.7 18.5 18 2
170	23 045	070	096	121	147	172	198	223	249	274	.8 21.2 20.8
171	299	325	350	375	401	426	451	477	502	527	.9 23.8 23.4
172	553	578	603	628	653	679	704	729	754	779	
173	804	829	855	880	905	930	955	980	*005	*030	25 25 24
174	24 055	080	105	129	154	179	204	229	254	279	.1 2.5 2 5 2.4
175	304	328	353	378	403	427	452	477	502	526	.2 5.1 5 0 4.8
176	551	576	600	625	650	674	699	723	748	773	.3 7.6 7.5 7.2
177	797	822	846	871	895	920	944	968	993	*017	.4 10.2 10.0 9.6
178	25 042	066	091	115	139	164	188	212	237	261	.5 12.7 12 5 12.0
179	285	309	334	358	382	406	430	455	479	503	.6 15.3 15.0 14.4
180	527	551	575	599	623	647	672	696	720	744	.7 17.8 17.5 16.8
181	768	792	816	840	863	887	911	935	959	983	.8 20.4 20.0 19.2
182	26 007	031	055	078	102	126	150	174	197	221	.9 22.9 22.5 21.6
183	245	269	292	316	340	363	387	411	434	458	
184	482	505	529	552	576	599	623	646	670	693	23 23
185	717	740	764	787	811	834	858	881	904	928	.1 2.3 2.3
186	951	974	998	*021	*044	*068	*091	*114	*137	*161	.2 4.7 4.6
187	27 184	207	230	254	277	300	323	346	369	392	.3 7.0 6.9
188	416	439	462	485	508	531	554	577	600	623	.4 9.4 9.2
189	646	669	692	715	738	761	784	806	829	852	.5 11.7 11.5
190	875	898	921	944	966	989	*012	*035	*058	*080	.6 14.1 13.8
191	28 103	126	149	171	194	217	239	262	285	307	.7 16.4 16.1
192	330	352	375	398	420	443	465	488	510	533	.8 18.8 18.4
193	555	578	600	623	645	668	690	713	735	758	.9 21.1 20.7
194	780	802	825	847	869	892	914	936	959	981	
195	29 003	025	048	070	092	114	137	159	181	203	22 22 21
196	225	248	270	292	314	336	358	380	402	424	.1 2.2 2.2 2.1
197	446	468	490	512	534	556	578	600	622	644	.2 4.5 4.4 4.3
198	666	688	710	732	754	776	798	820	841	863	.3 6.7 6.6 6.4
199	885	907	929	950	972	994	*016	*038	*059	*081	.4 9.0 8.8 8.6
200	30 103	124	146	168	190	211	233	254	276	298	.5 11.2 11.0 10.7
N.	0	1	2	3	4	5	6	7	8	9	.6 13.5 13.2 12.9
											.7 15.7 15.4 15.0
											.8 18.0 17.6 17.2
											.9 20.2 19.8 19.3

N.	0	1	2	3	4	5	6	7	8	9	P. P.	
											22	21
200	30 103	124	146	168	190	211	233	254	276	298		
201	319	341	363	384	406	427	449	470	492	513	.1	2.2	2.1
202	535	556	578	599	621	642	664	685	707	728	.2	4.4	4.2
203	749	771	792	813	835	856	878	899	920	941	.3	6.6	6.3
204	963	984	*005	*027	*048	*069	*090	*112	*133	*154	.4	8.8	8.4
205	31 175	196	217	239	260	281	302	323	344	365	.5	11.0	10.5
206	386	408	429	450	471	492	513	534	555	576	.6	13.2	12.6
207	597	618	639	660	681	702	722	743	764	785	.7	15.4	14.7
208	806	827	848	869	890	910	931	952	973	994	.8	17.6	16.8
209	32 014	035	056	077	097	118	139	160	180	201	.9	19.8	18.9
											20	20
210	222	242	263	284	304	325	346	366	387	407		
211	428	449	469	490	510	531	551	572	592	613	.1	2.0	2.0
212	633	654	674	695	715	736	756	776	797	817	.2	4.1	4.0
213	838	858	878	899	919	940	960	980	*001	*021	.3	6.1	6.0
214	33 041	061	082	102	122	142	163	183	203	223	.4	8.2	8.0
215	244	264	284	304	324	344	365	385	405	425	.5	10.2	10.0
216	445	465	485	505	525	546	566	586	606	626	.6	12.3	12.0
217	646	666	686	706	726	746	766	786	806	825	.7	14.3	14.0
218	845	865	885	905	925	945	965	985	*004	*024	.8	16.4	16.0
219	34 044	064	084	104	123	143	163	183	203	222	.9	18.4	18.0
											19	19
220	242	262	281	301	321	341	360	380	400	419		
221	439	459	478	498	518	537	557	576	596	615	.1	1.9	1.9
222	635	655	674	694	713	733	752	772	791	811	.2	3.9	3.8
223	830	850	869	889	908	928	947	966	986	*005	.3	5.8	5.7
224	35 025	044	063	083	102	121	141	160	179	199	.4	7.8	7.6
225	218	237	257	276	295	314	334	353	372	391	.5	9.7	9.5
226	411	430	449	468	487	507	526	545	564	583	.6	11.7	11.4
227	602	621	641	660	679	698	717	736	755	774	.7	13.6	13.3
228	793	812	831	850	869	888	907	926	945	964	.8	15.6	15.2
229	983	*002	*021	*040	*059	*078	*097	*116	*135	*154	.9	17.5	17.1
											18	18
230	36 173	191	210	229	248	267	286	305	323	342		
231	361	380	399	417	436	455	474	492	511	530	.1	1.8	1.8
232	549	567	586	605	623	642	661	679	698	717	.2	3.7	3.6
233	735	754	773	791	810	828	847	866	884	903	.3	5.5	5.4
234	921	940	958	977	996	*014	*033	*051	*070	*088	.4	7.4	7.2
235	37 107	125	143	162	180	199	217	236	254	273	.5	9.2	9.0
236	291	309	328	346	364	383	401	420	438	456	.6	11.1	10.8
237	475	493	511	530	548	566	584	603	621	639	.7	12.9	12.6
238	657	676	694	712	730	749	767	785	803	821	.8	14.8	14.4
239	840	858	876	894	912	930	948	967	985	*003	.9	16.6	16.2
											17	17
240	38 021	039	057	075	093	111	129	147	165	183		
241	201	219	237	255	273	291	309	327	345	363	.1	1.7	1.7
242	381	399	417	435	453	471	489	507	525	543	.2	3.5	3.4
243	560	578	596	614	632	650	667	685	703	721	.3	5.2	5.1
244	739	757	774	792	810	828	845	863	881	899	.4	7.0	6.8
245	916	934	952	970	987	*005	*023	*040	*058	*076	.5	8.7	8.5
246	39 093	111	129	146	164	181	199	217	234	252	.6	10.5	10.2
247	269	287	305	322	340	357	375	392	410	427	.7	12.2	11.9
248	445	462	480	497	515	532	550	567	585	602	.8	14.0	13.6
249	620	637	655	672	689	707	724	742	759	776	.9	15.7	15.3
250	794	811	828	846	863	881	898	915	933	950			
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250	39 794	81	82	846	863	881	898	915	933	950		
251	967	984	*002	*019	*036	*054	*071	*088	*105	*123		
252	40 140	157	174	191	209	226	243	260	277	295		
253	312	329	346	363	380	398	415	432	449	466	17	17
254	483	500	517	534	551	569	586	603	620	637	.1	1.7	1.7
255	654	671	688	705	722	739	756	773	790	807	.2	3.5	3.4
256	824	841	858	875	892	908	925	942	959	976	.3	5.2	5.1
257	993	*010	*027	*044	*061	*077	*094	*111	*128	*145	.4	7.0	6.8
258	41 162	179	195	212	229	246	263	279	296	313	.5	8.7	8.5
259	330	346	363	380	397	413	430	447	464	480	.6	10.5	10.2
260	497	514	530	547	564	581	597	614	631	647	.7	12.2	11.9
261	664	680	697	714	730	747	764	780	797	813	.8	14.0	13.6
262	830	846	863	880	896	913	929	946	962	979	.9	15.7	15.3
263	995	*012	*028	*045	*061	*078	*094	*111	*127	*144			
264	42 160	177	193	209	226	242	259	275	292	308			
265	324	341	357	373	390	406	423	439	455	472		16	16
266	488	504	521	537	553	569	586	602	618	635	.1	1.6	1.6
267	651	667	683	700	716	732	748	765	781	797	.2	3.3	3.2
268	813	829	846	862	878	894	910	927	943	959	.3	4.9	4.8
269	975	991	*007	*023	*040	*056	*072	*088	*104	*120	.4	6.6	6.4
270	43 136	152	168	184	200	216	233	249	265	281	.5	8.2	8.0
271	297	313	329	345	361	377	393	409	425	441	.6	9.9	9.6
272	457	473	489	505	520	536	552	568	584	600	.7	11.5	11.2
273	616	632	648	664	680	695	711	727	743	759	.8	13.2	12.8
274	775	791	806	822	838	854	870	886	901	917	.9	14.8	14.4
275	933	949	965	980	996	*012	*028	*043	*059	*075			
276	44 091	106	122	138	154	169	185	201	216	232			
277	248	263	279	295	310	326	342	357	373	389		15	15
278	404	420	435	451	467	482	498	513	529	545	.1	1.5	1.5
279	560	576	591	607	622	638	653	669	685	700	.2	3.1	3.0
280	716	731	747	762	778	793	809	824	839	855	.3	4.6	4.5
281	870	886	901	917	932	948	963	978	994	*009	.4	6.2	6.0
282	45 025	040	055	071	086	102	117	132	148	163	.5	7.7	7.5
283	178	194	209	224	240	255	270	286	301	316	.6	9.3	9.0
284	332	347	362	377	393	408	423	438	454	469	.7	10.8	10.5
285	484	499	515	530	545	560	576	591	606	621	.8	12.4	12.0
286	636	652	667	682	697	712	727	743	758	773	.9	13.9	13.5
287	788	803	818	833	848	864	879	894	909	924			
288	939	954	969	984	999	*014	*029	*044	*059	*075			
289	46 090	105	120	135	150	165	180	195	210	225		14	14
290	240	255	269	284	299	314	329	344	359	374	.1	1.4	1.4
291	389	404	419	434	449	464	479	493	508	523	.2	2.9	2.8
292	538	553	568	583	597	612	627	642	657	672	.3	4.3	4.2
293	687	701	716	731	746	761	775	790	805	820	.4	5.8	5.6
294	834	849	864	879	894	908	923	938	952	967	.5	7.2	7.0
295	982	997	*011	*026	*041	*055	*070	*085	*100	*114	.6	8.7	8.4
296	47 129	144	158	173	188	202	217	232	246	261	.7	10.1	9.8
297	275	290	305	319	334	348	363	378	392	407	.8	11.6	11.2
298	421	436	451	465	480	494	509	523	538	552	.9	13.0	12.6
299	567	581	596	610	625	639	654	668	683	697			
300	712	726	741	755	770	784	799	813	828	842			
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300	47 712	726	741	755	770	784	799	813	828	842		
301	856	871	885	900	914	928	943	957	972	986		
302	48 000	015	029	044	058	072	087	101	115	130		
303	144	158	173	187	201	216	230	244	259	273		
304	287	301	316	330	344	358	373	387	401	415		
305	430	444	458	472	487	501	515	529	543	558		
306	**572**	586	600	614	629	643	657	671	685	699		14
307	**714**	728	742	756	770	784	798	812	827	841	.1	1.4
308	855	869	883	897	911	925	939	953	967	982	.2	2.9
309	996	*010	*024	*038	*052	*066	*080	*094	*108	*122	.3	4.3
310	49 136	150	164	178	192	206	220	234	248	262	.4	5.8
311	276	290	304	318	332	346	359	373	387	401	.5	7.2
312	415	429	443	457	471	485	499	513	526	540	.6	8.7
313	554	568	582	596	610	624	637	651	665	679	.7	10.1
314	693	707	720	734	748	762	776	789	803	817	.8	11.6
315	831	845	858	872	886	900	913	927	941	955	.9	13.0
316	968	982	996	*010	*023	*037	*051	*065	*078	*092		
317	50 106	119	133	147	160	174	188	201	215	229		
318	242	256	270	283	297	311	324	338	352	365		
319	379	392	406	420	433	447	460	474	488	501		
320	515	528	542	555	569	583	596	610	623	637		13
321	650	664	677	691	704	718	731	745	758	772	.1	1.3
322	785	799	812	826	839	853	866	880	893	907	.2	2.7
323	920	933	947	960	974	987	*001	*014	*027	*041	.3	4.0
324	51 054	068	081	094	108	121	135	148	161	175	.4	5.4
325	188	201	215	228	242	255	268	282	295	308	.5	6.7
326	322	335	348	361	375	388	401	415	428	441	.6	8.1
327	455	468	481	494	508	521	534	547	561	574	.7	9.4
328	587	600	614	627	640	653	667	680	693	706	.8	10.8
329	719	733	746	759	772	785	798	812	825	838	.9	12.1
330	851	864	877	891	904	917	930	943	956	969		
331	983	996	*009	*022	*035	*048	*061	*074	*087	*100		
332	52 114	127	140	153	166	179	192	205	218	231		
333	244	257	270	283	296	309	322	335	348	361		
334	374	387	400	413	426	439	452	465	478	491		
335	504	517	530	543	556	569	582	595	608	621		
336	634	647	660	672	685	698	711	724	737	750		12
337	763	776	789	801	814	827	840	853	866	879	.1	1.2
338	891	904	917	930	943	956	968	981	994	*007	.2	2.5
339	53 020	033	045	058	071	084	097	109	122	135	.3	3.7
340	148	160	173	186	199	211	224	237	250	262	.4	5.0
341	275	288	301	313	326	339	352	364	377	390	.5	6.2
342	402	415	428	440	453	466	478	491	504	516	.6	7.5
343	529	542	554	567	580	592	605	618	630	643	.7	8.7
344	656	668	681	693	706	719	731	744	756	769	.8	10.0
345	782	794	807	819	832	845	857	870	882	895	.9	11.2
346	907	920	932	945	958	970	983	995	*008	*020		
347	54 033	045	058	070	083	095	108	120	133	145		
348	158	170	183	195	208	220	232	245	257	270		
349	282	295	307	320	332	344	357	369	382	394		
350	407	419	431	444	456	469	481	493	506	518		
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350	54 407	419	431	444	456	469	481	493	506	518	
351	530	543	555	568	580	592	605	617	629	642	12
352	654	666	679	691	703	716	728	740	753	765	.1 1.2
353	777	790	802	814	826	839	851	863	876	888	.2 2.5
354	900	912	925	937	949	961	974	986	998	*010	.3 3.7
355	55 023	035	047	059	071	084	096	108	120	133	.4 5.0
356	145	157	169	181	194	206	218	230	242	254	.5 6.2
357	267	279	291	303	315	327	340	352	364	376	.6 7.5
358	388	400	412	424	437	449	461	473	485	497	.7 8.7
359	509	521	533	545	558	570	582	594	606	618	.8 10.0
360	630	642	654	666	678	690	702	714	726	738	.9 11.2
361	750	762	775	787	799	811	823	835	847	859	12
362	871	883	895	907	919	931	943	955	966	978	.1 1.2
363	990	*002	*014	*026	*038	*050	*062	*074	*086	*098	.2 2.4
364	56 110	122	134	146	158	170	181	193	205	217	.3 3.6
365	229	241	253	265	277	288	300	312	324	336	.4 4.8
366	348	360	372	383	395	407	419	431	443	455	.5 6.0
367	466	478	490	502	514	525	537	549	561	573	.6 7.2
368	585	596	608	620	632	643	655	667	679	691	.7 8.4
369	702	714	726	738	749	761	773	785	796	808	.8 9.6
370	820	832	843	855	867	879	890	902	914	925	.9 10.8
371	937	949	961	972	984	996	*007	*019	*031	*042	11
372	57 054	066	077	089	101	112	124	136	147	159	.1 1.1
373	171	182	194	206	217	229	240	252	264	275	.2 2.3
374	287	299	310	322	333	345	357	368	380	391	.3 3.4
375	403	414	426	438	449	461	472	484	495	507	.4 4.6
376	519	530	542	553	565	576	588	599	611	622	.5 5.7
377	634	645	657	668	680	691	703	714	726	737	.6 6.9
378	749	760	772	783	795	806	818	829	841	852	.7 8.0
379	864	875	887	898	909	921	932	944	955	967	.8 9.2
380	978	990	*001	*012	*024	*035	*047	*058	*069	*081	.9 10.3
381	58 092	104	115	126	138	149	161	172	183	195	11
382	206	217	229	240	252	263	274	286	297	308	.1 1.1
383	320	331	342	354	365	376	388	399	410	422	.2 2.2
384	433	444	455	467	478	489	501	512	523	535	.3 3.3
385	546	557	568	580	591	602	613	625	636	647	.4 4.4
386	658	670	681	692	703	715	726	737	748	760	.5 5.5
387	771	782	793	804	816	827	838	849	861	872	.6 6.6
388	883	894	905	916	928	939	950	961	972	984	.7 7.7
389	995	*006	*017	*028	*039	*050	*062	*073	*084	*095	.8 8.8
390	59 106	117	128	140	151	162	173	184	195	206	.9 9.9
391	217	229	240	251	262	273	284	295	306	317	10
392	328	339	351	362	373	384	395	406	417	428	.1 1.0
393	439	450	461	472	483	494	505	516	527	538	.2 2.1
394	549	560	571	582	593	604	615	626	637	648	.3 3.1
395	659	670	681	692	703	714	725	736	747	758	.4 4.2
396	769	780	791	802	813	824	835	846	857	868	.5 5.2
397	879	890	901	912	923	933	944	955	966	977	.6 6.3
398	988	999	*010	*021	*032	*043	*053	*064	*075	*086	.7 7.3
399	60 097	108	119	130	141	151	162	173	184	195	.8 8.4
400	206	217	227	238	249	260	271	282	293	303	.9 9.4
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400	60 206	217	227	238	249	260	271	282	293	303	
401	314	325	336	347	357	368	379	390	401	412	
402	422	433	444	455	466	476	487	498	509	519	
403	530	541	552	563	573	584	595	606	616	627	11
404	638	649	659	670	681	692	702	713	724	735	.1 1.1
405	745	756	767	777	788	799	810	820	831	842	.2 2.2
406	852	863	874	884	895	906	916	927	938	949	.3 3.3
407	959	970	981	991	*002	*013	*023	*034	*044	*055	.4 4.4
408	61 066	076	087	098	108	119	130	140	151	161	.5 5.5
409	172	183	193	204	215	225	236	246	257	268	.6 6.6
410	278	289	299	310	320	331	342	352	363	373	.7 7.7
411	384	394	405	416	426	437	447	458	468	479	.8 8.8
412	489	500	511	521	532	542	553	563	574	584	.9 9.9
413	595	605	616	626	637	647	658	668	679	689	
414	700	710	721	731	742	752	763	773	784	794	10
415	805	815	825	836	846	857	867	878	888	899	.1 1.0
416	909	920	930	940	951	961	972	982	993	*003	.2 2.1
417	62 013	024	034	045	055	065	076	086	097	107	.3 3.1
418	117	128	138	149	159	169	180	190	200	211	
419	221	232	242	252	263	273	283	294	304	314	.4 4.2
420	325	335	345	356	366	376	387	397	407	418	.5 5.2
421	428	438	449	459	469	480	490	500	510	521	.6 6.3
422	531	541	552	562	572	582	593	603	613	624	.7 7.3
423	634	644	654	665	675	685	695	706	716	726	.8 8.4
424	736	747	757	767	777	788	798	808	818	828	.9 9.4
425	839	849	859	869	879	890	900	910	920	931	
426	941	951	961	971	981	992	*002	*012	*022	*032	
427	63 043	053	063	073	083	093	104	114	124	134	10
428	144	154	164	175	185	195	205	215	225	235	.1 1.0
429	245	256	266	276	286	296	306	316	326	336	.2 2.0
430	347	357	367	377	387	397	407	417	427	437	.3 3.0
431	447	458	468	478	488	498	508	518	528	538	.4 4.0
432	548	558	568	578	588	598	608	618	628	639	.5 5.0
433	649	659	669	679	689	699	709	719	729	739	.6 6.0
434	749	759	769	779	789	799	809	819	829	839	.7 7.0
435	849	859	869	879	889	899	909	919	928	938	.8 8.0
436	948	958	968	978	988	998	*008	*018	*028	*038	.9 9.0
437	64 048	058	068	078	088	098	107	117	127	137	
438	147	157	167	177	187	197	207	217	226	236	
439	246	256	266	276	286	296	306	315	325	335	9
440	345	355	365	375	384	394	404	414	424	434	.1 0.9
441	444	453	463	473	483	493	503	512	522	532	.2 1.9
442	542	552	562	571	581	591	601	611	621	630	.3 2.8
443	640	650	660	670	679	689	699	709	718	728	.4 3.8
444	738	748	758	767	777	787	797	806	816	826	.5 4.7
445	836	846	855	865	875	885	894	904	914	923	.6 5.7
446	933	943	953	962	972	982	992	*001	*011	*021	.7 6.6
447	65 031	040	050	060	069	079	089	098	108	118	.8 7.6
448	128	137	147	157	166	176	186	195	205	215	.9 8.5
449	224	234	244	253	263	273	282	292	302	311	
450	321	331	340	350	360	369	379	389	398	408	
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450	65 321	331	340	350	360	369	379	389	398	408	
451	417	427	437	446	456	466	475	485	494	504	
452	514	523	533	542	552	562	571	581	590	600	
453	610	619	629	638	648	657	667	677	686	696	10
454	705	715	724	734	744	753	763	772	782	791	.1 1.0
455	801	810	820	830	839	849	858	868	877	887	.2 2.0
456	896	906	915	925	934	944	953	963	972	982	.3 3.0
457	991	*001	*010	*020	*029	*039	*048	*058	*067	*077	.4 4.0
458	66 086	096	105	115	124	134	143	153	162	172	.5 5.0
459	181	190	200	209	219	228	238	247	257	266	.6 6.0
460	276	285	294	304	313	323	332	342	351	360	.7 7.0
461	370	379	389	398	408	417	426	436	445	455	.8 8.0
462	464	473	483	492	502	511	520	530	539	548	.9 9.0
463	558	567	577	586	595	605	614	623	633	642	
464	652	661	670	680	689	698	708	717	726	736	
465	745	754	764	773	782	792	801	810	820	829	9
466	838	848	857	866	876	885	894	904	913	922	.1 0.9
467	931	941	950	959	969	978	987	996	*006	*015	.2 1.8
468	67 024	034	043	052	061	071	080	089	099	108	.3 2.7
469	117	126	136	145	154	163	173	182	191	200	.4 3.6
470	210	219	228	237	246	256	265	274	283	293	.5 4.5
471	302	311	320	329	339	348	357	366	376	385	.6 5.4
472	394	403	412	422	431	440	449	458	467	477	.7 6.3
473	486	495	504	513	523	532	541	550	559	568	.8 7.2
474	578	587	596	605	614	623	633	642	651	660	.9 8.1
475	669	678	687	697	706	715	724	733	742	751	
476	760	770	779	788	797	806	815	824	833	842	
477	852	861	870	879	888	897	906	915	924	933	9
478	943	952	961	970	979	988	997	*006	*015	*024	.1 0.9
479	68 033	042	051	060	070	079	088	097	106	115	.2 1.8
480	124	133	142	151	160	169	178	187	196	205	.3 2.7
481	214	223	232	241	250	259	268	277	286	295	.4 3.6
482	304	313	322	331	340	349	358	367	376	385	.5 4.5
483	394	403	412	421	430	439	448	457	466	475	.6 5.4
484	484	493	502	511	520	529	538	547	556	565	.7 6.3
485	574	583	592	601	610	619	628	637	646	654	.8 7.2
486	663	672	681	690	699	708	717	726	735	744	.9 8.1
487	753	762	770	779	788	797	806	815	824	833	
488	842	851	860	868	877	886	895	904	913	922	
489	931	940	948	957	966	975	984	993	*002	*010	8
490	69 019	028	037	046	055	064	073	081	090	099	.1 0.8
491	108	117	126	134	143	152	161	170	179	187	.2 1.6
492	196	205	214	223	232	240	249	258	267	276	.3 2.4
493	284	293	302	311	320	328	337	346	355	364	.4 3.2
494	372	381	390	399	408	416	425	434	443	451	.5 4.0
495	460	469	478	487	495	504	513	522	530	539	.6 4.8
496	548	557	565	574	583	592	600	609	618	627	.7 5.6
497	635	644	653	662	670	679	688	697	705	714	.8 6.4
498	723	731	740	749	758	766	775	784	792	801	.9 7.2
499	810	819	827	836	845	853	862	871	879	888	
500	897	905	914	923	931	940	949	958	966	975	
N.	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**P. P.**

N.	0	1	2	3	4	5	6	7	8	9	P. P.
500	69 897	905	914	923	931	940	949	958	966	975	
501	984	992	*001	*010	*018	*027	*036	*044	*053	*061	
502	70 070	079	087	096	105	113	122	131	139	148	9
503	157	165	174	182	191	200	208	217	226	234	.1 0.9
504	243	251	260	269	277	286	294	303	312	320	.2 1.8
505	329	337	346	355	363	372	380	389	398	406	.3 2.7
506	415	423	432	441	449	458	466	475	483	492	.4 3.6
507	501	509	518	526	535	543	552	560	569	578	.5 4.5
508	586	595	603	612	620	629	637	646	654	663	.6 5.4
509	672	680	689	697	706	714	723	731	740	748	.7 6.3
510	757	765	774	782	791	799	808	816	825	833	.8 7.2
511	842	850	859	867	876	884	893	901	910	918	.9 8.1
512	927	935	944	952	961	969	978	986	995	*003	
513	71 011	020	028	037	045	054	062	071	079	088	
514	096	105	113	121	130	138	147	155	164	172	8
515	180	189	197	206	214	223	231	239	248	256	.1 0.8
516	265	273	282	290	298	307	315	324	332	340	.2 1.7
517	349	357	366	374	382	391	399	408	416	424	.3 2.5
518	433	441	449	458	466	475	483	491	500	508	.4 3.4
519	516	525	533	542	550	558	567	575	583	592	.5 4.2
520	600	608	617	625	633	642	650	659	667	675	.6 5.1
521	684	692	700	709	717	725	734	742	750	758	.7 5.9
522	767	775	783	792	800	808	817	825	833	842	.8 6.8
523	850	858	867	875	883	891	900	908	916	925	.9 7.6
524	933	941	949	958	966	974	983	991	999	*007	
525	72 016	024	032	040	049	057	065	074	082	090	
526	098	107	115	123	131	140	148	156	164	173	
527	181	189	197	206	214	222	230	238	247	255	8
528	263	271	280	288	296	304	312	321	329	337	.1 0.8
529	345	354	362	370	378	386	395	403	411	419	.2 1.6
530	427	436	444	452	460	468	476	485	493	501	.3 2.4
531	509	517	526	534	542	550	558	566	575	583	.4 3.2
532	591	599	607	615	624	632	640	648	656	664	.5 4.0
533	672	681	689	697	705	713	721	729	738	746	.6 4.8
534	754	762	770	778	786	795	803	811	819	827	.7 5.6
535	835	843	851	859	868	876	884	892	900	908	.8 6.4
536	916	924	932	941	949	957	965	973	981	989	.9 7.2
537	997	*005	*013	*021	*030	*038	*046	*054	*062	*070	
538	73 078	086	094	102	110	118	126	134	143	151	
539	159	167	175	183	191	199	207	215	223	231	7
540	239	247	255	263	271	279	287	295	303	311	.1 0.7
541	319	328	336	344	352	360	368	376	384	392	.2 1.5
542	400	408	416	424	432	440	448	456	464	472	.3 2.2
543	480	488	496	504	512	520	528	536	544	552	.4 3.0
544	560	568	576	584	592	600	608	615	623	631	.5 3.7
545	639	647	655	663	671	679	687	695	703	711	.6 4.5
546	719	727	735	743	751	759	767	775	783	791	.7 5.2
547	798	806	814	822	830	838	846	854	862	870	.8 6.0
548	878	886	894	902	909	917	925	933	941	949	.9 6.7
549	957	965	973	981	989	997	*004	*012	*020	*028	
550	74 036	044	052	060	068	075	083	091	099	107	
N.	0	1	2	3	4	5	6	7	8	9	P. P.

N.	0	1	2	3	4	5	6	7	8	9	P. P.
550	74 036	044	052	060	068	075	083	091	099	107	
551	115	123	131	139	146	154	162	170	178	186	
552	194	202	209	217	225	233	241	249	257	264	
553	273	280	288	296	304	312	319	327	335	343	
554	351	359	366	374	382	390	398	406	413	421	
555	429	437	445	453	460	468	476	484	492	499	
556	507	515	523	531	538	546	554	562	570	577	8
557	585	593	601	609	616	624	632	640	648	655	.1 0.8
558	663	671	679	687	694	702	710	718	725	733	.2 1.6
559	741	749	756	764	772	780	788	795	803	811	.3 2.4
560	819	826	834	842	850	857	865	873	881	888	.4 3.2
561	896	904	912	919	927	935	942	950	958	966	.5 4.0
562	973	981	989	997	*004	*012	*020	*027	*035	*043	.6 4.8
563	75 051	058	066	074	081	089	097	105	112	120	.7 5.6
564	128	135	143	151	158	166	174	182	189	197	.8 6.4
565	205	212	220	228	235	243	251	258	266	274	.9 7.2
566	281	289	297	304	312	320	327	335	343	350	
567	358	366	373	381	389	396	404	412	419	427	
568	435	442	450	458	465	473	480	488	496	503	
569	511	519	526	534	541	549	557	564	572	580	
570	587	595	602	610	618	625	633	641	648	656	
571	663	671	679	686	694	701	709	717	724	732	7
572	739	747	755	762	770	777	785	792	800	808	.1 0.7
573	815	823	830	838	846	853	861	868	876	883	.2 1.5
574	891	899	906	914	921	929	936	944	951	959	.3 2.2
575	967	974	982	989	997	*004	*012	*019	*027	*034	.4 3.0
576	76 042	050	057	065	072	080	087	095	102	110	.5 3.7
577	117	125	132	140	147	155	162	170	178	185	.6 4.5
578	193	200	208	215	223	230	238	245	253	260	.7 5.2
579	268	275	283	290	298	305	313	320	328	335	.8 6.0
580	343	350	358	365	372	380	387	395	402	410	.9 6.7
581	417	425	432	440	447	455	462	470	477	485	
582	492	500	507	514	522	529	537	544	552	559	
583	567	574	582	589	596	604	611	619	626	634	
584	641	648	656	663	671	678	686	693	700	708	
585	715	723	730	738	745	752	760	767	775	782	
586	790	797	804	812	819	827	834	841	849	856	7
587	864	871	878	886	893	901	908	915	923	930	.1 0.7
588	937	945	952	960	967	974	982	989	997	*004	.2 1.4
589	77 011	019	026	033	041	048	055	063	070	078	.3 2.1
590	085	092	100	107	114	122	129	136	144	151	.4 2.8
591	158	166	173	181	188	195	203	210	217	225	.5 3.5
592	232	239	247	254	261	269	276	283	291	298	.6 4.2
593	305	313	320	327	335	342	349	356	364	371	.7 4.9
594	378	386	393	400	408	415	422	430	437	444	.8 5.6
595	451	459	466	473	481	488	495	503	510	517	.9 6.3
596	524	532	539	546	554	561	568	575	583	590	
597	597	604	612	619	626	634	641	648	655	663	
598	670	677	684	692	699	706	713	721	728	735	
599	742	750	757	764	771	779	786	793	800	808	
600	815	822	829	837	844	851	858	866	873	880	
N.	0	1	2	3	4	5	6	7	8	9	P. P.

N.	0	1	2	3	4	5	6	7	8	9	P. P.
600	77 815	822	829	837	844	851	858	866	873	880	
601	887	894	902	909	916	923	931	938	945	952	
602	959	967	974	981	988	995	*003	*010	*017	*024	
603	78 031	039	046	053	060	067	075	082	089	096	
604	103	111	118	125	132	139	147	154	161	168	
605	175	182	190	197	204	211	218	226	233	240	
606	247	254	261	269	276	283	290	297	304	311	7
607	319	326	333	340	347	354	362	369	376	383	.1 0.7
608	390	397	404	412	419	426	433	440	447	454	.2 1.5
609	461	469	476	483	490	497	504	511	518	526	.3 2.2
610	533	540	547	554	561	568	575	583	590	597	.4 3.0
611	604	611	618	625	632	639	646	654	661	668	.5 3.7
612	675	682	689	696	703	710	717	725	732	739	.6 4.5
613	746	753	760	767	774	781	788	795	802	810	.7 5.2
614	817	824	831	838	845	852	859	866	873	880	.8 6.0
615	887	894	901	908	915	923	930	937	944	951	.9 6.7
616	958	965	972	979	986	993	*000	*007	*014	*021	
617	79 028	035	042	049	056	063	070	078	085	092	
618	099	106	113	120	127	134	141	148	155	162	
619	169	176	183	190	197	204	211	218	225	232	
620	239	246	253	260	267	274	281	288	295	302	
621	309	316	323	330	337	344	351	358	365	372	7
622	379	386	393	400	407	414	421	428	435	442	.1 0.7
623	449	456	462	469	476	483	490	497	504	511	.2 1.4
624	518	525	532	539	546	553	560	567	574	581	.3 2.1
625	588	595	602	609	616	622	629	636	643	650	.4 2.8
626	657	664	671	678	685	692	699	706	713	720	.5 3.5
627	727	733	740	747	754	761	768	775	782	789	.6 4.2
628	796	803	810	816	823	830	837	844	851	858	.7 4.9
629	865	872	879	886	892	899	906	913	920	927	.8 5.6
630	934	941	948	954	961	968	975	982	989	996	.9 6.3
631	80 003	010	016	023	030	037	044	051	058	065	
632	071	078	085	092	099	106	113	120	126	133	
633	140	147	154	161	168	174	181	188	195	202	
634	209	216	222	229	236	243	250	257	263	270	
635	277	284	291	298	304	311	318	325	332	339	
636	345	352	359	366	373	380	386	393	400	407	6
637	414	421	427	434	441	448	455	461	468	475	.1 0.6
638	482	489	495	502	509	516	523	529	536	543	.2 1.3
639	550	557	563	570	577	584	591	597	604	611	.3 1.9
640	618	625	631	638	645	652	658	665	672	679	.4 2.6
641	686	692	699	706	713	719	726	733	740	746	.5 3.2
642	753	760	767	774	780	787	794	801	807	814	.6 3.9
643	821	828	834	841	848	855	861	868	875	882	.7 4.5
644	888	895	902	909	915	922	929	936	942	949	.8 5.2
645	956	962	969	976	983	989	996	*003	*010	*016	.9 5.8
646	81 023	030	036	043	050	057	063	070	077	083	
647	090	097	104	110	117	124	130	137	144	151	
648	157	164	171	177	184	191	197	204	211	218	
649	224	231	238	244	251	258	264	271	278	284	
650	291	298	304	311	318	324	331	338	345	351	
N.	0	1	2	3	4	5	6	7	8	9	P. P.

N.	0	1	2	3	4	5	6	7	8	9	P. P.
650	81 29$\hat{1}$	298	30$\hat{4}$	31$\hat{1}$	318	32$\hat{4}$	33$\hat{1}$	338	345	35$\hat{1}$	
651	358	365	37$\hat{1}$	378	385	39$\hat{1}$	398	405	41$\hat{1}$	418	
652	425	43$\hat{1}$	438	44$\hat{4}$	45$\hat{1}$	458	46$\hat{4}$	47$\hat{1}$	478	48$\hat{4}$	
653	49$\hat{1}$	498	50$\hat{4}$	51$\hat{1}$	518	52$\hat{4}$	531	538	54$\hat{4}$	551	
654	558	56$\hat{4}$	571	57$\hat{7}$	58$\hat{4}$	591	59$\hat{7}$	604	611	61$\hat{7}$	
655	624	631	63$\hat{7}$	644	65$\hat{0}$	65$\hat{7}$	664	67$\hat{0}$	677	684	
656	69$\hat{0}$	697	70$\hat{3}$	710	717	72$\hat{3}$	730	73$\hat{6}$	74$\hat{3}$	750	7
657	75$\hat{6}$	763	770	77$\hat{6}$	783	78$\hat{9}$	796	803	80$\hat{9}$	816	.1 0.7
658	82$\hat{2}$	829	836	84$\hat{2}$	849	85$\hat{5}$	862	869	87$\hat{5}$	882	.2 1.4
659	88$\hat{8}$	895	90$\hat{1}$	90$\hat{8}$	915	92$\hat{1}$	928	93$\hat{4}$	941	948	.3 2.1
660	95$\hat{4}$	961	96$\hat{7}$	974	98$\hat{0}$	98$\hat{7}$	994	*00$\hat{0}$	*00$\hat{7}$	*01$\hat{3}$	.4 2.8
661	82 020	02$\hat{6}$	03$\hat{3}$	040	04$\hat{6}$	053	05$\hat{9}$	066	07$\hat{2}$	079	.5 3.5
662	086	09$\hat{2}$	099	10$\hat{5}$	112	11$\hat{8}$	125	13$\hat{1}$	138	145	.6 4.2
663	15$\hat{1}$	158	16$\hat{4}$	171	17$\hat{7}$	184	19$\hat{0}$	197	20$\hat{3}$	21$\hat{0}$	.7 4.9
664	217	22$\hat{3}$	230	23$\hat{6}$	243	24$\hat{9}$	256	26$\hat{2}$	269	27$\hat{5}$	.8 5.6
665	282	28$\hat{8}$	295	302	30$\hat{8}$	31$\hat{5}$	32$\hat{1}$	328	33$\hat{4}$	341	.9 6.3
666	34$\hat{7}$	354	36$\hat{0}$	367	37$\hat{3}$	380	38$\hat{6}$	393	39$\hat{9}$	406	
667	41$\hat{2}$	419	42$\hat{5}$	43$\hat{2}$	43$\hat{8}$	445	45$\hat{1}$	458	46$\hat{4}$	471	
668	47$\hat{7}$	484	49$\hat{0}$	497	50$\hat{3}$	510	51$\hat{6}$	523	52$\hat{9}$	536	
669	54$\hat{2}$	549	55$\hat{5}$	562	56$\hat{8}$	575	58$\hat{1}$	588	59$\hat{4}$	601	
670	60$\hat{7}$	614	62$\hat{0}$	627	63$\hat{3}$	640	64$\hat{6}$	653	65$\hat{9}$	666	
671	67$\hat{2}$	67$\hat{8}$	685	69$\hat{1}$	698	70$\hat{4}$	711	71$\hat{7}$	72$\hat{4}$	73$\hat{0}$	6
672	737	74$\hat{3}$	75$\hat{0}$	75$\hat{6}$	763	769	77$\hat{5}$	782	78$\hat{8}$	795	.1 0.$\hat{6}$
673	80$\hat{1}$	808	81$\hat{4}$	821	82$\hat{7}$	834	840	84$\hat{6}$	853	85$\hat{9}$	.2 1.3
674	866	87$\hat{2}$	879	88$\hat{5}$	892	898	90$\hat{4}$	911	91$\hat{7}$	924	.3 1.$\hat{9}$
675	93$\hat{0}$	937	943	94$\hat{9}$	956	96$\hat{2}$	969	97$\hat{5}$	982	988	.4 2.6
676	99$\hat{4}$	*001	*00$\hat{7}$	*014	*02$\hat{0}$	*027	*033	*03$\hat{9}$	*046	*052	.5 3.$\hat{2}$
677	83 059	06$\hat{5}$	07$\hat{1}$	078	08$\hat{4}$	091	09$\hat{7}$	10$\hat{3}$	110	11$\hat{6}$	.6 3.9
678	123	12$\hat{9}$	136	142	14$\hat{8}$	155	16$\hat{1}$	168	174	18$\hat{0}$	.7 4.$\hat{5}$
679	187	19$\hat{3}$	200	206	21$\hat{2}$	219	22$\hat{5}$	23$\hat{1}$	238	24$\hat{4}$	.8 5.2
680	251	25$\hat{7}$	26$\hat{3}$	270	27$\hat{6}$	283	289	29$\hat{5}$	302	30$\hat{8}$	.9 5.$\hat{8}$
681	31$\hat{4}$	321	32$\hat{7}$	334	340	34$\hat{6}$	353	35$\hat{9}$	36$\hat{5}$	372	
682	37$\hat{8}$	38$\hat{5}$	391	39$\hat{7}$	404	41$\hat{0}$	41$\hat{6}$	423	42$\hat{9}$	43$\hat{5}$	
683	442	44$\hat{8}$	455	461	46$\hat{7}$	474	480	48$\hat{6}$	493	49$\hat{9}$	
684	50$\hat{5}$	512	51$\hat{8}$	52$\hat{4}$	531	53$\hat{7}$	54$\hat{3}$	550	55$\hat{6}$	56$\hat{2}$	
685	569	57$\hat{5}$	58$\hat{1}$	588	59$\hat{4}$	60$\hat{0}$	607	61$\hat{3}$	61$\hat{9}$	626	
686	63$\hat{2}$	63$\hat{8}$	645	65$\hat{1}$	65$\hat{7}$	664	67$\hat{0}$	67$\hat{6}$	683	68$\hat{9}$	6
687	69$\hat{5}$	702	70$\hat{8}$	71$\hat{4}$	721	72$\hat{7}$	73$\hat{3}$	740	746	75$\hat{2}$	.1 0.6
688	759	765	77$\hat{1}$	778	784	79$\hat{0}$	79$\hat{6}$	803	80$\hat{9}$	81$\hat{5}$	.2 1.2
689	822	828	83$\hat{4}$	841	847	85$\hat{3}$	85$\hat{9}$	866	87$\hat{2}$	87$\hat{8}$	.3 1.8
690	885	891	89$\hat{7}$	904	910	91$\hat{6}$	92$\hat{2}$	929	935	94$\hat{1}$	.4 2.4
691	948	954	96$\hat{0}$	96$\hat{6}$	973	979	98$\hat{5}$	992	998	*00$\hat{4}$	.5 3.0
692	84 01$\hat{0}$	017	023	02$\hat{9}$	03$\hat{5}$	042	048	05$\hat{4}$	061	067	.6 3.6
693	07$\hat{3}$	07$\hat{9}$	086	092	09$\hat{8}$	10$\hat{4}$	111	117	12$\hat{3}$	12$\hat{9}$	.7 4.2
694	136	142	14$\hat{8}$	15$\hat{4}$	161	167	17$\hat{3}$	17$\hat{9}$	186	192	.8 4.8
695	19$\hat{8}$	20$\hat{4}$	211	217	22$\hat{3}$	22$\hat{9}$	236	242	24$\hat{8}$	25$\hat{4}$	.9 5.4
696	261	267	27$\hat{3}$	27$\hat{9}$	286	292	29$\hat{8}$	30$\hat{4}$	311	317	
697	32$\hat{3}$	32$\hat{9}$	33$\hat{5}$	342	348	35$\hat{4}$	36$\hat{0}$	367	373	37$\hat{9}$	
698	38$\hat{5}$	392	398	404	41$\hat{0}$	41$\hat{6}$	423	429	43$\hat{5}$	44$\hat{1}$	
699	44$\hat{7}$	454	460	46$\hat{6}$	47$\hat{2}$	479	485	491	49$\hat{7}$	50$\hat{3}$	
700	510	516	522	52$\hat{8}$	53$\hat{4}$	541	547	553	55$\hat{9}$	56$\hat{5}$	
N.	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**P. P.**

N.	0	1	2	3	4	5	6	7	8	9	P. P.
700	84 510	516	522	528	534	541	547	553	559	565	
701	572	578	584	590	596	603	609	615	621	627	
702	633	640	646	652	658	664	671	677	683	689	
703	695	701	708	714	720	726	732	739	745	751	
704	757	763	769	776	782	788	794	800	806	813	
705	819	825	831	837	843	849	856	862	868	874	
706	880	886	893	899	905	911	917	923	929	936	6
707	942	948	954	960	966	972	979	985	991	997	.1 0.6
708	85 003	009	015	021	028	034	040	046	052	058	.2 1.3
709	064	070	077	083	089	095	101	107	113	119	.3 1.9
710	126	132	138	144	150	156	162	168	174	181	.4 2.6
711	187	193	199	205	211	217	223	229	236	242	.5 3.2
712	248	254	260	266	272	278	284	290	297	303	.6 3.9
713	309	315	321	327	333	339	345	351	357	363	.7 4.5
714	370	376	382	388	394	400	406	412	418	424	.8 5.2
715	430	436	443	449	455	461	467	473	479	485	.9 5.8
716	491	497	503	509	515	521	527	533	540	546	
717	552	558	564	570	576	582	588	594	600	606	
718	612	618	624	630	636	642	648	655	661	667	
719	673	679	685	691	697	703	709	715	721	727	
720	733	739	745	751	757	763	769	775	781	787	6
721	793	799	805	811	817	823	829	835	841	847	.1 0.6
722	853	859	865	872	878	884	890	896	902	908	.2 1.2
723	914	920	926	932	938	944	950	956	962	968	.3 1.8
724	974	980	986	992	998	*004	*010	*016	*022	*028	.4 2.4
725	86 034	040	046	052	058	063	069	075	081	087	.5 3.0
726	093	099	105	111	117	123	129	135	141	147	.6 3.6
727	153	159	165	171	177	183	189	195	201	207	.7 4.2
728	213	219	225	231	237	243	249	255	261	267	.8 4.8
729	273	278	284	290	296	302	308	314	320	326	.9 5.4
730	332	338	344	350	356	362	368	374	380	386	
731	391	397	403	409	415	421	427	433	439	445	
732	451	457	463	469	475	481	486	492	498	504	
733	510	516	522	528	534	540	546	552	558	563	
734	569	575	581	587	593	599	605	611	617	623	
735	628	634	640	646	652	658	664	670	676	682	
736	688	693	699	705	711	717	723	729	735	741	5
737	746	752	758	764	770	776	782	788	794	800	.1 0.5
738	805	811	817	823	829	835	841	847	852	858	.2 1.1
739	864	870	876	882	888	894	899	905	911	917	.3 1.6
740	923	929	935	941	946	952	958	964	970	976	.4 2.2
741	982	987	993	999	*005	*011	*017	*023	*028	*034	.5 2.7
742	87 040	046	052	058	064	069	075	081	087	093	.6 3.3
743	099	104	110	116	122	128	134	140	145	151	.7 3.8
744	157	163	169	175	180	186	192	198	204	210	.8 4.4
745	215	221	227	233	239	245	250	256	262	268	.9 4.9
746	274	279	285	291	297	303	309	314	320	326	
747	332	338	343	349	355	361	367	372	378	384	
748	390	396	402	407	413	419	425	431	436	442	
749	448	454	460	465	471	477	483	489	494	500	
750	506	512	517	523	529	535	541	546	552	558	
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N.	0	1	2	3	4	5	6	7	8	9	P. P.
750	87 506	512	517	523	529	535	541	546	552	558	
751	564	570	575	581	587	593	598	604	610	616	
752	622	627	633	639	645	650	656	662	668	673	
753	679	685	691	697	702	708	714	720	725	731	
754	737	743	748	754	760	766	771	777	783	789	
755	794	800	806	812	817	823	829	835	840	846	
756	852	858	863	869	875	881	886	892	898	904	6
757	909	915	921	927	932	938	944	949	955	961	.1 0.6
758	967	972	978	984	990	995	*001	*007	*012	*018	.2 1.2
759	88 024	030	035	041	047	053	058	064	070	075	.3 1.8
760	081	087	093	098	104	110	115	121	127	133	.4 2.4
761	138	144	150	155	161	167	172	178	184	190	.5 3.0
762	195	201	207	212	218	224	229	235	241	247	.6 3.6
763	252	258	264	269	275	281	286	292	298	303	.7 4.2
764	309	315	320	326	332	337	343	349	355	360	.8 4.8
765	366	372	377	383	389	394	400	406	411	417	.9 5.4
766	423	428	434	440	445	451	457	462	468	474	
767	479	485	491	496	502	508	513	519	525	530	
768	536	542	547	553	558	564	570	575	581	587	
769	592	598	604	609	615	621	626	632	638	643	
770	649	654	660	666	671	677	683	688	694	700	
771	705	711	716	722	728	733	739	745	750	756	5
772	761	767	773	778	784	790	795	801	806	812	.1 0.5
773	818	823	829	835	840	846	851	857	863	868	.2 1.1
774	874	879	885	891	896	902	907	913	919	924	.3 1.6
775	930	936	941	947	952	958	964	969	975	980	.4 2.2
776	986	992	997	*003	*008	*014	*019	*025	*031	*036	.5 2.7
777	89 042	047	053	059	064	070	075	081	087	092	.6 3.3
778	098	103	109	114	120	126	131	137	142	148	.7 3.8
779	153	159	165	170	176	181	187	193	198	204	.8 4.4
780	209	215	220	226	231	237	243	248	254	259	.9 4.9
781	265	270	276	282	287	293	298	304	309	315	
782	320	326	332	337	343	348	354	359	365	370	
783	376	381	387	393	398	404	409	415	420	426	
784	431	437	442	448	454	459	465	470	476	481	
785	487	492	498	503	509	514	520	525	531	536	
786	542	548	553	559	564	570	575	581	586	592	
787	597	603	608	614	619	625	630	636	641	647	5
788	652	658	663	669	674	680	685	691	696	702	.1 0.5
789	707	713	718	724	729	735	740	746	751	757	.2 1.0
790	762	768	773	779	784	790	795	801	806	812	.3 1.5
791	817	823	828	834	839	845	850	856	861	867	.4 2.0
792	872	878	883	889	894	900	905	911	916	922	.5 2.5
793	927	933	938	943	949	954	960	965	971	976	.6 3.0
794	982	987	993	998	*004	*009	*015	*020	*026	*031	.7 3.5
795	90 036	042	047	053	058	064	069	075	080	086	.8 4.0
796	091	097	102	107	113	118	124	129	135	140	.9 4.5
797	146	151	156	162	167	173	178	184	189	195	
798	200	205	211	216	222	227	233	238	244	249	
799	254	260	265	271	276	282	287	292	298	303	
800	309	314	320	325	330	336	341	347	352	358	
N.	0	1	2	3	4	5	6	7	8	9	P. P.

N.	0	1	2	3	4	5	6	7	8	9	P. P.
800	90 309	314	320	325	330	336	341	347	352	358	
801	363	368	374	379	385	390	396	401	406	412	
802	417	423	428	433	439	444	450	455	460	466	
803	471	477	482	488	493	498	504	509	515	520	
804	525	531	536	542	547	552	558	563	569	574	
805	579	585	590	596	601	606	612	617	622	628	
806	633	639	644	649	655	660	666	671	676	682	
807	687	692	698	703	709	714	719	725	730	736	
808	741	746	752	757	762	768	773	778	784	789	
809	795	800	805	811	816	821	827	832	838	843	
810	848	854	859	864	870	875	880	886	891	896	
811	902	907	913	918	923	929	934	939	945	950	5
812	955	961	966	971	977	982	987	993	998	*003	.1 | 0.5
813	91 009	014	019	025	030	036	041	046	052	057	.2 | 1.1
814	062	068	073	078	084	089	094	100	105	110	.3 | 1.6
815	116	121	126	131	137	142	147	153	158	163	.4 | 2.2
816	169	174	179	185	190	195	201	206	211	217	.5 | 2.7
817	222	227	233	238	243	249	254	259	264	270	.6 | 3.3
818	275	280	286	291	296	302	307	312	318	323	.7 | 3.8
819	328	333	339	344	349	355	360	365	371	376	.8 | 4.4
820	381	386	392	397	402	408	413	418	423	429	.9 | 4.9
821	434	439	445	450	455	461	466	471	476	482	
822	487	492	497	503	508	513	519	524	529	534	
823	540	545	550	556	561	566	571	577	582	587	
824	592	598	603	608	614	619	624	629	635	640	
825	645	650	656	661	666	671	677	682	687	692	
826	698	703	708	714	719	724	729	735	740	745	
827	750	756	761	766	771	777	782	787	792	798	
828	803	808	813	819	824	829	834	839	845	850	
829	855	860	866	871	876	881	887	892	897	902	
830	908	913	918	923	928	934	939	944	949	955	
831	960	965	970	976	981	986	991	996	*002	*007	5
832	92 012	017	023	028	033	038	043	049	054	059	.1 | 0.5
833	064	069	075	080	085	090	096	101	106	111	.2 | 1.0
834	116	122	127	132	137	142	148	153	158	163	.3 | 1.5
835	168	174	179	184	189	194	200	205	210	215	.4 | 2.0
836	220	226	231	236	241	246	252	257	262	267	.5 | 2.5
837	272	277	283	288	293	298	303	309	314	319	.6 | 3.0
838	324	329	335	340	345	350	355	360	366	371	.7 | 3.5
839	376	381	386	391	397	402	407	412	417	423	.8 | 4.0
840	428	433	438	443	448	454	459	464	469	474	.9 | 4.5
841	479	485	490	495	500	505	510	515	521	526	
842	531	536	541	546	552	557	562	567	572	577	
843	583	588	593	598	603	608	613	619	624	629	
844	634	639	644	649	655	660	665	670	675	680	
845	685	691	696	701	706	711	716	721	727	732	
846	737	742	747	752	757	762	768	773	778	783	
847	788	793	798	803	809	814	819	824	829	834	
848	839	844	850	855	860	865	870	875	880	885	
849	891	896	901	906	911	916	921	926	931	937	
850	942	947	952	957	962	967	972	977	982	988	
N.	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**P. P.**

N.	0	1	2	3	4	5	6	7	8	9	P. P.
850	92 942	947	952	957	962	967	972	977	982	988	
851	993	998	*003	*008	*013	*018	*023	*028	*034	*039	
852	93 044	049	054	059	064	069	074	079	084	090	
853	095	100	105	110	115	120	125	130	135	140	
854	146	151	156	161	166	171	176	181	186	191	
855	196	201	207	212	217	222	227	232	237	242	
856	247	252	257	262	267	272	278	283	288	293	5
857	298	303	308	313	318	323	328	333	338	343	.1 0.5
858	348	354	359	364	369	374	379	384	389	394	.2 1.1
859	399	404	409	414	419	424	429	434	439	445	.3 1.6
860	450	455	460	465	470	475	480	485	490	495	.4 2.2
861	500	505	510	515	520	525	530	535	540	545	.5 2.7
862	550	556	561	566	571	576	581	586	591	596	.6 3.3
863	601	606	611	616	621	626	631	636	641	646	.7 3.8
864	651	656	661	666	671	676	681	686	691	696	.8 4.4
865	701	706	711	716	721	726	731	736	742	747	.9 4.9
866	752	757	762	767	772	777	782	787	792	797	
867	802	807	812	817	822	827	832	837	842	847	
868	852	857	862	867	872	877	882	887	892	897	
869	902	907	912	917	922	927	932	937	942	947	
870	952	957	962	967	972	977	982	987	992	997	
871	94 002	007	012	017	022	026	031	036	041	046	5
872	051	056	061	066	071	076	081	086	091	096	.1 0.5
873	101	106	111	116	121	126	131	136	141	146	.2 1.0
874	151	156	161	166	171	176	181	186	191	196	.3 1.5
875	201	206	210	215	220	225	230	235	240	245	.4 2.0
876	250	255	260	265	270	275	280	285	290	295	.5 2.5
877	300	305	310	315	320	324	329	334	339	344	.6 3.0
878	349	354	359	364	369	374	379	384	389	394	.7 3.5
879	399	404	409	413	418	423	428	433	438	443	.8 4.0
880	448	453	458	463	468	473	478	483	487	492	.9 4.5
881	497	502	507	512	517	522	527	532	537	542	
882	547	552	556	561	566	571	576	581	586	591	
883	596	601	606	611	615	620	625	630	635	640	
884	645	650	655	660	665	670	674	679	684	689	
885	694	699	704	709	714	719	724	728	733	738	
886	743	748	753	758	763	768	773	777	782	787	4
887	792	797	802	807	812	817	821	826	831	836	.1 0.4
888	841	846	851	856	861	865	870	875	880	885	.2 0.9
889	890	895	900	905	909	914	919	924	929	934	.3 1.3
890	939	944	949	953	958	963	968	973	978	983	.4 1.8
891	988	992	997	*002	*007	*012	*017	*022	*026	031	.5 2.2
892	95 036	041	046	051	056	061	065	070	075	080	.6 2.7
893	085	090	095	099	104	109	114	119	124	129	.7 3.1
894	134	138	143	148	153	158	163	167	172	177	.8 3.6
895	182	187	192	197	201	206	211	216	221	226	.9 4.0
896	231	235	240	245	250	255	260	264	269	274	
897	279	284	289	294	298	303	308	313	318	323	
898	327	332	337	342	347	352	356	361	366	371	
899	376	381	385	390	395	400	405	410	414	419	
900	424	429	434	438	443	448	453	458	463	467	
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N.	0	1	2	3	4	5	6	7	8	9	P. P.
900	95 424	429	434	438	443	448	453	458	463	467	
901	472	477	482	487	492	496	501	506	511	516	
902	520	525	530	535	540	544	549	554	559	564	
903	569	573	578	583	588	593	597	602	607	612	
904	617	621	626	631	636	641	645	650	655	660	
905	665	669	674	679	684	689	693	698	703	708	
906	713	717	722	727	732	737	741	746	751	756	
907	760	765	770	775	780	784	789	794	799	804	
908	808	813	818	823	827	832	837	842	847	851	
909	856	861	866	870	875	880	885	890	894	899	
910	904	909	913	918	923	928	933	937	942	947	
911	952	956	961	966	971	975	980	985	990	994	5
912	999	*004	*009	*014	*018	*023	*028	*033	*037	*042	.1 | 0.5
913	96 047	052	056	061	066	071	075	080	085	090	.2 | 1.0 .3 | 1.5
914	094	099	104	109	113	118	123	128	132	137	
915	142	147	151	156	161	166	170	175	180	185	.4 | 2.0
916	189	194	199	204	208	213	218	222	227	232	.5 | 2.5 .6 | 3.0
917	237	241	246	251	256	260	265	270	275	279	
918	284	289	293	298	303	308	312	317	322	327	.7 | 3.5
919	331	336	341	345	350	355	360	364	369	374	.8 | 4.0 .9 | 4.5
920	379	383	388	393	397	402	407	412	416	421	
921	426	430	435	440	445	449	454	459	463	468	
922	473	478	482	487	492	496	501	506	511	515	
923	520	525	529	534	539	543	548	553	558	562	
924	567	572	576	581	586	590	595	600	605	609	
925	614	619	623	628	633	637	642	647	651	656	
926	661	666	670	675	680	684	689	694	698	703	
927	708	712	717	722	726	731	736	741	745	750	
928	755	759	764	769	773	778	783	787	792	797	
929	801	806	811	815	820	825	829	834	839	843	
930	848	853	857	862	867	871	876	881	885	890	
931	895	899	904	909	913	918	923	927	932	937	4
932	941	946	951	955	960	965	969	974	979	983	.1 | 0.4
933	988	993	997	*002	*007	*011	*016	*020	*025	*030	.2 | 0 9 .3 | 1.3
934	97 034	039	044	048	053	058	062	067	072	076	
935	081	086	090	095	099	104	109	113	118	123	.4 | 1.8
936	127	132	137	141	146	151	155	160	164	169	.5 | 2.2 .6 | 2.7
937	174	178	183	188	192	197	202	206	211	215	
938	220	225	229	234	239	243	248	252	257	262	.7 | 3.1
939	266	271	276	280	285	289	294	299	303	308	.8 | 3.6 .9 | 4.0
940	313	317	322	326	331	336	340	345	349	354	
941	359	363	368	373	377	382	386	391	396	400	
942	405	409	414	419	423	428	432	437	442	446	
943	451	456	460	465	469	474	479	483	488	492	
944	497	502	506	511	515	520	525	529	534	538	
945	543	548	552	557	561	566	570	575	580	584	
946	589	593	598	603	607	612	616	621	626	630	
947	635	639	644	649	653	658	662	667	671	676	
948	681	685	690	694	699	703	708	713	717	722	
949	726	731	736	740	745	749	754	758	763	768	
950	772	777	781	786	790	795	800	804	809	813	
N.	0	1	2	3	4	5	6	7	8	9	P. P.

N.	0	1	2	3	4	5	6	7	8	9	P. P.
950	97 772	777	781	786	790	795	800	804	809	813	
951	818	822	827	831	836	841	845	850	854	859	
952	863	868	873	877	882	886	891	895	900	904	
953	909	914	918	923	927	932	936	941	945	950	
954	955	959	964	968	973	977	982	986	991	996	
955	98 000	005	009	014	018	023	027	032	036	041	5
956	046	050	055	059	064	068	073	077	082	086	.1 0.5
957	091	095	100	105	109	114	118	123	127	132	.2 1.0
958	136	141	145	150	154	159	163	168	173	177	.3 1.5
959	182	186	191	195	200	204	209	213	218	222	.4 2.0
960	227	231	236	240	245	249	254	259	263	268	.5 2.5
961	272	277	281	286	290	295	299	304	308	313	.6 3.0
962	317	322	326	331	335	340	344	349	353	358	
963	362	367	371	376	380	385	389	394	398	403	.7 3.5
964	407	412	416	421	425	430	434	439	443	448	.8 4.0
965	452	457	461	466	470	475	479	484	488	493	.9 4.5
966	497	502	506	511	515	520	524	529	533	538	
967	542	547	551	556	560	565	569	574	578	583	
968	587	592	596	601	605	610	614	619	623	628	
969	632	637	641	646	650	655	659	663	668	672	
970	677	681	686	690	695	699	704	708	713	717	
971	722	726	731	735	740	744	749	753	757	762	4
972	766	771	775	780	784	789	793	798	802	807	.1 0.4
973	811	815	820	824	829	833	838	842	847	851	.2 0.9
974	856	860	865	869	873	878	882	887	891	896	.3 1.3
975	900	905	909	914	918	922	927	931	936	940	.4 1.8
976	945	949	954	958	963	967	971	976	980	985	.5 2.2
977	989	994	998	*003	*007	*011	*016	*020	*025	*029	.6 2.7
978	99 034	038	043	047	051	056	060	065	069	074	.7 3.1
979	078	082	087	091	096	100	105	109	113	118	.8 3.6
980	122	127	131	136	140	145	149	153	158	162	.9 4.0
981	167	171	176	180	184	189	193	198	202	206	
982	211	215	220	224	229	233	237	242	246	251	
983	255	260	264	268	273	277	282	286	290	295	
984	299	304	308	312	317	321	326	330	335	339	
985	343	348	352	357	361	365	370	374	379	383	
986	387	392	396	401	405	409	414	418	423	427	4
987	431	436	440	445	449	453	458	462	467	471	.1 0.4
988	475	480	484	489	493	497	502	506	511	515	.2 0.8
989	519	524	528	533	537	541	546	550	554	559	.3 1.2
990	563	568	572	576	581	585	590	594	598	603	.4 1.6
991	607	611	616	620	625	629	633	638	642	647	.5 2.0
992	651	655	660	664	668	673	677	682	686	690	.6 2.4
993	695	699	703	708	712	717	721	725	730	734	.7 2.8
994	738	743	747	751	756	760	765	769	773	778	.8 3.2
995	782	786	791	795	800	804	808	813	817	821	.9 3.6
996	826	830	834	839	843	847	852	856	861	865	
997	869	874	878	882	887	891	895	900	904	908	
998	913	917	922	926	930	935	939	943	948	952	
999	956	961	965	969	974	978	982	987	991	995	
1000	00 000	004	008	013	017	021	026	030	034	039	
N.	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**P. P.**

N.	0	1	2	3	4	5	6	7	8	9	P. P.	
1000	000 000	043	087	130	173	217	260	304	347	390		
01	434	477	521	564	607	651	694	737	781	824		
02	867	911	954	997	*041	*084	*127	*171	*214	*257		
03	001 301	344	387	431	474	517	560	604	647	690		
04	733	777	820	863	906	950	993	*036	*079	*123		
05	002 166	209	252	295	339	382	425	468	511	555		
06	598	641	684	727	770	814	857	900	943	986		
07	003 029	072	115	159	202	245	288	331	374	417		
08	460	503	546	590	633	676	719	762	805	848	43	43
09	891	934	977	*020	*063	*106	*149	*192	*235	*278	.1	4.3	4.3
1010	004 321	364	407	450	493	536	579	622	665	708	.2	8.7	8.6
11	751	794	837	880	923	966	*009	*051	*094	*137	.3	13.0	12.9
12	005 180	223	266	309	352	395	438	481	523	566	.4	17.4	17.2
13	609	652	695	738	781	824	866	909	952	995	.5	21.7	21.5
14	006 038	081	123	166	209	252	295	337	380	423	.6	26.1	25.8
15	466	509	551	594	637	680	722	765	808	851	.7	30.4	30.1
16	893	936	979	*022	*064	*107	*150	*193	*235	*278	.8	34.8	34.4
17	007 321	363	406	449	491	534	577	620	662	705	.9	39.1	38.7
18	748	790	833	875	918	961	*003	*046	*089	131			
19	008 174	217	259	302	344	387	430	472	515	557			
1020	600	642	685	728	770	813	855	898	940	983			
21	009 025	068	111	153	196	238	281	323	366	408			
22	451	493	536	578	621	663	706	748	790	833			
23	875	918	960	*003	*045	*088	*130	*172	*215	*257	42	42	
24	010 300	342	385	427	469	512	554	596	639	681	.1	4.2	4.2
25	724	766	808	851	893	935	978	*020	*062	*105	.2	8.5	8.4
26	011 147	189	232	274	316	359	401	443	486	528	.3	12.7	12.6
27	570	612	655	697	739	782	824	866	908	951	.4	17.0	16.8
28	993	*035	*077	*120	*162	*204	*246	*288	*331	*373	.5	21.2	21.0
29	012 415	457	500	542	584	626	668	710	753	795	.6	25.5	25.2
1030	837	879	921	963	*006	*048	*090	*132	174	216	.7	29.7	29.4
31	013 258	301	343	385	427	469	511	553	595	637	.8	34.0	33.6
32	679	722	764	806	848	890	932	974	*016	*058	.9	38.2	37.8
33	014 100	142	184	226	268	310	352	394	436	478			
34	520	562	604	646	688	730	772	814	856	898			
35	940	982	*024	*066	*108	*150	*192	*234	*276	*318			
36	015 360	401	443	485	527	569	611	653	695	737			
37	779	820	862	904	946	988	*030	*072	*113	155	41	41	
38	016 197	239	281	323	364	406	448	490	532	573	.1	4.1	4.1
39	615	657	699	741	782	824	866	908	950	991	.2	8.3	8.2
1040	017 033	075	117	158	200	242	284	325	367	409	.3	12.4	12.3
41	450	492	534	576	617	659	701	742	784	826	.4	16.6	16.4
42	867	909	951	992	*034	*076	*117	*159	*201	*242	.5	20.7	20.5
43	018 284	326	367	409	451	492	534	575	617	659	.6	24.9	24.6
44	700	742	783	825	867	908	950	991	*033	*074	.7	29.0	28.7
45	019 116	158	199	241	282	324	365	407	448	490	.8	33.2	32.8
46	531	573	614	656	697	739	780	822	863	905	.9	37.3	36.9
47	946	988	*029	*071	*112	*154	*195	*237	*278	*320			
48	020 361	402	444	485	527	568	610	651	692	734			
49	775	817	858	899	941	982	*024	*065	*106	*148			
1050	021 189	230	272	313	354	396	437	478	520	561			
N.	0	1	2	3	4	5	6	7	8	9	P. P.	

N.	0	1	2	3	4	5	6	7	8	9	P. P.
1050	021 189	230	272	313	354	396	437	478	520	561	
51	602	644	685	726	768	809	850	892	933	974	
52	022 015	057	098	139	181	222	263	304	346	387	41
53	428	469	511	552	593	634	676	717	758	799	.1 4.1
54	840	882	923	964	*005	*046	*088	*129	*170	*211	.2 8.2
55	023 252	293	335	376	417	458	499	540	581	623	.3 12.3
56	664	705	746	787	828	869	910	951	993	*034	.4 16.4
57	024 075	116	157	198	239	280	321	362	403	444	.5 20.5
58	485	526	568	609	650	691	732	773	814	855	.6 24.6
59	896	937	978	*019	*060	*101	*142	*183	*224	*265	.7 28.7
1060	025 306	347	388	429	469	510	551	592	633	674	.8 32.8
61	715	756	797	838	879	920	961	*002	*042	*083	.9 36.9
62	026 124	165	206	247	288	329	370	410	451	492	
63	533	574	615	656	696	737	778	819	860	901	41
64	941	982	*023	*064	*105	*145	*186	*227	*268	*309	.1 4.1
65	027 349	390	431	472	512	553	594	635	675	716	.2 8.2
66	757	798	838	879	920	961	*001	*042	*083	*123	.3 12.3
67	028 164	205	246	286	327	368	408	449	490	530	.4 16.4
68	571	612	652	693	734	774	815	856	896	937	.5 20.5
69	977	*018	*059	*099	*140	*181	*221	*262	*302	*343	.6 24.6
1070	029 384	424	465	505	546	586	627	668	708	749	.7 28.7
71	789	830	870	911	951	992	*032	*073	*114	*154	.8 32.8
72	030 195	235	276	316	357	397	438	478	519	559	.9 36.9
73	599	640	680	721	761	802	842	883	923	964	
74	031 004	044	085	125	166	206	247	287	327	368	40
75	408	449	489	529	570	610	651	691	731	772	.1 4.0
76	812	852	893	933	973	*014	*054	*094	*135	*175	.2 8.0
77	032 215	256	296	336	377	417	457	498	538	578	.3 12.0
78	619	659	699	739	780	820	860	900	941	981	.4 16.0
79	033 021	061	102	142	182	222	263	303	343	383	.5 20.0
1080	424	464	504	544	584	625	665	705	745	785	.6 24.0
81	825	866	906	946	986	*026	*066	*107	147	187	.7 28.0
82	034 227	267	307	347	388	428	468	508	548	588	.8 32.0
83	628	668	708	748	789	829	869	909	949	989	.9 36.0
84	035 029	069	109	149	189	229	269	309	349	389	
85	429	470	510	550	590	630	670	710	750	790	
86	830	870	910	950	990	*029	*069	*109	*149	*189	
87	036 229	269	309	349	389	429	469	509	549	589	
88	629	669	708	748	788	828	868	908	948	988	
89	037 028	068	107	147	187	227	267	307	347	386	
1090	426	466	506	546	586	625	665	705	745	785	
91	825	864	904	944	984	*023	*063	*103	143	183	
92	038 222	262	302	342	381	421	461	501	540	580	39
93	620	660	699	739	779	819	858	898	938	977	.1 3.9
94	039 017	057	096	136	176	216	255	295	335	374	.2 7.8
95	414	454	493	533	572	612	652	691	731	771	.3 11.7
96	810	850	890	929	969	*008	*048	*088	*127	*167	.4 15.6
97	040 206	246	286	325	365	404	444	483	523	563	.5 19.5
98	602	642	681	721	760	800	839	879	918	958	.6 23.4
99	997	*037	*076	*116	*155	*195	*234	*274	*313	*353	.7 27.3
1100	041 392	432	471	511	550	590	629	669	708	748	.8 31.2
N.	0	1	2	3	4	5	6	7	8	9	.9 35.1
											P. P.

TABLE II.—CONSTANTS.

PART I.

LOGARITHMIC CONSTANTS.

l = Naperian (natural) logarithm log = common logarithm
e = base of Naperian system 10 = base of common system
1 = Modulus of Naperian system M = Modulus of common system

$lN = \frac{1}{M} \log N.$ $\log N = MlN.$

Table for passing from log to l		Numbers.	Common Logarithms.	Table for passing from l to log	
1	2.30 258 509$\hat{2}$	$M = 0.43\ 429\ 448\ 19$	$9.63\ 778\ 431 - 10$	10	4.34 294 482
2	4.60 517 018	$\frac{1}{M} = 2.30\ 258\ 509\ 30$	$0.36\ 221\ 570$	20	8.68 588 964
3	6.90 775 528	$e = 2.71\ 828\ 182\ 84\hat{}$	M	3	1.30 288 344$\hat{}$
4	9.21 034 037			4	1.73 717 793
5	11.51 292 546			5	2.17 147 241
6	13.81 551 056			6	2.60 576 689
7	16.11 809 565			7	3.04 006 137$\hat{}$
8	18.42 068 074			8	3.47 435 585
9	20.72 326 583			9	3.90 865 033

PART II.

CIRCULAR AND SPHERICAL CONSTANTS.

π = ratio of circumference to diameter of circle. C = circumference of circle. A = area of circle.
S = surface of sphere. V = volume of sphere. R = radius. D = diameter.

Table of Expressions for

R	D	C	A	S	V
R	$2R$	$2\pi R$	πR^2	$4\pi R^2$	$\frac{4}{3}\pi R^3$
$\frac{1}{2}D$	D	πD	$\frac{1}{4}\pi D^2$	πD^2	$\frac{1}{6}\pi D^3$
$\frac{1}{2\pi}C$	$\frac{1}{\pi}C$	C	$\frac{1}{4\pi}C^2$	$\frac{1}{\pi}C^2$	$\frac{1}{6\pi^2}C^3$
$\sqrt{\frac{1}{\pi}}A^{\frac{1}{2}}$	$2\sqrt{\frac{1}{\pi}}A^{\frac{1}{2}}$	$2\sqrt{\pi}A^{\frac{1}{2}}$	A	$4A$	$\frac{4}{3}\sqrt{\frac{1}{\pi}}A^{\frac{3}{2}}$
$\frac{1}{2}\sqrt{\frac{1}{\pi}}S^{\frac{1}{2}}$	$\sqrt{\frac{1}{\pi}}S^{\frac{1}{2}}$	$\sqrt{\pi}S^{\frac{1}{2}}$	$\frac{1}{4}S$	S	$\frac{1}{6}\sqrt{\frac{1}{\pi}}S^{\frac{3}{2}}$
$\frac{1}{2}\sqrt[3]{\frac{6}{\pi}}V^{\frac{1}{3}}$	$\sqrt[3]{\frac{6}{\pi}}V^{\frac{1}{3}}$	$\sqrt[3]{6\pi^2}\,V^{\frac{1}{3}}$	$\frac{1}{4}\sqrt[3]{36\pi}\,V^{\frac{2}{3}}$	$\sqrt[3]{36\pi}\,V^{\frac{2}{3}}$	V

Numbers.	Logarithms.	Numbers.	Logarithms.
$4\pi = 12.56\ 637\ 061\hat{}$	1.09 920 98$\hat{6}$	$2\sqrt{\frac{1}{\pi}} = 1.12\ 837\ 91\hat{6}$	0.05 245 506
$2\pi = 6.28\ 318\ 53\hat{0}$	0.79 817 987	$\sqrt{\frac{1}{\pi}} = 0.56\ 418\ 95\hat{8}$	9.75 142 50$\hat{6}$ − 10
$\pi = 3.14\ 159\ 26\hat{5}$	0.49 714 98$\hat{7}$	$\frac{4}{3}\sqrt{\frac{1}{\pi}} = 0.75\ 225\ 278$	9.87 636 380 − 10
$\frac{4}{3}\pi = 4.18\ 879\ 02\hat{0}$	0.62 208 861	$\frac{1}{6}\sqrt{\frac{1}{\pi}} = 0.09\ 403\ 15\hat{9}$	8.97 327 38$\hat{1}$ − 10
$\frac{1}{4}\pi = 0.78\ 539\ 81\hat{6}$	9.89 508 988 − 10	$\sqrt[3]{36\pi} = 4.83\ 597\ 586$	0.68 448 41$\hat{2}$
$\frac{1}{6}\pi = 0.52\ 359\ 87\hat{7}$	9.71 899 862 − 10	$\sqrt[3]{\frac{6}{\pi}} = 1.24\ 070\ 098$	0.09 366 71$\hat{2}$
$\frac{1}{\pi} = 0.31\ 830\ 98\hat{8}$	9.50 285 01$\hat{2}$ − 10	$\sqrt[3]{\pi} = 1.46\ 459\ 189$	0.16 571 66$\hat{2}$
$\frac{1}{2\pi} = 0.15\ 915\ 49\hat{4}$	9.20 182 013 − 10	$\sqrt[3]{\pi^2} = 2.14\ 502\ 93\hat{9}$	0.33 143 325
$\frac{1}{4\pi} = 0.07\ 957\ 747$	8.90 079 01$\hat{3}$ − 10	$\sqrt[3]{6\pi^2} = 3.89\ 777\ 709$	0.59 081 700
$\pi^2 = 9.86\ 960\ 440$	0.99 429 97$\hat{4}$		
$\frac{1}{6\pi^2} = 0.01\ 688\ 68\hat{6}$	8.22 754 90$\hat{0}$ − 10		
$2\sqrt{\pi} = 3.54\ 490\ 770$	0.54 960 493		
$\sqrt{\pi} = 1.77\ 245\ 385$	0.24 857 49$\hat{3}$		

PART III.

ANGULAR CONSTANTS.

ρ = unit of circular measure, *i.e.*, angle at centre of circle which intercepts an arc equal in length to the radius.

$360^\circ = 2\pi.$ $180^\circ = \pi.$

Numbers.		Logarithms.
$360^\circ =$	360°	2.55 630 250
$360^\circ =$	$21\,600'$	4.33 445 375
$360^\circ =$	$1\,296\,000''$	6.11 260 500
$360^\circ =$	24 hours	1.38 021 124
$360^\circ =$	1 440 minutes	3.15 836 249
$360^\circ =$	86 400 seconds	4.93 651 374
1 hour =	15°	1.17 609 126
1 hour =	$900'$	2.95 424 251
1 hour =	$54\,000''$	4.73 239 376
$\rho^\circ = \frac{180^\circ}{\pi} =$	$57^\circ.29\,577\,95\hat{1}$	1.75 812 263
=	$57^\circ 17' 44''.806$	
$\rho' = \frac{10\,800'}{\pi} =$	$3437'.74\,677\,07\hat{8}$	3.53 627 38$\hat{8}$
$\rho'' = \frac{648\,000''}{\pi} =$	$206\,264''.80\,624\hat{4}$	5.31 442 51$\hat{3}$
$\rho_h = \left(\frac{12}{\pi}\right)_h =$	$3_h.81\,971\,86\hat{3}$	0.58 203 13$\hat{7}$
$\rho_m = \left(\frac{720}{\pi}\right)_m =$	$229_m.18\,311\,805$	2.36 018 26$\hat{2}$
$\rho_s = \left(\frac{43\,200}{\pi}\right)_s =$	$13\,750_s.98\,7083$	4.13 833 38$\hat{7}$
$1_r = 90^\circ = \frac{\pi}{2} =$	1.57 079 63$\hat{2}$	0.19 611 98$\hat{7}$
$60^\circ = \frac{\pi}{3} =$	1.04 719 755	0.02 002 862
$1^\circ = \frac{\pi}{180} =$	0.01 745 32$\hat{9}$	8.24 187 737 − 10
$1' = \frac{\pi}{10\,800} =$	0.00 029 089	6.46 372 61$\hat{1}$ − 10
$1'' = \frac{\pi}{648000} =$	0.00 000 485	4.68 557 48$\hat{6}$ − 10
$1_h = \frac{\pi}{12} =$	0.26 179 939	9.41 796 86$\hat{2}$ − 10
$1_m = \frac{\pi}{720} =$	0.00 436 33$\hat{2}$	7.63 981 73$\hat{7}$ − 10
$1_s = \frac{\pi}{43\,200} =$	0.00 007 272	5.86 166 61$\hat{2}$ − 10

log sin ϕ = log ϕ'' + S. log tan ϕ = log ϕ'' + T.

0°

log ϕ'' = log sin ϕ + S'. log ϕ'' = log tan ϕ + T'.

″	′	S	T	Log. Sin.	S′	T′	Log. Tan.
0	**0**	4.685 57	57	— ∞	5.314 43	43	— ∞
60	1		57	6.46 372	43	43	6.46 372
120	2		57	.76 475	43	43	.76 475
180	3		57	.94 084	43	43	.94 084
240	4		57	7.06 578	43	43	7.06 578
300	5	4.685 57	57	7.16 269	5.314 43	43	7.16 269
360	6	57	57	.24 187	43	43	.24 188
420	7	57	57	.30 883	43	43	.30 882
480	8	57	57	.36 681	43	43	.36 681
540	9	57	57	.41 797	43	43	.41 797
600	**10**	4.685 57	57	7.46 372	5.314 43	43	7.46 372
660	11	57	57	.50 512	43	43	.50 512
720	12	57	57	.54 290	43	43	.54 291
780	13	57	57	.57 767	43	43	.57 767
840	14	57	57	.60 985	43	43	.60 985
900	15	4.685 57	58	7.63 981	5.314 43	42	7.63 982
960	16	57	58	.66 784	43	42	.66 785
1020	17	57	58	.69 417	43	42	.69 418
1080	18	57	58	.71 899	43	42	.71 900
1140	19	57	58	.74 248	43	42	.74 248
1200	**20**	4.685 57	58	7.76 475	5.314 43	42	7.76 476
1260	21	57	58	.78 594	43	42	.78 595
1320	22	57	58	.80 614	43	42	.80 615
1380	23	57	58	.82 545	43	42	.82 546
1440	24	57	58	.84 393	43	42	.84 394
1500	25	4.685 57	58	7.86 166	5.314 43	41	7.86 167
1560	26	57	58	.87 869	43	41	.87 871
1620	27	57	58	.89 508	43	41	.89 510
1680	28	57	58	.91 088	43	41	.91 089
1740	29	57	58	.92 612	43	41	.92 613
1800	**30**	4.685 57	58	7.94 084	5.314 43	41	7.94 086
1860	31	57	58	.95 508	43	41	.95 510
1920	32	57	58	.96 887	43	41	.96 889
1980	33	57	59	.98 223	43	41	.98 225
2040	34	57	59	.99 520	43	41	.99 522
2100	35	4.685 56	59	8.00 778	5.314 43	41	8.00 781
2160	36	56	59	.02 002	43	41	.02 004
2220	37	56	59	.03 192	43	41	.03 194
2280	38	56	59	.04 350	43	40	.04 352
2340	39	56	59	.05 478	43	40	.05 481
2400	**40**	4.685 56	59	8.06 577	5.314 43	40	8.06 580
2460	41	56	59	.07 650	43	40	.07 653
2520	42	56	59	.08 696	43	40	.08 699
2580	43	56	60	.09 718	43	40	.09 721
2640	44	56	60	.10 716	43	40	.10 720
2700	45	4.685 56	60	8.11 692	5.314 44	40	8.11 696
2760	46	56	60	.12 647	44	40	.12 651
2820	47	56	60	.13 581	44	40	.13 585
2880	48	56	60	.14 495	44	39	.14 499
2940	49	56	60	.15 390	44	39	.15 395
3000	**50**	4.685 56	60	8.16 268	5.314 44	39	8.16 272
3060	51	56	60	.17 128	44	39	.17 133
3120	52	56	61	.17 971	44	39	.17 976
3180	53	56	61	.18 798	44	39	.18 803
3240	54	55	61	.19 610	44	39	.19 615
3300	55	4.685 55	61	8.20 407	5.314 44	39	8.20 412
3360	56	55	61	.21 189	44	38	.21 195
3420	57	55	61	.21 958	44	38	.21 964
3480	58	55	61	.22 713	44	38	.22 719
3540	59	55	62	.23 455	44	38	.23 462

log sin ϕ = log ϕ'' + S. log tan ϕ = log ϕ'' + T. **1°** log ϕ'' = log sin ϕ + S'. log ϕ'' = log tan ϕ + T''.

$''$	$'$	S	T	Log. Sin.	S′	T″	Log. Tan.
3600	**0**	4.685 55	62	8.24 185	5.314 45	38	8.24 192
3660	1	55	62	.24 903	45	38	.24 910
3720	2	55	62	.25 609	45	38	.25 616
3780	3	55	63	.26 304	45	37	.26 311
3840	4	55	63	.26 988	45	37	.26 995
3900	5	4.685 55	63	8.27 661	5.314 45	37	8.27 669
3960	6	55	63	.28 324	45	37	.28 332
4020	7	54	63	.28 977	45	37	.28 985
4080	8	54	63	.29 620	45	37	.29 629
4140	9	54	63	.30 254	45	36	.30 263
4200	**10**	4.685 54	63	8.30 879	5.314 45	36	8.30 888
4260	11	54	63	.31 495	45	36	.31 504
4320	12	54	64	.32 102	45	36	.32 112
4380	13	54	64	.32 701	46	36	.32 711
4440	14	54	64	.33 292	46	36	.33 302
4500	15	4.685 54	64	8.33 875	5.314 46	35	8.33 885
4560	16	54	64	.34 450	46	35	.34 461
4620	17	54	65	.35 018	46	35	.35 029
4680	18	54	65	.35 578	46	35	.35 589
4740	19	53	65	.36 131	46	35	.36 143
4800	**20**	4.685 53	65	8.36 677	5.314 46	34	8.36 689
4860	21	53	65	.37 217	46	34	.37 229
4920	22	53	65	.37 750	46	34	.37 762
4980	23	53	66	.38 276	46	34	.38 289
5040	24	53	66	.38 796	47	34	.38 809
5100	25	4.685 53	66	8.39 310	5.314 47	33	8.39 323
5160	26	53	66	.39 818	47	33	.39 831
5220	27	53	67	.40 320	47	33	.40 334
5280	28	52	67	.40 816	47	33	.40 830
5340	29	52	67	.41 307	47	33	.41 321
5400	**30**	4.685 52	67	8.41 792	5.314 47	32	8.41 807
5460	31	52	67	.42 271	47	32	.42 287
5520	32	52	68	.42 746	47	32	.42 762
5580	33	52	68	.43 215	48	32	.43 231
5640	34	52	68	.43 680	48	31	.43 696
5700	35	4.685 52	68	8.44 139	5.314 48	31	8.44 156
5760	36	52	69	.44 594	48	31	.44 611
5820	37	51	69	.45 044	48	31	.45 061
5880	38	51	69	.45 489	48	30	.45 507
5940	39	51	69	.45 930	48	30	.45 948
6000	**40**	4.685 51	69	8.46 366	5.314 48	30	8.46 385
6060	41	51	70	.46 798	49	30	.46 817
6120	42	51	70	.47 226	49	30	.47 245
6180	43	51	70	.47 650	49	29	.47 669
6240	44	51	70	.48 069	49	29	.48 089
6300	45	4.685 50	71	8.48 485	5.314 49	29	8.48 505
6360	46	50	71	.48 896	49	28	.48 917
6420	47	50	71	.49 304	49	28	.49 325
6480	48	50	72	.49 708	49	28	.49 729
6540	49	50	72	.50 108	50	28	.50 130
6600	**50**	4.685 50	72	8.50 504	5.314 50	27	8.50 526
6660	51	50	72	.50 897	50	27	.50 920
6720	52	50	73	.51 286	50	27	.51 310
6780	53	49	73	.51 672	50	27	.51 696
6840	54	49	73	.52 055	50	26	.52 079
6900	55	4.685 49	73	8.52 434	5.314 50	26	8.52 458
6960	56	49	74	.52 810	51	26	.52 835
7020	57	49	74	.53 183	51	25	.53 208
7080	58	49	74	.53 552	51	25	.53 578
7140	59	49	75	.53 918	51	25	.53 944

log sin ϕ = log ϕ'' + S. log tan ϕ = log ϕ'' + T.

2°

log ϕ'' = log sin ϕ + S'. log ϕ'' = log tan ϕ + T'.

"	′	S	T	Log. Sin.	S′	T′	Log. Tan.
7200	**0**	4.685 48	75	8.54 282	5.314 51	25	8.54 308
7260	1	48	75	.54 642	51	24	.54 669
7320	2	48	75	.54 999	51	24	.55 027
7380	3	48	76	.55 354	52	24	.55 381
7440	4	48	76	.55 705	52	23	.55 733
7500	5	4.685 48	76	8.56 054	5.314 52	23	8.56 083
7560	6	48	77	.56 400	52	23	.56 429
7620	7	47	77	.56 743	52	22	.56 772
7680	8	47	77	.57 083	52	22	.57 113
7740	9	47	78	.57 421	52	22	.57 452
7800	**10**	4.685 47	78	8.57 756	5.314 53	22	8.57 787
7860	11	47	78	.58 089	53	21	.58 121
7920	12	47	79	.58 419	53	21	.58 451
7980	13	46	79	.58 747	53	21	.58 779
8040	14	46	79	.59 072	53	20	.59 105
8100	15	4.685 46	80	8.59 395	5.314 53	20	8.59 428
8160	16	46	80	.59 715	54	20	.59 749
8220	17	46	80	.60 033	54	19	.60 067
8280	18	46	81	.60 349	54	19	.60 384
8340	19	45	81	.60 662	54	19	.60 698
8400	**20**	4.685 45	81	8.60 973	5.314 54	18	8.61 009
8460	21	45	82	.61 282	54	18	.61 319
8520	22	45	82	.61 589	55	18	.61 626
8580	23	45	82	.61 893	55	17	.61 931
8640	24	45	83	.62 196	55	17	.62 234
8700	25	4.685 44	83	8.62 496	5.314 55	16	8.62 535
8760	26	44	83	.62 795	55	16	.62 834
8820	27	44	84	.63 091	55	16	.63 131
8880	28	44	84	.63 385	56	15	.63 425
8940	29	44	84	.63 677	56	15	.63 718
9000	**30**	4.685 43	85	8.63 968	5.314 56	15	8.64 009
9060	31	43	85	.64 256	56	14	.64 298
9120	32	43	86	.64 543	56	14	.64 585
9180	33	43	86	.64 827	57	14	.64 870
9240	34	43	86	.65 110	57	13	.65 153
9300	35	4.685 43	87	8.65 391	5.314 57	13	8.65 435
9360	36	42	87	.65 670	57	12	.65 715
9420	37	42	87	.65 947	57	12	.65 993
9480	38	42	88	.66 223	58	12	.66 269
9540	39	42	88	.66 497	58	11	.66 543
9600	**40**	4.685 42	89	8.66 769	5.314 58	11	8.66 816
9660	41	41	89	.67 039	58	10	.67 087
9720	42	41	89	.67 308	58	10	.67 356
9780	43	41	90	.67 575	59	10	.67 624
9840	44	41	90	.67 840	59	09	.67 890
9900	45	4.685 41	91	8.68 104	5.314 59	09	8.68 154
9960	46	40	91	.68 366	59	08	.68 417
10020	47	40	91	.68 627	59	08	.68 678
10080	48	40	92	.68 886	60	08	.68 938
10140	49	40	92	.69 144	60	07	.69 196
10200	**50**	4.685 40	93	8.69 400	5.314 60	07	8.69 453
10260	51	39	93	.69 654	60	06	.69 708
10320	52	39	93	.69 907	60	06	.69 961
10380	53	39	94	.70 159	61	06	.70 214
10440	54	39	94	.70 409	61	05	.70 464
10500	55	4.685 38	95	8.70 657	5.314 61	05	8.70 714
10560	56	38	95	.70 905	61	04	.70 962
10620	57	38	96	.71 150	61	04	.71 208
10680	58	38	96	.71 395	62	03	.71 453
10740	59	38	97	.71 638	62	03	.71 697

TABLE IV.

LOGARITHMIC SINES AND TANGENTS

OF ALL ANGLES FROM 0° TO 90°

AT INTERVALS OF 1′.

′	Log. Sin.	D	Log. Tan.	Com. D.	Log. Cot.	Log. Cos.	
0	− ∞		− ∞		+ ∞	0.00 000	60
1	6.46 372		6.46 372		3.53 627	0.00 000	59
2	6.76 475	30103	6.76 475	30103	3.23 524	0.00 000	58
3	6.94 084	17609	6.94 084	17609	3.05 916	0.00 000	57
4	7.06 578	12494	7.06 578	12494	2.93 422	0.00 000	56
5	7.16 269	9691	7.16 269	9691	2.83 731	0.00 000	55
6	7.24 187	7918	7.24 188	7918	2.75 812	0.00 000	54
7	7.30 882	6695	7.30 882	6694	2.69 117	0.00 000	53
8	7.36 681	5799	7.36 681	5799	2.63 318	0.00 000	52
9	7.41 797	5115	7.41 797	5115	2.58 203	0.00 000	51
10	7.46 372	4575	7.46 372	4575	2.53 627	0.00 000	50
11	7.50 512	4139	7.50 512	4139	2.49 488	0.00 000	49
12	7.54 290	3778	7.54 291	3779	2.45 709	9.99 999	48
13	7.57 767	3476	7.57 767	3476	2.42 233	9.99 999	47
14	7.60 985	3218	7.60 985	3218	2.39 014	9.99 999	46
15	7.63 981	2996	7.63 982	2996	2.36 018	9.99 999	45
16	7.66 784	2803	7.66 785	2803	2.33 215	9.99 999	44
17	7.69 417	2633	7.69 418	2633	2.30 582	9.99 999	43
18	7.71 899	2482	7.71 900	2482	2.28 099	9.99 999	42
19	7.74 248	2348	7.74 248	2348	2.25 751	9.99 999	41
20	7.76 475	2227	7.76 476	2227	2.23 524	9.99 999	40
21	7.78 594	2119	7.78 595	2119	2.21 405	9.99 999	39
22	7.80 614	2020	7.80 615	2020	2.19 384	9.99 999	38
23	7.82 545	1930	7.82 546	1930	2.17 454	9.99 999	37
24	7.84 393	1848	7.84 394	1848	2.15 605	9.99 999	36
25	7.86 166	1773	7.86 167	1773	2.13 832	9.99 999	35
26	7.87 869	1703	7.87 871	1703	2.12 129	9.99 999	34
27	7.89 508	1639	7.89 510	1639	2.10 490	9.99 998	33
28	7.91 088	1579	7.91 089	1579	2.08 910	9.99 998	32
29	7.92 612	1524	7.92 613	1524	2.07 386	9.99 998	31
30	7.94 084	1472	7.94 086	1472	2.05 914	9.99 998	30
31	7.95 508	1424	7.95 510	1424	2.04 490	9.99 998	29
32	7.96 887	1379	7.96 889	1379	2.03 111	9.99 998	28
33	7.98 223	1336	7.98 225	1336	2.01 774	9.99 998	27
34	7.99 520	1296	7.99 522	1296	2.00 478	9.99 998	26
35	8.00 778	1258	8.00 781	1259	1.99 219	9.99 997	25
36	8.02 002	1223	8.02 004	1223	1.97 995	9.99 997	24
37	8.03 192	1190	8.03 194	1190	1.96 805	9.99 997	23
38	8.04 350	1158	8.04 352	1158	1.95 647	9.99 997	22
39	8.05 478	1128	8.05 481	1128	1.94 519	9.99 997	21
40	8.06 577	1099	8.06 580	1099	1.93 419	9.99 997	20
41	8.07 650	1072	8.07 653	1072	1.92 347	9.99 997	19
42	8.08 696	1046	8.08 699	1046	1.91 300	9.99 997	18
43	8.09 718	1022	8.09 721	1022	1.90 278	9.99 996	17
44	8.10 716	998	8.10 720	999	1.89 279	9.99 996	16
45	8.11 692	976	8.11 696	976	1.88 303	9.99 996	15
46	8.12 647	954	8.12 651	954	1.87 349	9.99 996	14
47	8.13 581	934	8.13 585	934	1.86 415	9.99 996	13
48	8.14 495	914	8.14 499	914	1.85 500	9.99 996	12
49	8.15 390	895	8.15 395	895	1.84 605	9.99 995	11
50	8.16 268	877	8.16 272	877	1.83 727	9.99 995	10
51	8.17 128	860	8.17 133	860	1.82 867	9.99 995	9
52	8.17 971	843	8.17 976	843	1.82 023	9.99 995	8
53	8.18 798	827	8.18 803	827	1.81 196	9.99 995	7
54	8.19 610	811	8.19 615	812	1.80 384	9.99 994	6
55	8.20 407	797	8.20 412	797	1.79 587	9.99 994	5
56	8.21 189	782	8.21 195	783	1.78 804	9.99 994	4
57	8.21 958	768	8.21 964	768	1.78 036	9.99 994	3
58	8.22 713	755	8.22 719	755	1.77 280	9.99 994	2
59	8.23 455	742	8.23 462	742	1.76 538	9.99 993	1
60	8.24 185	730	8.24 192	730	1.75 808	9.99 993	0
	Log. Cos.	D	Log. Cot.	Com. D.	Log. Tan.	Log. Sin.	′

′	Log. Sin.	D	Log. Tan.	Com. D.	Log. Cot.	Log. Cos.	
0	8.24 185	718	8.24 192	718	1.75 808	9.99 993	**60**
1	8.24 903	706	8.24 910	706	1.75 090	9.99 993	59
2	8.25 609	694	8.25 616	695	1.74 383	9.99 993	58
3	8.26 304	684	8.26 311	684	1.73 688	9.99 992	57
4	8.26 988	673	8.26 995	673	1.73 004	9.99 992	56
5	8.27 661	663	8.27 669	663	1.72 331	9.99 992	55
6	8.28 324	653	8.28 332	653	1.71 667	9.99 992	54
7	8.28 977	643	8.28 985	643	1.71 014	9.99 992	53
8	8.29 620	634	8.29 629	634	1.70 371	9.99 991	52
9	8.30 254	625	8.30 263	625	1.69 736	9.99 991	51
10	8.30 879	616	8.30 888	616	1.69 111	9.99 991	**50**
11	8.31 495	607	8.31 504	607	1.68 495	9.99 990	49
12	8.32 103	599	8.32 112	599	1.67 888	9.99 990	48
13	8.32 701	591	8.32 711	591	1.67 288	9.99 990	47
14	8.33 292	583	8.33 302	583	1.66 697	9.99 990	46
15	8.33 875	575	8.33 885	575	1.66 114	9.99 989	45
16	8.34 450	567	8.34 461	568	1.65 539	9.99 989	44
17	8.35 018	560	8.35 029	560	1.64 971	9.99 989	43
18	8.35 578	553	8.35 589	553	1.64 410	9.99 989	42
19	8.36 131	546	8.36 143	546	1.63 857	9.99 988	41
20	8.36 677	539	8.36 689	539	1.63 310	9.99 988	**40**
21	8.37 217	533	8.37 229	533	1.62 771	9.99 988	39
22	8.37 750	526	8.37 762	527	1.62 238	9.99 987	38
23	8.38 276	520	8.38 289	520	1.61 711	9.99 987	37
24	8.38 796	514	8.38 809	514	1.61 191	9.99 987	36
25	8.39 310	508	8.39 323	508	1.60 676	9.99 986	35
26	8.39 818	502	8.39 831	502	1.60 168	9.99 986	34
27	8.40 320	496	8.40 334	496	1.59 666	9.99 986	33
28	8.40 816	491	8.40 830	491	1.59 169	9.99 986	32
29	8.41 307	485	8.41 321	485	1.58 678	9.99 985	31
30	8.41 792	479	8.41 807	480	1.58 193	9.99 985	**30**
31	8.42 271	474	8.42 287	475	1.57 713	9.99 985	29
32	8.42 746	469	8.42 762	469	1.57 238	9.99 984	28
33	8 43 215	464	8.43 231	464	1.56 768	9.99 984	27
34	8.43 680	459	8.43 696	460	1.56 304	9.99 984	26
35	8.44 139	454	8.44 156	455	1.55 844	9.99 983	25
36	8.44 594	450	8.44 611	450	1.55 389	9.99 983	24
37	8.45 044	445	8.45 061	445	1.54 938	9.99 982	23
38	8.45 489	440	8.45 507	441	1.54 493	9.99 983	22
39	8.45 930	436	8.45 948	437	1.54 052	9.99 982	21
40	8.46 366	432	8.46 385	432	1.53 615	9.99 981	**20**
41	8.46 798	428	8.46 817	428	1.53 183	9.99 981	19
42	8.47 226	423	8.47 245	424	1.52 754	9.99 981	18
43	8.47 650	419	8.47 669	419	1.52 330	9.99 980	17
44	8.48 069	415	8.48 089	416	1.51 911	9.99 980	16
45	8.48 485	411	8.48 505	412	1.51 495	9.99 979	15
46	8.48 896	407	8.48 917	408	1.51 083	9.99 979	14
47	8.49 304	404	8.49 325	404	1.50 675	9.99 979	13
48	8.49 708	400	8.49 729	400	1.50 270	9.99 978	12
49	8.50 108	396	8.50 130	396	1.49 870	9.99 978	11
50	8.50 504	393	8.50 526	393	1.49 473	9.99 978	**10**
51	8.50 897	389	8.50 920	390	1.49 080	9.99 977	9
52	8.51 286	386	8.51 310	386	1.48 690	9.99 977	8
53	8.51 672	382	8.51 696	383	1.48 304	9.99 976	7
54	8.52 055	379	8.52 079	379	1.47 921	9.99 976	6
55	8.52 434	375	8.52 458	376	1.47 541	9.99 975	5
56	8.52 810	373	8.52 835	373	1.47 165	9.99 975	4
57	8.53 183	369	8.53 208	370	1.46 792	9.99 975	3
58	8.53 552	366	8.53 578	366	1.46 422	9.99 974	2
59	8.53 918	363	8.53 944	364	1.46 055	9.99 974	1
60	8.54 282		8.54 308		1.45 691	9.99 973	**0**
	Log. Cos.	D	Log. Cot.	Com. D.	Log. Tan.	Log. Sin.	′

′	Log. Sin.	D	Log. Tan.	Com. D.	Log. Cot.	Log. Cos.	
0	8.54 282	360	8.54 308	366	1.45 691	9.99 973	60
1	8.54 642	357	8.54 669	358	1.45 331	9.99 973	59
2	8.54 999	354	8.55 027	354	1.44 973	9.99 972	58
3	8.55 354	351	8.55 381	352	1.44 618	9.99 972	57
4	8.55 705	348	8.55 733	349	1.44 266	9.99 971	56
5	8.56 054	346	8.56 083	346	1.43 917	9.99 971	55
6	8.56 400	343	8.56 429	343	1.43 571	9.99 971	54
7	8.56 743	340	8.56 772	341	1.43 227	9.99 970	53
8	8.57 083	338	8.57 113	338	1.42 886	9.99 970	52
9	8.57 421	335	8.57 452	335	1.42 548	9.99 969	51
10	8.57 756	333	8.57 787	333	1.42 212	9.99 969	50
11	8.58 089	330	8.58 121	330	1.41 879	9.99 968	49
12	8.58 419	327	8.58 451	328	1.41 548	9.99 968	48
13	8.58 747	325	8.58 779	325	1.41 220	9.99 967	47
14	8.59 072	323	8.59 105	323	1.40 895	9.99 967	46
15	8.59 395	320	8.59 428	320	1.40 571	9.99 966	45
16	8.59 715	318	8.59 749	320	1.40 251	9.99 966	44
17	8.60 033	316	8.60 067	318	1.39 932	9.99 965	43
18	8.60 349	313	8.60 384	316	1.39 616	9.99 965	42
19	8.60 662	311	8.60 698	314	1.39 302	9.99 964	41
20	8.60 973	309	8.61 009	311	1.38 991	9.99 964	40
21	8.61 282	306	8.61 319	309	1.38 681	9.99 963	39
22	8.61 589	304	8.61 626	307	1.38 374	9.99 963	38
23	8.61 893	302	8.61 931	305	1.38 068	9.99 962	37
24	8.62 196	300	8.62 234	303	1.37 765	9.99 962	36
25	8.62 496	298	8.62 535	300	1.37 465	9.99 961	35
26	8.62 795	296	8.62 834	299	1.37 166	9.99 961	34
27	8.63 091	294	8.63 131	297	1.36 869	9.99 960	33
28	8.63 385	292	8.63 425	294	1.36 574	9.99 959	32
29	8.63 677	290	8.63 718	293	1.36 281	9.99 959	31
30	8.63 968	288	8.64 009	291	1.35 990	9.99 958	30
31	8.64 256	286	8.64 298	288	1.35 702	9.99 958	29
32	8.64 543	284	8.64 585	287	1.35 414	9.99 957	28
33	8.64 827	282	8.64 870	285	1.35 129	9.99 957	27
34	8.65 110	281	8.65 153	283	1.34 846	9.99 956	26
35	8.65 391	279	8.65 435	281	1.34 565	9.99 956	25
36	8.65 670	277	8.65 715	280	1.34 285	9.99 955	24
37	8.65 947	275	8.65 993	278	1.34 007	9.99 954	23
38	8.66 223	274	8.66 269	276	1.33 731	9.99 954	22
39	8.66 497	272	8.66 543	274	1.33 456	9.99 953	21
40	8.66 769	270	8.66 816	272	1.33 184	9.99 953	20
41	8.67 039	268	8.67 087	271	1.32 913	9.99 952	19
42	8.67 308	267	8.67 356	269	1.32 643	9.99 952	18
43	8.67 575	265	8.67 624	267	1.32 376	9.99 951	17
44	8.67 840	264	8.67 890	266	1.32 110	9.99 950	16
45	8.68 104	262	8.68 154	264	1.31 845	9.99 950	15
46	8.68 366	260	8.68 417	262	1.31 583	9.99 949	14
47	8.68 627	259	8.68 678	261	1.31 321	9.99 948	13
48	8.68 886	257	8.68 938	259	1.31 062	9.99 948	12
49	8.69 144	256	8.69 196	258	1.30 803	9.99 947	11
50	8.69 400	254	8.69 453	256	1.30 547	9.99 947	10
51	8.69 654	253	8.69 708	255	1.30 292	9.99 946	9
52	8.69 907	251	8.69 961	253	1.30 038	9.99 945	8
53	8.70 159	250	8.70 214	252	1.29 786	9.99 945	7
54	8.70 409	248	8.70 464	250	1.29 535	9.99 944	6
55	8.70 657	247	8.70 714	249	1.29 286	9.99 943	5
56	8.70 905	245	8.70 962	248	1.29 038	9.99 943	4
57	8.71 150	244	8.71 208	246	1.28 791	9.99 942	3
58	8.71 395	243	8.71 453	245	1.28 546	9.99 942	2
59	8.71 638	241	8.71 697	243	1.28 303	9.99 941	1
60	8.71 880		8.71 939	242	1.28 060	9.99 940	0
	Log. Cos.	D	Log. Cot.	Com. D.	Log. Tan.	Log. Sin.	′

′	Log. Sin.	c. d.	Log. Tan.	d.	Log. Cot.	Log. Cos.	
0	8.71 880	240	8.71 939	241	1.28 060	9.99 940	60
1	8.72 120	239	8.72 180	240	1.27 819	9.99 940	59
2	8.72 359	237	8.72 420	238	1.27 579	9.99 939	58
3	8.72 597	236	8.72 659	237	1.27 341	9.99 938	57
4	8.72 833	235	8.72 896	235	1.27 104	9.99 938	56
5	8.73 069	233	8.73 131	235	1.26 868	9.99 937	55
6	8.73 302	233	8.73 366	233	1.26 633	9.99 936	54
7	8.73 533	231	8.73 599	232	1.26 400	9.99 935	53
8	8.73 763	230	8.73 831	231	1.26 168	9.99 935	52
9	8.73 992	229	8.74 062	229	1.25 937	9.99 934	51
10	8.74 226	227	8.74 292	228	1.25 708	9.99 933	50
11	8.74 453	226	8.74 520	227	1.25 479	9.99 933	49
12	8.74 680	225	8.74 748	226	1.25 252	9.99 932	48
13	8.74 905	224	8.74 974	225	1.25 026	9.99 931	47
14	8.75 129	223	8.75 199	223	1.24 801	9.99 931	46
15	8.75 353	221	8.75 422	223	1.24 577	9.99 930	45
16	8.75 574	221	8.75 645	222	1.24 354	9.99 929	44
17	8.75 795	220	8.75 867	220	1.24 133	9.99 928	43
18	8.76 015	219	8.76 087	220	1.23 913	9.99 928	42
19	8.76 233	218	8.76 306	219	1.23 693	9.99 927	41
20	8.76 451	217	8.76 524	218	1.23 475	9.99 926	40
21	8.76 667	216	8.76 741	217	1.23 258	9.99 925	39
22	8.76 883	215	8.76 958	216	1.23 042	9.99 925	38
23	8.77 097	214	8.77 173	215	1.22 827	9.99 924	37
24	8.77 310	213	8.77 386	214	1.22 613	9.99 923	36
25	8.77 522	212	8.77 599	213	1.22 400	9.99 923	35
26	8.77 733	211	8.77 811	212	1.22 188	9.99 922	34
27	8.77 943	210	8.78 022	211	1.21 978	9.99 921	33
28	8.78 152	209	8.78 232	210	1.21 768	9.99 920	32
29	8.78 360	208	8.78 441	209	1.21 559	9.99 919	31
30	8.78 567	207	8.78 648	207	1.21 351	9.99 919	30
31	8.78 773	206	8.78 853	207	1.21 144	9.99 918	29
32	8.78 978	205	8.79 061	206	1.20 938	9.99 917	28
33	8.79 183	204	8.79 266	204	1.20 734	9.99 916	27
34	8.79 386	203	8.79 470	204	1.20 530	9.99 916	26
35	8.79 588	202	8.79 673	203	1.20 327	9.99 915	25
36	8.79 789	201	8.79 875	202	1.20 125	9.99 914	24
37	8.79 989	200	8.80 076	201	1.19 923	9.99 913	23
38	8.80 189	199	8.80 276	200	1.19 723	9.99 912	22
39	8.80 387	198	8.80 476	199	1.19 524	9.99 912	21
40	8.80 585	197	8.80 674	198	1.19 326	9.99 911	20
41	8.80 782	197	8.80 871	197	1.19 128	9.99 910	19
42	8.80 977	195	8.81 068	197	1.18 931	9.99 909	18
43	8.81 172	195	8.81 264	195	1.18 736	9.99 908	17
44	8.81 366	194	8.81 459	195	1.18 541	9.99 907	16
45	8.81 560	193	8.81 653	194	1.18 347	9.99 907	15
46	8.81 752	192	8.81 846	193	1.18 154	9.99 906	14
47	8.81 943	191	8.82 038	192	1.17 961	9.99 905	13
48	8.82 134	191	8.82 230	191	1.17 770	9.99 904	12
49	8.82 324	189	8.82 420	190	1.17 579	9.99 903	11
50	8.82 513	189	8.82 610	188	1.17 389	9.99 902	10
51	8.82 701	188	8.82 799	188	1.17 201	9.99 902	9
52	8.82 888	187	8.82 987	188	1.17 012	9.99 901	8
53	8.83 075	186	8.83 175	187	1.16 825	9.99 900	7
54	8.83 260	185	8.83 361	186	1.16 638	9.99 899	6
55	8.83 445	185	8.83 547	185	1.16 453	9.99 898	5
56	8.83 629	184	8.83 732	185	1.16 268	9.99 897	4
57	8.83 813	183	8.83 916	184	1.16 083	9.99 896	3
58	8.83 995	182	8.84 100	183	1.15 900	9.99 896	2
59	8.84 177	182	8.84 282	182	1.15 717	9.99 895	1
60	8.84 358	181	8.84 464	182	1.15 535	9.99 894	0
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	′

P. P.

	330	320	310	300
6	33.0	32.0	31.0	30.0
7	38.5	37.3	36.1	35.0
8	44.0	42.6	41.3	40.0
9	49.5	48.0	46.5	45.0
10	55.0	53.3	51.6	50.0
20	110.0	106.6	103.3	100.0
30	165.0	160.0	155.0	150.0
40	220.0	213.3	206.6	200.0
50	275.0	266.6	258.3	250.0

	290	280	270	260
6	29.0	28.0	27.0	26.0
7	33.8	32.6	31.5	30.3
8	38.6	37.3	36.0	34.6
9	43.5	42.0	40.5	39.0
10	48.3	46.6	45.0	43.3
20	96.6	93.3	90.0	86.6
30	145.0	140.0	135.0	130.0
40	193.3	186.6	180.0	173.3
50	241.6	233.3	225.0	216.6

	250	240	230	220
6	25.0	24.0	23.0	22.0
7	29.1	28.0	26.8	25.6
8	33.3	32.0	30.6	29.3
9	37.5	36.0	34.5	33.0
10	41.6	40.0	38.3	36.6
20	83.3	80.0	76.6	73.3
30	125.0	120.0	115.0	110.0
40	166.6	160.0	153.3	146.6
50	208.3	200.0	191.6	183.3

	210	200	190	180
6	21.0	20.0	19.0	18.0
7	24.5	23.3	22.1	21.0
8	28.0	26.6	25.3	24.0
9	31.5	30.0	28.5	27.0
10	35.0	33.3	31.6	30.0
20	70.0	66.6	63.3	60.0
30	105.0	100.0	95.0	90.0
40	140.0	133.3	126.6	120.0
50	175.0	166.6	158.3	150.0

	9̂	9	8	7	6	5
6	0.9	0.9	0.8	0.7	0.6	0.5
7	1.1	1.0	0.9	0.8	0.7	0.6
8	1.2	1.2	1.0	0.9	0.8	0.6
9	1.4	1.3	1.2	1.0	0.9	0.7
10	1.6	1.5	1.3	1.1	1.0	0.8
20	3.1	3.0	2.6	2.3	2.0	1.6
30	4.7	4.5	4.0	3.5	3.0	2.5
40	6.3	6.0	5.3	4.6	4.0	3.3
50	7.9	7.5	6.6	5.8	5.0	4.1

	4̂	4	3	2	1	0̂
6	0.4	0.4	0.3	0.2	0.1	0.0
7	0.5	0.4	0.3	0.2	0.1	0.0
8	0.6	0.5	0.4	0.2	0.1	0.0
9	0.7	0.6	0.4	0.3	0.1	0.1
10	0.7	0.6	0.5	0.3	0.1	0.1
20	1.5	1.3	1.0	0.6	0.3	0.1
30	2.2	2.0	1.5	1.0	0.5	0.2
40	3.0	2.6	2.0	1.3	0.6	0.3
50	3.7	3.3	2.5	1.6	0.8	0.4

P. P.

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.		P. P.
0	8.84 358	180	8.84 464	181	1.15 535	9.99 894	60	
1	8.84 538	180	8.84 645	180	1.15 354	9.99 893	59	
2	8.84 718	178	8.84 826	179	1.15 174	9.99 892	58	
3	8.84 897	178	8.85 005	179	1.14 994	9.99 891	57	
4	8.85 075	177	8.85 184	178	1.14 815	9.99 890	56	
5	8.85 252	176	8.85 363	177	1.14 637	9.99 889	55	
6	8.85 429	176	8.85 540	176	1.14 459	9.99 888	54	180 177 174 171
7	8.85 605	175	8.85 717	176	1.14 283	9.99 888	53	6 18.0 17.7 17.4 17.1
8	8.85 780	174	8.85 893	176	1.14 107	9.99 887	52	7 21.0 20.6 20.3 19.9
9	8.85 954	174	8.86 068	175	1.13 931	9.99 886	51	8 24.0 23.6 23.2 22.8
10	8.86 128	173	8.86 243	174	1.13 756	9.99 885	50	9 27.0 26.5 26.1 25.6
11	8.86 301	172	8.86 417	174	1.13 582	9.99 884	49	10 30.0 29.5 29.0 28.5
12	8.86 474	171	8.86 590	173	1.13 409	9.99 883	48	20 60.0 59.0 58.0 57.0
13	8.86 645	171	8.86 763	172	1.13 237	9.99 882	47	30 90.0 88.5 87.0 85.5
14	8.86 816	171	8.86 935	172	1.13 065	9.99 881	46	40 120.0 118.0 116.0 114.0
15	8.86 987	170	8.87 106	171	1.12 893	9.99 880	45	50 150.0 147.5 145.0 142.5
16	8.87 156	169	8.87 277	170	1.12 723	9.99 879	44	
17	8.87 325	169	8.87 447	170	1.12 553	9.99 878	43	
18	8.87 494	168	8.87 616	169	1.12 384	9.99 877	42	
19	8.87 661	167	8.87 785	169	1.12 215	9.99 876	41	
20	8.87 828	167	8.87 953	168	1.12 047	9.99 875	40	168 165 162 159
21	8.87 995	166	8.88 120	167	1.11 880	9.99 874	39	6 16.8 16.5 16.2 15.9
22	8.88 160	165	8.88 287	167	1.11 713	9.99 874	38	7 19.6 19.2 18.9 18.5
23	8.88 326	166	8.88 453	166	1.11 547	9.99 873	37	8 22.4 22.0 21.6 21.2
24	8.88 490	164	8.88 618	165	1.11 381	9.99 872	36	9 25.2 24.7 24.3 33.8
25	8.88 654	163	8.88 783	165	1.11 216	9.99 871	35	10 28.0 27.5 27.0 26.5
26	8.88 817	163	8.88 947	164	1.11 052	9.99 870	34	20 56.0 55.0 54.0 53.0
27	8.88 980	162	8.89 111	163	1.10 889	9.99 869	33	30 84.0 82.5 81.0 79.5
28	8.89 142	162	8.89 274	163	1.10 726	9.99 868	32	40 112.0 110.0 108.0 106.0
29	8.89 303	161	8.89 436	162	1.10 563	9.99 867	31	50 140.0 137.5 135.0 132.5
30	8.89 464	161	8.89 598	162	1.10 401	9.99 866	30	
31	8.89 624	160	8.89 759	161	1.10 240	9.99 865	29	
32	8.89 784	159	8.89 920	161	1.10 079	9.99 864	28	
33	8.89 943	159	8.90 080	160	1.09 919	9.99 863	27	
34	8.90 101	158	8.90 240	159	1.09 760	9.99 862	26	156 153 150 147
35	8.90 259	158	8.90 398	158	1.09 601	9.99 861	25	6 15.6 15.3 15.0 14.7
36	8.90 417	157	8.90 557	158	1.09 443	9.99 860	24	7 18.2 17.8 17.5 17.1
37	8.90 573	156	8.90 714	157	1.09 285	9.99 859	23	8 20.8 20.4 20.0 19.6
38	8.90 729	156	8.90 872	157	1.09 128	9.99 858	22	9 23.4 22.9 22.5 22.0
39	8.90 885	156	8.91 028	156	1.08 971	9.99 857	21	10 26.0 25.5 25.0 24.5
40	8.91 040	155	8.91 184	156	1.08 815	9.99 856	20	20 52.0 51.0 50.0 49.0
41	8.91 195	154	8.91 340	155	1.08 660	9.99 855	19	30 78.0 76.5 75.0 73.5
42	8.91 349	154	8.91 495	155	1.08 505	9.99 853	18	40 104.0 102.0 100.0 98.0
43	8.91 502	153	8.91 649	154	1.08 350	9.99 852	17	50 130.0 127.5 125.0 122.5
44	8.91 655	153	8.91 803	154	1.08 196	9.99 851	16	
45	8.91 807	152	8.91 957	153	1.08 043	9.99 850	15	
46	8.91 959	151	8.92 109	152	1.07 890	9.99 849	14	
47	8.92 110	151	8.92 262	152	1.07 738	9.99 848	13	144 2 2 1 1 0
48	8.92 261	150	8.92 413	151	1.07 586	9.99 847	12	6 14.4 0.2 0.2 0.1 0.1 0.0
49	8.92 411	150	8.92 565	151	1.07 435	9.99 846	11	7 16.8 0.3 0.2 0.2 0.1 0.0
50	8.92 561	149	8.92 715	150	1.07 284	9.99 845	10	8 19.2 0.3 0.2 0.2 0.1 0.0
51	8.92 710	148	8.92 866	149	1.07 134	9.99 844	9	9 21.6 0.4 0.3 0.2 0.1 0.1
52	8.92 858	148	8.93 013	149	1.06 984	9.99 843	8	10 24.0 0.4 0.3 0.2 0.1 0.1
53	8.93 007	147	8.93 164	149	1.06 835	9.99 842	7	20 48.0 0.8 0.6 0.5 0.3 0.1
54	8.93 154	147	8.93 313	148	1.06 686	9.99 841	6	30 72.0 1.2 1.0 0.7 0.5 0.2
55	8.93 301	146	8.93 461	148	1.06 538	9.99 840	5	40 96.0 1.6 1.3 1.0 0.6 0.3
56	8.93 448	146	8.93 609	147	1.06 390	9.99 839	4	50 120.0 2.1 1.6 1.2 0.8 0.4
57	8.93 594	146	8 93 756	146	1.06 243	9.99 837	3	
58	8.93 740	145	8.93 903	146	1.06 097	9.99 836	2	
59	8.93 885	144	8.94 049	145	1.05 950	9.99 835	1	
60	8.94 029		8.94 195		1.05 805	9.99 834	0	
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	′	P. P.

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	
0	8.94 029	144	8.94 195	145	1.05 805	9.99 834	60
1	8.94 174	143	8.94 340	144	1.05 659	9.99 833	59
2	8.94 317	143	8.94 485	144	1.05 515	9.99 832	58
3	8.94 460	143	8.94 629	144	1.05 370	9.99 831	57
4	8.94 603	142	8.94 773	143	1.05 226	9.99 830	56
5	8.94 745	142	8.94 917	142	1.05 083	9.99 829	55
6	8.94 887	141	8.95 059	142	1.04 940	9.99 827	54
7	8.95 028	141	8.95 202	142	1.04 798	9.99 826	53
8	8.95 169	140	8.95 344	141	1.04 656	9.99 825	52
9	8.95 310	140	8.95 485	141	1.04 514	9.99 824	51
10	8.95 450	139	8.95 626	140	1.04 373	9.99 823	50
11	8.95 589	139	8.95 767	140	1.04 232	9.99 822	49
12	8.95 728	138	8.95 907	140	1.04 092	9.99 821	48
13	8.95 867	138	8.96 047	139	1.03 952	9.99 819	47
14	8.96 005	138	8.96 186	139	1.03 813	9.99 818	46
15	8.96 143	137	8.96 325	138	1.03 674	9.99 817	45
16	8.96 280	137	8.96 464	138	1.03 536	9.99 816	44
17	8.96 417	137	8.96 602	138	1.03 398	9.99 815	43
18	8.96 553	136	8.96 739	137	1.03 260	9.99 814	42
19	8.96 689	136	8.96 876	137	1.03 123	9.99 813	41
20	8.96 825	135	8.97 013	137	1.02 986	9.99 811	40
21	8.96 960	135	8.97 149	136	1.02 850	9.99 810	39
22	8.97 094	134	8.97 285	136	1.02 714	9.99 809	38
23	8.97 229	134	8.97 421	135	1.02 579	9.99 808	37
24	8.97 363	134	8.97 556	135	1.02 444	9.99 807	36
25	8.97 496	133	8.97 690	134	1.02 309	9.99 805	35
26	8.97 629	133	8.97 825	134	1.02 175	9.99 804	34
27	8.97 762	132	8.97 958	133	1.02 041	9.99 803	33
28	8.97 894	132	8.98 092	133	1.01 908	9.99 802	32
29	8.98 026	132	8.98 225	133	1.01 775	9.99 801	31
30	8.98 157	131	8.98 357	132	1.01 642	9.99 799	30
31	8.98 288	131	8.98 490	132	1.01 510	9.99 798	29
32	8.98 419	130	8.98 621	131	1.01 378	9.99 797	28
33	8.98 549	130	8.98 753	131	1.01 247	9.99 796	27
34	8.98 679	130	8.98 884	131	1.01 116	9.99 794	26
35	8.98 808	129	8.99 015	131	1.00 985	9.99 793	25
36	8.98 937	129	8.99 145	130	1.00 855	9.99 792	24
37	8.99 066	128	8.99 275	130	1.00 725	9.99 791	23
38	8.99 194	128	8.99 404	129	1.00 595	9.99 789	22
39	8.99 322	127	8.99 533	129	1.00 466	9.99 788	21
40	8.99 449	127	8.99 662	129	1.00 337	9.99 787	20
41	8.99 577	126	8.99 791	128	1.00 209	9.99 786	19
42	8.99 703	126	8.99 919	128	1.00 081	9.99 784	18
43	8.99 830	126	9.00 046	127	0.99 953	9.99 783	17
44	8.99 956	125	9.00 174	127	0.99 826	9.99 782	16
45	9.00 081	125	9.00 300	126	0.99 699	9.99 781	15
46	9.00 207	125	9.00 427	126	0.99 573	9.99 779	14
47	9.00 332	124	9.00 553	125	0.99 446	9.99 778	13
48	9.00 456	124	9.00 679	125	0.99 321	9.99 777	12
49	9.00 580	124	9.00 804	125	0.99 195	9.99 776	11
50	9.00 704	123	9.00 930	124	0.99 070	9.99 774	10
51	9.00 828	123	9.01 054	124	0.98 945	9.99 773	9
52	9.00 951	122	9.01 179	124	0.98 821	9.99 772	8
53	9.01 073	122	9.01 303	124	0.98 697	9.99 770	7
54	9.01 196	122	9.01 427	123	0.98 573	9.99 769	6
55	9.01 318	122	9.01 550	123	0.98 450	9.99 768	5
56	9.01 440	121	9.01 673	123	0.98 327	9.99 766	4
57	9.01 561	121	9.01 796	122	0.98 204	9.99 765	3
58	9.01 682	120	9.01 918	122	0.98 081	9.99 764	2
59	9.01 803	120	9.02 040	121	0.97 959	9.99 763	1
60	9.01 923		9.02 162		0.97 838	9.99 761	0
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	′

P. P.

	145	144	143	142	141
6	14.5	14.4	14.3	14.2	14.1
7	16.9	16.8	16.7	16.5	16.4
8	19.3	19.2	19.0	18.9	18.8
9	21.7	21.6	21.4	21.3	21.1
10	24.1	24.0	23.8	23.6	23.5
20	48.3	48.0	47.6	47.3	47.0
30	72.5	72.0	71.5	71.0	70.5
40	96.6	96.0	95.3	94.6	94.0
50	120.8	120.0	119.1	118.3	117.5

	140	139	138	137	136
6	14.0	13.9	13.8	13.7	13.6
7	16.3	16.2	16.1	16.0	15.8
8	18.6	18.5	18.4	18.2	18.1
9	21.0	20.8	20.7	20.5	20.4
10	23.3	23.1	23.0	22.8	22.6
20	46.6	46.3	46.0	45.6	45.3
30	70.0	69.5	69.0	68.5	68.0
40	93.3	92.6	92.0	91.3	90.6
50	116.6	115.8	115.0	114.1	113.3

	135	134	133	132
6	13.5	13.4	13.3	13.2
7	15.7	15.6	15.5	15.4
8	18.0	17.8	17.7	17.6
9	20.2	20.1	19.9	19.8
10	22.5	22.3	22.1	22.0
20	45.0	44.6	44.3	44.0
30	67.5	67.0	66.5	66.0
40	90.0	89.3	88.6	88.0
50	112.5	111.6	110.8	110.0

	131	130	129	128
6	13.1	13.0	12.9	12.8
7	15.3	15.1	15.0	14.9
8	17.4	17.3	17.2	17.0
9	19.6	19.5	19.3	19.2
10	21.8	21.6	21.5	21.3
20	43.6	43.3	43.0	42.6
30	65.5	65.0	64.5	64.0
40	87.3	86.6	86.0	85.3
50	109.1	108.3	107.5	106.6

	127	126	125	124	123
6	12.7	12.6	12.5	12.4	12.3
7	14.8	14.7	14.6	14.4	14.3
8	16.9	16.8	16.6	16.5	16.4
9	19.0	18.9	18.7	18.6	18.4
10	21.1	21.0	20.8	20.6	20.5
20	42.3	42.0	41.6	41.3	41.0
30	63.5	63.0	62.5	62.0	61.5
40	84.6	84.0	83.3	82.6	82.0
50	105.8	105.0	104.1	103.3	102.5

	122	121	120	ī	1	ō
6	12.2	12.1	12.0	0.1	0.1	0.0
7	14.2	14.1	14.0	0.2	0.1	0.0
8	16.2	16.1	16.0	0.2	0.1	0.0
9	18.3	18.1	18.0	0.2	0.1	0.1
10	20.3	20.1	20.0	0.2	0.1	0.1
20	40.6	40.3	40.0	0.5	0.3	0.1
30	61.0	60.5	60.0	0.7	0.5	0.2
40	81.3	80.6	80.0	1.0	0.6	0.3
50	101.6	100.8	100.0	1.2	0.8	0.4

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.		′
0	9.01 923	120	9.02 162	121	0.97 838	9.99 761	60	
1	9.02 043	119	9.02 283	121	0.97 716	9.99 760	59	
2	9.02 163	119	9.02 404	120	0.97 595	9.99 759	58	
3	9.02 282	119	9.02 525	120	0.97 475	9.99 757	57	
4	9.02 401	119	9.02 645	120	0.97 354	9.99 756	56	
5	9.02 520	118	9.02 765	119	0.97 234	9.99 754	55	
6	9.02 638	118	9.02 885	119	0.97 115	9.99 753	54	
7	9.02 756	118	9.03 004	119	0.96 995	9.99 752	53	
8	9.02 874	118	9.03 123	119	0.96 876	9.99 750	52	
9	9.02 992	117	9.03 242	119	0.96 757	9.99 749	51	
10	9.03 109	117	9.03 361	118	0.96 639	9.99 748	**50**	
11	9.03 225	116	9.03 479	118	0.96 521	9.99 746	49	
12	9.03 342	116	9.03 597	118	0.96 403	9.99 745	48	
13	9.03 458	116	9.03 714	117	0.96 285	9.99 744	47	
14	9.03 574	116	9.03 831	117	0.96 168	9.99 742	46	
15	9.03 689	115	9.03 948	117	0.96 051	9.99 741	45	
16	9.03 805	115	9 04 065	116	0.95 935	9.99 739	44	
17	9.03 919	114	9.04 181	116	0.95 818	9.99 738	43	
18	9.04 034	114	9.04 297	116	0.95 702	9.99 737	42	
19	9.04 148	114	9.04 413	115	0.95 587	9.99 735	41	
20	9.04 262	114	9.04 528	115	0.95 471	9.99 734	**40**	
21	9.04 376	113	9.04 643	114	0.95 356	9.99 732	39	
22	9.04 489	113	9.04 758	114	0.95 242	9.99 731	38	
23	9.04 602	113	9.04 872	114	0.95 127	9.99 730	37	
24	9.04 715	113	9.04 987	114	0.95 013	9.99 728	36	
25	9.04 828	112	9.05 101	113	0.94 899	9.99 727	35	
26	9.04 940	112	9.05 214	113	0.94 785	9.99 725	34	
27	9.05 052	112	9.05 327	113	0.94 672	9.99 724	33	
28	9.05 163	111	9.05 440	113	0.94 559	9.99 723	32	
29	9.05 275	111	9.05 553	113	0.94 446	9.99 721	31	
30	9.05 386	111	9.05 666	112	0.94 334	9.99 720	**30**	
31	9.05 496	110	9.05 778	112	0.94 222	9.99 718	29	
32	9.05 607	110	9.05 890	112	0.94 110	9.99 717	28	
33	9.05 717	110	9.06 001	111	0.93 998	9.99 715	27	
34	9.05 827	110	9.06 113	111	0.93 887	9.99 714	26	
35	9.05 936	109	9.06 224	111	0.93 776	9.99 712	25	
36	9.06 046	109	9.06 335	110	0.93 665	9.99 711	24	
37	9.06 155	109	9.06 445	110	0.93 554	9.99 710	23	
38	9.06 264	109	9.06 555	110	0.93 444	9.99 708	22	
39	9.06 372	108	9.06 665	109	0.93 334	9.99 707	21	
40	9.06 480	108	9.06 775	109	0.93 225	9.99 705	**20**	
41	9.06 588	108	9.06 884	109	0.93 115	9.99 704	19	
42	9.06 696	107	9.06 994	109	0.93 006	9.99 702	18	
43	9.06 803	107	9.07 102	108	0.92 897	9.99 701	17	
44	9.06 910	107	9.07 211	109	0.92 788	9.99 699	16	
45	9.07 017	106	9.07 319	108	0.92 680	9.99 698	15	
46	9.07 124	106	9.07 428	107	0.92 572	9.99 696	14	
47	9.07 230	106	9.07 535	107	0.92 464	9.99 695	13	
48	9.07 336	106	9.07 643	107	0.92 357	9.99 693	12	
49	9.07 442	105	9.07 750	107	0.92 249	9.99 692	11	
50	9.07 548	105	9.07 857	107	0.92 142	9.99 690	**10**	
51	9.07 653	105	9.07 964	106	0.92 035	9.99 689	9	
52	9.07 758	104	9.08 071	106	0.91 929	9.99 687	8	
53	9.07 863	104	9.08 177	106	0.91 822	9.99 686	7	
54	9.07 967	104	9.08 283	105	0.91 716	9.99 684	6	
55	9.08 072	104	9.08 389	105	0.91 611	9.99 683	5	
56	9.08 176	103	9.08 494	105	0.91 505	9.99 681	4	
57	9.08 279	103	9.08 600	105	0.91 400	9.99 679	3	
58	9.08 383	103	9.08 705	105	0.91 295	9.99 678	2	
59	9.08 486	103	9.08 810	104	0.91 190	9.99 676	1	
60	9.08 589		9.08 914		0.91 085	9.99 675	**0**	
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.		′

P. P.

	121	120	119	118
6	12.1	12.0	11.9	11.8
7	14.2	14.0	13.9	13.7
8	16.2	16.0	15.8	15.7
9	18.2	18.0	17.8	17.7
10	20.2	20.0	19.8	19.6
20	40.5	40.0	39.6	39.3
30	60.7	60.0	59.5	59.0
40	81.0	80.0	79.3	78.6
50	101.2	100.0	99.1	98.3

	117	117	116	115
6	11.7	11.7	11.6	11.5
7	13.7	13.6	13.5	13.4
8	15.6	15.6	15.4	15.3
9	17.6	17.5	17.4	17.2
10	19.6	19.5	19.3	19.1
20	39.1	39.0	38.6	38.3
30	58.7	58.5	58.0	57.5
40	78.3	78.0	77.3	76.6
50	97.9	97.5	96.6	95.8

	114	114	113	112	111
6	11.4	11.4	11.3	11.2	11.1
7	13.3	13.3	13.2	13.0	12.9
8	15.2	15.2	15.0	14.9	14.8
9	17.2	17.1	16.9	16.8	16.6
10	19.1	19.0	18.8	18.6	18.5
20	38.1	38.0	37.6	37.3	37.0
30	57.2	57.0	56.5	56.0	55.5
40	76.3	76.0	75.3	74.6	74.0
50	95.4	95.0	94.1	93.3	92.5

	110	110	109	108
6	11.0	11.0	10.9	10.8
7	12.9	12.8	12.7	12.6
8	14.7	14.6	14.5	14.4
9	16.6	16.5	16.3	16.2
10	18.4	18.3	18.1	18.0
20	36.8	36.6	36.3	36.0
30	55.2	55.0	54.5	54.0
40	73.6	73.3	72.6	72.0
50	92.1	91.6	90.8	90.0

	107	107	106	105	104
6	10.7	10.7	10.6	10.5	10.4
7	12.5	12.5	12.3	12.2	12.1
8	14.3	14.2	14.1	14.0	13.8
9	16.1	16.0	15.9	15.7	15.6
10	17.9	17.8	17.6	17.5	17.3
20	35.8	35.6	35.3	35.0	34.6
30	53.7	53.5	53.0	52.5	52.0
40	71.6	71.3	70.6	70.0	69.3
50	89.6	89.1	88.3	87.5	86.6

	103	103	2	1	1
6	10.3	10.3	0.2	0.1	0.1
7	12.1	12.0	0.2	0.2	0.1
8	13.8	13.7	0.2	0.2	0.1
9	15.5	15.4	0.3	0.2	0.1
10	17.2	17.1	0.3	0.2	0.1
20	34.5	34.3	0.6	0.5	0.3
30	51.7	51.5	1.0	0.7	0.5
40	69.0	68.6	1.3	1 0	0.6
50	86.2	85.8	1.6	1.2	0.8

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	
0	9.08 589	102	9.08 914	104	0.91 085	9.99 675	60
1	9.08 692	102	9.09 018	104	0.90 981	9.99 673	59
2	9.08 794	102	9.09 123	103	0.90 877	9.99 672	58
3	9.08 897	102	9.09 226	103	0.90 773	9.99 670	57
4	9.08 999	102	9.09 330	103	0.90 670	9.99 669	56
5	9.09 101	101	9.09 433	103	0.90 566	9.99 667	55
6	9.09 202	101	9.09 536	103	0.90 463	9.99 665	54
7	9.09 303	101	9.09 639	102	0.90 360	9.99 664	53
8	9.09 404	101	9.09 742	102	0.90 258	9.99 662	52
9	9.09 505	101	9.09 844	102	0.90 155	9.99 661	51
10	9.09 606	100	9.09 947	101	0.90 053	9.99 659	50
11	9.09 706	100	9.10 048	102	0.89 951	9.99 658	49
12	9.09 806	100	9.10 150	101	0.89 849	9.99 656	48
13	9.09 906	100	9.10 252	101	0.89 748	9.99 654	47
14	9.10 006	99	9.10 353	101	0.89 647	9.99 653	46
15	9.10 105	99	9.10 454	101	0.89 546	9.99 651	45
16	9.10 205	99	9.10 555	101	0.89 445	9.99 650	44
17	9.10 303	98	9.10 655	100	0.89 344	9.99 648	43
18	9.10 402	99	9.10 756	100	0.89 244	9.99 646	42
19	9.10 501	98	9.10 856	100	0.89 144	9.99 645	41
20	9.10 599	98	9.10 956	99	0.89 044	9.99 643	40
21	9.10 697	98	9.11 055	99	0.88 944	9.99 641	39
22	9.10 795	97	9.11 155	99	0.88 845	9.99 640	38
23	9.10 892	97	9.11 254	99	0.88 745	9.99 638	37
24	9.10 990	97	9.11 353	99	0.88 646	9.99 637	36
25	9.11 087	97	9.11 452	98	0.88 548	9.99 635	35
26	9.11 184	96	9.11 550	98	0.88 449	9.99 633	34
27	9.11 281	97	9.11 649	98	0.88 351	9.99 632	33
28	9.11 377	96	9.11 747	98	0.88 253	9.99 630	32
29	9.11 473	96	9.11 845	98	0.88 155	9.99 628	31
30	9.11 570	96	9.11 943	98	0.88 057	9.99 627	30
31	9.11 663	95	9.12 040	97	0.87 959	9.99 625	29
32	9.11 761	96	9.12 137	97	0.87 862	9.99 623	28
33	9.11 856	95	9.12 235	97	0.87 765	9.99 622	27
34	9.11 952	95	9.12 331	96	0.87 668	9.99 620	26
35	9.12 047	95	9.12 428	97	0.87 571	9.99 618	25
36	9.12 141	94	9.12 525	96	0.87 475	9.99 617	24
37	9.12 236	94	9.12 621	96	0.87 379	9.99 615	23
38	9.12 330	94	9.12 717	96	0.87 283	9.99 613	22
39	9.12 425	94	9.12 813	96	0.87 187	9.99 611	21
40	9.12 518	93	9.12 908	95	0.87 091	9.99 610	20
41	9.12 612	94	9.13 004	95	0.86 996	9.99 608	19
42	9.12 706	93	9.13 099	95	0.86 900	9.99 606	18
43	9.12 799	93	9.13 194	95	0.86 805	9.99 605	17
44	9.12 892	93	9.13 289	95	0.86 710	9.99 603	16
45	9.12 985	93	9.13 384	94	0.86 616	9.99 601	15
46	9.13 078	92	9.13 478	94	0.86 521	9.99 600	14
47	9.13 170	92	9.13 572	94	0.86 427	9.99 598	13
48	9.13 263	92	9.13 666	94	0.86 333	9.99 596	12
49	9.13 355	92	9.13 760	94	0.86 239	9.99 594	11
50	9.13 447	91	9.13 854	93	0.86 146	9.99 593	10
51	9.13 538	92	9.13 947	93	0.86 052	9.99 591	9
52	9.13 630	91	9.14 041	93	0.85 959	9.99 589	8
53	9.13 721	91	9.14 134	93	0.85 866	9.99 587	7
54	9.13 813	90	9.14 227	92	0.85 773	9.99 586	6
55	9.13 903	91	9.14 319	92	0.85 680	9.99 584	5
56	9.13 994	90	9.14 412	92	0.85 588	9.99 582	4
57	9.14 085	90	9.14 504	92	0.85 495	9.99 580	3
58	9.14 175	90	9.14 596	92	0.85 403	9.99 579	2
59	9.14 265	90	9.14 688	92	0.85 311	9.99 577	1
60	9.14 355		9.14 780		0.85 219	9.99 575	0
′	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	′

P. P.

	104	103	102	101
6	10.4	10.3	10.2	10.1
7	12.1	12.0	11.9	11.8
8	13.8	13.7	13.6	13.4
9	15.6	15.4	15.3	15.1
10	17.3	17.1	17.0	16.8
20	34.6	34.3	34.0	33.6
30	52.0	51.5	51.0	50.5
40	69.3	68.6	68.0	67.3
50	86.6	85.8	85.0	84.1

	100	100	99	98
6	10.0	10.0	9.9	9.8
7	11.7	11.6	11.5	11.4
8	13.4	13.3	13.2	13.0
9	15.1	15.0	14.8	14.7
10	16.7	16.6	16.5	16.3
20	33.5	33.3	33.0	32.6
30	50.2	50.0	49.5	49.0
40	67.0	66.6	66.0	65.3
50	83.7	83.3	82.5	81.6

	97	97	96	95
6	9.7	9.7	9.6	9.5
7	11.4	11.3	11.2	11.1
8	13.0	12.9	12.8	12.6
9	14.6	14.5	14.4	14.2
10	16.2	16.1	16.0	15.8
20	32.5	32.3	32.0	31.6
30	48.7	48.5	48.0	47.5
40	65.0	64.6	64.0	63.3
50	81.2	80.8	80.0	79.1

	94	94	93	92
6	9.4	9.4	9.3	9.2
7	11.0	10.9	10.8	10.7
8	12.6	12.5	12.4	12.2
9	14.2	14.1	13.9	13.8
10	15.7	15.6	15.5	15.3
20	31.5	31.3	31.0	30.6
30	47.2	47.0	46.5	46.0
40	63.0	62.6	62.0	61.3
50	78.7	78.3	77.5	76.6

	91	91	90	2	1
6	9.1	9.1	9.0	0.2	0.1
7	10.7	10.6	10.5	0.2	0.2
8	12.2	12.1	12.0	0.2	0.2
9	13.7	13.6	13.5	0.3	0.2
10	15.2	15.1	15.0	0.3	0.2
20	30.5	30.3	30.0	0.6	0.5
30	45.7	45.5	45.0	1.0	0.7
40	61.0	60.6	60.0	1.3	1.0
50	76.2	75.8	75.0	1.6	1.2

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	
0	9.14 355	90	9.14 780	91	0.85 219	9.99 575	60
1	9.14 445	89	9.14 872	91	0.85 128	9.99 573	59
2	9.14 535	89	9.14 963	91	0.85 037	9.99 571	58
3	9.14 624	89	9.15 054	91	0.84 945	9.99 570	57
4	9.14 713	89	9.15 145	91	0.84 854	9.99 568	56
5	9.14 802	89	9.15 236	90	0.84 763	9.99 566	55
6	9.14 891	88	9.15 327	90	0.84 673	9.99 564	54
7	9.14 980	88	9.15 417	90	0.84 582	9.99 563	53
8	9.15 068	88	9.15 507	90	0.84 492	9.99 561	52
9	9.15 157	88	9.15 598	89	0.84 402	9.99 559	51
10	9.15 245	88	9.15 687	90	0.84 312	9.99 557	50
11	9.15 333	88	9.15 777	89	0.84 222	9.99 555	49
12	9.15 421	87	9.15 867	89	0.84 133	9.99 553	48
13	9.15 508	87	9.15 956	89	0.84 043	9.99 552	47
14	9.15 595	87	9.16 045	89	0.83 954	9.99 550	46
15	9.15 683	87	9.16 134	89	0.83 865	9.99 548	45
16	9.15 770	87	9.16 223	89	0.83 776	9.99 546	44
17	9.15 857	86	9.16 312	88	0.83 687	9.99 544	43
18	9.15 943	86	9.16 401	88	0.83 599	9.99 542	42
19	9.16 030	86	9.16 489	88	0.83 511	9.99 541	41
20	9.16 116	86	9.16 577	88	0.83 422	9.99 539	40
21	9.16 202	86	9.16 665	87	0.83 334	9.99 537	39
22	9.16 288	86	9.16 753	88	0.83 247	9.99 535	38
23	9.16 374	85	9.16 841	87	0.83 159	9.99 533	37
24	9.16 460	85	9.16 928	87	0.83 071	9.99 531	36
25	9.16 545	85	9.17 015	87	0.82 984	9.99 529	35
26	9.16 630	85	9.17 103	87	0.82 897	9.99 528	34
27	9.16 716	85	9.17 190	86	0.82 810	9.99 526	33
28	9.16 801	84	9.17 276	87	0.82 723	9.99 524	32
29	9.16 885	84	9.17 363	86	0.82 636	9.99 522	31
30	9.16 970	84	9.17 450	86	0.82 550	9.99 520	30
31	9.17 054	84	9.17 536	86	0.82 464	9.99 518	29
32	9.17 139	84	9.17 622	86	0.82 377	9.99 516	28
33	9.17 223	84	9.17 708	85	0.82 291	9.99 514	27
34	9.17 307	84	9.17 794	86	0.82 206	9.99 512	26
35	9.17 391	83	9.17 880	85	0.82 120	9.99 511	25
36	9.17 474	83	9.17 965	85	0.82 034	9.99 509	24
37	9.17 558	83	9.18 051	85	0.81 949	9.99 507	23
38	9.17 641	83	9.18 136	85	0.81 864	9.99 505	22
39	9.17 724	83	9.18 221	85	0.81 779	9.99 503	21
40	9.17 807	83	9.18 306	84	0.81 694	9.99 501	20
41	9.17 890	83	9.18 390	84	0.81 609	9.99 499	19
42	9.17 972	82	9.18 475	84	0.81 525	9.99 497	18
43	9.18 055	82	9.18 559	84	0.81 440	9.99 495	17
44	9.18 137	82	9.18 644	84	0.81 356	9.99 493	16
45	9.18 219	82	9.18 728	84	0.81 272	9.99 491	15
46	9.18 301	82	9.18 812	84	0.81 188	9.99 489	14
47	9.18 383	81	9.18 896	83	0.81 104	9.99 487	13
48	9.18 465	81	9.18 979	83	0.81 020	9.99 485	12
49	9.18 546	81	9.19 063	83	0.80 937	9.99 484	11
50	9.18 628	81	9.19 146	83	0.80 854	9.99 482	10
51	9.18 709	81	9.19 229	83	0.80 770	9.99 480	9
52	9.18 790	80	9.19 312	83	0.80 687	9.99 478	8
53	9.18 871	81	9.19 395	82	0.80 604	9.99 476	7
54	9.18 952	80	9.19 478	82	0.80 522	9.99 474	6
55	9.19 032	80	9.19 560	82	0.80 439	9.99 472	5
56	9.19 113	80	9.19 643	82	0.80 357	9.99 470	4
57	9.19 193	80	9.19 725	82	0.80 274	9.99 468	3
58	9.19 273	80	9.19 807	82	0.80 192	9.99 466	2
59	9.19 353	79	9.19 889	82	0.80 110	9.99 464	1
60	9.19 433		9.19 971		0.80 028	9.99 462	0
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	′

P. P.

	91	91	90	89
6	9.1	9.1	9.0	8.9
7	10.7	10.6	10.5	10.4
8	12.2	12.1	12.0	11.8
9	13.7	13.6	13.5	13.3
10	15.2	15.1	15.0	14.8
20	30.5	30.3	30.0	29.6
30	45.7	45.5	45.0	44.5
40	61.0	60.6	60.0	59.3
50	76.2	75.8	75.0	74.1

	88	88	87	86
6	8.8	8.8	8.7	8.6
7	10.3	10.2	10.1	10.0
8	11.8	11.7	11.6	11.4
9	13.3	13.2	13.0	12.9
10	14.7	14.6	14.5	14.3
20	29.5	29.3	29.0	28.6
30	44.2	44.0	43.5	43.0
40	59.0	58.6	58.0	57.3
50	73.7	73.3	72.5	71.6

	85	85	84	83
6	8.5	8.5	8.4	8.3
7	10.0	9.9	9.8	9.7
8	11.4	11.3	11.2	11.0
9	12.8	12.7	12.6	12.4
10	14.2	14.1	14.0	13.8
20	28.5	28.3	28.0	27.6
30	42.7	42.5	42.0	41.5
40	57.0	56.6	56.0	55.3
50	71.2	70.8	70.0	69.1

	82	82	81	80
6	8.2	8.2	8.1	8.0
7	9.6	9.5	9.4	9.3
8	11.0	10.9	10.8	10.6
9	12.4	12.3	12.1	12.0
10	13.7	13.6	13.5	13.3
20	27.5	27.3	27.0	26.6
30	41.2	41.0	40.5	40.0
40	55.0	54.6	54.0	53.3
50	68.7	68.3	67.5	66.6

	79	2	1
6	7.9	0.2	0.1
7	9.3	0.2	0.2
8	10.6	0.2	0.2
9	11.9	0.3	0.2
10	13.2	0.3	0.2
20	26.5	0.6	0.5
30	39.7	1.0	0.7
40	53.0	1.3	1.0
50	66.2	1.6	1.2

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	
0	9.19 433	80	9.19 97 1̂	81̂	0.80 028 8̂	9.99 462	60
1	9.19 513	79̂	9.20 053	81̂	0.79 947	9.99 460	59
2	9.19 592̂	79̂	9.20 134̂	81̂	0.79 865̂	9.99 458	58
3	9.19 672	79	9.20 216	81	0.79 784	9.99 456	57
4	9.19 751	79	9.20 297	81	0.79 703	9.99 454	56
5	9.19 830	79	9.20 378	81	0.79 622	9.99 452	55
6	9.19 909	79	9.20 459	81	0.79 541	9.99 450	54
7	9.19 988	79	9.20 540	81	0.79 460	9.99 448	53
8	9.20 066̂	78̂	9.20 620̂	80̂	0.79 379̂	9.99 446	52
9	9.20 145	78̂	9.20 701̂	81	0.79 298̂	9.99 444	51
10	9.20 223̂	78̂	9.20 781̂	80	0.79 218̂	9.99 442	50
11	9.20 301̂	78	9.20 862	80̂	0.79 138	9.99 440	49
12	9.20 379̂	78	9.20 942	80	0.79 058	9.99 437̂	48
13	9.20 457̂	78	9.21 022	80	0.78 978	9.99 435̂	47
14	9.20 535̂	78	9.21 102	80	0.78 898	9.99 433̂	46
15	9.20 613	77̂	9.21 181̂	79̂	0.78 818̂	9.99 431̂	45
16	9.20 690̂	77̂	9.21 261	79̂	0.78 739	9.99 429̂	44
17	9.20 768	77̂	9.21 340̂	79̂	0.78 659̂	9.99 427̂	43
18	9.20 845	77	9.21 420	79	0.78 580	9.99 425̂	42
19	9.20 922	77	9.21 499	79	0.78 501	9.99 423̂	41
20	9.20 999	77	9.21 578	79	0.78 422	9.99 421	40
21	9.21 076	77	9.21 657	79	0.78 343	9.99 419	39
22	9.21 152̂	76̂	9.21 735̂	78̂	0.78 264̂	9.99 417	38
23	9.21 229	76̂	9.21 814	78̂	0.78 186	9.99 415	37
24	9.21 305̂	76̂	9.21 893̂	78	0.78 107̂	9.99 413	36
25	9.21 382	76̂	9.21 971	78̂	0.78 029	9.99 411	35
26	9.21 458	76	9.22 049	78	0.77 951	9.99 408̂	34
27	9.21 534	76	9.22 127	78	0.77 873	9.99 406̂	33
28	9.21 609̂	75̂	9.22 205	78	0.77 795	9.99 404̂	32
29	9.21 685̂	76	9.22 283	78	0.77 717	9.99 402̂	31
30	9.21 761	75̂	9.22 360̂	77̂	0.77 639̂	9.99 400̂	30
31	9.21 836̂	75̂	9.22 438	77̂	0.77 562	9.99 398	29
32	9.21 911̂	75	9.22. 515̂	77̂	0.77 484̂	9.99 396	28
33	9.21 987	75̂	9.22 593	77	0.77 407	9.99 394	27
34	9.22 062	75	9.22 670	77	0.77 330	9.99 392	26
35	9.22 136̂	74̂	9.22 747	77	0.77 253	9.99 389̂	25
36	9.22 211̂	75	9.22 824	77	0.77 176	9.99 387̂	24
37	9.22 286	74̂	9.22 900̂	77	0.77 099̂	9.99 385̂	23
38	9.22 360̂	74̂	9.22 977̂	77	0.77 022̂	9.99 383	22
39	9.22 435	74̂	9.23 054	76̂	0.76 946	9.99 381	21
40	9.22 509	74	9.23 130	76	0.76 870	9.99 379	20
41	9.22 583̂	74̂	9.23 206̂	76̂	0.76 793̂	9.99 377	19
42	9.22 657̂	74	9.23 282̂	76	0.76 717̂	9.99 374̂	18
43	9.22 731	73̂	9.23 358̂	76	0.76 641̂	9.99 372̂	17
44	9.22 805	74	9.23 434̂	76	0.76 565̂	9.99 370̂	16
45	9.22 878̂	73̂	9.23 510̂	76	0.76 489̂	9.99 368	15
46	9.22 952	73̂	9.23 586	75̂	0.76 414	9.99 366	14
47	9.23 025	73	9.23 661̂	75̂	0.76 338̂	9.99 364	13
48	9.23 098̂	73	9.23 737	75̂	0.76 263	9.99 361̂	12
49	9.23 171̂	73	9.23 812	75	0.76 188	9.99 359̂	11
50	9.23 244̂	73	9.23 887	75	0.76 113	9.99 357	10
51	9.23 317	72̂	9.23 962	75	0.76 038	9.99 355	9
52	9.23 390	73	9.24 037	75	0.75 963	9.99 353	8
53	9.23 462̂	72̂	9.24 112	75	0.75 888	9.99 350̂	7
54	9.23 535	72̂	9.24 186̂	74̂	0.75 813̂	9.99 348̂	6
55	9.23 607̂	72̂	9.24 261	74̂	0.75 739	9.99 346	5
56	9.23 679̂	72	9.24 335̂	74̂	0.75 664̂	9.99 344	4
57	9.23 751̂	72	9.24 409̂	74	0.75 590̂	9.99 342	3
58	9.23 823̂	72	9.24 484	74̂	0.75 516	9.99 339̂	2
59	9.23 895̂	72	9.24 558	74	0.75 442	9.99 337̂	1
60	9.23 967	71̂	9.24 632	74	0.75 368	9.99 335	0
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	′

P. P.

	81̂	81	80	79
6	8.1̂	8.1	8.0	7.9
7	9.5	9.4̂	9.3̂	9.2
8	10.8̂	10.8	10 6̂	10.5̂
9	12.2	12.1̂	12.0	11.8̂
10	13.6	13.5	13.3̂	13.1̂
20	27.1̂	27.0	26.6̂	26.3̂
30	40.7̂	40.5	40 0	39.5
40	54.3̂	54.0	53.3̂	52.6
50	67.9	67.5	66.6̂	65.8̂

	78̂	78	77
6	7.8̂	7.8	7.7
7	9.1̂	9.1	9.0
8	10.4̂	10.4	10.2̂
9	11.8	11.7	11.5̂
10	13.1	13.0	12.8̂
20	26.1̂	26.0	25.6
30	39.2̂	39.0	38.5
40	52.3̂	52.0	51.3̂
50	65.4	65.0	64.1̂

	76̂	76	75	74
6	7.6̂	7.6	7.5	7.4
7	8.9	8.8̂	8.7̂	8.6̂
8	10.2	10.1̂	10.0	9.8̂
9	11.5	11.4	11.2̂	11.1
10	12.7̂	12.6̂	12.5	12.3̂
20	25.5	25.3̂	25.0	24.6̂
30	38.2̂	38.0	37.5	37.0
40	51.0	50.6̂	50.0	49.3̂
50	63.7̂	63.3̂	62.5	61.6̂

	73̂	73	72
6	7.3̂	7.3	7.2
7	8.6	8.5	8.4
8	9.8	9.7̂	9.6
9	11.0	10.9	10.8
10	12.2̂	12.1̂	12.0
20	24.5	24.3̂	24.0
30	36.7̂	36.5	36.0
40	49.0	48.6̂	48.0
50	61.2̂	60.8	60.0

	71̂	71	2̂	2
6	7.1̂	7.1	0.2̂	0.2
7	8.3̂	8.3	0.3	0.2̂
8	9.5̂	9.4	0.3̂	0.2̂
9	10.7	10.6̂	0.4	0.3
10	11.9	11.8	0.4	0.3̂
20	23.8	23.6	0.8	0.6̂
30	35.7	35.5	1.2̂	1.0
40	47.6	47.3̂	1.6	1.3̂
50	59.6	59.1̂	2.1	1.6̂

P. P.

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	
0	9.23 967	71	9.24 632	73	0.75 368	9.99 335	60
1	9.24 038	71	9.24 703	74	0.75 294	9.99 333	59
2	9.24 110	71	9.24 779	73	0.75 220	9.99 330	58
3	9.24 181	71	9.24 853	73	0.75 147	9.99 328	57
4	9.24 252	71	9.24 926	73	0.75 073	9.99 326	56
5	9.24 323	71	9.25 000	73	0.75 000	9.99 324	55
6	9.24 394	71	9.25 073	73	0.74 927	9.99 321	54
7	9.24 465	71	9.25 146	73	0.74 854	9.99 319	53
8	9.24 536	70	9.25 219	73	0.74 781	9.99 317	52
9	9.24 607	70	9.25 292	73	0.74 708	9.99 315	51
10	9.24 677	70	9.25 365	72	0.74 635	9.99 312	50
11	9.24 748	70	9.25 437	73	0.74 562	9.99 310	49
12	9.24 818	70	9.25 510	72	0.74 490	9.99 308	48
13	9.24 888	70	9.25 582	72	0.74 417	9.99 306	47
14	9.24 958	69	9.25 654	72	0.74 345	9.99 303	46
15	9.25 028	70	9.25 727	72	0.74 273	9.99 301	45
16	9.25 098	69	9.25 799	72	0.74 201	9.99 299	44
17	9.25 167	70	9.25 871	72	0.74 129	9.99 296	43
18	9.25 237	69	9.25 943	72	0.74 057	9.99 294	42
19	9.25 306	69	9.26 014	71	0.73 985	9.99 292	41
20	9.25 376	69	9.26 086	72	0.73 913	9.99 290	40
21	9.25 445	69	9.26 158	71	0.73 842	9.99 287	39
22	9.25 514	69	9.26 229	71	0.73 771	9.99 285	38
23	9.25 583	69	9.26 300	71	0.73 699	9.99 283	37
24	9.25 652	68	9.26 371	71	0.73 628	9.99 280	36
25	9.25 721	69	9.26 443	71	0.73 557	9.99 278	35
26	9.25 790	68	9.26 514	70	0.73 486	9.99 276	34
27	9.25 858	68	9.26 584	71	0.73 415	9.99 273	33
28	9.25 927	68	9.26 655	70	0.73 344	9.99 271	32
29	9.25 995	68	9.26 726	70	0.73 274	9.99 269	31
30	9.26 063	68	9.26 796	70	0.73 203	9.99 266	30
31	9.26 131	68	9.26 867	70	0.73 133	9.99 264	29
32	9.26 199	68	9.26 937	70	0.73 062	9.99 262	28
33	9.26 267	67	9.27 007	70	0.72 992	9.99 259	27
34	9.26 335	67	9.27 078	70	0.72 922	9.99 257	26
35	9.26 402	68	9.27 148	70	0.72 852	9.99 255	25
36	9.26 470	67	9.27 218	69	0.72 782	9.99 252	24
37	9.26 537	67	9.27 287	70	0.72 712	9.99 250	23
38	9.26 605	67	9.27 357	69	0.72 643	9.99 248	22
39	9.26 672	67	9.27 427	69	0.72 573	9.99 245	21
40	9.26 739	67	9.27 496	69	0.72 503	9.99 243	20
41	9.26 806	67	9.27 566	69	0.72 434	9.99 240	19
42	9.26 873	66	9.27 635	69	0.72 365	9.99 238	18
43	9.26 940	67	9.27 704	69	0.72 295	9.99 236	17
44	9.27 007	66	9.27 773	69	0.72 226	9.99 233	16
45	9.27 073	66	9.27 842	69	0.72 157	9.99 231	15
46	9.27 140	66	9.27 911	68	0.72 088	9.99 228	14
47	9.27 206	66	9.27 980	69	0.72 020	9.99 226	13
48	9.27 273	66	9.28 049	68	0.71 951	9.99 224	12
49	9.27 339	66	9.28 117	68	0.71 883	9.99 221	11
50	9.27 405	66	9.28 186	68	0.71 814	9.99 219	10
51	9.27 471	65	9.28 254	68	0.71 746	9.99 216	9
52	9.27 536	66	9.28 322	68	0.71 677	9.99 214	8
53	9.27 602	65	9.28 390	68	0.71 609	9.99 212	7
54	9.27 668	65	9.28 459	68	0.71 541	9.99 209	6
55	9.27 733	65	9.28 527	67	0.71 473	9.99 207	5
56	9.27 799	65	9.28 594	68	0.71 405	9.99 204	4
57	9.27 864	65	9.28 662	67	0.71 337	9.99 202	3
58	9.27 929	65	9.28 730	67	0.71 270	9.99 199	2
59	9.27 995	65	9.28 797	67	0.71 202	9.99 197	1
60	9.28 060		9.28 865		0.71 135	9.99 194	0
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	′

P. P.

	74	73	73
6	7.4	7.3	7.3
7	8.6	8.6	8.5
8	9.8	9.8	9.7
9	11.1	11.0	10.9
10	12.3	12.2	12.1
20	24.6	24.5	24.3
30	37.0	36.7	36.5
40	49.3	49.0	48.6
50	61.6	61.2	60.8

	72	72	71	71
6	7.2	7.2	7.1	7.1
7	8.4	8.4	8.3	8.3
8	9.6	9.6	9.5	9.4
9	10.9	10.8	10.7	10.6
10	12.1	12.0	11.9	11.8
20	24.1	24.0	23.8	23.6
30	36.2	36.0	35.7	35.5
40	48.3	48.0	47.6	47.3
50	60.4	60.0	59.6	59.1

	70	70	69	69
6	7.0	7.0	6.9	6.9
7	8.2	8.1	8.1	8.0
8	9.4	9.3	9.2	9.2
9	10.6	10.5	10.4	10.3
10	11.7	11.6	11.6	11.5
20	23.5	23.3	23.1	23.0
30	35.2	35.0	34.7	34.5
40	47.0	46.6	46.3	46.0
50	58.7	58.3	57.9	57.5

	68	68	67	67
6	6.8	6.8	6.7	6.7
7	8.0	7.9	7.9	7.8
8	9.1	9.0	9.0	8.9
9	10.3	10.2	10.1	10.0
10	11.4	11.3	11.2	11.1
20	22.8	22.6	22.5	22.3
30	34.2	34.0	33.7	33.5
40	45.6	45.3	45.0	44.6
50	57.1	56.6	56.2	55.8

	66	66	65	65
6	6.6	6.6	6.5	6.5
7	7.7	7.7	7.6	7.6
8	8.8	8.8	8.7	8.6
9	10.0	9.9	9.8	9.7
10	11.1	11.0	10.9	10.8
20	22.1	22.0	21.8	21.6
30	33.2	33.0	32.7	32.5
40	44.3	44.0	43.6	43.3
50	55.4	55.0	54.6	54.1

	2	2
6	0.2	0.2
7	0.3	0.2
8	0.3	0.2
9	0.4	0.3
10	0.4	0.3
20	0.8	0.6
30	1.2	1.0
40	1.6	1.3
50	2.1	1.6

P. P.

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	
0	9.28 060	65	9.28 865	67	0.71 135	9.99 194	**60**
1	9.28 125	64	9.28 932	67	0.71 067	9.99 192	59
2	9.28 189	65	9.29 000	67	0.71 000	9.99 189	58
3	9.28 254	64	9.29 067	67	0.70 933	9.99 187	57
4	9.28 319	64	9.29 134	67	0.70 866	9.99 185	56
5	9.28 383	64	9.29 201	66	0.70 798	9.99 182	55
6	9.28 448	64	9.29 268	67	0.70 732	9.99 180	54
7	9.28 512	64	9.29 335	66	0.70 665	9.99 177	53
8	9.28 576	64	9.29 401	67	0.70 598	9.99 175	52
9	9.28 641	64	9.29 468	66	0.70 531	9.99 172	51
10	9.28 705	64	9.29 535	66	0.70 465	9.99 170	**50**
11	9.28 769	63	9.29 601	66	0.70 398	9.99 167	49
12	9.28 832	64	9.29 667	66	0.70 332	9.99 165	48
13	9.28 896	63	9.29 734	66	0.70 266	9.99 162	47
14	9.28 960	63	9.29 800	66	0.70 200	9.99 160	46
15	9.29 023	63	9.29 866	66	0.70 134	9.99 157	45
16	9.29 087	63	9.29 932	66	0.70 068	9.99 155	44
17	9.29 150	63	9.29 998	66	0.70 002	9.99 152	43
18	9.29 213	63	9.30 064	66	0.69 936	9.99 150	42
19	9.29 277	63	9.30 129	65	0.69 870	9.99 147	41
20	9.29 340	63	9.30 195	65	0.69 805	9.99 145	**40**
21	9.29 403	63	9.30 260	65	0.69 739	9.99 142	39
22	9.29 466	62	9.30 326	65	0.69 674	9.99 139	38
23	9.29 528	63	9.30 391	65	0.69 608	9.99 137	37
24	9.29 591	63	9.30 456	65	0.69 543	9.99 134	36
25	9.29 654	62	9.30 522	65	0.69 478	9.99 132	35
26	9.29 716	62	9.30 587	65	0.69 413	9.99 129	34
27	9.29 779	62	9.30 652	65	0.69 348	9.99 127	33
28	9.29 841	62	9.30 717	64	0.69 283	9.99 124	32
29	9.29 903	62	9.30 781	65	0.69 218	9.99 122	31
30	9.29 965	62	9.30 846	64	0.69 153	9.99 119	**30**
31	9.30 027	62	9.30 911	64	0.69 089	9.99 116	29
32	9.30 089	62	9.30 975	64	0.69 024	9.99 114	28
33	9.30 151	61	9.31 040	64	0.68 960	9.99 111	27
34	9.30 213	62	9.31 104	64	0.68 896	9.99 109	26
35	9.30 275	61	9.31 168	64	0.68 831	9.99 106	25
36	9.30 336	61	9.31 232	64	0.68 767	9.99 104	24
37	9.30 398	61	9.31 297	64	0.68 703	9.99 101	23
38	9.30 459	61	9.31 361	63	0.68 639	9.99 098	22
39	9.30 520	61	9.31 424	64	0.68 575	9.99 096	21
40	9.30 582	61	9.31 488	64	0.68 511	9.99 093	**20**
41	9.30 643	61	9.31 552	63	0.68 447	9.99 091	19
42	9.30 704	61	9.31 616	63	0.68 384	9.99 088	18
43	9.30 765	61	9.31 679	63	0.68 320	9.99 085	17
44	9.30 826	60	9.31 743	63	0.68 257	9.99 083	16
45	9.30 886	61	9.31 806	63	0.68 193	9.99 080	15
46	9.30 947	60	9.31 869	63	0.68 130	9.99 077	14
47	9.31 008	60	9.31 933	63	0.68 067	9.99 075	13
48	9.31 068	60	9.31 996	63	0.68 004	9.99 072	12
49	9.31 129	60	9.32 059	63	0.67 941	9.99 069	11
50	9.31 189	60	9.32 122	63	0.67 878	9.99 067	**10**
51	9.31 249	60	9.32 185	63	0.67 815	9.99 064	9
52	9.31 309	60	9.32 248	62	0.67 752	9.99 062	8
53	9.31 370	59	9.32 310	63	0.67 689	9.99 059	7
54	9.31 429	60	9.32 373	62	0.67 626	9.99 056	6
55	9.31 489	60	9.32 436	62	0.67 564	9.99 054	5
56	9.31 549	59	9.32 498	62	0.67 501	9.99 051	4
57	9.31 609	60	9.32 560	62	0.67 439	9.99 048	3
58	9.31 669	59	9.32 623	62	0.67 377	9.99 046	2
59	9.31 728	59	9.32 685	62	0.67 314	9.99 043	1
60	9.31 788		9.32 747		0.67 252	9.99 040	**0**
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	′

P. P.

	67	67
6	6.7	6.7
7	7.9	7.8
8	9.0	8.9
9	10.1	10.0
10	11.2	11.1
20	22.5	22.3
30	33.7	33.5
40	45.0	44.6
50	56.2	55.8

	66	66	65	65
6	6.6	6.6	6.5	6.5
7	7.7	7.7	7.6	7.6
8	8.8	8.8	8.7	8.6
9	10.0	9.9	9.8	9.7
10	11.1	11.0	10.9	10.8
20	22.1	22.0	21.8	21.6
30	33.2	33.0	32.7	32.5
40	44.3	44.0	43.6	43.3
50	55.4	55.0	54.6	54.1

	64	64	63	63
6	6.4	6.4	6.3	6.3
7	7.5	7.4	7.4	7.3
8	8.6	8.5	8.4	8.4
9	9.7	9.6	9.5	9.4
10	10.7	10.6	10.6	10.5
20	21.5	21.3	21.1	21.0
30	32.2	32.0	31.7	31.5
40	43.0	42.6	42.3	42.0
50	53.7	53.3	52.9	52.5

	62	62	61	61
6	6.2	6.2	6.1	6.1
7	7.3	7.2	7.2	7.1
8	8.3	8.2	8.2	8.1
9	9.4	9.3	9.2	9.1
10	10.4	10.3	10.2	10.1
20	20.8	20.6	20.5	20.3
30	31.2	31.0	30.7	30.5
40	41.6	41.3	41.0	40.6
50	52.1	51.6	51.2	50.8

	60	60	59
6	6.0	6.0	5.9
7	7.0	7.0	6.9
8	8.0	8.0	7.9
9	9.1	9.0	8.9
10	10.1	10.0	9.9
20	20.1	20.0	19.8
30	30.2	30.0	29.7
40	40.3	40.0	39.6
50	50.4	50.0	49.6

	3	2	2
6	0.3	0.2	0.2
7	0.3	0.3	0.2
8	0.4	0.3	0.2
9	0.4	0.4	0.3
10	0.5	0.4	0.3
20	1.0	0.8	0.6
30	1.5	1.2	1.0
40	2.0	1.6	1.3
50	2.5	2.1	1.6

P. P.

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	
0	9.31 788	59	9.32 747	62	0.67 253	9.99 040	60
1	9.31 847	59	9.32 809	62	0.67 191	9.99 038	59
2	9.31 906	59	9.32 871	62	0.67 128	9.99 035	58
3	9.31 966	59	9.32 933	62	0.67 066	9.99 032	57
4	9.32 025	59	9.32 995	61	0.67 004	9.99 029	56
5	9.32 084	59	9.33 057	61	0.66 943	9.99 027	55
6	9.32 143	59	9.33 118	62	0.66 881	9.99 024	54
7	9.32 202	59	9.33 180	61	0.66 819	9.99 021	53
8	9.32 260	58	9.33 242	61	0.66 758	9.99 019	52
9	9.32 319	59	9.33 303	61	0.66 696	9.99 016	51
10	9.32 378	58	9.33 364	61	0.66 635	9.99 013	50
11	9.32 436	58	9.33 426	61	0.66 574	9.99 010	49
12	9.32 495	58	9.33 487	61	0.66 513	9.99 008	48
13	9.32 553	58	9.33 548	61	0.66 452	9.99 005	47
14	9.32 611	58	9.33 609	60	0.66 390	9.99 002	46
15	9.32 670	58	9.33 670	61	0.66 330	9.98 999	45
16	9.32 728	58	9.33 731	61	0.66 269	9.98 997	44
17	9.32 786	58	9.33 792	60	0.66 208	9.98 994	43
18	9.32 844	58	9.33 852	61	0.66 147	9.98 991	42
19	9.32 902	58	9.33 913	60	0.66 086	9.98 988	41
20	9.32 960	57	9.33 974	60	0.66 026	9.98 986	40
21	9.33 017	58	9.34 034	60	0.65 965	9.98 983	39
22	9.33 075	57	9.34 095	60	0.65 905	9.98 980	38
23	9.33 133	57	9.34 155	60	0.65 845	9.98 977	37
24	9.33 190	57	9.34 215	60	0.65 784	9.98 975	36
25	9.33 248	57	9.34 275	60	0.65 724	9.98 972	35
26	9.33 305	57	9.34 336	60	0.65 664	9.98 969	34
27	9.33 362	57	9.34 396	60	0.65 604	9.98 966	33
28	9.33 419	57	9.34 456	59	0.65 544	9.98 963	32
29	9.33 476	57	9.34 515	60	0.65 484	9.98 961	31
30	9.33 533	57	9.34 575	60	0.65 424	9.98 958	30
31	9.33 590	57	9.34 635	59	0.65 364	9.98 955	29
32	9.33 647	57	9.34 695	59	0.65 305	9.98 952	28
33	9.33 704	56	9.34 754	59	0.65 245	9.98 949	27
34	9.33 761	56	9.34 814	59	0.65 186	9.98 947	26
35	9.33 817	56	9.34 873	59	0.65 126	9.98 944	25
36	9.33 874	56	9.34 933	59	0.65 067	9.98 941	24
37	9.33 930	56	9.34 992	59	0.65 008	9.98 938	23
38	9.33 987	56	9.35 051	59	0.64 948	9.98 935	22
39	9.34 043	56	9.35 110	59	0.64 889	9.98 933	21
40	9.34 099	56	9.35 169	59	0.64 830	9.98 930	20
41	9.34 156	56	9.35 228	59	0.64 771	9.98 927	19
42	9.34 212	56	9.35 287	59	0.64 712	9.98 924	18
43	9.34 268	56	9.35 346	59	0.64 653	9.98 921	17
44	9.34 324	55	9.35 405	59	0.64 594	9.98 918	16
45	9.34 379	56	9.35 464	58	0.64 536	9.98 915	15
46	9.34 435	55	9.35 522	58	0.64 477	9.98 913	14
47	9.34 491	56	9.35 581	59	0.64 418	9.98 910	13
48	9.34 547	55	9.35 640	58	0.64 360	9.98 907	12
49	9.34 602	55	9.35 698	58	0.64 302	9.98 904	11
50	9.34 658	55	9.35 756	58	0.64 243	9.98 901	10
51	9.34 713	55	9.35 815	58	0.64 185	9.98 898	9
52	9.34 768	55	9.35 873	58	0.64 127	9.98 895	8
53	9.34 824	55	9.35 931	58	0.64 068	9.98 892	7
54	9.34 879	55	9.35 989	58	0.64 010	9.98 890	6
55	9.34 934	55	9.36 047	58	0.63 952	9.98 887	5
56	9.34 989	55	9.36 105	57	0.63 894	9.98 884	4
57	9.35 044	54	9.36 163	58	0.63 837	9.98 881	3
58	9.35 099	55	9.36 221	57	0.63 779	9.98 878	2
59	9.35 154	55	9.36 278	58	0.63 721	9.98 875	1
60	9.35 209		9.36 336		0.63 663	9.98 872	0
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	′

P. P.

	62	61	61
6	6.2	6.1	6.1
7	7.2	7.2	7.1
8	8.2	8.2	8.1
9	9.3	9.2	9.1
10	10.3	10.2	10.1
20	20.6	20.5	20.3
30	31.0	30.7	30.5
40	41.3	41.0	40.6
50	51.6	51.2	50.8

	60	60	59	59
6	6.0	6.0	5.9	5.9
7	7.0	7.0	6.9	6.9
8	8.0	8.0	7.9	7.8
9	9.1	9.0	8.9	8.8
10	10.1	10.0	9.9	9.8
20	20.1	20.0	19.8	19.6
30	30.2	30.0	29.7	29.5
40	40.3	40.0	39.6	39.3
50	50.4	50.0	49.6	49.1

	58	58	57	57
6	5.8	5.8	5.7	5.7
7	6.8	6.7	6.7	6.6
8	7.8	7.7	7.6	7.6
9	8.8	8.7	8.6	8.5
10	9.7	9.6	9.6	9.5
20	19.5	19.3	19.1	19.0
30	29.2	29.0	28.7	28.5
40	39.0	38.6	38.3	38.0
50	48.7	48.3	47.9	47.5

	56	56	55	55
6	5.6	5.6	5.5	5.5
7	6.6	6.5	6.5	6.4
8	7.5	7.4	7.4	7.3
9	8.5	8.4	8.3	8.2
10	9.4	9.3	9.2	9.1
20	18.8	18.6	18.5	18.3
30	28.2	28.0	27.7	27.5
40	37.6	37.3	37.0	36.6
50	47.1	46.6	46.2	45.8

	54	3	2
6	5.4	0.3	0.2
7	6.3	0.3	0.3
8	7.2	0.4	0.3
9	8.2	0.4	0.4
10	9.1	0.5	0.4
20	18.1	1.0	0.8
30	27.2	1.5	1.2
40	36.3	2.0	1.6
50	45.4	2.5	2.1

P. P.

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	
0	9.35 209	54	9.36 336	57	0.63 663	9.98 872	**60**
1	9.35 263	54	9.36 394	57	0.63 606	9.98 869	59
2	9.35 318	54	9.36 451	57	0.63 548	9.98 866	58
3	9.35 372	54	9.36 509	57	0.63 491	9.98 863	57
4	9.35 427	54	9.36 566	57	0.63 433	9.98 860	56
5	9.35 481	54	9.36 623	57	0.63 376	9.98 858	55
6	9.35 536	54	9.36 681	57	0.63 319	9.98 855	54
7	9.35 590	54	9.36 738	57	0.63 262	9.98 852	53
8	9.35 644	54	9.36 795	57	0.63 204	9.98 849	52
9	9.35 698	54	9.36 852	57	0.63 147	9.98 846	51
10	9.35 752	54	9.36 909	57	0.63 090	9.98 843	**50**
11	9.35 806	54	9.36 966	57	0.63 033	9.98 840	49
12	9.35 860	53	9.37 023	56	0.62 977	9.98 837	48
13	9.35 914	54	9.37 080	57	0.62 920	9.98 834	47
14	9.35 968	53	9.37 136	56	0.62 863	9.98 831	46
15	9.36 021	53	9.37 193	57	0.62 806	9.98 828	45
16	9.36 075	53	9.37 250	56	0.62 750	9.98 825	44
17	9.36 128	53	9.37 306	56	0.62 693	9.98 822	43
18	9.36 182	53	9.37 363	56	0.62 637	9.98 819	42
19	9.36 235	53	9.37 419	56	0.62 580	9.98 816	41
20	9.36 289	53	9.37 476	56	0.62 524	9.98 813	**40**
21	9.36 342	53	9.37 532	56	0.62 468	9.98 810	39
22	9.36 395	53	9.37 588	56	0.62 412	9.98 807	38
23	9.36 448	53	9.37 644	56	0.62 356	9.98 804	37
24	9.36 501	53	9.37 700	56	0.62 299	9.98 801	36
25	9.36 554	53	9.37 756	56	0.62 243	9.98 798	35
26	9.36 607	53	9.37 812	56	0.62 188	9.98 795	34
27	9.36 660	53	9.37 868	56	0.62 132	9.98 792	33
28	9.36 713	53	9.37 924	56	0.62 076	9.98 789	32
29	9.36 766	53	9.37 979	55	0.62 020	9.98 786	31
30	9.36 818	53	9.38 035	56	0.61 964	9.98 783	**30**
31	9.36 871	52	9.38 091	55	0.61 909	9.98 780	29
32	9.36 923	53	9.38 146	55	0.61 853	9.98 777	28
33	9.36 976	52	9.38 202	55	0.61 798	9.98 774	27
34	9.37 028	53	9.38 257	55	0.61 742	9.98 771	26
35	9.37 081	52	9.38 313	55	0.61 687	9.98 768	25
36	9.37 133	52	9.38 368	55	0.61 632	9.98 765	24
37	9.37 185	53	9.38 423	55	0.61 576	9.98 762	23
38	9.37 237	52	9.38 478	55	0.61 521	9.98 759	22
39	9.37 289	52	9.38 533	55	0.61 466	9.98 755	21
40	9.37 341	52	9.38 589	55	0.61 411	9.98 752	**20**
41	9.37 393	51	9.38 644	55	0.61 356	9.98 749	19
42	9.37 445	52	9.38 698	54	0.61 301	9.98 746	18
43	9.37 497	51	9.38 753	55	0.61 246	9.98 743	17
44	9.37 548	52	9.38 808	55	0.61 191	9.98 740	16
45	9.37 600	51	9.38 863	54	0.61 137	9.98 737	15
46	9.37 652	51	9.38 918	55	0.61 082	9.98 734	14
47	9.37 703	51	9.38 972	54	0.61 027	9.98 731	13
48	9.37 755	51	9.39 027	54	0.60 973	9.98 728	12
49	9.37 806	51	9.39 081	54	0.60 918	9.98 725	11
50	9.37 857	51	9.39 136	54	0.60 864	9.98 721	**10**
51	9.37 909	51	9.39 190	54	0.60 809	9.98 718	9
52	9.37 960	51	9.39 244	54	0.60 755	9.98 715	8
53	9.38 011	51	9.39 299	54	0.60 701	9.98 712	7
54	9.38 062	51	9.39 353	54	0.60 647	9.98 709	6
55	9.38 113	51	9.39 407	54	0.60 592	9.98 706	5
56	9.38 164	50	9.39 461	54	0.60 538	9.98 703	4
57	9.38 215	51	9.39 515	54	0.60 484	9.98 700	3
58	9.38 266	51	9.39 569	54	0.60 430	9.98 696	2
59	9.38 317	50	9.39 623	53	0.60 376	9.98 693	1
60	9.38 367		9.39 677		0.60 323	9.98 690	**0**
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	′

P. P.

	57	57	56	56
6	5.7	5.7	5.6	5.6
7	6.7	6.6	6.6	6.5
8	7.6	7.6	7.5	7.4
9	8.6	8.5	8.5	8.4
10	9.6	9.5	9.4	9.3
20	19.1	19.0	18.8	18.6
30	28.7	28.5	28.2	28.0
40	38.3	38.0	37.6	37.3
50	47.9	47.5	47.1	46.6

	55	55	54	54
6	5.5	5.5	5.4	5.4
7	6.5	6.4	6.3	6.3
8	7.4	7.3	7.2	7.2
9	8.3	8.2	8.2	8.1
10	9.2	9.1	9.1	9.0
20	18.5	18.3	18.1	18.0
30	27.7	27.5	27.2	27.0
40	37.0	36.6	36.3	36.0
50	46.2	45.8	45.4	45.0

	53	53	52	52
6	5.3	5.3	5.2	5.2
7	6.2	6.2	6.1	6.0
8	7.1	7.0	7.0	6.9
9	8.0	7.9	7.9	7.8
10	8.9	8.8	8.7	8.6
20	17.8	17.6	17.5	17.3
30	26.7	26.5	26.2	26.0
40	35.6	35.3	35.0	34.6
50	44.6	44.1	43.7	43.3

	51	51	50
6	5.1	5.1	5.0
7	6.0	5.9	5.9
8	6.8	6.8	6.7
9	7.7	7.6	7.6
10	8.6	8.5	8.4
20	17.1	17.0	16.8
30	25.7	25.5	25.2
40	34.3	34.0	33.6
50	42.9	42.5	42.1

	3	3	2
6	0.3	0.3	0.2
7	0.4	0.3	0.3
8	0.4	0.4	0.3
9	0.5	0.4	0.4
10	0.6	0.5	0.4
20	1.1	1.0	0.8
30	1.7	1.5	1.2
40	2.3	2.0	1.6
50	2.9	2.5	2.1

P. P.

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.		P. P.
0	9.38 367	5δ	9.39 677	54	0.60 323	9.98 696	3	60	
1	9.38 418	5δ	9.39 731	53	0.60 269	9.98 687	3	59	
2	9.38 468	5δ	9.39 784	54	0.60 216	9.98 684	3	58	
3	9.38 519	5δ	9.39 838	53	0.60 162	9.98 681	3	57	
4	9.38 569	5δ	9.39 892	53	0.60 108	9.98 678	3	56	
5	9.38 620	5δ	9.39 945	53	0.60 054	9.98 674	3	55	
6	9.38 670	5δ	9.39 999	53	0.60 001	9.98 671	3	54	
7	9.38 720	5δ	9.40 052	53	0.59 947	9.98 668	3	53	
8	9.38 771	5δ	9.40 106	53	0.59 894	9.98 665	3	52	
9	9.38 821	5δ	9.40 159	53	0.59 841	9.98 662	3	51	
10	9.38 871	5δ	9.40 212	53	0.59 787	9.98 658	3	50	
11	9.38 921	5δ	9.40 265	53	0.59 734	9.98 655	3	49	
12	9.38 971	5δ	9.40 318	53	0.59 681	9.98 652	3	48	
13	9.39 021	5δ	9.40 372	53	0.59 628	9.98 649	3	47	
14	9.39 071	5δ	9.40 425	53	0.59 575	9.98 646	3	46	
15	9.39 120	5δ	9.40 478	53	0.59 522	9.98 642	3	45	
16	9.39 170	5δ	9.40 531	53	0.59 469	9.98 639	3	44	
17	9.39 220	4δ	9.40 583	53	0.59 416	9.98 636	3	43	
18	9.39 269	4δ	9.40 636	53	0.59 363	9.98 633	3	42	
19	9.39 319	4δ	9.40 689	52	0.59 311	9.98 630	3	41	
20	9.39 368	4δ	9.40 742	53	0.59 258	9.98 626	3	40	
21	9.39 418	4δ	9.40 794	52	0.59 205	9.98 623	3	39	
22	9.39 467	4δ	9.40 847	53	0.59 153	9.98 620	3	38	
23	9.39 516	4δ	9.40 899	52	0.59 100	9.98 617	3	37	
24	9.39 566	4δ	9.40 952	52	0.59 048	9.98 613	3	36	
25	9.39 615	4δ	9.41 004	52	0.58 995	9.98 610	3	35	
26	9.39 664	4δ	9.41 057	52	0.58 943	9.98 607	3	34	
27	9.39 713	4δ	9.41 109	52	0.58 891	9.98 604	3	33	
28	9.39 762	4δ	9.41 161	52	0.58 838	9.98 600	3	32	
29	9.39 811	4δ	9.41 213	52	0.58 786	9.98 597	3	31	
30	9.39 860	4δ	9.41 266	52	0.58 734	9.98 594	3	30	
31	9.39 909	4δ	9.41 318	52	0.58 682	9.98 591	3	29	
32	9.39 957	4δ	9.41 370	52	0.58 630	9.98 587	3	28	
33	9.40 006	4δ	9.41 422	52	0.58 578	9.98 584	3	27	
34	9.40 055	4δ	9.41 474	52	0.58 526	9.98 581	3	26	
35	9.40 103	4δ	9.41 525	51	0.58 474	9.98 578	3	25	
36	9.40 152	4δ	9.41 577	52	0.58 422	9.98 574	3	24	
37	9.40 200	4δ	9.41 629	52	0.58 370	9.98 571	3	23	
38	9.40 249	4δ	9.41 681	51	0.58 319	9.98 568	3	22	
39	9.40 297	4δ	9.41 733	51	0.58 267	9.98 564	3	21	
40	9.40 345	4δ	9.41 784	51	0.58 216	9.98 561	3	20	
41	9.40 394	4δ	9.41 836	52	0.58 164	9.98 558	3	19	
42	9.40 442	4δ	9.41 887	51	0.58 113	9.98 554	3	18	
43	9.40 490	4δ	9.41 938	51	0.58 061	9.98 551	3	17	
44	9.40 538	4δ	9.41 990	51	0.58 010	9.98 548	3	16	
45	9.40 586	4δ	9.42 041	51	0.57 958	9.98 544	3	15	
46	9.40 634	4δ	9.42 093	51	0.57 907	9.98 541	3	14	
47	9.40 682	4δ	9.42 144	51	0.57 856	9.98 538	3	13	
48	9.40 730	4δ	9.42 195	51	0.57 805	9.98 534	3	12	
49	9.40 777	4δ	9.42 246	51	0.57 753	9.98 531	3	11	
50	9.40 825	4δ	9.42 297	51	0.57 702	9.98 528	3	10	
51	9.40 873	4δ	9.42 348	51	0.57 651	9.98 524	3	9	
52	9.40 920	4δ	9.42 399	51	0.57 600	9.98 521	3	8	
53	9.40 968	4δ	9.42 450	51	0.57 549	9.98 518	3	7	
54	9.41 015	4δ	9.42 501	50	0.57 499	9.98 514	3	6	
55	9.41 063	4δ	9.42 552	51	0.57 448	9.98 511	3	5	
56	9.41 110	4δ	9.42 602	50	0.57 397	9.98 508	3	4	
57	9.41 158	4δ	9.42 653	51	0.57 346	9.98 504	3	3	
58	9.41 205	4δ	9.42 704	50	0.57 296	9.98 501	3	2	
59	9.41 253	4δ	9.42 754	50	0.57 245	9.98 498	3	1	
60	9.41 299	4δ	9.42 805	50	0.57 195	9.98 494	3	0	
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′	P. P.

	54	53	53
6	5.4	5.3	5.3
7	6.3	6.2	6.2
8	7.2	7.1	7.0
9	8.1	8.0	7.9
10	9.0	8.9	8.8
20	18.0	17.8	17.6
30	27.0	26.7	26.5
40	36.0	35.6	35.3
50	45.0	44.6	44.1

	52	52	51	51
6	5.2	5.2	5.1	5.1
7	6.1	6.0	6.0	5.9
8	7.0	6.9	6.8	6.8
9	7.9	7.8	7.7	7.6
10	8.7	8.6	8.6	8.5
20	17.5	17.3	17.1	17.0
30	26.2	26.0	25.7	25.5
40	35.0	34.6	34.3	34.0
50	43.7	43.3	42.9	42.5

	50	50	49	49
6	5.0	5.0	4.9	4.9
7	5.9	5.8	5.8	5.7
8	6.7	6.6	6.6	6.5
9	7.6	7.5	7.4	7.3
10	8.4	8.3	8.2	8.1
20	16.8	16.6	16.5	16.3
30	25.2	25.0	24.7	24.5
40	33.6	33.3	33.0	32.6
50	42.1	41.6	41.2	40.8

	48	48	47	47
6	4.8	4.8	4.7	4.7
7	5.6	5.6	5.5	5.5
8	6.4	6.4	6.3	6.2
9	7.3	7.2	7.1	7.0
10	8.1	8.0	7.9	7.8
20	16.1	16.0	15.8	15.6
30	24.2	24.0	23.7	23.5
40	32.3	32.0	31.6	31.3
50	40.4	40.0	39.6	39.1

	3	3
6	0.3	0.3
7	0.4	0.3
8	0.4	0.4
9	0.5	0.4
10	0.6	0.5
20	1.1	1.0
30	1.7	1.5
40	2.3	2.0
50	2.9	2.5

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.		P. P.
0	9.41 299	47	9.42 805	51	0.57 195	9.98 494	3	60	
1	9.41 346	47	9.42 856	50	0.57 144	9.98 491	3	59	
2	9.41 394	47	9.42 906	50	0.57 094	9.98 487	3	58	
3	9.41 441	47	9.42 956	50	0.57 043	9.98 484	3	57	
4	9.41 488	46	9.43 007	50	0.56 993	9.98 481	3	56	
5	9.41 534	47	9.43 057	50	0.56 942	9.98 477	3	55	
6	9.41 581	47	9.43 107	50	0.56 892	9.98 474	3	54	
7	9.41 628	46	9.43 157	50	0.56 842	9.98 470	3	53	
8	9.41 675	46	9.43 208	50	0.56 792	9.98 467	3	52	
9	9.41 721	47	9.43 258	50	0.56 742	9.98 464	3	51	
10	9.41 768	46	9.43 308	50	0.56 692	9.98 460	3	50	
11	9.41 815	46	9.43 358	50	0.56 642	9.98 457	3	49	
12	9.41 861	46	9.43 408	50	0.56 592	9.98 453	3	48	
13	9.41 908	46	9.43 458	50	0.56 542	9.98 450	3	47	
14	9.41 954	46	9.43 508	49	0.56 492	9.98 446	3	46	
15	9.42 000	46	9.43 557	50	0.56 443	9.98 443	3	45	
16	9.42 047	46	9.43 607	49	0.56 393	9.98 439	3	44	
17	9.42 093	46	9.43 657	49	0.56 343	9.98 436	3	43	
18	9.42 139	46	9.43 706	50	0.56 293	9.98 433	3	42	
19	9.42 185	46	9.43 756	49	0.56 243	9.98 429	3	41	
20	9.42 232	46	9.43 806	49	0.56 194	9.98 426	3	40	
21	9.42 278	46	9.43 855	49	0.56 144	9.98 422	3	39	
22	9.42 324	46	9.43 905	49	0.56 095	9.98 419	3	38	
23	9.42 369	45	9.43 954	49	0.56 045	9.98 415	3	37	
24	9.42 415	46	9.44 003	49	0.55 996	9.98 412	3	36	
25	9.42 461	46	9.44 053	49	0.55 947	9.98 408	3	35	
26	9.42 507	46	9.44 102	49	0.55 898	9.98 405	3	34	
27	9.42 553	45	9.44 151	49	0.55 848	9.98 401	3	33	
28	9.42 598	45	9.44 200	49	0.55 799	9.98 398	3	32	
29	9.42 644	46	9.44 249	49	0.55 750	9.98 394	3	31	
30	9.42 690	45	9.44 299	49	0.55 701	9.98 391	3	30	
31	9.42 735	45	9.44 348	49	0.55 652	9.98 387	3	29	
32	9.42 781	45	9.44 397	49	0.55 603	9.98 384	3	28	
33	9.42 826	45	9.44 446	49	0.55 554	9.98 380	3	27	
34	9.42 871	45	9.44 494	48	0.55 505	9.98 377	3	26	
35	9.42 917	45	9.44 543	49	0.55 456	9.98 373	3	25	
36	9.42 962	45	9.44 592	49	0.55 407	9.98 370	3	24	
37	9.43 007	45	9.44 641	48	0.55 359	9.98 366	3	23	
38	9.43 052	45	9.44 690	49	0.55 310	9.98 363	3	22	
39	9.43 098	45	9.44 738	48	0.55 261	9.98 359	3	21	
40	9.43 143	45	9.44 787	48	0.55 213	9.98 356	3	20	
41	9.43 188	45	9.44 835	48	0.55 164	9.98 352	3	19	
42	9.43 233	45	9.44 884	48	0.55 116	9.98 348	4	18	
43	9.43 278	45	9.44 932	48	0.55 067	9.98 345	3	17	
44	9.43 322	44	9.44 981	48	0.55 019	9.98 341	3	16	
45	9.43 367	45	9.45 029	48	0.54 970	9.98 338	3	15	
46	9.43 412	44	9.45 077	48	0.54 922	9.98 334	3	14	
47	9.43 457	45	9.45 126	48	0.54 874	9.98 331	3	13	
48	9.43 501	44	9.45 174	48	0.54 825	9.98 327	3	12	
49	9.43 546	44	9.45 223	48	0.54 777	9.98 324	3	11	
50	9.43 591	45	9.45 270	48	0.54 729	9.98 320	4	10	
51	9.43 635	44	9.45 318	48	0.54 681	9.98 316	3	9	
52	9.43 680	44	9.45 367	48	0.54 633	9.98 313	3	8	
53	9.43 724	44	9.45 415	48	0.54 585	9.98 309	3	7	
54	9.43 768	44	9.45 463	47	0.54 537	9.98 306	3	6	
55	9.43 813	44	9.45 510	48	0.54 489	9.98 302	4	5	
56	9.43 857	44	9.45 558	48	0.54 441	9.98 298	3	4	
57	9.43 901	44	9.45 606	48	0.54 393	9.98 295	3	3	
58	9.43 945	44	9.45 654	47	0.54 346	9.98 291	3	2	
59	9.43 989	44	9.45 702	48	0.54 298	9.98 288	3	1	
60	9.44 034	44	9.45 749	47	0.54 250	9.98 284	4	0	
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′	P. P.

	50	50
6	5.0	5.0
7	5.9	5.8
8	6.7	6.6
9	7.6	7.5
10	8.4	8.3
20	16.8	16.6
30	25.2	25.0
40	33.6	33.3
50	42.1	41.6

	49	49	48	48
6	4.9	4.9	4.8	4.8
7	5.8	5.7	5.6	5.6
8	6.6	6.5	6.4	6.4
9	7.4	7.3	7.3	7.2
10	8.2	8.1	8.1	8.0
20	16.5	16.3	16.1	16.0
30	24.7	24.5	24.2	24.0
40	33.0	32.6	32.3	32.0
50	41.2	40.8	40.4	40.0

	47	47	46	46
6	4.7	4.7	4.6	4.6
7	5.5	5.5	5.4	5.3
8	6.3	6.2	6.2	6.1
9	7.1	7.0	7.0	6.9
10	7.9	7.8	7.7	7.6
20	15.8	15.6	15.5	15.3
30	23.7	23.5	23.2	23.0
40	31.6	31.3	31.0	30.6
50	39.6	39.1	38.7	38.3

	45	45	44	44
6	4.5	4.5	4.4	4.4
7	5.3	5.2	5.2	5.1
8	6.0	6.0	5.9	5.8
9	6.8	6.7	6.7	6.6
10	7.6	7.5	7.4	7.3
20	15.1	15.0	14.8	14.6
30	22.7	22.5	22.2	22.0
40	30.3	30.0	29.6	29.3
50	37.9	37.5	37.1	36.6

	4	3	3
6	0.4	0.3	0.3
7	0.4	0.4	0.3
8	0.5	0.4	0.4
9	0.6	0.5	0.4
10	0.6	0.6	0.5
20	1.3	1.1	1.0
30	2.0	1.7	1.5
40	2.6	2.3	2.0
50	3.3	2.9	2.5

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.	′
0	9.44 034	44	9.45 749	48	0.54 250	9.98 284	3	60
1	9.44 078	44	9.45 797	47	0.54 203	9.98 280	3	59
2	9.44 122	44	9.45 845	47	0.54 155	9.98 277	3	58
3	9.44 166	43	9.45 892	47	0.54 107	9.98 273	4	57
4	9.44 209	44	9.45 940	47	0.54 060	9.98 269	3	56
5	9.44 253	44	9.45 987	47	0.54 012	9.98 266	3	55
6	9.44 297	43	9.46 035	47	0.53 965	9.98 262	4	54
7	9.44 341	43	9.46 082	47	0.53 917	9.98 258	3	53
8	9.44 384	44	9.46 129	47	0.53 870	9.98 255	3	52
9	9.44 428	43	9.46 177	47	0.53 823	9.98 251	4	51
10	9.44 472	43	9.46 224	47	0.53 776	9.98 247	3	50
11	9.44 515	43	9.46 271	47	0.53 728	9.98 244	3	49
12	9.44 559	43	9.46 318	47	0.53 681	9.98 240	4	48
13	9.44 602	43	9.46 366	47	0.53 634	9.98 236	3	47
14	9.44 646	43	9.46 413	47	0.53 587	9.98 233	3	46
15	9.44 689	43	9.46 460	47	0.53 540	9.98 229	4	45
16	9.44 732	43	9.46 507	47	0.53 493	9.98 225	3	44
17	9.44 776	43	9.46 554	47	0.53 446	9.98 222	3	43
18	9.44 819	43	9.46 601	47	0.53 399	9.98 218	4	42
19	9.44 862	43	9.46 647	46	0.53 352	9.98 214	3	41
20	9.44 905	43	9.46 694	47	0.53 305	9.98 211	4	40
21	9.44 948	43	9.46 741	47	0.53 258	9.98 207	3	39
22	9.44 991	43	9.46 788	46	0.53 212	9.98 203	3	38
23	9.45 034	43	9.46 834	46	0.53 165	9.98 200	3	37
24	9.45 077	43	9.46 881	47	0.53 118	9.98 196	4	36
25	9.45 120	43	9.46 928	46	0.53 072	9.98 192	3	35
26	9.45 163	42	9.46 974	46	0.53 025	9.98 188	4	34
27	9.45 206	43	9.47 021	46	0.52 979	9.98 185	3	33
28	9.45 249	43	9.47 067	46	0.52 932	9.98 181	4	32
29	9.45 291	42	9.47 114	46	0.52 886	9.98 177	3	31
30	9.45 334	42	9.47 160	46	0.52 839	9.98 173	4	30
31	9.45 377	43	9.47 207	46	0.52 793	9.98 170	3	29
32	9.45 419	42	9.47 253	46	0.52 747	9.98 166	4	28
33	9.45 462	42	9.47 299	46	0.52 700	9.98 162	3	27
34	9.45 504	42	9.47 345	46	0.52 654	9.98 158	4	26
35	9.45 547	42	9.47 392	46	0.52 608	9.98 155	3	25
36	9.45 589	42	9.47 438	46	0.52 562	9.98 151	4	24
37	9.45 631	42	9.47 484	46	0.52 516	9.98 147	3	23
38	9.45 674	42	9.47 530	46	0.52 469	9.98 143	4	22
39	9.45 716	42	9.47 576	46	0.52 423	9.98 140	3	21
40	9.45 758	42	9.47 622	46	0.52 377	9.98 136	4	20
41	9.45 800	42	9.47 668	46	0.52 331	9.98 132	3	19
42	9.45 842	42	9.47 714	45	0.52 286	9.98 128	4	18
43	9.45 885	42	9.47 760	46	0.52 240	9.98 124	4	17
44	9.45 927	42	9.47 806	46	0.52 194	9.98 121	3	16
45	9.45 969	42	9.47 851	45	0.52 148	9.98 117	4	15
46	9.46 011	42	9.47 897	46	0.52 102	9.98 113	3	14
47	9.46 053	41	9.47 943	45	0.52 057	9.98 109	4	13
48	9.46 094	42	9.47 989	46	0.52 011	9.98 105	4	12
49	9.46 136	42	9.48 034	45	0.51 965	9.98 102	3	11
50	9.46 178	41	9.48 080	45	0.51 920	9.98 098	4	10
51	9.46 220	42	9.48 125	45	0.51 874	9.98 094	4	9
52	9.46 261	41	9.48 171	45	0.51 829	9.98 090	3	8
53	9.46 303	41	9.48 216	45	0.51 783	9.98 086	4	7
54	9.46 345	42	9.48 262	45	0.51 738	9.98 082	4	6
55	9.46 386	41	9.48 307	45	0.51 692	9.98 079	3	5
56	9.46 428	41	9.48 353	45	0.51 647	9.98 075	4	4
57	9.46 469	41	9.48 398	45	0.51 602	9.98 071	4	3
58	9.46 511	41	9.48 443	45	0.51 556	9.98 067	3	2
59	9.46 552	41	9.48 488	45	0.51 511	9.98 063	4	1
60	9.46 593	41	9.48 534	45	0.51 466	9.98 059	4	0
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′

P. P.

	48	47	47
6	4.8	4.7	4.7
7	5.6	5.5	5.5
8	6.4	6.3	6.2
9	7.2	7.1	7.0
10	8.0	7.9	7.8
20	16.0	15.8	15.6
30	24.0	23.7	23.5
40	32.0	31.6	31.3
50	40.0	39.6	39.1

	46	46	45	45
6	4.6	4.6	4.5	4.5
7	5.4	5.3	5.3	5.2
8	6.2	6.1	6.0	6.0
9	7.0	6.9	6.8	6.7
10	7.7	7.6	7.6	7.5
20	15.5	15.3	15.1	15.0
30	23.2	23.0	22.7	22.5
40	31.0	30.6	30.3	30.0
50	38.7	38.3	37.9	37.5

	44	43	43
6	4.4	4.3	4.3
7	5.1	5.1	5.0
8	5.8	5.8	5.7
9	6.6	6.5	6.4
10	7.3	7.2	7.1
20	14.6	14.5	14.3
30	22.0	21.7	21.5
40	29.3	29.0	28.6
50	36.6	36.2	35.8

	42	42	41	41
6	4.2	4.2	4.1	4.1
7	4.9	4.9	4.8	4.8
8	5.6	5.6	5.5	5.4
9	6.4	6.3	6.2	6.1
10	7.1	7.0	6.9	6.8
20	14.1	14.0	13.8	13.6
30	21.2	21.0	20.7	20.5
40	28.3	28.0	27.6	27.3
50	35.4	35.0	34.6	34.1

	4	3
6	0.4	0.3
7	0.4	0.4
8	0.5	0.4
9	0.6	0.5
10	0.6	0.6
20	1.3	1.1
30	2.0	1.7
40	2.6	2.3
50	3.3	2.9

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.	
0	9.46 593	41	9.48 534	45	0.51 466	9.98 059	3	**60**
1	9.46 635	41	9.48 579	45	0.51 421	9.98 056	4	59
2	9.46 676	41	9.48 624	45	0.51 376	9.98 052	4	58
3	9.46 717	41	9.48 669	45	0.51 330	9.98 048	4	57
4	9.46 758	41	9.48 714	45	0.51 285	9.98 044	4	56
5	9.46 799	41	9.48 759	45	0.51 240	9.98 040	4	55
6	9.46 840	41	9.48 804	44	0.51 195	9.98 036	4	54
7	9.46 881	41	9.48 849	45	0.51 151	9.98 032	4	53
8	9.46 922	41	9.48 894	45	0.51 106	9.98 028	4	52
9	9.46 963	41	9.48 939	45	0.51 061	9.98 024	4	51
10	9.47 004	41	9.48 984	45	0.51 016	9.98 021	3	**50**
11	9.47 043	41	9.49 028	44	0.50 971	9.98 017	4	49
12	9.47 086	40	9.49 073	45	0.50 926	9.98 013	4	48
13	9.47 127	41	9.49 118	44	0.50 882	9.98 009	4	47
14	9.47 168	40	9.49 162	44	0.50 837	9.98 005	4	46
15	9.47 208	40	9.49 207	45	0.50 792	9.98 001	4	45
16	9.47 249	41	9.49 252	44	0.50 748	9.97 997	3	44
17	9.47 290	40	9.49 296	44	0.50 703	9.97 993	4	43
18	9.47 330	40	9.49 341	44	0.50 659	9.97 989	4	42
19	9.47 371	40	9.49 385	44	0.50 614	9.97 985	4	41
20	9.47 411	40	9.49 430	44	0.50 570	9.97 981	4	**40**
21	9.47 452	40	9.49 474	44	0.50 525	9.97 977	4	39
22	9.47 492	40	9.49 518	44	0.50 481	9.97 973	4	38
23	9.47 532	40	9.49 563	44	0.50 437	9.97 969	3	37
24	9.47 573	40	9.49 607	44	0.50 392	9.97 966	4	36
25	9.47 613	40	9.49 651	44	0.50 348	9.97 962	4	35
26	9.47 653	40	9.49 695	44	0.50 304	9.97 958	4	34
27	9.47 694	40	9.49 740	44	0.50 260	9.97 954	4	33
28	9.47 734	40	9.49 784	44	0.50 216	9.97 950	4	32
29	9.47 774	40	9.49 828	44	0.50 172	9.97 946	4	31
30	9.47 814	40	9.49 872	44	0.50 128	9.97 942	4	**30**
31	9.47 854	40	9.49 916	44	0.50 083	9.97 938	4	29
32	9.47 894	40	9.49 960	44	0.50 039	9.97 934	4	28
33	9.47 934	40	9.50 004	43	0.49 996	9.97 930	4	27
34	9.47 974	40	9.50 048	44	0.49 952	9.97 926	4	26
35	9.48 014	40	9.50 092	44	0.49 908	9.97 922	4	25
36	9.48 054	40	9.50 136	44	0.49 864	9.97 918	4	24
37	9.48 093	39	9.50 179	43	0.49 820	9.97 914	4	23
38	9.48 133	40	9.50 223	44	0.49 776	9.97 910	4	22
39	9.48 173	39	9.50 267	43	0.49 733	9.97 906	4	21
40	9.48 213	40	9.50 311	44	0.49 689	9.97 902	4	**20**
41	9.48 252	39	9.50 354	43	0.49 645	9.97 898	4	19
42	9.48 292	39	9.50 398	43	0.49 602	9.97 894	4	18
43	9.48 331	39	9.50 442	44	0.49 558	9.97 890	4	17
44	9.48 371	39	9.50 485	43	0.49 514	9.97 886	4	16
45	9.48 410	39	9.50 529	43	0.49 471	9.97 881	4	15
46	9.48 450	39	9.50 572	43	0.49 427	9.97 877	4	14
47	9.48 489	39	9.50 616	43	0.49 384	9.97 873	4	13
48	9.48 529	39	9.50 659	43	0.49 340	9.97 869	4	12
49	9.48 568	39	9.50 703	43	0.49 297	9.97 865	4	11
50	9.48 607	39	9.50 746	43	0.49 254	9.97 861	4	**10**
51	9.48 646	39	9.50 789	43	0.49 210	9.97 857	4	9
52	9.48 686	39	9.50 833	43	0.49 167	9.97 853	4	8
53	9.48 725	39	9.50 876	43	0.49 124	9.97 849	4	7
54	9.48 764	39	9.50 919	43	0.49 081	9.97 845	4	6
55	9.48 803	39	9.50 962	43	0.49 038	9.97 841	4	5
56	9.48 842	39	9.51 005	43	0.48 994	9.97 837	4	4
57	9.48 881	39	9.51 048	43	0.48 951	9.97 833	4	3
58	9.48 920	39	9.51 091	43	0.48 908	9.97 829	4	2
59	9.48 959	39	9.51 134	43	0.48 865	9.97 824	4	1
60	9.48 998	38	9.51 177	43	0.48 822	9.97 820	4	**0**
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′

P. P.

	45	45	44	44
6	4.5	4.5	4.4	4.4
7	5.3	5.2	5.2	5.1
8	6.0	6.0	5.9	5.8
9	6.8	6.7	6.7	6.6
10	7.6	7.5	7.4	7.3
20	15.1	15.0	14.8	14.6
30	22.7	22.5	22.2	22.0
40	30.3	30.0	29.6	29.3
50	37.9	37.5	37.1	36.6

	43	43
6	4.3	4.3
7	5.1	5.0
8	5.8	5.7
9	6.5	6.4
10	7.2	7.1
20	14.5	14.3
30	21.7	21.5
40	29.0	28.6
50	36.2	35.8

	41	41	40	40
6	4.1	4.1	4.0	4.0
7	4.8	4.8	4.7	4.6
8	5.5	5.4	5.4	5.3
9	6.2	6.1	6.1	6.0
10	6.9	6.8	6.7	6.6
20	13.8	13.6	13.5	13.3
30	20.7	20.5	20.2	20.0
40	27.6	27.3	27.0	26.6
50	34.6	34.1	33.7	33.3

	39	39	38
6	3.9	3.9	3.8
7	4.6	4.5	4.5
8	5.2	5.2	5.1
9	5.9	5.8	5.8
10	6.6	6.5	6.4
20	13.1	13.0	12.8
30	19.7	19.5	19.2
40	26.3	26.0	25.6
50	32.9	32.5	32.1

	4	4	3
6	0.4	0.4	0.3
7	0.5	0.4	0.4
8	0.6	0.5	0.4
9	0.7	0.6	0.5
10	0.7	0.6	0.6
20	1.5	1.3	1.1
30	2.2	2.0	1.7
40	3.0	2.6	2.3
50	3.7	3.3	2.9

P. P.

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.		P. P.
0	9.48 998		9.51 177		0.48 822	9.97 820		60	
1	9.49 037	39	9.51 220	43	0.48 779	9.97 816	4	59	
2	9.49 076	39	9.51 263	43	0.48 736	9.97 812	4	58	
3	9.49 114	38	9.51 306	43	0.48 693	9.97 808	4	57	
4	9.49 153	39	9.51 349	43	0.48 650	9.97 804	4	56	
5	9.49 192	38	9.51 392	43	0.48 608	9.97 800	4	55	
6	9.49 231	39	9.51 435	43	0.48 565	9.97 796	4	54	
7	9.49 269	38	9.51 477	42	0.48 522	9.97 792	4	53	
8	9.49 308	38	9.51 520	43	0.48 479	9.97 787	4	52	
9	9.49 346	38	9.51 563	43	0.48 437	9.97 783	4	51	
10	9.49 385	38	9.51 605	42	0.48 394	9.97 779	4	50	
11	9.49 423	38	9.51 648	43	0.48 351	9.97 775	4	49	
12	9.49 462	38	9.51 691	43	0.48 309	9.97 771	4	48	
13	9.49 500	38	9.51 733	42	0.48 266	9.97 767	4	47	
14	9.49 539	38	9.51 776	43	0.48 224	9.97 763	4	46	
15	9.49 577	38	9.51 818	42	0.48 181	9.97 758	4	45	
16	9.49 615	38	9.51 861	43	0.48 139	9.97 754	4	44	
17	9.49 653	38	9.51 903	42	0.48 096	9.97 750	4	43	
18	9.49 692	38	9.51 946	43	0.48 054	9.97 746	4	42	
19	9.49 730	38	9.51 988	42	0.48 012	9.97 742	4	41	
20	9.49 768	38	9.52 030	42	0.47 969	9.97 737	4	40	
21	9.49 806	38	9.52 073	42	0.47 927	9.97 733	4	39	
22	9.49 844	38	9.52 115	42	0.47 885	9.97 729	4	38	
23	9.49 882	38	9.52 157	42	0.47 842	9.97 725	4	37	
24	9.49 920	38	9.52 199	42	0.47 800	9.97 721	4	36	
25	9.49 958	38	9.52 241	42	0.47 758	9.97 716	4	35	
26	9.49 996	38	9.52 284	42	0.47 716	9.97 712	4	34	
27	9.50 034	37	9.52 326	42	0.47 674	9.97 708	4	33	
28	9.50 072	38	9.52 368	42	0.47 632	9.97 704	4	32	
29	9.50 110	38	9.52 410	42	0.47 590	9.97 700	4	31	
30	9.50 147	37	9.52 452	42	0.47 548	9.97 695	4	30	
31	9.50 185	38	9.52 494	42	0.47 506	9.97 691	4	29	
32	9.50 223	38	9.52 536	42	0.47 464	9.97 687	4	28	
33	9.50 260	37	9.52 578	42	0.47 422	9.97 683	4	27	
34	9.50 298	38	9.52 619	41	0.47 380	9.97 678	4	26	
35	9.50 336	38	9.52 661	42	0.47 338	9.97 674	4	25	
36	9.50 373	37	9.52 703	42	0.47 296	9.97 670	4	24	
37	9.50 411	38	9.52 745	42	0.47 255	9.97 666	4	23	
38	9.50 448	37	9.52 787	42	0.47 213	9.97 661	4	22	
39	9.50 486	38	9.52 828	41	0.47 171	9.97 657	4	21	
40	9.50 523	37	9.52 870	42	0.47 130	9.97 653	4	20	
41	9.50 561	38	9.52 912	42	0.47 088	9.97 649	4	19	
42	9.50 598	37	9.52 953	41	0.47 046	9.97 644	4	18	
43	9.50 635	37	9.52 995	42	0.47 005	9.97 640	4	17	
44	9.50 673	38	9.53 036	41	0.46 963	9.97 636	4	16	
45	9.50 710	37	9.53 078	42	0.46 922	9.97 632	4	15	
46	9.50 747	37	9.53 119	41	0.46 880	9.97 627	4	14	
47	9.50 784	37	9.53 161	42	0.46 839	9.97 623	4	13	
48	9.50 821	37	9.53 202	41	0.46 797	9.97 619	4	12	
49	9.50 858	37	9.53 244	41	0.46 756	9.97 614	4	11	
50	9.50 895	37	9.53 285	41	0.46 714	9.97 610	4	10	
51	9.50 932	37	9.53 326	41	0.46 673	9.97 606	4	9	
52	9.50 969	37	9.53 368	42	0.46 632	9.97 601	4	8	
53	9.51 006	37	9.53 409	41	0.46 591	9.97 597	4	7	
54	9.51 043	37	9.53 450	41	0.46 549	9.97 593	4	6	
55	9.51 080	37	9.53 491	41	0.46 508	9.97 588	4	5	
56	9.51 117	36	9.53 533	41	0.46 467	9.97 584	4	4	
57	9.51 154	37	9.53 574	41	0.46 426	9.97 580	4	3	
58	9.51 190	36	9.53 615	41	0.46 385	9.97 575	4	2	
59	9.51 227	37	9.53 656	41	0.46 344	9.97 571	4	1	
60	9.51 264	36	9.53 697	41	0.46 303	9.97 567	4	0	
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′	P. P.

	43	42	42
6	4.3	4.2	4.2
7	5.0	4.9	4.9
8	5.7	5.6	5.6
9	6.4	6.4	6.3
10	7.1	7.1	7.0
20	14.3	14.1	14.0
30	21.5	21.2	21.0
40	28.6	28.3	28.0
50	35.8	35.4	35.0

	41	41
6	4.1	4.1
7	4.8	4.8
8	5.5	5.4
9	6.2	6.1
10	6.9	6.8
20	13.8	13.6
30	20.7	20.5
40	27.6	27.3
50	34.6	34.1

	39	38	38
6	3.9	3.8	3.8
7	4.5	4.5	4.4
8	5.2	5.1	5.0
9	5.8	5.8	5.7
10	6.5	6.4	6.3
20	13.0	12.8	12.6
30	19.5	19.2	19.0
40	26.0	25.6	25.3
50	32.5	32.1	31.6

	37	37	36
6	3.7	3.7	3.6
7	4.4	4.3	4.2
8	5.0	4.9	4.8
9	5.6	5.5	5.5
10	6.2	6.1	6.1
20	12.5	12.3	12.1
30	18.7	18.5	18.2
40	25.0	24.6	24.3
50	31.2	30.8	30.4

	4	4
6	0.4	0.4
7	0.5	0.4
8	0.6	0.5
9	0.7	0.6
10	0.7	0.6
20	1.5	1.3
30	2.2	2.0
40	3.0	2.6
50	3.7	3.3

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.	
0	9.51 264	37	9.53 697	41	0.46 303	9.97 567	4	60
1	9.51 301	36	9.53 738	41	0.46 262	9.97 562	4	59
2	9.51 337	36	9.53 779	41	0.46 221	9.97 558	4	58
3	9.51 374	36	9.53 820	41	0.46 180	9.97 554	4	57
4	9.51 410	36	9.53 861	41	0.46 139	9.97 549	4	56
5	9.51 447	36	9.53 902	41	0.46 098	9.97 545	4	55
6	9.51 483	36	9.53 943	40	0.46 057	9.97 541	4	54
7	9.51 520	36	9.53 983	41	0.46 016	9.97 536	4	53
8	9.51 556	36	9.54 024	41	0.45 975	9.97 532	4	52
9	9.51 593	36	9.54 065	40	0.45 934	9.97 527	4	51
10	9.51 629	36	9.54 106	41	0.45 894	9.97 523	4	50
11	9.51 665	36	9.54 147	40	0.45 853	9.97 519	4	49
12	9.51 702	36	9.54 187	40	0.45 812	9.97 514	4	48
13	9.51 738	36	9.54 228	41	0.45 772	9.97 510	4	47
14	9.51 774	36	9.54 269	40	0.45 731	9.97 505	4	46
15	9.51 810	36	9.54 309	40	0.45 690	9.97 501	4	45
16	9.51 847	36	9.54 350	40	0.45 650	9.97 497	4	44
17	9.51 883	36	9.54 390	40	0.45 609	9.97 492	4	43
18	9.51 919	36	9.54 431	40	0.45 569	9.97 488	4	42
19	9.51 955	36	9.54 471	40	0.45 528	9.97 483	4	41
20	9.51 991	36	9.54 512	40	0.45 488	9.97 479	4	40
21	9.52 027	36	9.54 552	40	0.45 447	9.97 475	4	39
22	9.52 063	36	9.54 593	40	0.45 407	9.97 470	4	38
23	9.52 099	36	9.54 633	40	0.45 367	9.97 466	4	37
24	9.52 135	35	9.54 673	40	0.45 326	9.97 461	4	36
25	9.52 170	36	9.54 714	40	0.45 286	9.97 457	4	35
26	9.52 206	36	9.54 754	40	0.45 246	9.97 452	4	34
27	9.52 242	35	9.54 794	40	0.45 205	9.97 448	4	33
28	9.52 278	36	9.54 834	40	0.45 165	9.97 443	4	32
29	9.52 314	35	9.54 874	40	0.45 125	9.97 439	4	31
30	9.52 349	35	9.54 915	40	0.45 085	9.97 434	4	30
31	9.52 385	36	9.54 955	40	0.45 045	9.97 430	4	29
32	9.52 421	35	9.54 995	40	0.45 005	9.97 425	4	28
33	9.52 456	35	9.55 035	40	0.44 965	9.97 421	4	27
34	9.52 492	35	9.55 075	40	0.44 925	9.97 416	4	26
35	9.52 527	35	9.55 115	39	0.44 884	9.97 412	4	25
36	9.52 563	35	9.55 155	40	0.44 845	9.97 407	4	24
37	9.52 598	35	9.55 195	40	0.44 805	9.97 403	4	23
38	9.52 634	35	9.55 235	40	0.44 765	9.97 398	4	22
39	9.52 669	35	9.55 275	40	0.44 725	9.97 394	4	21
40	9.52 704	35	9.55 315	40	0.44 685	9.97 389	4	20
41	9.52 740	35	9.55 355	39	0.44 645	9.97 385	4	19
42	9.52 775	35	9.55 394	40	0.44 605	9.97 380	4	18
43	9.52 810	35	9.55 434	39	0.44 565	9.97 376	4	17
44	9.52 846	35	9.55 474	40	0.44 526	9.97 371	4	16
45	9.52 881	35	9.55 514	39	0.44 486	9.97 367	4	15
46	9.52 916	35	9.55 553	40	0.44 446	9.97 362	4	14
47	9.52 951	35	9.55 593	39	0.44 406	9.97 358	4	13
48	9.52 986	35	9.55 633	39	0.44 367	9.97 353	4	12
49	9.53 021	35	9.55 672	39	0.44 327	9.97 349	4	11
50	9.53 056	35	9.55 712	39	0.44 288	9.97 344	4	10
51	9.53 091	35	9.55 751	40	0.44 248	9.97 340	5	9
52	9.53 126	35	9.55 791	39	0.44 208	9.97 335	4	8
53	9.53 161	35	9.55 831	39	0.44 169	9.97 330	4	7
54	9.53 196	35	9.55 870	39	0.44 129	9.97 326	4	6
55	9.53 231	34	9.55 909	39	0.44 090	9.97 321	4	5
56	9.53 266	35	9.55 949	39	0.44 051	9.97 317	4	4
57	9.53 301	35	9.55 988	39	0.44 011	9.97 312	4	3
58	9.53 335	34	9.56 028	39	0.43 972	9.97 308	4	2
59	9.53 370	35	9.56 067	39	0.43 932	9.97 303	5	1
60	9.53 405	34	9.56 106	39	0.43 893	9.97 298	4	0
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′

P. P.

	41	40	40
6	4.1	4.0	4.0
7	4.8	4.7	4.6
8	5.4	5.4	5.3
9	6.1	6.1	6.0
10	6.8	6.7	6.6
20	13.6	13.5	13.3
30	20.5	20.2	20.0
40	27.3	27.0	26.6
50	34.1	33.7	33.3

	39	39
6	3.9	3.9
7	4.6	4.5
8	5.2	5.2
9	5.9	5.8
10	6.6	6.5
20	13.1	13.0
30	19.7	19.5
40	26.3	26.0
50	32.9	32.5

	37	36	36
6	3.7	3.6	3.6
7	4.3	4.2	4.2
8	4.9	4.8	4.8
9	5.5	5.5	5.4
10	6.1	6.1	6.0
20	12.3	12.1	12.0
30	18.5	18.2	18.0
40	24.6	24.3	24.0
50	30.8	30.4	30.0

	35	35	34
6	3.5	3.5	3.4
7	4.1	4.1	4.0
8	4.7	4.6	4.6
9	5.3	5.2	5.2
10	5.9	5.8	5.7
20	11.8	11.6	11.5
30	17.7	17.5	17.2
40	23.6	23.3	23.0
50	29.6	29.1	28.7

	5	4	4
6	0.5	0.4	0.4
7	0.6	0.5	0.4
8	0.6	0.6	0.5
9	0.7	0.7	0.6
10	0.8	0.7	0.6
20	1.6	1.5	1.3
30	2.5	2.2	2.0
40	3.3	3.0	2.6
50	4.1	3.7	3.3

P. P.

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.		P. P.
0	9.53 405		9.56 106		0.43 893	9.97 298		**60**	
1	9.53 440	35	9.56 146	39	0.43 854	9.97 294	4	59	
2	9.53 474	34	9.56 185	39	0.43 815	9.97 289	4	58	
3	9.53 509	35	9.56 224	39	0.43 775	9.97 285	5	57	
4	9.53 544	34	9.56 263	39	0.43 736	9.97 280	4	56	
5	9.53 578	34	9.56 303	39	0.43 697	9.97 275	4	55	
6	9.53 613	34	9.56 342	39	0.43 658	9.97 271	4	54	
7	9.53 647	34	9.56 381	39	0.43 619	9.97 266	5	53	
8	9.53 682	34	9.56 420	39	0.43 580	9.97 261	4	52	
9	9.53 716	34	9.56 459	39	0.43 540	9.97 257	4	51	
10	9.53 750	34	9.56 498	39	0.43 501	9.97 252	4	**50**	
11	9.53 785	34	9.56 537	39	0.43 462	9.97 248	4	49	
12	9.53 819	34	9.56 576	39	0.43 423	9.97 243	5	48	
13	9.53 854	34	9.56 615	39	0.43 384	9.97 238	4	47	
14	9.53 888	34	9.56 654	38	0.43 346	9.97 234	4	46	
15	9.53 922	34	9.56 693	39	0.43 307	9.97 229	5	45	
16	9.53 956	34	9.56 732	39	0.43 268	9.97 224	4	44	
17	9.53 990	34	9.56 771	39	0.43 229	9.97 220	4	43	
18	9.54 025	34	9.56 810	39	0.43 190	9.97 215	5	42	
19	9.54 059	34	9.56 848	38	0.43 151	9.97 210	4	41	
20	9.54 093	34	9.56 887	39	0.43 112	9.97 206	4	**40**	
21	9.54 127	34	9.56 926	38	0.43 074	9.97 201	5	39	
22	9.54 161	34	9.56 965	39	0.43 035	9.97 196	4	38	
23	9.54 195	34	9.57 003	38	0.42 996	9.97 191	5	37	
24	9.54 229	33	9.57 042	38	0.42 958	9.97 187	4	36	
25	9.54 263	34	9.57 081	39	0.42 919	9.97 182	4	35	
26	9.54 297	34	9.57 119	38	0.42 880	9.97 177	5	34	
27	9.54 331	34	9.57 158	38	0.42 842	9.97 173	4	33	
28	9.54 365	34	9.57 196	38	0.42 803	9.97 168	5	32	
29	9.54 398	33	9.57 235	38	0.42 765	9.97 163	4	31	
30	9.54 432	34	9.57 274	39	0.42 726	9.97 159	4	**30**	
31	9.54 466	34	9.57 312	38	0.42 687	9.97 154	5	29	
32	9.54 500	33	9.57 350	38	0.42 649	9.97 149	4	28	
33	9.54 534	34	9.57 389	38	0.42 611	9.97 144	5	27	
34	9.54 567	33	9.57 427	38	0.42 572	9.97 140	4	26	
35	9.54 601	33	9.57 466	38	0.42 534	9.97 135	5	25	
36	9.54 634	33	9.57 504	38	0.42 495	9.97 130	4	24	
37	9.54 668	34	9.57 542	38	0.42 457	9.97 125	5	23	
38	9.54 702	33	9.57 581	38	0.42 419	9.97 121	4	22	
39	9.54 735	33	9.57 619	38	0.42 380	9.97 116	5	21	
40	9.54 769	33	9.57 657	38	0.42 342	9.97 111	4	**20**	
41	9.54 802	33	9.57 696	38	0.42 304	9.97 106	5	19	
42	9.54 836	33	9.57 734	38	0.42 266	9.97 102	4	18	
43	9.54 869	33	9.57 772	38	0.42 227	9.97 097	5	17	
44	9.54 902	33	9.57 810	38	0.42 189	9.97 092	5	16	
45	9.54 936	33	9.57 848	38	0.42 151	9.97 087	4	15	
46	9.54 969	33	9.57 886	38	0.42 113	9.97 082	5	14	
47	9.55 002	33	9.57 925	38	0.42 075	9.97 078	4	13	
48	9.55 036	33	9.57 963	38	0.42 037	9.97 073	5	12	
49	9.55 069	33	9.58 001	38	0.41 999	9.97 068	4	11	
50	9.55 102	33	9.58 039	38	0.41 961	9.97 063	5	**10**	
51	9.55 135	33	9.58 077	38	0.41 923	9.97 058	5	9	
52	9.55 168	33	9.58 115	38	0.41 885	9.97 054	4	8	
53	9.55 202	33	9.58 153	38	0.41 847	9.97 049	5	7	
54	9.55 235	33	9.58 190	37	0.41 809	9.97 044	5	6	
55	9.55 268	33	9.58 228	38	0.41 771	9.97 039	4	5	
56	9.55 301	33	9.58 266	38	0.41 733	9.97 034	5	4	
57	9.55 334	33	9.58 304	38	0.41 695	9.97 029	5	3	
58	9.55 367	33	9.58 342	37	0.41 658	9.97 025	4	2	
59	9.55 400	33	9.58 380	38	0.41 620	9.97 020	5	1	
60	9.55 433	33	9.58 417	37	0.41 582	9.97 015	5	**0**	
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′	P. P.

	39	39
6	3.9	3.9
7	4.6	4.5
8	5.2	5.2
9	5.9	5.8
10	6.6	6.5
20	13.1	13.0
30	19.7	19.5
40	26.3	26.0
50	32.9	32.5

	38	38	37
6	3.8	3.8	3.7
7	4.5	4.4	4.4
8	5.1	5.0	5.0
9	5.8	5.7	5.6
10	6.4	6.3	6.2
20	12.8	12.6	12.5
30	19.2	19.0	18.7
40	25.6	25.3	25.0
50	32.1	31.6	31.2

	35	34	34
6	3.5	3.4	3.4
7	4.1	4.0	3.9
8	4.6	4.6	4.5
9	5.2	5.2	5.1
10	5.8	5.7	5.6
20	11.6	11.5	11.3
30	17.5	17.2	17.0
40	23.3	23.0	22.6
50	29.1	28.7	28.3

	33	33
6	3.3	3.3
7	3.9	3.8
8	4.4	4.4
9	5.0	4.9
10	5.6	5.5
20	11.1	11.0
30	16.7	16.5
40	22.3	22.0
50	27.9	27.5

	5	4
6	0.5	0.4
7	0.6	0.5
8	0.6	0.6
9	0.7	0.7
10	0.8	0.7
20	1.6	1.5
30	2.5	2.2
40	3.3	3.0
50	4.1	3.7

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.	
0	9.55 433	33	9.58 417	38	0.41 582	9.97 015	4	60
1	9.55 466	33	9.58 455	37	0.41 544	9.97 010	5	59
2	9.55 498	33	9.58 493	38	0.41 507	9.97 005	5	58
3	9.55 531	33	9.58 531	37	0.41 469	9.97 000	5	57
4	9.55 564	32	9.58 568	37	0.41 431	9.96 995	4	56
5	9.55 597	33	9.58 606	38	0.41 394	9.96 991	5	55
6	9.55 630	32	9.58 644	37	0.41 356	9.96 986	5	54
7	9.55 662	33	9.58 681	37	0.41 318	9.96 981	5	53
8	9.55 695	32	9.58 719	37	0.41 281	9.96 976	5	52
9	9.55 728	32	9.58 756	37	0.41 243	9.96 971	4	51
10	9.55 760	32	9.58 794	37	0.41 206	9.96 966	5	50
11	9.55 793	33	9.58 831	37	0.41 168	9.96 961	5	49
12	9.55 826	32	9.58 869	37	0.41 131	9.96 956	5	48
13	9.55 858	32	9.58 906	37	0.41 093	9.96 952	4	47
14	9.55 891	32	9.58 944	37	0.41 056	9.96 947	5	46
15	9.55 923	32	9.58 981	37	0.41 018	9.96 942	5	45
16	9.55 956	32	9.59 019	37	0.40 981	9.96 937	5	44
17	9.55 988	32	9.59 056	37	0.40 944	9.96 932	5	43
18	9.56 020	32	9.59 093	37	0.40 906	9.96 927	5	42
19	9.56 053	32	9.59 131	37	0.40 869	9.96 922	4	41
20	9.56 085	32	9.59 168	37	0.40 832	9.96 917	5	40
21	9.56 118	32	9.59 205	37	0.40 794	9.96 912	5	39
22	9.56 150	32	9.59 242	37	0.40 757	9.96 907	5	38
23	9.56 182	32	9.59 280	37	0.40 720	9.96 902	5	37
24	9.56 214	32	9.59 317	37	0.40 683	9.96 897	5	36
25	9.56 247	32	9.59 354	37	0.40 646	9.96 892	5	35
26	9.56 279	32	9.59 391	37	0.40 608	9.96 887	5	34
27	9.56 311	32	9.59 428	37	0.40 571	9.96 882	5	33
28	9.56 343	32	9.59 465	37	0.40 534	9.96 877	5	32
29	9.56 375	32	9.59 502	37	0.40 497	9.96 873	4	31
30	9.56 407	32	9.59 540	37	0.40 460	9.96 868	5	30
31	9.56 439	32	9.59 577	37	0.40 423	9.96 863	5	29
32	9.56 471	32	9.59 614	37	0.40 386	9.96 858	5	28
33	9.56 503	32	9.59 651	37	0.40 349	9.96 853	5	27
34	9.56 535	32	9.59 688	37	0.40 312	9.96 848	5	26
35	9.56 567	32	9.59 724	36	0.40 275	9.96 843	5	25
36	9.56 599	32	9.59 761	37	0.40 238	9.96 838	5	24
37	9.56 631	32	9.59 798	37	0.40 201	9.96 833	5	23
38	9.56 663	31	9.59 835	37	0.40 164	9.96 828	5	22
39	9.56 695	32	9.59 872	36	0.40 128	9.96 823	5	21
40	9.56 727	32	9.59 909	37	0.40 091	9.96 818	5	20
41	9.56 758	31	9.59 946	37	0.40 054	9.96 813	5	19
42	9.56 790	32	9.59 983	36	0.40 017	9.96 808	5	18
43	9.56 822	31	9.60 019	37	0.39 980	9.96 802	5	17
44	9.56 854	32	9.60 056	36	0.39 944	9.96 797	5	16
45	9.56 885	31	9.60 093	37	0.39 907	9.96 792	5	15
46	9.56 917	31	9.60 129	36	0.39 870	9.96 787	5	14
47	9.56 949	32	9.60 166	37	0.39 833	9.96 782	5	13
48	9.56 980	31	9.60 203	36	0.39 797	9.96 777	5	12
49	9.57 012	31	9.60 239	36	0.39 760	9.96 772	5	11
50	9.57 043	31	9.60 276	36	0.39 724	9.96 767	5	10
51	9.57 075	31	9.60 312	36	0.39 687	9.96 762	5	9
52	9.57 106	31	9.60 349	37	0.39 650	9.96 757	5	8
53	9.57 138	31	9.60 386	36	0.39 614	9.96 752	5	7
54	9.57 169	31	9.60 422	36	0.39 577	9.96 747	5	6
55	9.57 201	31	9.60 459	36	0.39 541	9.96 742	5	5
56	9.57 232	31	9.60 495	36	0.39 504	9.96 737	5	4
57	9.57 263	31	9.60 531	36	0.39 468	9.96 732	5	3
58	9.57 295	31	9.60 568	36	0.39 432	9.96 727	5	2
59	9.57 326	31	9.60 604	36	0.39 395	9.96 721	5	1
60	9.57 357	31	9.60 641	36	0.39 359	9.96 716	5	0
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′

P. P.

	38	37	37
6	3.8	3.7	3.7
7	4.4	4.4	4.3
8	5.0	5.0	4.9
9	5.7	5.6	5.5
10	6.3	6.2	6.1
20	12.6	12.5	12.3
30	19.0	18.7	18.5
40	25.3	25.0	24.6
50	31.6	31.2	30.8

	36	36
6	3.6	3.6
7	4.2	4.2
8	4.8	4.8
9	5.5	5.4
10	6.1	6.0
20	12.1	12.0
30	18.2	18.0
40	24.3	24.0
50	30.4	30.0

	33	32	32
6	3.3	3.2	3.2
7	3.8	3.8	3.7
8	4.4	4.3	4.2
9	4.9	4.9	4.8
10	5.5	5.4	5.3
20	11.0	10.8	10.6
30	16.5	16.2	16.0
40	22.0	21.6	21.3
50	27.5	27.1	26.6

	31	31
6	3.1	3.1
7	3.7	3.6
8	4.2	4.1
9	4.7	4.6
10	5.2	5.1
20	10.5	10.3
30	15.7	15.5
40	21.0	20.6
50	26.2	25.8

	5	5	4
6	0.5	0.5	0.4
7	0.6	0.6	0.5
8	0.7	0.6	0.6
9	0.8	0.7	0.7
10	0.9	0.8	0.7
20	1.8	1.6	1.5
30	2.7	2.5	2.2
40	3.6	3.3	3.0
50	4.6	4.1	3.7

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.	′
0	9.57 357	31	9.60 641	36	0.39 359	9.96 716	5	60
1	9.57 389	31	9.60 677	36	0.39 322	9.96 711	5	59
2	9.57 420	31	9.60 713	36	0.39 286	9.96 706	5	58
3	9.57 451	31	9.60 750	36	0.39 250	9.96 701	5	57
4	9.57 482	31	9.60 786	36	0.39 213	9.96 696	5	56
5	9.57 513	31	9.60 822	36	0.39 177	9.96 691	5	55
6	9.57 544	31	9.60 859	36	0.39 141	9.96 686	5	54
7	9.57 576	31	9.60 895	36	0.39 105	9.96 681	5	53
8	9.57 607	31	9.60 931	36	0.39 069	9.96 675	5	52
9	9.57 638	31	9.60 967	36	0.39 032	9.96 670	5	51
10	9.57 669	31	9.61 003	36	0.38 996	9.96 665	5	50
11	9.57 700	31	9.61 039	36	0.38 960	9.96 660	5	49
12	9.57 731	31	9.61 076	36	0.38 924	9.96 655	5	48
13	9.57 762	30	9.61 112	36	0.38 888	9.96 650	5	47
14	9.57 792	31	9.61 148	36	0.38 852	9.96 644	5	46
15	9.57 823	31	9.61 184	36	0.38 816	9.96 639	5	45
16	9.57 854	31	9.61 220	36	0.38 780	9.96 634	5	44
17	9.57 885	30	9.61 256	36	0.38 744	9.96 629	5	43
18	9.57 916	31	9.61 292	36	0.38 708	9.96 624	5	42
19	9.57 947	30	9.61 328	36	0.38 672	9.96 619	5	41
20	9.57 977	31	9.61 364	36	0.38 636	9.96 613	5	40
21	9.58 008	30	9.61 400	36	0.38 600	9.96 608	5	39
22	9.58 039	31	9.61 436	36	0.38 564	9.96 603	5	38
23	9.58 070	30	9.61 472	35	0.38 528	9.96 598	5	37
24	9.58 100	30	9.61 507	36	0.38 492	9.96 593	5	36
25	9.58 131	31	9.61 543	36	0.38 456	9.96 587	5	35
26	9.58 162	30	9.61 579	35	0.38 420	9.96 582	5	34
27	9.58 192	30	9.61 615	36	0.38 385	9.96 577	5	33
28	9.58 223	30	9.61 651	35	0.38 349	9.96 572	5	32
29	9.58 253	30	9.61 686	36	0.38 313	9.96 567	5	31
30	9.58 284	30	9.61 722	35	0.38 277	9.96 561	5	30
31	9.58 314	30	9.61 758	36	0.38 242	9.96 556	5	29
32	9.58 345	30	9.61 794	35	0.38 206	9.96 551	5	28
33	9.58 375	30	9.61 829	35	0.38 170	9.96 546	5	27
34	9.58 406	30	9.61 865	36	0.38 135	9.96 540	5	26
35	9.58 436	30	9.61 901	35	0.38 099	9.96 535	5	25
36	9.58 466	30	9.61 936	35	0.38 063	9.96 530	5	24
37	9.58 497	30	9.61 972	35	0.38 028	9.96 525	5	23
38	9.58 527	30	9.62 007	35	0.37 992	9.96 519	5	22
39	9.58 557	30	9.62 043	35	0.37 957	9.96 514	5	21
40	9.58 587	30	9.62 078	35	0.37 921	9.96 509	5	20
41	9.58 618	30	9.62 114	35	0.37 886	9.96 503	5	19
42	9.58 648	30	9.62 149	35	0.37 850	9.96 498	5	18
43	9.58 678	30	9.62 185	35	0.37 815	9.96 493	5	17
44	9.58 708	30	9.62 220	35	0.37 779	9.96 488	5	16
45	9.58 738	30	9.62 256	35	0.37 744	9.96 482	5	15
46	9.58 769	30	9.62 291	35	0.37 708	9.96 477	5	14
47	9.58 799	30	9.62 327	35	0.37 673	9.96 472	5	13
48	9.58 829	30	9.62 362	35	0.37 637	9.96 466	5	12
49	9.58 859	30	9.62 397	35	0.37 602	9.96 461	5	11
50	9.58 889	30	9.62 433	35	0.37 567	9.96 456	5	10
51	9.58 919	30	9.62 468	35	0.37 531	9.96 450	5	9
52	9.58 949	30	9.62 503	35	0.37 496	9.96 445	5	8
53	9.58 979	30	9.62 539	35	0.37 461	9.96 440	5	7
54	9.59 009	30	9.62 574	35	0.37 426	9.96 434	5	6
55	9.59 038	29	9.62 609	35	0.37 390	9.96 429	5	5
56	9.59 068	30	9.62 644	35	0.37 355	9.96 424	5	4
57	9.59 098	30	9.62 679	35	0.37 320	9.96 418	5	3
58	9.59 128	29	9.62 715	35	0.37 285	9.96 413	5	2
59	9.59 158	30	9.62 750	35	0.37 250	9.96 408	5	1
60	9.59 188	30	9.62 785	35	0.37 215	9.96 402	5	0
′	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′

P. P.

	36	36
6	3.6	3.6
7	4.2	4.2
8	4.8	4.8
9	5.5	5.4
10	6.1	6.0
20	12.1	12.0
30	18.2	18.0
40	24.3	24.0
50	30.4	30.0

	35	35
6	3.5	3.5
7	4.1	4.1
8	4.7	4.6
9	5.3	5.2
10	5.9	5.8
20	11.8	11.6
30	17.7	17.5
40	23.6	23.3
50	29.6	29.1

	31	31
6	3.1	3.1
7	3.7	3.6
8	4.2	4.1
9	4.7	4.6
10	5.2	5.1
20	10.5	10.3
30	15.7	15.5
40	21.0	20.6
50	26.2	25.8

	30	30	29
6	3.0	3.0	2.9
7	3.5	3.5	3.4
8	4.0	4.0	3.9
9	4.6	4.5	4.4
10	5.1	5.0	4.9
20	10.1	10.0	9.8
30	15.2	15.0	14.7
40	20.3	20.0	19.6
50	25.4	25.0	24.6

	5	5
6	0.5	0.5
7	0.6	0.6
8	0.7	0.6
9	0.8	0.7
10	0.9	0.8
20	1.8	1.6
30	2.7	2.5
40	3.6	3.3
50	4.6	4.1

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.		′
0	9.59 188	29	9.62 785	35	0.37 215	9.96 402	5	**60**	
1	9.59 217	30	9.62 820	35	0.37 179	9.96 397	5	59	
2	9.59 247	29	9.62 855	35	0.37 144	9.96 392	5	58	
3	9.59 277	29	9.62 890	35	0.37 109	9.96 386	5	57	
4	9.59 306	30	9.62 925	35	0.37 074	9.96 381	5	56	
5	9.59 336	29	9.62 960	35	0.37 039	9.96 375	5	55	
6	9.59 366	29	9.62 995	35	0.37 004	9.96 370	5	54	
7	9.59 395	29	9.63 030	35	0.36 969	9.96 365	5	53	
8	9.59 425	29	9.63 065	35	0.36 934	9.96 359	5	52	
9	9.59 454	29	9.63 100	35	0.36 899	9.96 354	5	51	
10	9.59 484	29	9.63 135	35	0.36 864	9.96 349	5	**50**	
11	9.59 513	29	9.63 170	35	0.36 829	9.96 343	5	49	
12	9.59 543	29	9.63 205	35	0.36 794	9.96 338	5	48	
13	9.59 572	29	9.63 240	34	0.36 760	9.96 332	5	47	
14	9.59 602	29	9.63 275	35	0.36 725	9.96 327	5	46	
15	9.59 631	29	9.63 310	35	0.36 690	9.96 321	5	45	
16	9.59 661	29	9.63 344	34	0.36 655	9.96 316	5	44	
17	9.59 690	29	9.63 379	35	0.36 620	9.96 311	5	43	
18	9.59 719	29	9.63 414	35	0.36 585	9.96 305	5	42	
19	9.59 749	29	9.63 449	34	0.36 551	9.96 300	5	41	
20	9.59 778	29	9.63 484	35	0.36 516	9.96 294	5	**40**	
21	9.59 807	29	9.63 518	34	0.36 481	9.96 289	5	39	
22	9.59 837	29	9.63 553	34	0.36 447	9.96 283	5	38	
23	9.59 866	29	9.63 588	35	0.36 412	9.96 278	5	37	
24	9.59 895	29	9.63 623	34	0.36 377	9.96 272	5	36	
25	9.59 924	29	9.63 657	34	0.36 343	9.96 267	5	35	
26	9.59 953	29	9.63 692	35	0.36 308	9.96 261	5	34	
27	9.59 982	29	9.63 726	34	0.36 273	9.96 256	5	33	
28	9.60 012	29	9.63 761	34	0.36 239	9.96 251	5	32	
29	9.60 041	29	9.63 795	34	0.36 204	9.96 245	5	31	
30	9.60 070	29	9.63 830	34	0.36 170	9.96 240	5	**30**	
31	9.60 099	29	9.63 864	34	0.36 135	9.96 234	5	29	
32	9.60 128	29	9.63 899	34	0.36 101	9.96 229	5	28	
33	9.60 157	29	9.63 933	34	0.36 066	9.96 223	5	27	
34	9.60 186	29	9.63 968	34	0.36 032	9.96 218	5	26	
35	9.60 215	29	9.64 002	34	0.35 997	9.96 212	6	25	
36	9.60 244	29	9.64 037	34	0.35 963	9.96 206	5	24	
37	9.60 273	29	9.64 071	34	0.35 928	9.96 201	5	23	
38	9.60 301	28	9.64 106	34	0.35 894	9.96 195	5	22	
39	9.60 330	29	9.64 140	34	0.35 859	9.96 190	5	21	
40	9.60 359	29	9.64 174	34	0.35 825	9.96 184	5	**20**	
41	9.60 388	28	9.64 209	34	0.35 791	9.96 179	5	19	
42	9.60 417	29	9.64 243	34	0.35 756	9.96 173	5	18	
43	9.60 445	28	9.64 277	34	0.35 722	9.96 168	5	17	
44	9.60 474	29	9.64 312	34	0.35 688	9.96 162	5	16	
45	9.60 503	28	9.64 346	34	0.35 653	9.96 157	5	15	
46	9.60 532	29	9.64 380	34	0.35 619	9.96 151	5	14	
47	9.60 560	28	9.64 415	34	0.35 585	9.96 146	5	13	
48	9.60 589	28	9.64 449	34	0.35 551	9.96 140	6	12	
49	9.60 618	29	9.64 483	34	0.35 517	9.96 134	5	11	
50	9.60 646	28	9.64 517	34	0.35 482	9.96 129	5	**10**	
51	9.60 675	28	9.64 551	34	0.35 448	9.96 123	5	9	
52	9.60 703	28	9.64 585	34	0.35 414	9.96 118	5	8	
53	9.60 732	28	9.64 620	34	0.35 380	9.96 112	5	7	
54	9.60 760	28	9.64 654	34	0.35 346	9.96 106	6	6	
55	9.60 789	28	9.64 688	34	0.35 312	9.96 101	5	5	
56	9.60 817	28	9.64 722	34	0.35 278	9.96 095	5	4	
57	9.60 846	28	9.64 756	34	0.35 244	9.96 090	5	3	
58	9.60 874	28	9.64 790	34	0.35 209	9.96 084	6	2	
59	9.60 903	28	9.64 824	34	0.35 175	9.96 078	5	1	
60	9.60 931	28	9.64 858	34	0.35 141	9.96 073	5	**0**	
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.		′

P. P.

	35	35
6	3.5	3.5
7	4.1	4.1
8	4.7	4.6
9	5.3	5.2
10	5.9	5.8
20	11.8	11.6
30	17.7	17.5
40	23.6	23.3
50	29.6	29.1

	34	34
6	3.4	3.4
7	4.0	3.9
8	4.6	4.5
9	5.2	5.1
10	5.7	5.6
20	11.5	11.3
30	17.2	17.0
40	23.0	22.6
50	28.7	28.3

	30
6	3.0
7	3.5
8	4.0
9	4.5
10	5.0
20	10.0
30	15.0
40	20.0
50	25.0

	29	29	28
6	2.9	2.9	2.8
7	3.4	3.4	3.3
8	3.9	3.8	3.8
9	4.4	4.3	4.3
10	4.9	4.8	4.7
20	9.8	9.6	9.5
30	14.7	14.5	14.2
40	19.6	19.3	19.0
50	24.6	24.1	23.7

	6	5	5
6	0.6	0.5	0.5
7	0.7	0.6	0.6
8	0.8	0.7	0.6
9	0.9	0.8	0.7
10	1.0	0.9	0.8
20	2.0	1.8	1.6
30	3.0	2.7	2.5
40	4.0	3.6	3.3
50	5.0	4.6	4.1

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.	′
0	9.60 931	28	9.64 858	34	0.35 141	9.96 073	5	60
1	9.60 959	28	9.64 892	34	0.35 107	9.96 067	6	59
2	9.60 988	28	9.64 926	33	0.35 073	9.96 062	5	58
3	9.61 016	28	9.64 960	34	0.35 040	9.96 056	6	57
4	9.61 044	28	9.64 994	34	0.35 006	9.96 050	5	56
5	9.61 073	28	9.65 028	34	0.34 972	9.96 045	5	55
6	9.61 101	28	9.65 062	34	0.34 938	9.96 039	6	54
7	9.61 129	28	9.65 096	33	0.34 904	9.96 033	5	53
8	9.61 157	28	9.65 129	34	0.34 870	9.96 028	5	52
9	9.61 186	28	9.65 163	34	0.34 836	9.96 022	6	51
10	9.61 214	28	9.65 197	33	0.34 802	9.96 016	5	50
11	9.61 242	28	9.65 231	34	0.34 769	9.96 011	5	49
12	9.61 270	28	9.65 265	34	0.34 735	9.96 005	6	48
13	9.61 298	28	9.65 299	33	0.34 701	9.95 999	5	47
14	9.61 326	28	9.65 332	34	0.34 667	9.95 994	5	46
15	9.61 354	28	9.65 366	33	0.34 633	9.95 988	6	45
16	9.61 382	28	9.65 400	33	0.34 600	9.95 982	5	44
17	9.61 410	28	9.65 433	34	0.34 566	9.95 977	5	43
18	9.61 438	28	9.65 467	33	0.34 532	9.95 971	6	42
19	9.61 466	28	9.65 501	34	0.34 499	9.95 965	5	41
20	9.61 494	28	9.65 535	33	0.34 465	9.95 959	6	40
21	9.61 522	27	9.65 568	33	0.34 431	9.95 954	5	39
22	9.61 550	28	9.65 602	33	0.34 398	9.95 948	6	38
23	9.61 578	28	9.65 635	33	0.34 364	9.95 942	5	37
24	9.61 606	28	9.65 669	33	0.34 331	9.95 937	5	36
25	9.61 634	27	9.65 703	34	0.34 297	9.95 931	6	35
26	9.61 661	28	9.65 736	33	0.34 263	9.95 925	6	34
27	9.61 689	27	9.65 770	33	0.34 230	9.95 919	6	33
28	9.61 717	28	9.65 803	33	0.34 196	9.95 914	5	32
29	9.61 745	27	9.65 837	33	0.34 163	9.95 908	6	31
30	9.61 772	28	9.65 870	33	0.34 129	9.95 902	5	30
31	9.61 800	27	9.65 904	33	0.34 096	9.95 896	6	29
32	9.61 828	28	9.65 937	33	0.34 062	9.95 891	5	28
33	9.61 856	27	9.65 971	33	0.34 029	9.95 885	6	27
34	9.61 883	27	9.66 004	33	0.33 996	9.95 879	6	26
35	9.61 911	27	9.66 037	33	0.33 962	9.95 873	5	25
36	9.61 938	27	9.66 071	33	0.33 929	9.95 867	6	24
37	9.61 966	28	9.66 104	33	0.33 895	9.95 862	5	23
38	9.61 994	27	9.66 137	33	0.33 862	9.95 856	6	22
39	9.62 021	27	9.66 171	33	0.33 829	9.95 850	5	21
40	9.62 049	27	9.66 204	33	0.33 795	9.95 844	6	20
41	9.62 076	27	9.66 237	33	0.33 762	9.95 838	6	19
42	9.62 104	27	9.66 271	33	0.33 729	9.95 833	5	18
43	9.62 131	27	9.66 304	33	0.33 696	9.95 827	6	17
44	9.62 158	27	9.66 337	33	0.33 662	9.95 821	5	16
45	9.62 186	27	9.66 370	33	0.33 629	9.95 815	6	15
46	9.62 213	27	9.66 404	33	0.33 596	9.95 809	6	14
47	9.62 241	27	9.66 437	33	0.33 563	9.95 804	5	13
48	9.62 268	27	9.66 470	33	0.33 529	9.95 798	6	12
49	9.62 295	27	9.66 503	33	0.33 496	9.95 792	6	11
50	9.62 323	27	9.66 536	33	0.33 463	9.95 786	5	10
51	9.62 350	27	9.66 570	33	0.33 430	9.95 780	6	9
52	9.62 377	27	9.66 603	33	0.33 397	9.95 774	6	8
53	9.62 404	27	9.66 636	33	0.33 364	9.95 768	6	7
54	9.62 432	27	9.66 669	33	0.33 331	9.95 763	5	6
55	9.62 459	27	9.66 702	33	0.33 298	9.95 757	6	5
56	9.62 486	27	9.66 735	33	0.33 265	9.95 751	6	4
57	9.62 513	27	9.66 768	33	0.33 232	9.95 745	6	3
58	9.62 540	27	9.66 801	33	0.33 198	9.95 739	5	2
59	9.62 567	27	9.66 834	33	0.33 165	9.95 733	6	1
60	9.62 595	27	9.66 867	33	0.33 132	9.95 727	6	0
′	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′

P. P.

	34	33	33
6	3.4	3.3	3.3
7	3.9	3.9	3.8
8	4.5	4.4	4.4
9	5.1	5.0	4.9
10	5.6	5.6	5.5
20	11.3	11.1	11.0
30	17.0	16.7	16.5
40	22.6	22.3	22.0
50	28.3	27.9	27.5

	28	28
6	2.8	2.8
7	3.3	3.2
8	3.8	3.7
9	4.3	4.2
10	4.7	4.6
20	9.5	9.3
30	14.2	14.0
40	19.0	18.6
50	23.7	23.3

	27	27
6	2.7	2.7
7	3.2	3.1
8	3.6	3.6
9	4.1	4.0
10	4.6	4.5
20	9.1	9.0
30	13.7	13.5
40	18.3	18.0
50	22.9	22.5

	6	5
6	0.6	0.5
7	0.7	0.6
8	0.8	0.7
9	0.9	0.8
10	1.0	0.9
20	2.0	1.8
30	3.0	2.7
40	4.0	3.6
50	5.0	4.6

P. P.

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.		P. P.
0	9.62 595		9.66 867		0.33 133	9.95 727		60	
1	9.62 622	27	9.66 900	33	0.33 100	9.95 721	6	59	
2	9.62 649	27	9.66 933	33	0.33 067	9.95 716	5	58	
3	9.62 676	27	9.66 966	33	0.33 034	9.95 710	6	57	
4	9.62 703	27	9.66 999	33	0.33 001	9.95 704	6	56	
5	9.62 730	27	9.67 032	33	0.32 968	9.95 698	6	55	
6	9.62 757	27	9.67 065	33	0.32 935	9.95 692	6	54	
7	9.62 784	27	9.67 097	32	0.32 902	9.95 686	5	53	
8	9.62 811	27	9.67 130	33	0.32 869	9.95 680	6	52	
9	9.62 838	27	9.67 163	33	0.32 836	9.95 674	6	51	
10	9.62 864	26	9.67 196	33	0.32 803	9.95 668	6	50	
11	9.62 891	27	9.67 229	32	0.32 771	9.95 662	6	49	
12	9.62 918	27	9.67 262	33	0.32 738	9.95 656	6	48	
13	9.62 945	27	9.67 294	32	0.32 705	9.95 650	6	47	
14	9.62 972	26	9.67 327	33	0.32 672	9.95 644	6	46	
15	9.62 999	27	9.67 360	33	0.32 640	9.95 638	6	45	
16	9.63 025	26	9.67 393	33	0.32 607	9.95 632	6	44	
17	9.63 052	27	9.67 425	32	0.32 574	9.95 627	5	43	
18	9.63 079	27	9.67 458	33	0.32 541	9.95 621	6	42	
19	9.63 106	26	9.67 491	33	0.32 509	9.95 615	6	41	
20	9.63 132	27	9.67 523	32	0.32 476	9.95 609	6	40	
21	9.63 159	26	9.67 556	33	0.32 443	9.95 603	6	39	
22	9.63 186	26	9.67 589	33	0.32 411	9.95 597	6	38	
23	9.63 212	26	9.67 621	32	0.32 378	9.95 591	6	37	
24	9.63 239	27	9.67 654	33	0.32 345	9.95 585	6	36	
25	9.63 266	26	9.67 687	33	0.32 313	9.95 579	6	35	
26	9.63 292	26	9.67 719	32	0.32 280	9.95 573	6	34	
27	9.63 319	26	9.67 752	33	0.32 248	9.95 567	6	33	
28	9.63 345	26	9.67 784	32	0.32 215	9.95 561	6	32	
29	9.63 372	26	9.67 817	33	0.32 183	9.95 555	6	31	
30	9.63 398	26	9.67 849	32	0.32 150	9.95 549	6	30	
31	9.63 425	26	9.67 882	33	0.32 118	9.95 543	6	29	
32	9.63 451	26	9.67 914	32	0.32 085	9.95 537	6	28	
33	9.63 478	26	9.67 947	33	0.32 053	9.95 530	6	27	
34	9.63 504	26	9.67 979	32	0.32 020	9.95 524	6	26	
35	9.63 530	26	9.68 012	33	0.31 988	9.95 518	6	25	
36	9.63 557	26	9.68 044	32	0.31 955	9.95 512	6	24	
37	9.63 583	26	9.68 077	33	0.31 923	9.95 506	6	23	
38	9.63 609	26	9.68 109	32	0.31 891	9.95 500	6	22	
39	9.63 636	26	9.68 141	32	0.31 858	9.95 494	6	21	
40	9.63 662	26	9.68 174	33	0.31 826	9.95 488	6	20	
41	9.63 688	26	9.68 206	32	0.31 793	9.95 482	6	19	
42	9.63 715	26	9.68 238	32	0.31 761	9.95 476	6	18	
43	9.63 741	26	9.68 271	33	0.31 729	9.95 470	6	17	
44	9.63 767	26	9.68 303	32	0.31 696	9.95 464	6	16	
45	9.63 793	26	9.68 335	32	0.31 664	9.95 458	6	15	
46	9.63 819	26	9.68 368	32	0.31 632	9.95 452	6	14	
47	9.63 846	26	9.68 400	32	0.31 600	9.95 445	6	13	
48	9.63 872	26	9.68 432	32	0.31 567	9.95 439	6	12	
49	9.63 898	26	9.68 464	32	0.31 535	9.95 433	6	11	
50	9.63 924	26	9.68 497	33	0.31 503	9.95 427	6	10	
51	9.63 950	26	9.68 529	32	0.31 471	9.95 421	6	9	
52	9.63 976	26	9.68 561	32	0.31 439	9.95 415	6	8	
53	9.64 002	26	9.68 593	32	0.31 406	9.95 409	6	7	
54	9.64 028	26	9.68 625	32	0.31 374	9.95 403	6	6	
55	9.64 054	26	9.68 657	32	0.31 342	9.95 397	6	5	
56	9.64 080	26	9.68 690	33	0.31 310	9.95 390	6	4	
57	9.64 106	26	9.68 722	32	0.31 278	9.95 384	6	3	
58	9.64 132	26	9.68 754	32	0.31 246	9.95 378	6	2	
59	9.64 158	26	9.68 786	32	0.31 214	9.95 372	6	1	
60	9.64 184	25	9.68 818	32	0.31 182	9.95 366	6	0	
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′	P. P.

	33	32	32
6	3.3	3.2	3.2
7	3.8	3.8	3.7
8	4.4	4.3	4.2
9	4.9	4.9	4.8
10	5.5	5.4	5.3
20	11.0	10.8	10.6
30	16.5	16.2	16.0
40	22.0	21.6	21.3
50	27.5	27.1	26.6

	27
6	2.7
7	3.1
8	3.6
9	4.0
10	4.5
20	9.0
30	13.5
40	18.0
50	22.5

	26	26	25
6	2.6	2.6	2.5
7	3.1	3.0	3.0
8	3.5	3.4	3.4
9	4.0	3.9	3.8
10	4.4	4.3	4.2
20	8.8	8.6	8.5
30	13.2	13.0	12.7
40	17.6	17.3	17.0
50	22.1	21.6	21.2

	6	6	5
6	0.6	0.6	0.5
7	0.7	0.7	0.6
8	0.8	0.8	0.7
9	1.0	0.9	0.8
10	1.1	1.0	0.9
20	2.1	2.0	1.8
30	3.2	3.0	2.7
40	4.3	4.0	3.6
50	5.4	5.0	4.6

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.		P. P.
0	9.64 184	26	9.68 818	32	0.31 182	9.95 366	6	60	
1	9.64 210	26	9.68 850	32	0.31 150	9.95 360	6	59	
2	9.64 236	26	9.68 882	32	0.31 117	9.95 353	6	58	
3	9.64 262	26	9.68 914	32	0.31 085	9.95 347	6	57	
4	9.64 287	25	9.68 946	32	0.31 053	9.95 341	6	56	
5	9.64 313	26	9.68 978	32	0.31 021	9.95 335	6	55	
6	9.64 339	26	9.69 010	32	0.30 989	9.95 329	6	54	
7	9.64 365	25	9.69 042	32	0.30 957	9.95 323	6	53	
8	9.64 391	26	9.69 074	31	0.30 926	9.95 316	6	52	
9	9.64 416	25	9.69 106	32	0.30 894	9.95 310	6	51	
10	9.64 442	26	9.69 138	32	0.30 862	9.95 304	6	50	
11	9.64 468	25	9.69 170	32	0.30 830	9.95 298	6	49	
12	9.64 493	25	9.69 202	32	0.30 798	9.95 292	6	48	
13	9.64 519	26	9.69 234	32	0.30 766	9.95 285	6	47	
14	9.64 545	25	9.69 265	31	0.30 734	9.95 279	6	46	
15	9.64 570	25	9.69 297	32	0.30 702	9.95 273	6	45	
16	9.64 596	25	9.69 329	32	0.30 670	9.95 267	6	44	
17	9.64 622	26	9.69 361	31	0.30 639	9.95 260	6	43	
18	9.64 647	25	9.69 393	32	0.30 607	9.95 254	6	42	
19	9.64 673	25	9.69 425	32	0.30 575	9.95 248	6	41	
20	9.64 698	25	9.69 456	31	0.30 543	9.95 242	6	40	
21	9.64 724	25	9.69 488	32	0.30 511	9.95 235	6	39	
22	9.64 749	25	9.69 520	31	0.30 480	9.95 229	6	38	
23	9.64 775	25	9.69 552	32	0.30 448	9.95 223	6	37	
24	9.64 800	25	9.69 583	31	0.30 416	9.95 217	6	36	
25	9.64 826	25	9.69 615	32	0.30 384	9.95 210	6	35	
26	9.64 851	25	9.69 647	31	0.30 353	9.95 204	6	34	
27	9.64 876	25	9.69 678	31	0.30 321	9.95 198	6	33	
28	9.64 902	25	9.69 710	32	0.30 289	9.95 191	6	32	
29	9.64 927	25	9.69 742	31	0.30 258	9.95 185	6	31	
30	9.64 953	25	9.69 773	31	0.30 226	9.95 179	6	30	
31	9.64 978	25	9.69 805	32	0.30 194	9.95 173	6	29	
32	9.65 003	25	9.69 837	31	0.30 163	9.95 166	6	28	
33	9.65 028	25	9.69 868	31	0.30 131	9.95 160	6	27	
34	9.65 054	25	9.69 900	31	0.30 100	9.95 154	6	26	
35	9.65 079	25	9.69 931	31	0.30 068	9.95 147	6	25	
36	9.65 104	25	9.69 963	31	0.30 037	9.95 141	6	24	
37	9.65 129	25	9.69 994	31	0.30 005	9.95 135	6	23	
38	9.65 155	25	9.70 026	32	0.29 973	9.95 128	6	22	
39	9.65 180	25	9.70 058	31	0.29 942	9.95 122	6	21	
40	9.65 205	25	9.70 089	31	0.29 910	9.95 116	6	20	
41	9.65 230	25	9.70 121	31	0.29 879	9.95 109	6	19	
42	9.65 255	25	9.70 152	31	0.29 847	9.95 103	6	18	
43	9.65 280	25	9.70 183	31	0.29 816	9.95 097	6	17	
44	9.65 305	25	9.70 215	31	0.29 785	9.95 090	6	16	
45	9.65 331	25	9.70 246	31	0.29 753	9.95 084	6	15	
46	9.65 356	25	9.70 278	31	0.29 722	9.95 078	6	14	
47	9.65 381	25	9.70 309	31	0.29 690	9.95 071	6	13	
48	9.65 406	25	9.70 341	31	0.29 659	9.95 065	6	12	
49	9.65 431	25	9.70 372	31	0.29 628	9.95 058	6	11	
50	9.65 456	25	9.70 403	31	0.29 596	9.95 052	6	10	
51	9.65 481	25	9.70 435	31	0.29 565	9.95 046	6	9	
52	9.65 506	25	9.70 466	31	0.29 533	9.95 039	6	8	
53	9.65 530	24	9.70 497	31	0.29 502	9.95 033	6	7	
54	9.65 555	25	9.70 529	31	0.29 471	9.95 026	6	6	
55	9.65 580	25	9.70 560	31	0.29 439	9.95 020	6	5	
56	9.65 605	25	9.70 591	31	0.29 408	9.95 014	6	4	
57	9.65 630	24	9.70 623	31	0.29 377	9.95 007	6	3	
58	9.65 655	25	9.70 654	31	0.29 346	9.95 001	6	2	
59	9.65 680	25	9.70 685	31	0.29 314	9.94 994	6	1	
60	9.65 704	24	9.70 716	31	0.29 283	9.94 988	6	0	
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′	P. P.

	32	31
6	3.2	3.2
7	3.8	3.7
8	4.3	4.2
9	4.9	4.8
10	5.4	5.3
20	10.8	10.6
30	16.2	16.0
40	21.6	21.3
50	27.1	26.6

	31	30
6	3.1	3.1
7	3.7	3.6
8	4.2	4.1
9	4.7	4.6
10	5.2	5.1
20	10.5	10.3
30	15.7	15.5
40	21.0	20.6
50	26.2	25.8

	26	25	25
6	2.6	2.5	2.5
7	3.0	3.0	2.9
8	3.4	3.4	3.3
9	3.9	3.8	3.7
10	4.3	4.2	4.1
20	8.6	8.5	8.3
30	13.0	12.7	12.5
40	17.3	17.0	16.6
50	21.6	21.2	20.8

	24	6	6
6	2.4	0.6	0.6
7	2.8	0.7	0.7
8	3.2	0.8	0.8
9	3.7	1.0	0.9
10	4.1	1.1	1.0
20	8.1	2.1	2.0
30	12.2	3.2	3.0
40	16.3	4.3	4.0
50	20.4	5.4	5.0

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.	
0	9.65 704	25	9.70 716	31	0.29 283	9.94 988	6	**60**
1	9.65 729	24	9.70 748	31	0.29 252	9.94 981	6	59
2	9.65 754	25	9.70 779	31	0.29 221	9.94 975	6	58
3	9.65 779	24	9.70 810	31	0.29 190	9.94 969	6	57
4	9.65 803	25	9.70 841	31	0.29 158	9.94 963	6	56
5	9.65 828	24	9.70 872	31	0.29 127	9.94 956	6	55
6	9.65 853	25	9.70 903	31	0.29 096	9.94 949	6	54
7	9.65 878	24	9.70 935	31	0.29 065	9.94 943	6	53
8	9.65 902	24	9.70 966	31	0.29 034	9.94 936	6	52
9	9.65 927	24	9.70 997	31	0.29 003	9.94 930	6	51
10	9.65 951	25	9.71 028	31	0.28 972	9.94 923	6	**50**
11	9.65 976	24	9.71 059	31	0.28 940	9.94 917	6	49
12	9.66 001	24	9.71 090	31	0.28 909	9.94 910	6	48
13	9.66 025	24	9.71 121	31	0.28 878	9.94 904	6	47
14	9.66 050	24	9.71 152	31	0.28 847	9.94 897	6	46
15	9.66 074	24	9.71 183	31	0.28 816	9.94 891	6	45
16	9.66 099	24	9.71 214	31	0.28 785	9.94 884	6	44
17	9.66 123	24	9.71 245	31	0.28 754	9.94 878	6	43
18	9.66 148	24	9.71 276	31	0.28 723	9.94 871	6	42
19	9.66 172	24	9.71 307	31	0.28 692	9.94 865	6	41
20	9.66 197	24	9.71 338	31	0.28 661	9.94 858	6	**40**
21	9.66 221	24	9.71 369	31	0.28 630	9.94 852	6	39
22	9.66 246	24	9.71 400	31	0.28 599	9.94 845	6	38
23	9.66 270	24	9.71 431	31	0.28 568	9.94 839	6	37
24	9.66 294	24	9.71 462	31	0.28 537	9.94 832	6	36
25	9.66 319	24	9.71 493	30	0.28 506	9.94 825	7	35
26	9.66 343	24	9.71 524	31	0.28 476	9.94 819	6	34
27	9.66 367	24	9.71 555	31	0.28 445	9.94 812	6	33
28	9.66 392	24	9.71 586	31	0.28 414	9.94 806	6	32
29	9.66 416	24	9.71 617	30	0.28 383	9.94 799	6	31
30	9.66 440	24	9.71 647	31	0.28 352	9.94 793	6	**30**
31	9.66 465	24	9.71 678	31	0.28 321	9.94 786	7	29
32	9.66 489	24	9.71 709	30	0.28 290	9.94 779	6	28
33	9.66 513	24	9.71 740	31	0.28 260	9.94 773	6	27
34	9.66 537	24	9.71 771	30	0.28 229	9.94 766	6	26
35	9.66 561	24	9.71 801	31	0.28 198	9.94 760	6	25
36	9.66 586	24	9.71 832	31	0.28 167	9.94 753	7	24
37	9.66 610	24	9.71 863	30	0.28 136	9.94 746	6	23
38	9.66 634	24	9.71 894	31	0.28 106	9.94 740	6	22
39	9.66 658	24	9.71 925	30	0.28 075	9.94 733	6	21
40	9.66 682	24	9.71 955	30	0.28 044	9.94 727	6	**20**
41	9.66 706	24	9.71 986	31	0.28 014	9.94 720	6	19
42	9.66 730	24	9.72 017	30	0.27 983	9.94 713	7	18
43	9.66 754	24	9.72 047	31	0.27 952	9.94 707	6	17
44	9.66 778	24	9.72 078	30	0.27 921	9.94 700	6	16
45	9.66 802	24	9.72 109	30	0.27 891	9.94 693	7	15
46	9.66 826	24	9.72 139	30	0.27 860	9.94 687	6	14
47	9.66 850	24	9.72 170	30	0.27 830	9.94 680	6	13
48	9.66 874	24	9.72 201	31	0.27 799	9.94 674	6	12
49	9.66 898	24	9.72 231	30	0.27 768	9.94 667	7	11
50	9.66 922	24	9.72 262	30	0.27 738	9.94 660	6	**10**
51	9.66 946	24	9.72 292	30	0.27 707	9.94 654	6	9
52	9.66 970	24	9.72 323	30	0.27 677	9.94 647	7	8
53	9.66 994	23	9.72 354	31	0.27 646	9.94 640	6	7
54	9.67 018	24	9.72 384	30	0.27 615	9.94 633	7	6
55	9.67 042	24	9.72 415	30	0.27 585	9.94 627	6	5
56	9.67 066	24	9.72 445	30	0.27 554	9.94 620	6	4
57	9.67 089	23	9.72 476	30	0.27 524	9.94 613	7	3
58	9.67 113	24	9.72 506	30	0.27 493	9.94 607	6	2
59	9.67 137	23	9.72 537	30	0.27 463	9.94 600	7	1
60	9.67 161	24	9.72 567	30	0.27 432	9.94 593	6	**0**
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′

P. P.

	31	31	30
6	3.1	3.1	3.0
7	3.7	3.6	3.5
8	4.2	4.1	4.0
9	4.7	4.6	4.6
10	5.2	5.1	5.1
20	10.5	10.3	10.1
30	15.7	15.5	15.2
40	21.0	20.6	20.3
50	26.2	25.8	25.4

	25
6	2.5
7	2.9
8	3.3
9	3.7
10	4.1
20	8.3
30	12.5
40	16.6
50	20.8

	24	24	23
6	2.4	2.4	2.3
7	2.8	2.8	2.7
8	3.2	3.2	3.1
9	3.7	3.6	3.5
10	4.1	4.0	3.9
20	8.1	8.0	7.8
30	12.2	12.0	11.7
40	16.3	16.0	15.6
50	20.4	20.0	19.6

	7	6	6
6	0.7	0.6	0.6
7	0.8	0.7	0.7
8	0.9	0.8	0.8
9	1.0	1.0	0.9
10	1.1	1.1	1.0
20	2.3	2.1	2.0
30	3.5	3.2	3.0
40	4.6	4.3	4.0
50	5.8	5.4	5.0

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.		′
0	9.67 161	23	9.72 567	30	0.27 432	9.94 593	6	60	0
1	9.67 184	24	9.72 598	30	0.27 402	9.94 587	7	59	1
2	9.67 208	23	9.72 628	30	0.27 371	9.94 580	6	58	2
3	9.67 232	24	9.72 659	30	0.27 341	9.94 573	7	57	3
4	9.67 256	23	9.72 689	30	0.27 311	9.94 566	6	56	4
5	9.67 279	23	9.72 719	30	0.27 280	9.94 560	7	55	5
6	9.67 303	24	9.72 750	30	0.27 250	9.94 553	6	54	6
7	9.67 327	23	9.72 780	30	0.27 219	9.94 546	7	53	7
8	9.67 350	23	9.72 811	30	0.27 189	9.94 539	6	52	8
9	9.67 374	23	9.72 841	30	0.27 159	9.94 533	7	51	9
10	9.67 397	23	9.72 871	30	0.27 128	9.94 526	6	50	10
11	9.67 421	24	9.72 902	30	0.27 098	9.94 519	7	49	11
12	9.67 445	23	9.72 932	30	0.27 067	9.94 512	6	48	12
13	9.67 468	23	9.72 962	30	0.27 037	9.94 506	7	47	13
14	9.67 492	23	9.72 993	30	0.27 007	9.94 499	7	46	14
15	9.67 515	23	9.73 023	30	0.26 976	9.94 492	6	45	15
16	9.67 539	23	9.73 053	30	0.26 946	9.94 485	7	44	16
17	9.67 562	23	9.73 084	30	0.26 916	9.94 478	6	43	17
18	9.67 586	23	9.73 114	30	0.26 886	9.94 472	7	42	18
19	9.67 609	23	9.73 144	30	0.26 855	9.94 465	7	41	19
20	9.67 633	23	9.73 174	30	0.26 825	9.94 458	6	40	20
21	9.67 656	23	9.73 205	30	0.26 795	9.94 451	7	39	21
22	9.67 679	23	9.73 235	30	0.26 765	9.94 444	7	38	22
23	9.67 703	23	9.73 265	30	0.26 734	9.94 437	6	37	23
24	9.67 726	23	9.73 295	30	0.26 704	9.94 431	7	36	24
25	9.67 750	23	9.73 325	30	0.26 674	9.94 424	7	35	25
26	9.67 773	23	9.73 356	30	0.26 644	9.94 417	7	34	26
27	9.67 796	23	9.73 386	30	0.26 614	9.94 410	6	33	27
28	9.67 819	23	9.73 416	30	0.26 584	9.94 403	7	32	28
29	9.67 843	23	9.73 446	30	0.26 553	9.94 396	7	31	29
30	9.67 866	23	9.73 476	30	0.26 523	9.94 390	6	30	30
31	9.67 889	23	9.73 506	30	0.26 493	9.94 383	7	29	31
32	9.67 913	23	9.73 536	30	0.26 463	9.94 376	7	28	32
33	9.67 936	23	9.73 567	30	0.26 433	9.94 369	6	27	33
34	9.67 959	23	9.73 597	30	0.26 403	9.94 362	7	26	34
35	9.67 982	23	9.73 627	30	0.26 373	9.94 355	7	25	35
36	9.68 005	23	9.73 657	30	0.26 343	9.94 348	7	24	36
37	9.68 029	23	9.73 687	30	0.26 313	9.94 341	7	23	37
38	9.68 052	23	9.73 717	30	0.26 283	9.94 335	6	22	38
39	9.68 075	23	9.73 747	30	0.26 253	9.94 328	7	21	39
40	9.68 098	23	9.73 777	30	0.26 223	9.94 321	7	20	40
41	9.68 121	23	9.73 807	30	0.26 193	9.94 314	7	19	41
42	9.68 144	23	9.73 837	30	0.26 163	9.94 307	7	18	42
43	9.68 167	23	9.73 867	30	0.26 133	9.94 300	6	17	43
44	9.68 190	23	9.73 897	30	0.26 103	9.94 293	7	16	44
45	9.68 213	23	9.73 927	30	0.26 073	9.94 286	7	15	45
46	9.68 236	23	9.73 957	30	0.26 043	9.94 279	7	14	46
47	9.68 259	23	9.73 987	30	0.26 013	9.94 272	7	13	47
48	9.68 282	23	9.74 017	30	0.25 983	9.94 265	7	12	48
49	9.68 305	23	9.74 047	30	0.25 953	9.94 258	7	11	49
50	9.68 328	23	9.74 076	29	0.25 923	9.94 251	7	10	50
51	9.68 351	23	9.74 106	30	0.25 893	9.94 245	6	9	51
52	9.68 374	23	9.74 136	30	0.25 863	9.94 238	7	8	52
53	9.68 397	22	9.74 166	30	0.25 833	9.94 231	7	7	53
54	9.68 420	23	9.74 196	29	0.25 804	9.94 224	7	6	54
55	9.68 443	23	9.74 226	30	0.25 774	9.94 217	7	5	55
56	9.68 466	23	9.74 256	30	0.25 744	9.94 210	7	4	56
57	9.68 488	22	9.74 286	30	0.25 714	9.94 203	7	3	57
58	9.68 511	23	9.74 315	29	0.25 684	9.94 196	7	2	58
59	9.68 534	23	9.74 345	30	0.25 654	9.94 189	7	1	59
60	9.68 557	22	9.74 375	29	0.25 625	9.94 182	7	0	60
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′	

P. P.

	30	29
6	3.0	2.9
7	3.5	3.4
8	4.0	3.9
9	4.5	4.4
10	5.0	4.9
20	10.0	9.8
30	15.0	14.7
40	20.0	19.6
50	25.0	24.6

	24
6	2.4
7	2.8
8	3.2
9	3.6
10	4.0
20	8.0
30	12.0
40	16.0
50	20.0

	23	22
6	2.3	2.2
7	2.7	2.6
8	3.0	3.0
9	3.4	3.4
10	3.8	3.7
20	7.6	7.5
30	11.5	11.2
40	15.3	15.0
50	19.1	18.7

	7	6
6	0.7	0.6
7	0.8	0.7
8	0.9	0.8
9	1.0	1.0
10	1.1	1.1
20	2.3	2.1
30	3.5	3.2
40	4.6	4.3
50	5.8	5.4

P. P.

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.		P. P.
0	9.68 557	23	9.74 375	30	0.25 625	9.94 182	7	60	
1	9.68 580	23	9.74 405	30	0.25 595	9.94 175	7	59	
2	9.68 602	23	9.74 435	29	0.25 565	9.94 168	7	58	
3	9.68 625	22	9.74 464	30	0.25 535	9.94 161	7	57	
4	9.68 648	23	9.74 494	29	0.25 505	9.94 154	7	56	
5	9.68 671	22	9.74 524	30	0.25 476	9.94 147	7	55	
6	9.68 693	23	9.74 554	29	0.25 446	9.94 140	7	54	
7	9.68 716	23	9.74 583	29	0.25 416	9.94 133	7	53	
8	9.68 739	22	9.74 613	30	0.25 387	9.94 126	7	52	
9	9.68 761	23	9.74 643	29	0.25 357	9.94 118	8	51	
10	9.68 784	23	9.74 672	30	0.25 328	9.94 111	7	**50**	
11	9.68 807	22	9.74 702	29	0.25 298	9.94 104	7	49	
12	9.68 829	23	9.74 732	29	0.25 268	9.94 097	7	48	
13	9.68 852	22	9.74 761	30	0.25 238	9.94 090	7	47	
14	9.68 874	23	9.74 791	29	0.25 208	9.94 083	7	46	
15	9.68 897	23	9.74 821	29	0.25 179	9.94 076	7	45	
16	9.68 920	22	9.74 850	29	0.25 149	9.94 069	8	44	
17	9.68 942	22	9.74 880	29	0.25 120	9.94 062	7	43	
18	9.68 965	22	9.74 909	30	0.25 090	9.94 055	7	42	
19	9.68 987	22	9.74 939	29	0.25 060	9.94 048	7	41	
20	9.69 010	22	9.74 969	29	0.25 031	9.94 041	7	**40**	
21	9.69 032	22	9.74 998	29	0.25 001	9.94 034	8	39	
22	9.69 055	22	9.75 028	29	0.24 972	9.94 026	7	38	
23	9.69 077	22	9.75 057	29	0.24 942	9.94 019	7	37	
24	9.69 099	22	9.75 087	29	0.24 913	9.94 012	7	36	
25	9.69 122	22	9.75 116	29	0.24 883	9.94 005	8	35	
26	9.69 144	22	9.75 146	29	0.24 854	9.93 998	7	34	
27	9.69 167	22	9.75 175	29	0.24 824	9.93 991	7	33	
28	9.69 189	22	9.75 205	29	0.24 795	9.93 984	7	32	
29	9.69 211	22	9.75 234	29	0.24 765	9.93 977	8	31	
30	9.69 234	22	9.75 264	29	0.24 736	9.93 969	7	**30**	
31	9.69 256	22	9.75 293	29	0.24 706	9.93 962	7	29	
32	9.69 278	22	9.75 323	29	0.24 677	9.93 955	8	28	
33	9.69 301	22	9.75 352	29	0.24 647	9.93 948	7	27	
34	9.69 323	22	9.75 382	29	0.24 618	9.93 941	7	26	
35	9.69 345	22	9.75 411	29	0.24 588	9.93 934	8	25	
36	9.69 367	22	9.75 441	29	0.24 559	9.93 926	7	24	
37	9.69 390	22	9.75 470	29	0.24 529	9.93 919	7	23	
38	9.69 412	22	9.75 499	29	0.24 500	9.93 912	8	22	
39	9.69 434	22	9.75 529	29	0.24 471	9.93 905	7	21	
40	9.69 456	22	9.75 558	29	0.24 441	9.93 898	7	**20**	
41	9.69 478	22	9.75 588	29	0.24 412	9.93 891	8	19	
42	9.69 500	22	9.75 617	29	0.24 383	9.93 883	7	18	
43	9.69 523	22	9.75 646	29	0.24 353	9.93 876	8	17	
44	9.69 545	22	9.75 676	29	0.24 324	9.93 869	7	16	
45	9.69 567	22	9.75 705	29	0.24 295	9.93 862	8	15	
46	9.69 589	22	9.75 734	29	0.24 265	9.93 854	7	14	
47	9.69 611	22	9.75 764	29	0.24 236	9.93 847	8	13	
48	9.69 633	22	9.75 793	29	0.24 207	9.93 840	7	12	
49	9.69 655	22	9.75 822	29	0.24 177	9.93 833	8	11	
50	9.69 677	22	9.75 851	29	0.24 148	9.93 826	7	**10**	
51	9.69 699	22	9.75 881	29	0.24 119	9.93 818	8	9	
52	9.69 721	22	9.75 910	29	0.24 090	9.93 811	7	8	
53	9.69 743	22	9.75 939	29	0.24 060	9.93 804	8	7	
54	9.69 765	22	9.75 968	29	0.24 031	9.93 796	8	6	
55	9.69 787	22	9.75 998	29	0.24 002	9.93 789	7	5	
56	9.69 809	22	9.76 027	29	0.23 973	9.93 782	8	4	
57	9.69 831	22	9.76 056	29	0.23 943	9.93 775	8	3	
58	9.69 853	21	9.76 085	29	0.23 914	9.93 767	7	2	
59	9.69 875	22	9.76 115	29	0.23 885	9.93 760	8	1	
60	9.69 897	22	9.76 144	29	0.23 856	9.93 753	8	**0**	
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′	P. P.

	30	29	29
6	3.0	2.9	2.9
7	3.5	3.4	3.4
8	4.0	3.9	3.8
9	4.5	4.4	4.3
10	5.0	4.9	4.8
20	10.0	9.8	9.6
30	15.0	14.7	14.5
40	20.0	19.6	19.3
50	25.0	24.6	24.1

	23
6	2.3
7	2.7
8	3.0
9	3.4
10	3.8
20	7.6
30	11.5
40	15.3
50	19.1

	22	22	21
6	2.2	2.2	2.1
7	2.6	2.5	2.5
8	3.0	2.9	2.8
9	3.4	3.3	3.2
10	3.7	3.6	3.6
20	7.5	7.3	7.1
30	11.2	11.0	10.7
40	15.0	14.6	14.3
50	18.7	18.3	17.9

	7	7
6	0.7	0.7
7	0.9	0.8
8	1.0	0.9
9	1.1	1.0
10	1.2	1.1
20	2.5	2.3
30	3.7	3.5
40	5.0	4.6
50	6.2	5.8

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.		P. P.
0	9.69 897	22	9.76 144	29	0.23 856	9.93 753	7	**60**	
1	9.69 919	21	9.76 173	29	0.23 827	9.93 746	7	59	
2	9.69 940	22	9.76 202	29	0.23 798	9.93 738	7	58	
3	9.69 962	22	9.76 231	29	0.23 768	9.93 731	7	57	
4	9.69 984	21	9.76 260	29	0.23 739	9.93 724	7	56	
5	9.70 006	22	9.76 289	29	0.23 710	9.93 716	7	55	
6	9.70 028	22	9.76 319	29	0.23 681	9.93 709	7	54	
7	9.70 050	21	9.76 348	29	0.23 652	9.93 702	7	53	
8	9.70 071	22	9.76 377	29	0.23 623	9.93 694	7	52	
9	9.70 093	21	9.76 406	29	0.23 594	9.93 687	7	51	
10	9.70 115	22	9.76 435	29	0.23 565	9.93 680	7	**50**	
11	9.70 137	21	9.76 464	29	0.23 535	9.93 672	7	49	
12	9.70 158	21	9.76 493	29	0.23 506	9.93 665	7	48	
13	9.70 180	22	9.76 522	29	0.23 477	9.93 658	7	47	
14	9.70 202	21	9.76 551	29	0.23 448	9.93 650	7	46	
15	9.70 223	21	9.76 580	29	0.23 419	9.93 643	7	45	
16	9.70 245	22	9.76 609	29	0.23 390	9.93 635	7	44	
17	9.70 267	21	9.76 638	29	0.23 361	9.93 628	7	43	
18	9.70 288	21	9.76 667	29	0.23 332	9.93 621	7	42	
19	9.70 310	21	9.76 696	29	0.23 303	9.93 613	7	41	
20	9.70 331	22	9.76 725	29	0.23 274	9.93 606	7	**40**	
21	9.70 353	21	9.76 754	29	0.23 245	9.93 599	7	39	
22	9.70 375	21	9.76 783	29	0.23 216	9.93 591	7	38	
23	9.70 396	21	9.76 812	29	0.23 187	9.93 584	7	37	
24	9.70 418	21	9.76 841	29	0.23 158	9.93 576	7	36	
25	9.70 439	21	9.76 870	29	0.23 129	9.93 569	7	35	
26	9.70 461	21	9.76 899	28	0.23 101	9.93 562	7	34	
27	9.70 482	21	9.76 928	29	0.23 072	9.93 554	7	33	
28	9.70 504	21	9.76 957	29	0.23 043	9.93 547	7	32	
29	9.70 525	21	9.76 986	29	0.23 014	9.93 539	7	31	
30	9.70 547	21	9.77 015	29	0.22 985	9.93 532	7	**30**	
31	9.70 568	21	9.77 043	28	0.22 956	9.93 524	7	29	
32	9.70 590	21	9.77 072	29	0.22 927	9.93 517	7	28	
33	9.70 611	21	9.77 101	29	0.22 898	9.93 509	7	27	
34	9.70 632	21	9.77 130	29	0.22 869	9.93 502	7	26	
35	9.70 654	21	9.77 159	28	0.22 841	9.93 495	7	25	
36	9.70 675	21	9.77 188	29	0.22 812	9.93 487	7	24	
37	9.70 696	21	9.77 217	29	0.22 783	9.93 480	7	23	
38	9.70 718	21	9.77 245	28	0.22 754	9.93 472	7	22	
39	9.70 739	21	9.77 274	29	0.22 725	9.93 465	7	21	
40	9.70 760	21	9.77 303	29	0.22 696	9.93 457	7	**20**	
41	9.70 782	21	9.77 332	28	0.22 668	9.93 450	7	19	
42	9.70 803	21	9.77 361	29	0.22 639	9.93 442	7	18	
43	9.70 824	21	9.77 389	28	0.22 610	9.93 435	7	17	
44	9.70 846	21	9.77 418	29	0.22 581	9.93 427	7	16	
45	9.70 867	21	9.77 447	28	0.22 553	9.93 420	7	15	
46	9.70 888	21	9.77 476	29	0.22 524	9.93 412	7	14	
47	9.70 909	21	9.77 504	28	0.22 495	9.93 405	7	13	
48	9.70 930	21	9.77 533	29	0.22 466	9.93 397	7	12	
49	9.70 952	21	9.77 562	28	0.22 438	9.93 390	7	11	
50	9.70 973	21	9.77 591	29	0.22 409	9.93 382	8	**10**	
51	9.70 994	21	9.77 619	28	0.22 380	9.93 374	7	9	
52	9.71 015	21	9.77 648	28	0.22 352	9.93 367	7	8	
53	9.71 036	21	9.77 677	29	0.22 323	9.93 359	7	7	
54	9.71 057	21	9.77 705	28	0.22 294	9.93 352	7	6	
55	9.71 078	21	9.77 734	28	0.22 266	9.93 344	7	5	
56	9.71 099	21	9.77 763	29	0.22 237	9.93 337	7	4	
57	9.71 121	21	9.77 791	28	0.22 208	9.93 329	8	3	
58	9.71 142	21	9.77 820	28	0.22 180	9.93 321	7	2	
59	9.71 163	21	9.77 849	29	0.22 151	9.93 314	7	1	
60	9.71 184	21	9.77 877	28	0.22 123	9.93 306	7	**0**	
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′	P. P.

	29	29	28
6	2.9	2.9	2.8
7	3.4	3.4	3.3
8	3.9	3.8	3.8
9	4.4	4.3	4.3
10	4.9	4.8	4.7
20	9.8	9.6	9.5
30	14.7	14.5	14.2
40	19.6	19.3	19.0
50	24.6	24.1	23.7

	22	21	21
6	2.2	2.1	2.1
7	2.5	2.5	2.4
8	2.9	2.8	2.8
9	3.3	3.2	3.1
10	3.6	3.6	3.5
20	7.3	7.1	7.0
30	11.0	10.7	10.5
40	14.6	14.3	14.0
50	18.3	17.9	17.5

	8	7	7
6	0.8	0.7	0.7
7	0.9	0.9	0.8
8	1.0	1.0	0.9
9	1.2	1.1	1.0
10	1.3	1.2	1.1
20	2.6	2.5	2.3
30	4.0	3.7	3.5
40	5.3	5.0	4.6
50	6.6	6.2	5.8

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.		P. P.
0	9.71 184	21	9.77 877	28	0.22 122	9.93 306	7	60	
1	9.71 205	21	9.77 906	28	0.22 094	9.93 299	7	59	
2	9.71 226	21	9.77 934	28	0.22 065	9.93 291	7	58	
3	9.71 247	21	9.77 963	29	0.22 037	9.93 284	8	57	
4	9.71 268	21	9.77 992	28	0.22 008	9.93 276	7	56	
5	9.71 289	21	9.78 020	28	0.21 979	9.93 268	7	55	
6	9.71 310	21	9.78 049	28	0.21 951	9.93 261	7	54	
7	9.71 331	20	9.78 077	28	0.21 922	9.93 253	8	53	
8	9.71 351	21	9.78 106	28	0.21 894	9.93 245	7	52	
9	9.71 372	21	9.78 134	28	0.21 865	9.93 238	7	51	
10	9.71 393	21	9.78 163	28	0.21 837	9.93 230	7	50	
11	9.71 414	20	9.78 191	28	0.21 808	9.93 223	8	49	
12	9.71 435	21	9.78 220	28	0.21 780	9.93 215	7	48	
13	9.71 456	21	9.78 248	28	0.21 751	9.93 207	7	47	
14	9.71 477	21	9.78 277	28	0.21 723	9.93 200	8	46	
15	9.71 498	20	9.78 305	28	0.21 694	9.93 192	7	45	
16	9.71 518	21	9.78 334	28	0.21 666	9.93 184	7	44	
17	9.71 539	20	9.78 362	28	0.21 637	9.93 177	8	43	
18	9.71 560	21	9.78 391	28	0.21 609	9.93 169	7	42	
19	9.71 581	20	9.78 419	28	0.21 580	9.93 161	8	41	
20	9.71 601	21	9.78 448	28	0.21 552	9.93 153	7	40	
21	9.71 623	20	9.78 476	28	0.21 523	9.93 146	7	39	
22	9.71 643	21	9.78 505	28	0.21 495	9.93 138	8	38	
23	9.71 664	20	9.78 533	28	0.21 467	9.93 130	7	37	
24	9.71 684	21	9.78 561	28	0.21 438	9.93 123	8	36	
25	9.71 705	20	9.78 590	28	0.21 410	9.93 115	7	35	
26	9.71 726	20	9.78 618	28	0.21 381	9.93 107	7	34	
27	9.71 746	21	9.78 647	28	0.21 353	9.93 100	8	33	
28	9.71 767	20	9.78 675	28	0.21 325	9.93 092	7	32	
29	9.71 788	20	9.78 703	28	0.21 296	9.93 084	8	31	
30	9.71 808	20	9.78 732	28	0.21 268	9.93 076	7	30	
31	9.71 829	20	9.78 760	28	0.21 239	9.93 069	8	29	
32	9.71 849	21	9.78 788	28	0.21 211	9.93 061	7	28	
33	9.71 870	20	9.78 817	28	0.21 183	9.93 053	8	27	
34	9.71 891	20	9.78 845	28	0.21 154	9.93 045	7	26	
35	9.71 911	20	9.78 873	28	0.21 126	9.93 038	8	25	
36	9.71 932	20	9.78 902	28	0.21 098	9.93 030	7	24	
37	9.71 952	20	9.78 930	28	0.21 070	9.93 022	8	23	
38	9.71 973	20	9.78 958	28	0.21 041	9.93 014	8	22	
39	9.71 993	20	9.78 987	28	0.21 013	9.93 006	7	21	
40	9.72 014	20	9.79 015	28	0.20 985	9.92 999	8	20	
41	9.72 034	20	9.79 043	28	0.20 956	9.92 991	7	19	
42	9.72 055	20	9.79 071	28	0.20 928	9.92 983	8	18	
43	9.72 075	20	9.79 100	28	0.20 900	9.92 975	8	17	
44	9.72 096	20	9.79 128	28	0.20 872	9.92 967	7	16	
45	9.72 116	20	9.79 156	28	0.20 843	9.92 960	8	15	
46	9.72 136	20	9.79 184	28	0.20 815	9.92 952	8	14	
47	9.72 157	20	9.79 213	28	0.20 787	9.92 944	7	13	
48	9.72 177	20	9.79 241	28	0.20 759	9.92 936	8	12	
49	9.72 198	20	9.79 269	28	0.20 731	9.92 928	8	11	
50	9.72 218	20	9.79 297	28	0.20 702	9.92 920	7	10	
51	9.72 238	20	9.79 325	28	0.20 674	9.92 913	8	9	
52	9.72 259	20	9.79 354	28	0.20 646	9.92 905	8	8	
53	9.72 279	20	9.79 382	28	0.20 618	9.92 897	7	7	
54	9.72 299	20	9.79 410	28	0.20 590	9.92 889	8	6	
55	9.72 319	20	9.79 438	28	0.20 561	9.92 881	8	5	
56	9.72 340	20	9.79 466	28	0.20 533	9.92 873	8	4	
57	9.72 360	20	9.79 494	28	0.20 505	9.92 865	7	3	
58	9.72 380	20	9.79 522	28	0.20 477	9.92 858	8	2	
59	9.72 400	20	9.79 551	28	0.20 449	9.92 850	8	1	
60	9.72 421	20	9.79 579	28	0.20 421	9.92 842	8	0	
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′	P. P.

	29	28	28
6	2.9	2.8	2.8
7	3.4	3.3	3.2
8	3.8	3.8	3.7
9	4.3	4.3	4.2
10	4.8	4.7	4.6
20	9.6	9.5	9.3
30	14.5	14.2	14.0
40	19.3	19.0	18.6
50	24.1	23.7	23.3

	21	20	20
6	2.1	2.0	2.0
7	2.4	2.4	2.3
8	2.8	2.7	2.6
9	3.1	3.1	3.0
10	3.5	3.4	3.3
20	7.0	6.8	6.6
30	10.5	10.2	10.0
40	14.0	13.6	13.3
50	17.5	17.1	16.6

	8	7
6	0.8	0.7
7	0.9	0.9
8	1.0	1.0
9	1.2	1.1
10	1.3	1.2
20	2.6	2.5
30	4.0	3.7
40	5.3	5.0
50	6.6	6.2

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.		P. P.
0	9.72 421	20	9.79 579	28	0.20 421	9.92 842	8	60	
1	9.72 441	20	9.79 607	28	0.20 393	9.92 834	8	59	
2	9.72 461	20	9.79 635	28	0.20 365	9.92 826	8	58	
3	9.72 481	20	9.79 663	28	0.20 337	9.92 818	8	57	
4	9.72 501	20	9.79 691	28	0.20 308	9.92 810	8	56	
5	9.72 522	20	9.79 719	28	0.20 280	9.92 802	8	55	
6	9.72 542	20	9.79 747	28	0.20 252	9.92 794	8	54	
7	9.72 562	20	9.79 775	28	0.20 224	9.92 786	8	53	
8	9.72 582	20	9.79 803	28	0.20 196	9.92 778	7	52	
9	9.72 602	20	9.79 831	28	0.20 168	9.92 771	8	51	
10	9.72 622	20	9.79 859	28	0.20 140	9.92 763	8	50	
11	9.72 642	20	9.79 887	28	0.20 112	9.92 755	8	49	
12	9.72 662	20	9.79 915	28	0.20 084	9.92 747	8	48	
13	9.72 682	20	9.79 943	28	0.20 056	9.92 739	8	47	
14	9.72 702	20	9.79 971	28	0.20 028	9.92 731	8	46	
15	9.72 723	20	9.79 999	28	0.20 000	9.92 723	8	45	
16	9.72 743	20	9.80 027	28	0.19 972	9.92 715	8	44	
17	9.72 763	20	9.80 055	28	0.19 944	9.92 707	8	43	
18	9.72 783	20	9.80 083	28	0.19 916	9.92 699	8	42	
19	9.72 802	19	9.80 111	28	0.19 888	9.92 691	8	41	
20	9.72 822	20	9.80 139	28	0.19 860	9.92 683	8	40	
21	9.72 842	20	9.80 167	28	0.19 832	9.92 675	8	39	
22	9.72 862	20	9.80 195	28	0.19 804	9.92 667	8	38	
23	9.72 882	20	9.80 223	28	0.19 776	9.92 659	8	37	
24	9.72 902	20	9.80 251	27	0.19 748	9.92 651	8	36	
25	9.72 922	19	9.80 279	28	0.19 721	9.92 643	8	35	
26	9.72 942	20	9.80 307	28	0.19 693	9.92 635	8	34	
27	9.72 962	20	9.80 335	28	0.19 665	9.92 627	8	33	
28	9.72 982	20	9.80 363	28	0.19 637	9.92 619	8	32	
29	9.73 002	19	9.80 391	27	0.19 609	9.92 611	8	31	
30	9.73 021	20	9.80 418	28	0.19 581	9.92 603	8	30	
31	9.73 041	20	9.80 446	28	0.19 553	9.92 595	8	29	
32	9.73 061	19	9.80 474	28	0.19 525	9.92 587	8	28	
33	9.73 081	20	9.80 502	27	0.19 497	9.92 579	8	27	
34	9.73 101	19	9.80 530	28	0.19 470	9.92 570	8	26	
35	9.73 120	20	9.80 558	28	0.19 442	9.92 562	8	25	
36	9.73 140	19	9.80 586	27	0.19 414	9.92 554	8	24	
37	9.73 160	20	9.80 613	28	0.19 386	9.92 546	8	23	
38	9.73 180	19	9.80 641	28	0.19 358	9.92 538	8	22	
39	9.73 199	20	9.80 669	27	0.19 330	9.92 530	8	21	
40	9.73 219	19	9.80 697	28	0.19 303	9.92 522	8	20	
41	9.73 239	19	9.80 725	27	0.19 275	9.92 514	8	19	
42	9.73 258	20	9.80 752	28	0.19 247	9.92 506	8	18	
43	9.73 278	19	9.80 780	28	0.19 219	9.92 498	8	17	
44	9.73 298	19	9.80 808	27	0.19 191	9.92 489	8	16	
45	9.73 317	20	9.80 836	28	0.19 164	9.92 481	8	15	
46	9.73 337	19	9.80 864	27	0.19 136	9.92 473	8	14	
47	9.73 357	19	9.80 891	28	0.19 108	9.92 465	8	13	
48	9.73 376	19	9.80 919	27	0.19 080	9.92 457	8	12	
49	9.73 396	19	9.80 947	28	0.19 053	9.92 449	8	11	
50	9.73 415	20	9.80 975	27	0.19 025	9.92 441	8	10	
51	9.73 435	19	9.81 002	27	0.18 997	9.92 433	8	9	
52	9.73 455	19	9.81 030	28	0.18 970	9.92 424	8	8	
53	9.73 474	19	9.81 058	27	0.18 942	9.92 416	8	7	
54	9.73 494	19	9.81 085	28	0.18 914	9.92 408	8	6	
55	9.73 513	19	9.81 113	27	0.18 886	9.92 400	8	5	
56	9.73 533	19	9.81 141	27	0.18 859	9.92 392	8	4	
57	9.73 552	19	9.81 168	28	0.18 831	9.92 383	8	3	
58	9.73 572	19	9.81 196	27	0.18 803	9.92 375	8	2	
59	9.73 591	19	9.81 224	27	0.18 776	9.92 367	8	1	
60	9.73 611	19	9.81 251	27	0.18 748	9.92 359	8	0	
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′	P. P.

	28	28	27
6	2.8	2.8	2.7
7	3.3	3.2	3.2
8	3.8	3.7	3.6
9	4.3	4.2	4.1
10	4.7	4.6	4.6
20	9.5	9.3	9.1
30	14.2	14.0	13.7
40	19.0	18.6	18.3
50	23.7	23.3	22.9

	20	20	19
6	2.0	2.0	1.9
7	2.4	2.3	2.3
8	2.7	2.6	2.6
9	3.1	3.0	2.9
10	3.4	3.3	3.2
20	6.8	6.6	6.5
30	10.2	10.0	9.7
40	13.6	13.3	13.0
50	17.1	16.6	16.2

	8	8	7
6	0.8	0.8	0.7
7	1.0	0.9	0.9
8	1.1	1.0	1.0
9	1.3	1.2	1.1
10	1.4	1.3	1.2
20	2.8	2.6	2.5
30	4.2	4.0	3.7
40	5.6	5.3	5.0
50	7.1	6.6	6.2

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.		P. P.
0	9.73 611	19	9.81 251	28	0.18 748	9.92 359	8	60	
1	9.73 630	19	9.81 279	27	0.18 720	9.92 351	8	59	
2	9.73 650	19	9.81 307	27	0.18 693	9.92 342	8	58	
3	9.73 669	19	9.81 334	28	0.18 665	9.92 334	8	57	
4	9.73 688	19	9.81 362	27	0.18 637	9.92 326	8	56	
5	9.73 708	19	9.81 390	27	0.18 610	9.92 318	8	55	
6	9.73 727	19	9.81 417	27	0.18 582	9.92 310	8	54	
7	9.73 746	19	9.81 445	28	0.18 555	9.92 301	8	53	
8	9.73 766	19	9.81 473	27	0.18 527	9.92 293	8	52	
9	9.73 785	19	9.81 500	27	0.18 499	9.92 285	8	51	
10	9.73 805	19	9.81 528	27	0.18 472	9.92 277	8	50	
11	9.73 824	19	9.81 555	27	0.18 444	9.92 268	8	49	
12	9.73 843	19	9.81 583	27	0.18 417	9.92 260	8	48	
13	9.73 862	19	9.81 610	27	0.18 389	9.92 252	8	47	
14	9.73 882	19	9.81 638	28	0.18 362	9.92 244	8	46	
15	9.73 901	19	9.81 666	27	0.18 334	9.92 235	8	45	
16	9.73 920	19	9.81 693	27	0.18 306	9.92 227	8	44	
17	9.73 940	19	9.81 721	27	0.18 279	9.92 219	8	43	
18	9.73 959	19	9.81 748	27	0.18 251	9.92 210	8	42	
19	9.73 978	19	9.81 776	27	0.18 224	9.92 202	8	41	
20	9.73 997	19	9.81 803	27	0.18 196	9.92 194	8	40	
21	9.74 016	19	9.81 831	27	0.18 169	9.92 185	8	39	
22	9.74 036	19	9.81 858	27	0.18 141	9.92 177	8	38	
23	9.74 055	19	9.81 886	27	0.18 114	9.92 169	8	37	
24	9.74 074	19	9.81 913	27	0.18 086	9.92 160	8	36	
25	9.74 093	19	9.81 941	27	0.18 059	9.92 152	8	35	
26	9.74 112	19	9.81 968	27	0.18 031	9.92 144	8	34	
27	9.74 131	19	9.81 996	27	0.18 004	9.92 135	8	33	
28	9.74 151	19	9.82 023	27	0.17 976	9.92 127	8	32	
29	9.74 170	19	9.82 051	27	0.17 949	9.92 119	8	31	
30	9.74 189	19	9.82 078	27	0.17 921	9.92 110	8	30	
31	9.74 208	19	9.82 105	27	0.17 894	9.92 102	8	29	
32	9.74 227	19	9.82 133	27	0.17 867	9.92 094	8	28	
33	9.74 246	19	9.82 160	27	0.17 839	9.92 085	8	27	
34	9.74 265	19	9.82 188	27	0.17 812	9.92 077	8	26	
35	9.74 284	19	9.82 215	27	0.17 784	9.92 069	8	25	
36	9.74 303	19	9.82 243	27	0.17 757	9.92 060	8	24	
37	9.74 322	19	9.82 270	27	0.17 729	9.92 052	8	23	
38	9.74 341	19	9.82 297	27	0.17 702	9.92 043	8	22	
39	9.74 360	18	9.82 325	27	0.17 675	9.92 035	8	21	
40	9.74 379	19	9.82 352	27	0.17 647	9.92 027	8	20	
41	9.74 398	19	9.82 380	27	0.17 620	9.92 018	8	19	
42	9.74 417	19	9.82 407	27	0.17 593	9.92 010	8	18	
43	9.74 436	19	9.82 434	27	0.17 565	9.92 001	8	17	
44	9.74 455	19	9.82 462	27	0.17 538	9.91 993	8	16	
45	9.74 474	19	9.82 489	27	0.17 510	9.91 984	8	15	
46	9.74 493	19	9.82 516	27	0.17 483	9.91 976	8	14	
47	9.74 511	18	9.82 544	27	0.17 456	9.91 967	8	13	
48	9.74 530	19	9.82 571	27	0.17 428	9.91 959	8	12	
49	9.74 549	19	9.82 598	27	0.17 401	9.91 951	8	11	
50	9.74 568	19	9.82 626	27	0.17 374	9.91 942	8	10	
51	9.74 587	18	9.82 653	27	0.17 347	9.91 934	8	9	
52	9.74 606	19	9.82 680	27	0.17 319	9.91 925	8	8	
53	9.74 625	19	9.82 708	27	0.17 292	9.91 917	8	7	
54	9.74 643	18	9.82 735	27	0.17 265	9.91 908	8	6	
55	9.74 662	19	9.82 762	27	0.17 237	9.91 900	8	5	
56	9.74 681	18	9.82 789	27	0.17 210	9.91 891	8	4	
57	9.74 700	19	9.82 817	27	0.17 183	9.91 883	8	3	
58	9.74 718	18	9.82 844	27	0.17 156	9.91 874	8	2	
59	9.74 737	19	9.82 871	27	0.17 128	9.91 866	8	1	
60	9.74 756	18	9.82 898	27	0.17 101	9.91 857	8	0	
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′	P. P.

	28	27	27
6	2.8	2.7	2.7
7	3.2	3.2	3.1
8	3.7	3.6	3.6
9	4.2	4.1	4.0
10	4.6	4.6	4.5
20	9.3	9.1	9.0
30	14.0	13.7	13.5
40	18.6	18.3	18.0
50	23.3	22.9	22.5

	19	19	18
6	1.9	1.9	1.8
7	2.3	2.2	2.1
8	2.6	2.5	2.4
9	2.9	2.8	2.8
10	3.2	3.1	3.1
20	6.5	6.3	6.1
30	9.7	9.5	9.2
40	13.0	12.6	12.3
50	16.2	15.8	15.4

	8	8
6	0.8	0.8
7	1.0	0.9
8	1.1	1.0
9	1.3	1.2
10	1.4	1.3
20	2.8	2.6
30	4.2	4.0
40	5.6	5.3
50	7.1	6.6

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.	′
0	9.74 756		9.82 898		0.17 101	9.91 857		60
1	9.74 775	19	9.82 926	28	0.17 074	9.91 849	8	59
2	9.74 793	18	9.82 953	27	0.17 047	9.91 840	9	58
3	9.74 812	19	9.82 980	27	0.17 019	9.91 832	8	57
4	9.74 831	18	9.83 007	27	0.16 992	9.91 823	9	56
5	9.74 849	19	9.83 035	28	0.16 965	9.91 814	9	55
6	9.74 868	18	9.83 062	27	0.16 938	9.91 806	8	54
7	9.74 887	18	9.83 089	27	0.16 910	9.91 797	9	53
8	9.74 905	18	9.83 116	27	0.16 883	9.91 789	8	52
9	9.74 924	19	9.83 143	27	0.16 856	9.91 780	9	51
10	9.74 943	18	9.83 171	28	0.16 829	9.91 772	8	50
11	9.74 961	18	9.83 198	27	0.16 802	9.91 763	9	49
12	9.74 980	18	9.83 225	27	0.16 774	9.91 755	8	48
13	9.74 998	18	9.83 252	27	0.16 747	9.91 746	9	47
14	9.75 017	18	9.83 279	27	0.16 720	9.91 737	9	46
15	9.75 036	19	9.83 307	28	0.16 693	9.91 729	8	45
16	9.75 054	18	9.83 334	27	0.16 666	9.91 720	9	44
17	9.75 073	18	9.83 361	27	0.16 639	9.91 712	8	43
18	9.75 091	18	9.83 388	27	0.16 612	9.91 703	9	42
19	9.75 110	18	9.83 415	27	0.16 584	9.91 694	9	41
20	9.75 128	18	9.83 442	27	0.16 557	9.91 686	8	40
21	9.75 147	18	9.83 469	27	0.16 530	9.91 677	9	39
22	9.75 165	18	9.83 496	27	0.16 503	9.91 668	9	38
23	9.75 184	18	9.83 524	28	0.16 476	9.91 660	8	37
24	9.75 202	18	9.83 551	27	0.16 449	9.91 651	9	36
25	9.75 221	18	9.83 578	27	0.16 422	9.91 642	9	35
26	9.75 239	18	9.83 605	27	0.16 395	9.91 634	8	34
27	9.75 257	18	9.83 632	27	0.16 368	9.91 625	9	33
28	9.75 276	18	9.83 659	27	0.16 340	9.91 616	9	32
29	9.75 294	18	9.83 686	27	0.16 313	9.91 608	8	31
30	9.75 313	18	9.83 713	27	0.16 286	9.91 599	9	30
31	9.75 331	18	9.83 740	27	0.16 259	9.91 590	9	29
32	9.75 349	18	9.83 767	27	0.16 232	9.91 582	8	28
33	9.75 368	18	9.83 794	27	0.16 205	9.91 573	9	27
34	9.75 386	18	9.83 821	27	0.16 178	9.91 564	9	26
35	9.75 404	18	9.83 848	27	0.16 151	9.91 556	8	25
36	9.75 423	18	9.83 875	27	0.16 124	9.91 547	9	24
37	9.75 441	18	9.83 902	27	0.16 097	9.91 538	9	23
38	9.75 459	18	9.83 929	27	0.16 070	9.91 529	9	22
39	9.75 478	18	9.83 957	28	0.16 043	9.91 521	8	21
40	9.75 496	18	9.83 984	27	0.16 016	9.91 512	9	20
41	9.75 514	18	9.84 011	27	0.15 989	9.91 503	9	19
42	9.75 532	18	9.84 038	27	0.15 962	9.91 495	8	18
43	9.75 551	18	9.84 065	27	0.15 935	9.91 486	9	17
44	9.75 569	18	9.84 091	26	0.15 908	9.91 477	9	16
45	9.75 587	18	9.84 118	27	0.15 881	9.91 468	9	15
46	9.75 605	18	9.84 145	27	0.15 854	9.91 460	8	14
47	9.75 623	18	9.84 172	27	0.15 827	9.91 451	9	13
48	9.75 642	18	9.84 199	27	0.15 800	9.91 442	9	12
49	9.75 660	18	9.84 226	27	0.15 773	9.91 433	9	11
50	9.75 678	18	9.84 253	27	0.15 746	9.91 424	9	10
51	9.75 696	18	9.84 280	27	0.15 719	9.91 416	8	9
52	9.75 714	18	9.84 307	27	0.15 693	9.91 407	9	8
53	9.75 732	18	9.84 334	27	0.15 665	9.91 398	9	7
54	9.75 750	18	9.84 361	26	0.15 639	9.91 389	9	6
55	9.75 769	18	9.84 388	27	0.15 612	9.91 380	9	5
56	9.75 787	18	9.84 415	27	0.15 585	9.91 372	8	4
57	9.75 805	18	9.84 442	27	0.15 558	9.91 363	9	3
58	9.75 823	18	9.84 469	27	0.15 531	9.91 354	9	2
59	9.75 841	18	9.84 496	27	0.15 504	9.91 345	9	1
60	9.75 859		9.84 522	26	0.15 477	9.91 336	8	0
′	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′

P. P.

	27	27	26
6	2.7	2.7	2.6
7	3.2	3.1	3.1
8	3.6	3.6	3.5
9	4.1	4.0	4.0
10	4.6	4.5	4.4
20	9.1	9.0	8.8
30	13.7	13.5	13.2
40	18.3	18.0	17.6
50	22.9	22.5	22.1

	19	18	18
6	1.9	1.8	1.8
7	2.2	2.1	2.1
8	2.5	2.4	2.4
9	2.8	2.8	2.7
10	3.1	3.1	3.0
20	6.3	6.1	6.0
30	9.5	9.2	9.0
40	12.6	12.3	12.0
50	15.8	15.4	15.0

	9	8
6	0.9	0.8
7	1.0	1.0
8	1.2	1.1
9	1.3	1.3
10	1.5	1.4
20	3.0	2.8
30	4.5	4.2
40	6.0	5.6
50	7.5	7.1

P. P.

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.		P. P.
0	9.75 859	18	9.84 522	27	0.15 477	9.91 336	9	60	
1	9.75 877	18	9.84 549	27	0.15 450	9.91 327	9	59	
2	9.75 895	18	9.84 576	27	0.15 423	9.91 318	9	58	
3	9.75 913	18	9.84 603	26	0.15 396	9.91 310	8	57	
4	9.75 931	18	9.84 630	27	0.15 370	9.91 301	9	56	
5	9.75 949	18	9.84 657	27	0.15 343	9.91 292	9	55	
6	9.75 967	18	9.84 684	27	0.15 316	9.91 283	9	54	
7	9.75 985	18	9.84 711	26	0.15 289	9.91 274	9	53	
8	9.76 003	18	9.84 737	27	0.15 262	9.91 265	9	52	
9	9.76 021	18	9.84 764	27	0.15 235	9.91 256	9	51	
10	9.76 039	18	9.84 791	26	0.15 208	9.91 247	9	50	
11	9.76 057	18	9.84 818	27	0.15 182	9.91 239	8	49	
12	9.76 075	17	9.84 845	26	0.15 155	9.91 230	9	48	
13	9.76 092	18	9.84 871	27	0.15 128	9.91 221	9	47	
14	9.76 110	18	9.84 898	27	0.15 101	9.91 212	9	46	
15	9.76 128	18	9.84 925	26	0.15 074	9.91 203	9	45	
16	9.76 146	17	9.84 952	27	0.15 048	9.91 194	9	44	
17	9.76 164	18	9.84 979	26	0.15 021	9.91 185	8	43	
18	9.76 182	18	9.85 005	27	0.14 994	9.91 176	9	42	
19	9.76 200	17	9.85 032	27	0.14 967	9.91 167	9	41	
20	9.76 217	18	9.85 059	26	0.14 940	9.91 158	9	40	
21	9.76 235	18	9.85 086	27	0.14 914	9.91 149	9	39	
22	9.76 253	17	9.85 113	26	0.14 887	9.91 140	9	38	
23	9.76 271	18	9.85 139	27	0.14 860	9.91 131	9	37	
24	9.76 289	17	9.85 166	26	0.14 833	9.91 122	9	36	
25	9.76 306	18	9.85 193	27	0.14 807	9.91 113	9	35	
26	9.76 324	17	9.85 220	26	0.14 780	9.91 104	9	34	
27	9.76 342	18	9.85 246	27	0.14 753	9.91 095	9	33	
28	9.76 360	17	9.85 273	26	0.14 726	9.91 086	9	32	
29	9.76 377	18	9.85 300	27	0.14 700	9.91 077	9	31	
30	9.76 395	17	9.85 327	26	0.14 673	9.91 068	9	30	
31	9.76 413	18	9.85 353	26	0.14 646	9.91 059	9	29	
32	9.76 431	17	9.85 380	27	0.14 620	9.91 050	9	28	
33	9.76 448	17	9.85 407	26	0.14 593	9.91 041	9	27	
34	9.76 466	18	9.85 433	27	0.14 566	9.91 032	9	26	
35	9.76 484	17	9.85 460	26	0.14 539	9.91 023	9	25	
36	9.76 501	17	9.85 487	26	0.14 513	9.91 014	9	24	
37	9.76 519	17	9.85 513	27	0.14 486	9.91 005	9	23	
38	9.76 536	18	9.85 540	26	0.14 459	9.90 996	9	22	
39	9.76 554	17	9.85 567	27	0.14 433	9.90 987	9	21	
40	9.76 572	17	9.85 594	26	0.14 406	9.90 978	9	20	
41	9.76 589	17	9.85 620	26	0.14 379	9.90 969	9	19	
42	9.76 607	17	9.85 647	26	0.14 353	9.90 960	9	18	
43	9.76 624	18	9.85 673	27	0.14 326	9.90 951	9	17	
44	9.76 642	17	9.85 700	26	0.14 299	9.90 942	9	16	
45	9.76 660	17	9.85 727	26	0.14 273	9.90 933	9	15	
46	9.76 677	17	9.85 753	26	0.14 246	9.90 923	9	14	
47	9.76 695	17	9.85 780	27	0.14 219	9.90 914	9	13	
48	9.76 712	17	9.85 807	26	0.14 193	9.90 905	9	12	
49	9.76 730	17	9.85 833	26	0.14 166	9.90 896	9	11	
50	9.76 747	17	9.85 860	26	0.14 140	9.90 887	9	10	
51	9.76 765	17	9.85 887	27	0.14 113	9.90 878	9	9	
52	9.76 782	17	9.85 913	26	0.14 086	9.90 869	9	8	
53	9.76 800	17	9.85 940	26	0.14 060	9.90 860	9	7	
54	9.76 817	17	9.85 966	26	0.14 033	9.90 850	9	6	
55	9.76 835	17	9.85 993	26	0.14 007	9.90 841	9	5	
56	9.76 852	17	9.86 020	27	0.13 980	9.90 832	9	4	
57	9.76 869	17	9.86 046	26	0.13 953	9.90 823	9	3	
58	9.76 887	17	9.86 073	26	0.13 927	9.90 814	9	2	
59	9.76 904	17	9.86 099	26	0.13 900	9.90 805	9	1	
60	9.76 922	17	9.86 126	26	0.13 874	9.90 796	9	0	
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′	P. P.

	27	26
6	2.7	2.6
7	3.1	3.1
8	3.6	3.5
9	4.0	4.0
10	4.5	4.4
20	9.0	8.8
30	13 5	13.2
40	18.0	17.6
50	22.5	22.1

	18	17	17
6	1.8	1.7	1.7
7	2.1	2.0	2.0
8	2.4	2.3	2.2
9	2.7	2.6	2.5
10	3.0	2.9	2.8
20	6.0	5.8	5.6
30	9.0	8.7	8.5
40	12.0	11.6	11.3
50	15.0	14.6	14.1

	9	9	8
6	0.9	0.9	0.8
7	1.1	1.0	1.0
8	1.2	1.2	1.1
9	1.4	1.3	1.3
10	1.6	1.5	1.4
20	3.1	3.0	2.8
30	4.7	4.5	4.2
40	6.3	6.0	5.6
50	7.9	7.5	7.1

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.		P. P.
0	9.76 922	17	9.86 126	26	0.13 874	9.90 796	9	60	
1	9.76 939	17	9.86 152	26	0.13 847	9.90 786	9	59	
2	9.76 956	17	9.86 179	27	0.13 821	9.90 777	9	58	
3	9.76 974	17	9.86 206	26	0.13 794	9.90 768	9	57	
4	9.76 991	17	9.86 232	26	0.13 767	9.90 759	9	56	
5	9.77 008	17	9.86 259	26	0.13 741	9.90 750	9	55	
6	9.77 026	17	9.86 285	26	0.13 714	9.90 740	9	54	
7	9.77 043	17	9.86 312	26	0.13 688	9.90 731	9	53	
8	9.77 060	17	9.86 338	26	0.13 661	9.90 722	9	52	
9	9.77 078	17	9.86 365	26	0.13 635	9.90 713	9	51	27 26 26
10	9.77 095	17	9.86 391	26	0.13 608	9.90 703	9	50	6 2.7 2.6 2.6
11	9.77 112	17	9.86 418	26	0.13 582	9.90 694	9	49	7 3.1 3.1 3.0
12	9.77 130	17	9.86 444	26	0.13 555	9.90 685	9	48	8 3.6 3.5 3.4
13	9.77 147	17	9.86 471	26	0.13 529	9.90 676	9	47	9 4.0 4.0 3.9
14	9.77 164	17	9.86 497	26	0.13 502	9.90 666	9	46	10 4.5 4.4 4.3
15	9.77 181	17	9.86 524	26	0.13 476	9.90 657	9	45	20 9.0 8.8 8.6
16	9.77 198	17	9.86 550	26	0.13 449	9.90 648	9	44	30 13.5 13.2 13.0
17	9.77 216	17	9.86 577	26	0.13 423	9.90 639	9	43	40 18.0 17.6 17.3
18	9.77 233	17	9.86 603	26	0.13 396	9.90 629	9	42	50 22.5 22.1 21.6
19	9.77 250	17	9.86 630	26	0.13 370	9.90 620	9	41	
20	9.77 267	17	9.86 656	26	0.13 343	9.90 611	9	40	
21	9.77 284	17	9.86 683	26	0.13 317	9.90 602	9	39	
22	9.77 302	17	9.86 709	26	0.13 290	9.90 592	9	38	
23	9.77 319	17	9.86 736	26	0.13 264	9.90 583	9	37	
24	9.77 336	17	9.86 762	26	0.13 237	9.90 574	9	36	
25	9.77 353	17	9.86 788	26	0.13 211	9.90 564	9	35	
26	9.77 370	17	9.86 815	26	0.13 185	9.90 555	9	34	17 17 16
27	9.77 387	17	9.86 841	26	0.13 158	9.90 546	9	33	6 1.7 1.7 1.6
28	9.77 404	17	9.86 868	26	0.13 132	9.90 536	9	32	7 2.0 2.0 1.9
29	9.77 421	17	9.86 894	26	0.13 105	9.90 527	9	31	8 2.3 2.3 2.2
30	9.77 439	17	9.86 921	26	0.13 079	9.90 518	9	30	9 2.6 2.5 2.5
31	9.77 456	17	9.86 947	26	0.13 052	9.90 508	9	29	10 2.9 2.8 2.7
32	9.77 473	17	9.86 973	26	0.13 026	9.90 499	9	28	20 5.8 5.6 5.5
33	9.77 490	17	9.87 000	26	0.13 000	9.90 490	9	27	30 8.7 8.5 8.2
34	9.77 507	17	9.87 026	26	0.12 973	9.90 480	9	26	40 11.6 11.3 11.0
35	9.77 524	17	9.87 053	26	0.12 947	9.90 471	9	25	50 14.6 14.1 13.7
36	9.77 541	17	9.87 079	26	0.12 920	9.90 461	9	24	
37	9.77 558	17	9.87 105	26	0.12 894	9.90 452	9	23	
38	9.77 575	17	9.87 132	26	0.12 868	9.90 443	9	22	
39	9.77 592	17	9.87 158	26	0.12 841	9.90 433	9	21	
40	9.77 609	17	9.87 185	26	0.12 815	9.90 424	9	20	
41	9.77 626	17	9.87 211	26	0.12 789	9.90 414	9	19	
42	9.77 643	17	9.87 237	26	0.12 762	9.90 405	9	18	
43	9.77 660	17	9.87 264	26	0.12 736	9.90 396	9	17	
44	9.77 677	17	9.87 290	26	0.12 709	9.90 386	9	16	9 9
45	9.77 693	16	9.87 316	26	0.12 683	9.90 377	9	15	6 0.9 0.9
46	9.77 710	17	9.87 343	26	0.12 657	9.90 367	9	14	7 1.1 1.0
47	9.77 727	17	9.87 369	26	0.12 630	9.90 358	9	13	8 1.2 1.2
48	9.77 744	17	9.87 395	26	0.12 604	9.90 348	9	12	9 1.4 1.3
49	9.77 761	17	9.87 422	26	0.12 578	9.90 339	9	11	10 1.6 1.5
50	9.77 778	16	9.87 448	26	0.12 551	9.90 330	9	10	20 3.1 3.0
51	9.77 795	17	9.87 474	26	0.12 525	9.90 320	9	9	30 4.7 4.5
52	9.77 812	17	9.87 501	26	0.12 499	9.90 311	9	8	40 6.3 6.0
53	9.77 828	16	9.87 527	26	0.12 473	9.90 301	9	7	50 7.9 7.5
54	9.77 845	17	9.87 553	26	0.12 446	9.90 292	9	6	
55	9.77 862	17	9.87 580	26	0.12 420	9.90 282	9	5	
56	9.77 879	16	9.87 606	26	0.12 393	9.90 273	9	4	
57	9.77 896	17	9.87 632	26	0.12 367	9.90 263	9	3	
58	9.77 913	17	9.87 659	26	0.12 341	9.90 254	9	2	
59	9.77 929	16	9.87 685	26	0.12 315	9.90 244	9	1	
60	9.77 946	17	9.87 711	26	0.12 288	9.90 235	9	0	
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′	P. P.

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.		P. P.
0	9.77 946	16	9.87 711	26	0.12 288	9.90 235	9	**60**	
1	9.77 963	17	9.87 737	26	0.12 262	9.90 223	9	59	
2	9.77 980	16	9.87 764	26	0.12 236	9.90 216	9	58	
3	9.77 996	17	9.87 790	26	0.12 209	9.90 206	10	57	
4	9.78 013	16	9.87 816	26	0.12 183	9.90 196	9	56	
5	9.78 030	16	9.87 843	26	0.12 157	9.90 187	9	55	
6	9.78 046	17	9.87 869	26	0.12 131	9.90 177	9	54	
7	9.78 063	16	9.87 895	26	0.12 104	9.90 168	9	53	
8	9.78 080	17	9.87 921	26	0.12 078	9.90 158	9	52	
9	9.78 097	16	9.87 948	26	0.12 052	9.90 149	9	51	
10	9.78 113	16	9.87 974	26	0.12 026	9.90 139	9	**50**	
11	9.78 130	17	9.88 000	26	0.11 999	9.90 130	10	49	
12	9.78 147	16	9.88 026	26	0.11 973	9.90 120	9	48	
13	9.78 163	16	9.88 053	26	0.11 947	9.90 110	9	47	
14	9.78 180	16	9.88 079	26	0.11 921	9.90 101	9	46	
15	9.78 196	16	9.88 105	26	0.11 895	9.90 091	9	45	
16	9.78 213	17	9.88 131	26	0.11 868	9.90 082	10	44	
17	9.78 230	16	9.88 157	26	0.11 842	9.90 072	9	43	
18	9.78 246	16	9.88 184	26	0.11 816	9.90 062	9	42	
19	9.78 263	16	9.88 210	26	0.11 790	9.90 053	9	41	
20	9.78 279	16	9.88 236	26	0.11 763	9.90 043	10	**40**	
21	9.78 296	16	9.88 262	26	0.11 737	9.90 033	9	39	
22	9.78 312	16	9.88 288	26	0.11 711	9.90 024	9	38	
23	9.78 329	17	9.88 315	26	0.11 685	9.90 014	10	37	
24	9.78 346	16	9.88 341	26	0.11 659	9.90 004	9	36	
25	9.78 362	16	9.88 367	26	0.11 633	9.89 995	9	35	
26	9.78 379	16	9.88 393	26	0.11 606	9.89 985	10	34	
27	9.78 395	16	9.88 419	26	0.11 580	9.89 975	9	33	
28	9.78 412	16	9.88 445	26	0.11 554	9.89 966	9	32	
29	9.78 428	16	9.88 472	26	0.11 528	9.89 956	10	31	
30	9.78 444	16	9.88 498	26	0.11 502	9.89 946	9	**30**	
31	9.78 461	16	9.88 524	26	0.11 476	9.89 937	9	29	
32	9.78 477	16	9.88 550	26	0.11 449	9.89 927	10	28	
33	9.78 494	16	9.88 576	26	0.11 423	9.89 917	9	27	
34	9.78 510	16	9.88 602	26	0.11 397	9.89 908	10	26	
35	9.78 527	16	9.88 629	26	0.11 371	9.89 898	9	25	
36	9.78 543	16	9.88 655	26	0.11 345	9.89 888	10	24	
37	9.78 559	16	9.88 681	26	0.11 319	9.89 878	9	23	
38	9.78 576	16	9.88 707	26	0.11 293	9.89 869	10	22	
39	9.78 592	16	9.88 733	26	0.11 266	9.89 859	9	21	
40	9.78 609	16	9.88 759	26	0.11 240	9.89 849	10	**20**	
41	9.78 625	16	9.88 785	26	0.11 214	9.89 839	9	19	
42	9.78 641	16	9.88 811	26	0.11 188	9.89 830	10	18	
43	9.78 658	16	9.88 838	26	0.11 162	9.89 820	9	17	
44	9.78 674	16	9.88 864	26	0.11 136	9.89 810	10	16	
45	9.78 690	16	9.88 890	26	0.11 110	9.89 800	9	15	
46	9.78 707	16	9.88 916	26	0.11 084	9.89 791	10	14	
47	9.78 723	16	9.88 942	26	0.11 058	9.89 781	10	13	
48	9.78 739	16	9.88 968	26	0.11 032	9.89 771	9	12	
49	9.78 755	16	9.88 994	26	0.11 005	9.89 761	10	11	
50	9.78 772	16	9.89 020	26	0.10 979	9.89 751	9	**10**	
51	9.78 788	16	9.89 046	26	0.10 953	9.89 742	10	9	
52	9.78 804	16	9.89 072	26	0.10 927	9.89 732	10	8	
53	9.78 821	16	9.89 098	26	0.10 901	9.89 722	10	7	
54	9.78 837	16	9.89 124	26	0.10 875	9.89 712	9	6	
55	9.78 853	16	9.89 150	26	0.10 849	9.89 702	10	5	
56	9.78 869	16	9.89 177	26	0.10 823	9.89 692	10	4	
57	9.78 885	16	9.89 203	26	0.10 797	9.89 683	9	3	
58	9.78 902	16	9.89 229	26	0.10 771	9.89 673	10	2	
59	9.78 918	16	9.89 255	26	0.10 745	9.89 663	10	1	
60	9.78 934	16	9.89 281	26	0.10 719	9.89 653	10	**0**	
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′	P. P.

	26	26
6	2.6	2.6
7	3.1	3.6
8	3.5	3.4
9	4.0	3.9
10	4.4	4.3
20	8.8	8.6
30	13.2	13.0
40	17.6	17.3
50	22.1	21.6

	17	16	16
6	1.7	1.6	1.6
7	2.0	1.9	1.8
8	2.2	2.2	2.1
9	2.5	2.5	2.4
10	2.8	2.7	2.6
20	5.6	5.5	5.3
30	8.5	8.2	8.0
40	11.3	11.0	10.6
50	14.1	13.7	13.3

	10	9
6	1.0	0.9
7	1.1	1.1
8	1.3	1.2
9	1.5	1.4
10	1.6	1.6
20	3.3	3.1
30	5.0	4.7
40	6.6	6.3
50	8.3	7.9

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.		P. P.
0	9.78 934	16	9.89 281	26	0.10 719	9.89 653	9	60	
1	9.78 950	16	9.89 307	26	0.10 693	9.89 643	10	59	
2	9.78 966	16	9.89 333	26	0.10 667	9.89 633	10	58	
3	9.78 982	16	9.89 359	26	0.10 641	9.89 623	10	57	
4	9.78 999	16	9.89 385	26	0.10 615	9.89 613	9	56	
5	9.79 015	16	9.89 411	26	0.10 589	9.89 604	10	55	
6	9.79 031	16	9.89 437	26	0.10 563	9.89 594	10	54	
7	9.79 047	16	9.89 463	26	0.10 537	9.89 584	10	53	
8	9.79 063	16	9.89 489	26	0.10 511	9.89 574	10	52	
9	9.79 079	16	9.89 515	26	0.10 485	9.89 564	10	51	
10	9.79 095	16	9.89 541	26	0.10 459	9.89 554	9	50	
11	9.79 111	16	9.89 567	26	0.10 433	9.89 544	10	49	
12	9.79 127	16	9.89 593	26	0.10 407	9.89 534	10	48	
13	9.79 143	16	9.89 619	26	0.10 381	9.89 524	10	47	
14	9.79 159	16	9.89 645	26	0.10 355	9.89 514	10	46	
15	9.79 175	16	9.89 671	26	0.10 329	9.89 504	10	45	
16	9.79 191	16	9.89 697	26	0.10 303	9.89 494	10	44	
17	9.79 207	16	9.89 723	26	0.10 277	9.89 484	10	43	
18	9.79 223	16	9.89 749	26	0.10 251	9.89 474	10	42	
19	9.79 239	16	9.89 775	26	0.10 225	9.89 464	10	41	
20	9.79 255	16	9.89 801	26	0.10 199	9.89 454	10	40	
21	9.79 271	16	9.89 827	26	0.10 173	9.89 444	10	39	
22	9.79 287	16	9.89 853	26	0.10 147	9.89 434	10	38	
23	9.79 303	16	9.89 879	26	0.10 121	9.89 424	10	37	
24	9.79 319	16	9.89 905	26	0.10 095	9.89 414	10	36	
25	9.79 335	16	9.89 931	26	0.10 069	9.89 404	10	35	
26	9.79 351	16	9.89 957	26	0.10 043	9.89 394	10	34	
27	9.79 367	16	9.89 982	25	0.10 017	9.89 384	10	33	
28	9.79 383	15	9.90 008	26	0.09 991	9.89 374	10	32	
29	9.79 399	16	9.90 034	26	0.09 965	9.89 364	10	31	
30	9.79 415	16	9.90 060	26	0.09 939	9.89 354	10	30	
31	9.79 431	15	9.90 086	26	0.09 913	9.89 344	10	29	
32	9.79 446	16	9.90 112	26	0.09 887	9.89 334	10	28	
33	9.79 462	16	9.90 138	25	0.09 861	9.89 324	10	27	
34	9.79 478	15	9.90 164	26	0.09 836	9.89 314	10	26	
35	9.79 494	16	9.90 190	26	0.09 810	9.89 304	10	25	
36	9.79 510	16	9.90 216	26	0.09 784	9.89 294	10	24	
37	9.79 526	15	9.90 242	26	0.09 758	9.89 284	10	23	
38	9.79 541	16	9.90 268	26	0.09 732	9.89 274	10	22	
39	9.79 557	16	9.90 294	25	0.09 706	9.89 264	10	21	
40	9.79 573	15	9.90 319	26	0.09 680	9.89 253	10	20	
41	9.79 589	16	9.90 345	26	0.09 654	9.89 243	10	19	
42	9.79 605	15	9.90 371	26	0.09 628	9.89 233	10	18	
43	9.79 620	16	9.90 397	25	0.09 602	9.89 223	10	17	
44	9.79 636	15	9.90 423	26	0.09 577	9.89 213	10	16	
45	9.79 652	16	9.90 449	26	0.09 551	9.89 203	10	15	
46	9.79 668	15	9.90 475	26	0.09 525	9.89 193	10	14	
47	9.79 683	16	9.90 501	26	0.09 499	9.89 182	10	13	
48	9.79 699	15	9.90 526	25	0.09 473	9.89 172	10	12	
49	9.79 715	15	9.90 552	26	0.09 447	9.89 162	10	11	
50	9.79 730	15	9.90 578	26	0.09 421	9.89 152	10	10	
51	9.79 746	16	9.90 604	26	0.09 395	9.89 142	10	9	
52	9.79 762	15	9.90 630	25	0.09 370	9.89 132	10	8	
53	9.79 777	15	9.90 656	26	0.09 344	9.89 121	10	7	
54	9.79 793	16	9.90 682	26	0.09 318	9.89 111	10	6	
55	9.79 809	15	9.90 707	25	0.09 293	9.89 101	10	5	
56	9.79 824	15	9.90 733	26	0.09 267	9.89 091	10	4	
57	9.79 840	16	9.90 759	26	0.09 240	9.89 081	10	3	
58	9.79 856	15	9.90 785	26	0.09 214	9.89 070	10	2	
59	9.79 871	15	9.90 811	25	0.09 189	9.89 060	10	1	
60	9.79 887	15	9.90 837	26	0.09 163	9.89 050	10	0	
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′	P. P.

	26	25
6	2.6	2.5
7	3.0	3.0
8	3.4	3.4
9	3.9	3.8
10	4.3	4.2
20	8.6	8.5
30	13.0	12.7
40	17.3	17.0
50	21.6	21.2

	16	16	15
6	1.6	1.6	1.5
7	1.9	1.8	1.8
8	2.2	2.1	2.0
9	2.5	2.4	2.3
10	2.7	2.6	2.6
20	5.5	5.3	5.1
30	8.2	8.0	7.7
40	11.0	10.6	10.3
50	13.7	13.3	12.9

	10	10	9
6	1.0	1.0	0.9
7	1.2	1.1	1.1
8	1.4	1.3	1.2
9	1.6	1.5	1.4
10	1.7	1.6	1.6
20	3.5	3.3	3.1
30	5.2	5.0	4.7
40	7.0	6.6	6.3
50	8.7	8.3	7.9

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.		P. P.
0	9.79 887	16	9.90 837	26	0.09 163	9.89 056	10	60	
1	9.79 903	15	9.90 863	25	0.09 137	9.89 040	10	59	
2	9.79 918	15	9.90 888	26	0.09 111	9.89 030	10	58	
3	9.79 934	15	9.90 914	25	0.09 085	9.89 019	10	57	
4	9.79 949	15	9.90 940	26	0.09 060	9.89 009	10	56	
5	9.79 965	15	9.90 966	26	0.09 034	9.88 999	10	55	
6	9.79 980	15	9.90 992	25	0.09 008	9.88 989	10	54	
7	9.79 996	15	9.91 017	26	0.08 982	9.88 978	10	53	
8	9.80 011	15	9.91 043	26	0.08 956	9.88 968	10	52	
9	9.80 027	15	9.91 069	25	0.08 930	9.88 958	10	51	
10	9.80 042	15	9.91 095	26	0.08 905	9.88 947	10	50	
11	9.80 058	15	9.91 121	25	0.08 879	9.88 937	10	49	
12	9.80 073	15	9.91 146	26	0.08 853	9.88 927	10	48	
13	9.80 089	15	9.91 172	25	0.08 827	9.88 917	10	47	
14	9.80 104	15	9.91 198	26	0.08 802	9.88 906	10	46	
15	9.80 120	15	9.91 224	26	0.08 776	9.88 896	10	45	
16	9.80 135	15	9.91 250	25	0.08 750	9.88 886	10	44	
17	9.80 151	15	9.91 275	26	0.08 724	9.88 875	10	43	
18	9.80 166	15	9.91 301	25	0.08 698	9.88 865	10	42	
19	9.80 182	15	9.91 327	26	0.08 673	9.88 855	10	41	
20	9.80 197	15	9.91 353	25	0.08 647	9.88 844	10	40	
21	9.80 213	15	9.91 378	26	0.08 621	9.88 834	10	39	
22	9.80 228	15	9.91 404	25	0.08 595	9.88 823	10	38	
23	9.80 243	15	9.91 430	26	0.08 570	9.88 813	10	37	
24	9.80 259	15	9.91 456	25	0.08 544	9.88 803	10	36	
25	9.80 274	15	9.91 481	26	0.08 518	9.88 792	10	35	
26	9.80 289	15	9.91 507	25	0.08 492	9.88 782	10	34	
27	9.80 305	15	9.91 533	26	0.08 467	9.88 772	10	33	
28	9.80 320	15	9.91 559	25	0.08 441	9.88 761	10	32	
29	9.80 335	15	9.91 584	26	0.08 415	9.88 751	10	31	
30	9.80 351	15	9.91 610	25	0.08 389	9.88 740	10	30	
31	9.80 366	15	9.91 636	26	0.08 364	9.88 730	10	29	
32	9.80 381	15	9.91 662	25	0.08 338	9.88 720	10	28	
33	9.80 397	15	9.91 687	26	0.08 312	9.88 709	10	27	
34	9.80 412	15	9.91 713	25	0.08 286	9.88 699	10	26	
35	9.80 427	15	9.91 739	26	0.08 261	9.88 688	10	25	
36	9.80 443	15	9.91 765	25	0.08 235	9.88 678	10	24	
37	9.80 458	15	9.91 790	26	0.08 209	9.88 667	10	23	
38	9.80 473	15	9.91 816	25	0.08 183	9.88 657	10	22	
39	9.80 488	15	9.91 842	25	0.08 158	9.88 646	10	21	
40	9.80 504	15	9.91 867	26	0.08 132	9.88 636	10	20	
41	9.80 519	15	9.91 893	25	0.08 106	9.88 625	10	19	
42	9.80 534	15	9.91 919	26	0.08 081	9.88 615	10	18	
43	9.80 549	15	9.91 945	25	0.08 055	9.88 604	10	17	
44	9.80 564	15	9.91 970	25	0.08 029	9.88 594	10	16	
45	9.80 580	15	9.91 996	26	0.08 004	9.88 583	10	15	
46	9.80 595	15	9.92 022	25	0.07 978	9.88 573	10	14	
47	9.80 610	15	9.92 047	26	0.07 952	9.88 562	10	13	
48	9.80 625	15	9.92 073	25	0.07 926	9.88 552	10	12	
49	9.80 640	15	9.92 099	25	0.07 901	9.88 541	10	11	
50	9.80 655	15	9.92 124	26	0.07 875	9.88 531	10	10	
51	9.80 671	15	9.92 150	25	0.07 849	9.88 520	10	9	
52	9.80 686	15	9.92 176	25	0.07 824	9.88 510	10	8	
53	9.80 701	15	9.92 201	26	0.07 798	9.88 499	10	7	
54	9.80 716	15	9.92 227	25	0.07 772	9.88 489	10	6	
55	9.80 731	15	9.92 253	25	0.07 747	9.88 478	10	5	
56	9.80 746	15	9.92 278	26	0.07 721	9.88 467	11	4	
57	9.80 761	15	9.92 304	25	0.07 695	9.88 457	10	3	
58	9.80 776	15	9.92 330	25	0.07 670	9.88 446	10	2	
59	9.80 791	15	9.92 355	25	0.07 644	9.88 436	10	1	
60	9.80 806	15	9.92 381	26	0.07 618	9.88 425	10	0	
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′	P. P.

	26	25
6	2.6	2.5
7	3.0	3.0
8	3.4	3.4
9	3.9	3.8
10	4.3	4.2
20	8.6	8.5
30	13.0	12.7
40	17.3	17.0
50	21.6	21.2

	16	15	15
6	1.6	1.5	1.5
7	1.8	1.8	1.7
8	2.1	2.0	2.0
9	2.4	2.3	2.2
10	2.6	2.6	2.5
20	5.3	5.1	5.0
30	8.0	7.7	7.5
40	10.6	10.3	10.0
50	13.3	12.9	12.5

	11	10	10
6	1.1	1.0	1.0
7	1.3	1.2	1.1
8	1.4	1.4	1.3
9	1.6	1.6	1.5
10	1.8	1.7	1.6
20	3.6	3.5	3.3
30	5.5	5.2	5.0
40	7.3	7.0	6.6
50	9.1	8.7	8.3

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.	′
0	9.80 806	15	9.92 381	25	0.07 618	9.88 425	10	**60**
1	9.80 822	15	9.92 407	25	0.07 593	9.88 415	11	59
2	9.80 837	15	9.92 432	26	0.07 567	9.88 404	10	58
3	9.80 852	15	9.92 458	25	0.07 541	9.88 393	10	57
4	9.80 867	15	9.92 484	25	0.07 516	9.88 383	10	56
5	9.80 882	15	9.92 509	25	0.07 490	9.88 372	11	55
6	9.80 897	15	9.92 535	26	0.07 465	9.88 361	10	54
7	9.80 912	15	9.92 561	25	0.07 439	9.88 351	10	53
8	9.80 927	15	9.92 586	25	0.07 413	9.88 340	11	52
9	9.80 942	15	9.92 612	26	0.07 388	9.88 329	10	51
10	9.80 957	15	9.92 638	25	0.07 362	9.88 319	10	**50**
11	9.80 972	15	9.92 663	25	0.07 336	9.88 308	11	49
12	9.80 987	14	9.92 689	25	0.07 311	9.88 297	10	48
13	9.81 001	15	9.92 714	26	0.07 285	9.88 287	10	47
14	9.81 016	15	9.92 740	25	0.07 259	9.88 276	11	46
15	9.81 031	15	9.92 766	25	0.07 234	9.88 265	10	45
16	9.81 046	15	9.92 791	25	0.07 208	9.88 255	10	44
17	9.81 061	15	9.92 817	25	0.07 183	9.88 244	11	43
18	9.81 076	14	9.92 843	26	0.07 157	9.88 233	10	42
19	9.81 091	15	9.92 868	25	0.07 131	9.88 223	11	41
20	9.81 106	15	9.92 894	25	0.07 106	9.88 212	10	**40**
21	9.81 121	15	9.92 919	25	0.07 080	9.88 201	11	39
22	9.81 136	14	9.92 945	26	0.07 055	9.88 190	10	38
23	9.81 150	15	9.92 971	25	0.07 029	9.88 180	11	37
24	9.81 165	15	9.92 996	25	0.07 003	9.88 169	10	36
25	9.81 180	14	9.93 022	25	0.06 978	9.88 158	11	35
26	9.81 195	15	9.93 047	25	0.06 952	9.88 147	10	34
27	9.81 210	15	9.93 073	25	0.06 927	9.88 137	11	33
28	9.81 225	14	9.93 098	26	0.06 901	9.88 126	10	32
29	9.81 239	15	9.93 124	25	0.06 875	9.88 115	11	31
30	9.81 254	14	9.93 150	25	0.06 850	9.88 104	10	**30**
31	9.81 269	15	9.93 175	25	0.06 824	9.88 094	11	29
32	9.81 284	15	9.93 201	25	0.06 799	9.88 083	11	28
33	9.81 299	14	9.93 226	25	0.06 773	9.88 072	10	27
34	9.81 313	15	9.93 252	26	0.06 748	9.88 061	11	26
35	9.81 328	14	9.93 278	25	0.06 722	9.88 050	11	25
36	9.81 343	15	9.93 303	25	0.06 696	9.88 039	10	24
37	9.81 358	14	9.93 329	25	0.06 671	9.88 029	11	23
38	9.81 372	14	9.93 354	25	0.06 645	9.88 018	11	22
39	9.81 387	15	9.93 380	25	0.06 620	9.88 007	11	21
40	9.81 402	14	9.93 405	25	0.06 594	9.87 996	10	**20**
41	9.81 416	15	9.93 431	25	0.06 569	9.87 985	11	19
42	9.81 431	14	9.93 456	25	0.06 543	9.87 974	11	18
43	9.81 446	14	9.93 482	26	0.06 518	9.87 963	11	17
44	9.81 460	15	9.93 508	25	0.06 492	9.87 953	10	16
45	9.81 475	14	9.93 533	25	0.06 466	9.87 942	11	15
46	9.81 490	14	9.93 559	25	0.06 441	9.87 931	11	14
47	9.81 504	15	9.93 584	25	0.06 415	9.87 920	11	13
48	9.81 519	14	9.93 610	25	0.06 390	9.87 909	10	12
49	9.81 534	14	9.93 635	25	0.06 364	9.87 898	11	11
50	9.81 548	14	9.93 661	25	0.06 339	9.87 887	11	**10**
51	9.81 563	15	9.93 686	25	0.06 313	9.87 876	11	9
52	9.81 578	14	9.93 712	25	0.06 288	9.87 865	11	8
53	9.81 592	14	9.93 737	25	0.06 262	9.87 854	11	7
54	9.81 607	14	9.93 763	25	0.06 237	9.87 844	10	6
55	9.81 621	14	9.93 788	25	0.06 211	9.87 833	11	5
56	9.81 636	14	9.93 814	25	0.06 186	9.87 822	11	4
57	9.81 650	14	9.93 840	26	0.06 160	9.87 811	11	3
58	9.81 665	14	9.93 865	25	0.06 134	9.87 800	11	2
59	9.81 680	15	9.93 891	25	0.06 109	9.87 789	11	1
60	9.81 694	14	9.93 916	25	0.06 083	9.87 778	11	**0**
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′

P. P.

	26	25
6	2.6	2.5
7	3.0	3.0
8	3.4	3.4
9	3.9	3.8
10	4.3	4.2
20	8.6	8.5
30	13.0	12.7
40	17.3	17.0
50	21.6	21.2

	15	15	14
6	1.5	1.5	1.4
7	1.8	1.7	1.7
8	2.0	2.0	1.9
9	2.3	2.2	2.2
10	2.6	2.5	2.4
20	5.1	5.0	4.8
30	7.7	7.5	7.2
40	10.3	10.0	9.6
50	12.9	12.5	12.1

	11	10
6	1.1	1.0
7	1.3	1.2
8	1.4	1.4
9	1.6	1.6
10	1.8	1.7
20	3.6	3.5
30	5.5	5.2
40	7.3	7.0
50	9.1	8.7

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.		P. P.
0	9.81 694	14	9.93 916	25	0.06 083	9.87 778	11	60	
1	9.81 709	14	9.93 942	25	0.06 058	9.87 767	11	59	
2	9.81 723	14	9.93 967	25	0.06 032	9.87 756	11	58	
3	9.81 738	14	9.93 993	25	0.06 007	9.87 745	11	57	
4	9.81 752	14	9.94 018	25	0.05 981	9.87 734	11	56	
5	9.81 767	14	9.94 044	25	0.05 956	9.87 723	11	55	
6	9.81 781	14	9.94 069	25	0.05 930	9.87 712	11	54	
7	9.81 796	14	9.94 095	25	0.05 905	9.87 701	11	53	
8	9.81 810	14	9.94 120	25	0.05 879	9.87 690	11	52	
9	9.81 824	14	9.94 146	25	0.05 854	9.87 679	11	51	
10	9.81 839	14	9.94 171	25	0.05 828	9.87 668	11	50	
11	9.81 853	14	9.94 197	25	0.05 803	9.87 657	11	49	
12	9.81 868	14	9.94 222	25	0.05 777	9.87 645	11	48	
13	9.81 882	14	9.94 248	25	0.05 752	9.87 634	11	47	
14	9.81 897	14	9.94 273	25	0.05 726	9.87 623	11	46	
15	9.81 911	14	9.94 299	25	0.05 701	9.87 612	11	45	
16	9.81 925	14	9.94 324	25	0.05 675	9.87 601	11	44	
17	9.81 940	14	9.94 350	25	0.05 650	9.87 590	11	43	
18	9.81 954	14	9.94 375	25	0.05 625	9.87 579	11	42	
19	9.81 969	14	9.94 400	25	0.05 599	9.87 568	11	41	
20	9.81 983	14	9.94 426	25	0.05 574	9.87 557	11	40	
21	9.81 997	14	9.94 451	25	0.05 548	9.87 546	11	39	
22	9.82 012	14	9.94 477	25	0.05 523	9.87 535	11	38	
23	9.82 026	14	9.94 502	25	0.05 497	9.87 523	11	37	
24	9.82 040	14	9.94 528	25	0.05 472	9.87 512	11	36	
25	9.82 055	14	9.94 553	25	0.05 446	9.87 501	11	35	
26	9.82 069	14	9.94 579	25	0.05 421	9.87 490	11	34	
27	9.82 083	14	9.94 604	25	0.05 395	9.87 479	11	33	
28	9.82 098	14	9.94 630	25	0.05 370	9.87 468	11	32	
29	9.82 112	14	9.94 653	25	0.05 344	9.87 457	11	31	
30	9.82 126	14	9.94 681	25	0.05 319	9.87 445	11	30	
31	9.82 140	14	9.94 706	25	0.05 293	9.87 434	11	29	
32	9.82 155	14	9.94 732	25	0.05 268	9.87 423	11	28	
33	9.82 169	14	9.94 757	25	0.05 243	9.87 412	11	27	
34	9.82 183	14	9.94 783	25	0.05 217	9.87 401	11	26	
35	9.82 197	14	9.94 808	25	0.05 192	9.87 389	11	25	
36	9.82 212	14	9.94 833	25	0.05 166	9.87 378	11	24	
37	9.82 226	14	9.94 859	25	0.05 141	9.87 367	11	23	
38	9.82 240	14	9.94 884	25	0.05 115	9.87 356	11	22	
39	9.82 254	14	9.94 910	25	0.05 090	9.87 345	11	21	
40	9.82 269	14	9.94 935	25	0.05 064	9.87 333	11	20	
41	9.82 283	14	9.94 961	25	0.05 039	9.87 322	11	19	
42	9.82 297	14	9.94 986	25	0.05 014	9.87 311	11	18	
43	9.82 311	14	9.95 011	25	0.04 988	9.87 300	11	17	
44	9.82 325	14	9.95 037	25	0.04 963	9.87 288	11	16	
45	9.82 339	14	9.95 062	25	0.04 937	9.87 277	11	15	
46	9.82 354	14	9.95 088	25	0.04 912	9.87 266	11	14	
47	9.82 368	14	9.95 113	25	0.04 886	9.87 254	11	13	
48	9.82 382	14	9.95 139	25	0.04 861	9.87 243	11	12	
49	9.82 396	14	9.95 164	25	0.04 836	9.87 232	11	11	
50	9.82 410	14	9.95 189	25	0.04 810	9.87 221	11	10	
51	9.82 424	14	9.95 215	25	0.04 785	9.87 209	11	9	
52	9.82 438	14	9.95 240	25	0.04 759	9.87 198	11	8	
53	9.82 453	14	9.95 266	25	0.04 734	9.87 187	11	7	
54	9.82 467	14	9.95 291	25	0.04 708	9.87 175	11	6	
55	9.82 481	14	9.95 316	25	0.04 683	9.87 164	11	5	
56	9.82 495	14	9.95 342	25	0.04 658	9.87 153	11	4	
57	9.82 509	14	9.95 367	25	0.04 632	9.87 141	11	3	
58	9.82 523	14	9.95 393	25	0.04 607	9.87 130	11	2	
59	9.82 537	14	9.95 418	25	0.04 581	9.87 118	11	1	
60	9.82 551	14	9.95 443	25	0.04 556	9.87 107	11	0	
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′	P. P.

	25	25
6	2.5	2.5
7	3.0	2.9
8	3.4	3.3
9	3.8	3.7
10	4.2	4.1
20	8.5	8.3
30	12.7	12.5
40	17.0	16.6
50	21.2	20.8

	14	14
6	1.4	1.4
7	1.7	1.6
8	1.9	1.8
9	2.2	2.1
10	2.4	2.3
20	4.8	4.6
30	7.2	7.0
40	9.6	9.3
50	12.1	11.6

	11	11
6	1.1	1.1
7	1.3	1.3
8	1.5	1.4
9	1.7	1.6
10	1.9	1.8
20	3.8	3.6
30	5.7	5.5
40	7.6	7.3
50	9.6	9.1

′	Log. Sin.	d	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.		P. P.
0	9.82 551	14	9.95 443	25	0.04 556	9.87 107	11	**60**	
1	9.82 565	14	9.95 469	25	0.04 531	9.87 096	11	59	
2	9.82 579	14	9.95 494	25	0.04 505	9.87 084	11	58	
3	9.82 593	14	9.95 520	25	0.04 480	9.87 073	11	57	
4	9.82 607	14	9.95 545	25	0.04 454	9.87 062	11	56	
5	9.82 621	14	9.95 571	25	0.04 429	9.87 050	11	55	
6	9.82 635	14	9.95 596	25	0.04 404	9.87 039	11	54	
7	9.82 649	14	9.95 621	25	0.04 378	9.87 027	11	53	
8	9.82 663	14	9.95 647	25	0.04 353	9.87 016	11	52	
9	9.82 677	14	9.95 672	25	0.04 327	9.87 004	11	51	
10	9.82 691	14	9.95 697	25	0.04 302	9.86 993	11	**50**	
11	9.82 705	14	9.95 723	25	0.04 277	9.86 982	11	49	
12	9.82 719	14	9.95 748	25	0.04 251	9.86 970	11	48	
13	9.82 733	13	9.95 774	25	0.04 226	9.86 959	11	47	
14	9.82 746	14	9.95 799	25	0.04 200	9.86 947	11	46	
15	9.82 760	14	9.95 824	25	0.04 175	9.86 936	11	45	
16	9.82 774	14	9.95 850	25	0.04 150	9.86 924	11	44	
17	9.82 788	14	9.95 875	25	0.04 124	9.86 913	11	43	
18	9.82 802	14	9.95 901	25	0.04 099	9.86 901	11	42	
19	9.82 816	13	9.95 926	25	0.04 074	9.86 890	11	41	
20	9.82 830	14	9.95 951	25	0.04 048	9.86 878	11	**40**	
21	9.82 844	14	9.95 977	25	0.04 023	9.86 867	11	39	
22	9.82 858	13	9.96 002	25	0.03 997	9.86 855	11	38	
23	9.82 871	14	9.96 027	25	0.03 972	9.86 844	11	37	
24	9.82 885	14	9.96 053	25	0.03 947	9.86 832	11	36	
25	9.82 899	13	9.96 078	25	0.03 921	9.86 821	11	35	
26	9.82 913	14	9.96 104	25	0.03 896	9.86 809	11	34	
27	9.82 927	13	9.96 129	25	0.03 871	9.86 798	12	33	
28	9.82 940	14	9.96 154	25	0.03 845	9.86 786	11	32	
29	9.82 954	14	9.96 180	25	0.03 820	9.86 774	11	31	
30	9.82 968	13	9.96 205	25	0.03 795	9.86 763	11	**30**	
31	9.82 982	14	9.96 230	25	0.03 769	9.86 751	11	29	
32	9.82 996	13	9.96 256	25	0.03 744	9.86 740	11	28	
33	9.83 009	14	9.96 281	25	0.03 718	9.86 728	12	27	
34	9.83 023	13	9.96 306	25	0.03 693	9.86 716	11	26	
35	9.83 037	14	9.96 332	25	0.03 668	9.86 705	11	25	
36	9.83 051	13	9.96 357	25	0.03 642	9.86 693	11	24	
37	9.83 064	14	9.96 383	25	0.03 617	9.86 682	11	23	
38	9.83 078	13	9.96 408	25	0.03 592	9.86 670	12	22	
39	9.83 092	14	9.96 433	25	0.03 566	9.86 658	11	21	
40	9.83 106	13	9.96 459	25	0.03 541	9.86 647	11	**20**	
41	9.83 119	13	9.96 484	25	0.03 516	9.86 635	12	19	
42	9.83 133	14	9.96 509	25	0.03 490	9.86 623	11	18	
43	9.83 147	13	9.96 535	25	0.03 465	9.86 612	11	17	
44	9.83 160	13	9.96 560	25	0.03 440	9.86 600	12	16	
45	9.83 174	14	9.96 585	25	0.03 414	9.86 588	11	15	
46	9.83 188	13	9.96 611	25	0.03 389	9.86 577	11	14	
47	9.83 201	13	9.96 636	25	0.03 364	9.86 565	12	13	
48	9.83 215	14	9.96 661	25	0.03 338	9.86 553	11	12	
49	9.83 229	13	9.96 687	25	0.03 313	9.86 542	12	11	
50	9.83 242	13	9.96 712	25	0.03 287	9.86 530	11	**10**	
51	9.83 256	13	9.96 737	25	0.03 262	9.86 518	11	9	
52	9.83 269	13	9.96 763	25	0.03 237	9.86 507	12	8	
53	9.83 283	14	9.96 788	25	0.03 211	9.86 495	11	7	
54	9.83 297	13	9.96 813	25	0.03 186	9.86 483	12	6	
55	9.83 310	13	9.96 839	25	0.03 161	9.86 471	11	5	
56	9.83 324	13	9.96 864	25	0.03 135	9.86 460	12	4	
57	9.83 337	13	9.96 889	25	0.03 110	9.86 448	11	3	
58	9.83 351	13	9.96 915	25	0.03 085	9.86 436	12	2	
59	9.83 365	14	9.96 940	25	0.03 059	9.86 424	12	1	
60	9.83 378	13	9.96 965	25	0.03 034	9.86 412	12	**0**	
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′	P. P.

	25	25
6	2.5	2.5
7	3.0	2.9
8	3.4	3.3
9	3.8	3.7
10	4.2	4.1
20	8.5	8.3
30	12.7	12.5
40	17.0	16.6
50	21.2	20.8

	14	13
6	1.4	1.3
7	1.6	1.6
8	1.8	1.8
9	2.1	2.0
10	2.3	2.2
20	4.6	4.5
30	7.0	6.7
40	9.3	9.0
50	11.6	11.2

	12	11	11
6	1.2	1.1	1.1
7	1.4	1.3	1.3
8	1.6	1.5	1.4
9	1.8	1.7	1.6
10	2.0	1.9	1.8
20	4.0	3.8	3.6
30	6.0	5.7	5.5
40	8.0	7.6	7.3
50	10.0	9.6	9.1

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.		P. P.
0	9.83 378	13	9.96 965	25	0.03 034	9.86 412	11	60	
1	9.83 392	13	9.96 991	25	0.03 009	9.86 401	12	59	
2	9.83 405	13	9.97 016	25	0.02 984	9.86 389	11	58	
3	9.83 419	13	9.97 041	25	0.02 958	9.86 377	12	57	
4	9.83 432	13	9.97 067	25	0.02 933	9.86 365	11	56	
5	9.83 446	13	9.97 092	25	0.02 908	9.86 354	12	55	
6	9.83 459	13	9.97 117	25	0.02 882	9.86 342	12	54	
7	9.83 473	13	9.97 143	25	0.02 857	9.86 330	11	53	
8	9.83 486	13	9.97 168	25	0.02 832	9.86 318	12	52	
9	9.83 500	13	9.97 193	25	0.02 806	9.86 306	12	51	
10	9.83 513	13	9.97 219	25	0.02 781	9.86 294	12	50	
11	9.83 527	13	9.97 244	25	0.02 756	9.86 282	11	49	
12	9.83 540	13	9.97 269	25	0.02 730	9.86 271	12	48	
13	9.83 554	13	9.97 295	25	0.02 705	9.86 259	12	47	
14	9.83 567	13	9.97 320	25	0.02 680	9.86 247	11	46	
15	9.83 580	13	9.97 345	25	0.02 654	9.86 235	12	45	
16	9.83 594	13	9.97 370	25	0.02 629	9.86 223	12	44	
17	9.83 607	13	9.97 396	25	0.02 604	9.86 211	12	43	
18	9.83 621	13	9.97 421	25	0.02 578	9.86 199	12	42	
19	9.83 634	13	9.97 446	25	0.02 553	9.86 187	11	41	
20	9.83 647	13	9.97 472	25	0.02 528	9.86 176	12	40	
21	9.83 661	13	9.97 497	25	0.02 502	9.86 164	12	39	
22	9.83 674	13	9.97 523	25	0.02 477	9.86 152	12	38	
23	9.83 688	13	9.97 548	25	0.02 452	9.86 140	12	37	
24	9.83 701	13	9.97 573	25	0.02 427	9.86 128	12	36	
25	9.83 714	13	9.97 598	25	0.02 401	9.86 116	12	35	
26	9.83 728	13	9.97 624	25	0.02 376	9.86 104	12	34	
27	9.83 741	13	9.97 649	25	0.02 351	9.86 092	12	33	
28	9.83 754	13	9.97 674	25	0.02 325	9.86 080	12	32	
29	9.83 768	13	9.97 699	25	0.02 300	9.86 068	12	31	
30	9.83 781	13	9.97 725	25	0.02 275	9.86 056	12	30	
31	9.83 794	13	9.97 750	25	0.02 249	9.86 044	12	29	
32	9.83 808	13	9.97 775	25	0.02 224	9.86 032	12	28	
33	9.83 821	13	9.97 801	25	0.02 199	9.86 020	12	27	
34	9 83 834	13	9.97 826	25	0.02 174	9.86 008	12	26	
35	9.83 847	13	9.97 851	25	0.02 148	9.85 996	12	25	
36	9.83 861	13	9.97 877	25	0.02 123	9.85 984	12	24	
37	9.83 874	13	9.97 902	25	0.02 098	9.85 972	12	23	
38	9.83 887	13	9.97 927	25	0.02 072	9.85 960	12	22	
39	9.83 900	13	9.97 953	25	0.02 047	9.85 948	12	21	
40	9.83 914	13	9.97 978	25	0.02 022	9.85 936	12	20	
41	9.83 927	13	9.98 003	25	0.01 996	9.85 924	12	19	
42	9.83 940	13	9.98 028	25	0.01 971	9.85 912	12	18	
43	9.83 953	13	9.98 054	25	0.01 946	9.85 900	12	17	
44	9.83 967	13	9.98 079	25	0.01 921	9.85 887	13	16	
45	9.83 980	13	9.98 104	25	0.01 895	9.85 875	12	15	
46	9.83 993	13	9.98 129	25	0.01 870	9.85 863	12	14	
47	9.84 006	13	9.98 155	25	0.01 845	9.85 851	12	13	
48	9.84 019	13	9.98 180	25	0.01 819	9.85 839	12	12	
49	9.84 033	13	9.98 205	25	0.01 794	9.85 827	13	11	
50	9.84 046	13	9.98 231	25	0.01 769	9.85 815	12	10	
51	9.84 059	13	9.98 256	25	0.01 744	9.85 803	12	9	
52	9.84 072	13	9.98 281	25	0.01 718	9.85 791	12	8	
53	9.84 085	13	9.98 306	25	0.01 693	9.85 778	13	7	
54	9.84 098	13	9.98 332	25	0.01 668	9.85 766	12	6	
55	9.84 111	13	9.98 357	25	0.01 642	9.85 754	12	5	
56	9.84 124	13	9.98 382	25	0.01 617	9.85 742	13	4	
57	9.84 138	13	9.98 408	25	0.01 592	9.85 730	12	3	
58	9.84 151	13	9.98 433	25	0.01 567	9.85 718	12	2	
59	9.84 164	13	9.98 458	25	0.01 541	9.85 705	13	1	
60	9.84 177	13	9.98 483	25	0.01 516	9.85 693	12	0	
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′	P. P.

	25	25
6	2.5	2.5
7	3.0	2.9
8	3.4	3.3
9	3.8	3.7
10	4.2	4.1
20	8.5	8.3
30	12.7	12.5
40	17.0	16.6
50	21.2	20.8

	13	13
6	1.3	1.3
7	1.6	1.5
8	1.8	1.7
9	2.0	1.9
10	2.2	2.1
20	4.5	4.3
30	6.7	6.5
40	9.0	8.6
50	11.2	10.8

	12	12	11
6	1.2	1.2	1.1
7	1.4	1.4	1.3
8	1.6	1.6	1.5
9	1.9	1.8	1.7
10	2.1	2.0	1.9
20	4.1	4.0	3.8
30	6.2	6.0	5.7
40	8.3	8.0	7.6
50	10.4	10.0	9.6

′	Log. Sin.	d.	Log. Tan.	c. d.	Log. Cot.	Log. Cos.	d.		P. P.
0	9.84 177	13	9.98 483	25	0.01 516	9.85 693	12	60	
1	9.84 190	13	9.98 509	25	0.01 491	9.85 681	12	59	
2	9.84 203	13	9.98 534	25	0.01 465	9.85 669	12	58	
3	9.84 216	13	9.98 559	25	0.01 440	9.85 657	12	57	
4	9.84 229	13	9.98 585	25	0.01 415	9.85 644	12	56	
5	9.84 242	13	9.98 610	25	0.01 390	9.85 632	12	55	
6	9.84 255	13	9.98 635	25	0.01 364	9.85 620	12	54	
7	9.84 268	13	9.98 660	25	0.01 339	9.85 608	12	53	
8	9.84 281	13	9.98 686	25	0.01 314	9.85 595	12	52	
9	9.84 294	13	9.98 711	25	0.01 289	9.85 583	12	51	
10	9.84 307	13	9.98 736	25	0.01 263	9.85 571	12	50	
11	9.84 320	13	9.98 762	25	0.01 238	9.85 559	12	49	
12	9.84 333	13	9.98 787	25	0.01 213	9.85 546	12	48	
13	9.84 346	13	9.98 812	25	0.01 187	9.85 534	12	47	
14	9.84 359	13	9.98 837	25	0.01 162	9.85 522	12	46	
15	9.84 372	13	9.98 863	25	0.01 137	9.85 509	12	45	
16	9.84 385	13	9.98 888	25	0.01 112	9.85 497	12	44	
17	9.84 398	13	9.98 913	25	0.01 086	9.85 485	12	43	
18	9.84 411	13	9.98 938	25	0.01 061	9.85 472	12	42	
19	9.84 424	13	9.98 964	25	0.01 036	9.85 460	12	41	
20	9.84 437	13	9.98 989	25	0.01 010	9.85 448	12	40	
21	9.84 450	13	9.99 014	25	0.00 985	9.85 435	12	39	
22	9.84 463	13	9.99 040	25	0.00 960	9.85 423	12	38	
23	9.84 476	13	9.99 065	25	0.00 935	9.85 411	12	37	
24	9.84 489	13	9.99 090	25	0.00 909	9.85 398	12	36	
25	9.84 502	13	9.99 115	25	0.00 884	9.85 386	12	35	
26	9.84 514	13	9.99 141	25	0.00 859	9.85 374	12	34	
27	9.84 527	13	9.99 166	25	0.00 834	9.85 361	12	33	
28	9.84 540	13	9.99 191	25	0.00 808	9.85 349	12	32	
29	9.84 553	13	9.99 216	25	0.00 783	9.85 336	12	31	
30	9.84 566	13	9.99 242	25	0.00 758	9.85 324	12	30	
31	9.84 579	13	9.99 267	25	0.00 733	9.85 312	12	29	
32	9.84 592	13	9.99 292	25	0.00 707	9.85 299	12	28	
33	9.84 604	13	9.99 318	25	0.00 682	9.85 287	12	27	
34	9.84 617	13	9.99 343	25	0.00 657	9.85 274	12	26	
35	9.84 630	13	9.99 368	25	0.00 631	9.85 262	12	25	
36	9.84 643	13	9.99 393	25	0.00 606	9.85 249	12	24	
37	9.84 656	13	9.99 419	25	0.00 581	9.85 237	12	23	
38	9.84 669	13	9.99 444	25	0.00 556	9.85 224	12	22	
39	9.84 681	13	9.99 469	25	0.00 530	9.85 212	12	21	
40	9.84 694	13	9.99 494	25	0.00 505	9.85 199	12	20	
41	9.84 707	13	9.99 520	25	0.00 480	9.85 187	12	19	
42	9.84 720	13	9.99 545	25	0.00 455	9.85 174	12	18	
43	9.84 732	13	9.99 570	25	0.00 429	9.85 162	12	17	
44	9.84 745	13	9.99 595	25	0.00 404	9.85 149	12	16	
45	9.84 758	13	9.99 621	25	0.00 379	9.85 137	12	15	
46	9.84 771	13	9.99 646	25	0.00 353	9.85 124	12	14	
47	9.84 783	13	9.99 671	25	0.00 328	9.85 112	12	13	
48	9.84 796	13	9.99 697	25	0.00 303	9.85 099	12	12	
49	9.84 809	13	9.99 722	25	0.00 278	9.85 087	12	11	
50	9.84 822	13	9.99 747	25	0.00 252	9.85 074	12	10	
51	9.84 834	13	9.99 772	25	0.00 227	9.85 062	12	9	
52	9.84 847	13	9.99 798	25	0.00 202	9.85 049	12	8	
53	9.84 860	13	9.99 823	25	0.00 177	9.85 037	12	7	
54	9.84 873	13	9.99 848	25	0.00 151	9.85 024	13	6	
55	9.84 885	13	9.99 873	25	0.00 126	9.85 011	12	5	
56	9.84 898	13	9.99 899	25	0.00 101	9.84 999	12	4	
57	9.84 910	13	9.99 924	25	0.00 076	9.84 986	12	3	
58	9.84 923	13	9.99 949	25	0.00 050	9.84 974	12	2	
59	9.84 936	13	9.99 974	25	0.00 025	9.84 961	13	1	
60	9.84 948	13	0.00 000	25	0.00 000	9.84 948	12	0	
	Log. Cos.	d.	Log. Cot.	c. d.	Log. Tan.	Log. Sin.	d.	′	P. P.

	25	25
6	2.5	2.5
7	3.0	2.9
8	3.4	3.3
9	3.8	3.7
10	4.2	4.1
20	8.5	8.3
30	12.7	12.5
40	17.0	16.6
50	21.2	20.8

	13	13
6	1.3	1.3
7	1.6	1.5
8	1.8	1.7
9	2.0	1.9
10	2.2	2.1
20	4.5	4.3
30	6.7	6.5
40	9.0	8.6
50	11.2	10.8

	12	12
6	1.2	1.2
7	1.4	1.4
8	1.6	1.6
9	1.9	1.8
10	2.1	2.0
20	4.1	4.0
30	6.2	6.0
40	8.3	8.0
50	10.4	10.0

TABLE V.

NATURAL SINES, TANGENTS, COTANGENTS AND COSINES.

° ′	Sin.	d.	Tan.	d.	Cot.	d.	Cos.	d.		P. P.
0 0	0.0000		0.0000		∞		1.0000		0 90	
10	0.0029	29	0.0029	29	343.773		1.0000	0	50	
20	0.0058	29	0.0058	29	171.885		1.0000	0	40	
30	0.0087	29	0.0087	29	114.588		0.9999	0	30	
40	0.0116	29	0.0116	29	85.9398		0.9999	0	20	
50	0.0145	29	0.0145	29	68.7501		0.9999	0	10	
1 0	0.0174	29	0.0174	29	57.2899	8.1866	0.9998	0	0 89	
10	0.0203	29	0.0203	29	49.1039	6.1398	0.9998	0	50	
20	0.0232	29	0.0233	29	42.9641	4.7756	0.9997	1	40	
30	0.0262	29	0.0262	29	38.1884	3.8217	0.9996	0	30	
40	0.0291	29	0.0291	29	34.3677	3.1261	0.9996	0	20	
50	0.0320	29	0.0320	29	31.2416	2.6053	0.9995	1	10	
2 0	0.0349	29	0.0349	29	28.6362	2.2046	0.9994	1	0 88	
10	0.0378	29	0.0378	29	26.4316	1.8898	0.9993	1	50	
20	0.0407	29	0.0407	29	24.5417	1.6380	0.9991	1	40	
30	0.0436	29	0.0436	29	22.9037	1.4333	0.9990	1	30	
40	0.0465	29	0.0466	29	21.4704	1.2648	0.9989	1	20	
50	0.0494	29	0.0495	29	20.2055	1.1244	0.9988	1	10	
3 0	0.0523	29	0.0524	29	19.0811	1.0061	0.9986	2	0 87	
10	0.0552	29	0.0553	29	18.0750	9056	0.9984	1	50	
20	0.0581	29	0.0582	29	17.1693	8195	0.9983	1	40	
30	0.0610	29	0.0611	29	16.3498	7450	0.9981	1	30	
40	0.0639	29	0.0641	29	15.6048	6804	0.9979	2	20	
50	0.0668	29	0.0670	29	14.9244	6237	0.9977	2	10	
4 0	0.0697	29	0.0699	29	14.3006	5739	0.9975	2	0 86	
10	0.0726	29	0.0728	29	13.7267	5298	0.9973	2	50	
20	0.0755	29	0.0758	29	13.1969	4907	0.9971	2	40	
30	0.0784	29	0.0787	29	12.7062	4557	0.9969	2	30	
40	0.0813	29	0.0816	29	12.2505	4243	0.9967	2	20	
50	0.0842	29	0.0845	29	11.8261	3961	0.9964	2	10	
5 0	0.0871	29	0.0875	29	11.4300	3706	0.9962	2	0 85	
10	0.0900	29	0.0904	29	11.0594	3475	0.9959	3	50	
20	0.0929	29	0.0933	29	10.7119	3265	0.9956	2	40	
30	0.0958	29	0.0963	29	10.3854	3073	0.9954	3	30	
40	0.0987	29	0.0992	29	10.0780	2899	0.9951	3	20	
50	0.1016	29	0.1021	29	9.7881	2738	0.9948	3	10	
6 0	0.1045	28	0.1051	29	9.5143	2590	0.9945	3	0 84	
10	0.1074	29	0.1080	29	9.2553	2454	0.9942	3	50	
20	0.1103	29	0.1110	29	9.0098	2329	0.9939	3	40	
30	0.1132	29	0.1139	29	8.7769	2213	0.9935	3	30	
40	0.1161	29	0.1169	29	8.5555	2106	0.9932	3	20	
50	0.1190	29	0.1198	29	8.3449	2006	0.9929	3	10	
7 0	0.1218	28	0.1228	29	8.1443	1913	0.9925	3	0 83	
10	0.1247	29	0.1257	29	7.9530	1826	0.9922	4	50	
20	0.1276	29	0.1287	29	7.7703	1746	0.9918	3	40	
30	0.1305	29	0.1316	29	7.5957	1670	0.9914	4	30	
40	0.1334	28	0.1346	29	7.4287	1599	0.9910	4	20	
50	0.1363	29	0.1376	30	7.2687	1534	0.9906	4	10	
8 0	0.1391	28	0.1405	29	7.1153	1471	0.9902	4	0 82	
10	0.1420	29	0.1435	29	6.9682	1413	0.9898	4	50	
20	0.1449	29	0.1465	30	6.8269	1358	0.9894	4	40	
30	0.1478	28	0.1494	29	6.6911	1306	0.9890	4	30	
40	0.1507	29	0.1524	30	6.5605	1257	0.9886	4	20	
50	0.1536	28	0.1554	29	6.4348	1211	0.9881	4	10	
9 0	0.1564	29	0.1584	30	6.3137	1167	0.9877	4	0 81	
10	0.1593	28	0.1613	29	6.1970	1126	0.9872	5	50	
20	0.1622	29	0.1643	30	6.0844	1087	0.9867	4	40	
30	0.1650	28	0.1673	30	5.9757	1049	0.9863	4	30	
40	0.1679	29	0.1703	30	5.8708	1014	0.9858	5	20	
50	0.1708	29	0.1733	30	5.7693	980	0.9853	5	10	
10 0	0.1736	28	0.1763	30	5.6713		0.9848	5	0 80	
	Cos.	d.	Cot.	d.	Tan.	d.	Sin.	d.	′ °	P. P.

	30	29	28	27
1	3.0	2.9	2.8	2.7
2	6.0	5.9	5.6	5.4
3	9.0	8.7	8.4	8.1
4	12.0	11.6	11.2	10.8
5	15.0	14.5	14.0	13.5
6	18.0	17.4	16.8	16.2
7	21.0	20.3	19.6	18.9
8	24.0	23.2	22.4	21.6
9	27.0	26.1	25.2	24.3

	26	5	4	3
1	2.6	0.5	0.4	0.3
2	5.2	1.0	0.8	0.6
3	7.8	1.5	1.2	0.9
4	10.4	2.0	1.6	1.2
5	13.0	2.5	2.0	1.5
6	15.6	3.0	2.4	1.8
7	18.2	3.5	2.8	2.1
8	20.8	4.0	3.2	2.4
9	23.4	4.5	3.6	2.7

	2	1	0
1	0.2	0.1	0.0
2	0.4	0.2	0.1
3	0.6	0.3	0.1
4	0.8	0.4	0.2
5	1.0	0.5	0.2
6	1.2	0.6	0.3
7	1.4	0.7	0.3
8	1.6	0.8	0.4
9	1.8	0.9	0.4

° ′	Sin.	d.	Tan.	d.	Cot.	d.	Cos.	d.		P. P.
10 0	0.1736	28	0.1763	30	5.6713	949	0.9848	5	0 80	
10	0.1765	28	0.1793	30	5.5764	919	0.9843	5	50	
20	0.1793	29	0.1823	30	5.4845	890	0.9838	5	40	
30	0.1822	28	0.1853	30	5.3955	862	0.9832	5	30	
40	0.1851	28	0.1883	30	5.3093	836	0.9827	5	20	
50	0.1879	28	0.1913	30	5.2256	811	0.9822	5	10	33 32 31
11 0	0.1908	28	0.1944	30	5.1445	787	0.9816	6	0 79	1 3.3 3.2 3.1
10	0.1936	28	0.1974	30	5.0658	764	0.9810	5	50	2 6.6 6.4 6.2
20	0.1965	28	0.2004	30	4.9894	742	0.9805	6	40	3 9.9 9.6 9.3
30	0.1993	28	0.2034	30	4.9151	721	0.9799	5	30	4 13.2 12.8 12.4
40	0.2022	28	0.2065	30	4.8430	701	0.9793	6	20	5 16.5 16.0 15.5
50	0.2050	28	0.2095	30	4.7728	682	0.9787	6	10	6 19.8 19.2 18.6
12 0	0.2079	28	0.2125	30	4.7046	664	0.9781	6	0 78	7 23.1 22.4 21.7
10	0.2107	28	0.2156	30	4.6382	646	0.9775	6	50	8 26.4 25.6 24.8
20	0.2136	28	0.2186	30	4.5736	629	0.9769	6	40	9 29.7 28.8 27.9
30	0.2164	28	0.2217	30	4.5107	613	0.9763	6	30	
40	0.2193	28	0.2247	30	4.4494	597	0.9756	6	20	30 30 29
50	0.2221	28	0.2278	30	4.3897	582	0.9750	6	10	1 3.0 3.0 2.9
13 0	0.2249	28	0.2308	31	4.3315	568	0.9743	6	0 77	2 6.1 6.0 5.8
10	0.2278	28	0.2339	30	4.2747	553	0.9737	6	50	3 9.1 9.0 8.7
20	0.2306	28	0.2370	31	4.2193	540	0.9730	7	40	4 12.2 12.0 11.6
30	0.2334	28	0.2401	30	4.1653	527	0.9723	6	30	5 15.2 15.0 14.5
40	0.2362	28	0.2431	31	4.1125	515	0.9717	7	20	6 18.3 18.0 17.4
50	0.2391	28	0.2462	31	4.0610	502	0.9710	7	10	7 21.3 21.0 20.3
14 0	0.2419	28	0.2493	30	4.0108	491	0.9703	7	0 76	8 24.4 24.0 23.2
10	0.2447	28	0.2524	31	3.9616	480	0.9696	7	50	9 27.4 27.0 26.1
20	0.2476	28	0.2555	31	3.9136	469	0.9688	7	40	
30	0.2504	28	0.2586	31	3.8667	458	0.9681	7	30	28 28 27
40	0.2532	28	0.2617	31	3.8208	449	0.9674	7	20	1 2.8 2.8 2.7
50	0.2560	28	0.2648	31	3.7759	439	0.9666	7	10	2 5.7 5.6 5.4
15 0	0.2588	28	0.2679	31	3.7320	429	0.9659	8	0 75	3 8.5 8.4 8.1
10	0.2616	28	0.2710	31	3.6891	420	0.9651	7	50	4 11.4 11.2 10.8
20	0.2644	28	0.2742	31	3.6476	411	0.9644	7	40	5 14.2 14.0 13.5
30	0.2672	28	0.2773	31	3.6059	403	0.9636	8	30	6 17.1 16.8 16.2
40	0.2700	28	0.2804	31	3.5653	394	0.9628	8	20	7 19.9 19.6 18.9
50	0.2728	28	0.2836	32	3.5261	387	0.9620	8	10	8 22.8 22.4 21.6
16 0	0.2756	28	0.2867	31	3.4874	379	0.9612	8	0 74	9 25.6 25.2 24.3
10	0.2784	28	0.2899	32	3.4495	371	0.9604	8	50	
20	0.2812	27	0.2930	31	3.4123	364	0.9596	8	40	10 9 8
30	0.2840	28	0.2962	32	3.3759	357	0.9588	8	30	1 1.0 0.9 0.8
40	0.2868	28	0.2994	32	3.3402	350	0.9580	8	20	2 2.0 1.8 1.6
50	0.2896	28	0.3025	31	3.3052	343	0.9573	8	10	3 3.0 2.7 2.4
17 0	0.2923	27	0.3057	32	3.2708	337	0.9563	8	0 73	4 4.0 3.6 3.2
10	0.2951	28	0.3089	31	3.2371	331	0.9554	8	50	5 5.0 4.5 4.0
20	0.2979	28	0.3121	32	3.2040	324	0.9546	9	40	6 6.0 5.4 4.8
30	0.3007	27	0.3153	32	3.1716	319	0.9537	8	30	7 7.0 6.3 5.6
40	0.3035	28	0.3185	32	3.1397	313	0.9528	9	20	8 8.0 7.2 6.4
50	0.3062	27	0.3217	32	3.1084	307	0.9519	9	10	9 9.0 8.1 7.2
18 0	0.3090	27	0.3249	32	3.0777	302	0.9510	9	0 72	
10	0.3118	28	0.3281	32	3.0475	296	0.9501	9	50	7 7 6 5
20	0.3145	27	0.3313	32	3.0178	291	0.9492	9	40	1 0.7 0.7 0.6 0.5
30	0.3173	27	0.3346	32	2.9887	286	0.9483	9	30	2 1.5 1.4 1.2 1.0
40	0.3200	27	0.3378	32	2.9600	281	0.9474	9	20	3 2.2 2.1 1.8 1.5
50	0 3228	27	0.3411	32	2.9319	277	0.9464	10	10	4 3.0 2.8 2.4 2.0
19 0	0.3255	27	0.3443	32	2.9042	272	0.9455	9	0 71	5 3.7 3.5 3.0 2.5
10	0 3283	27	0.3476	32	2.8770	267	0.9445	9	50	6 4.5 4.2 3.6 3.0
20	0.3310	27	0.3508	32	2.8502	263	0.9436	9	40	7 5.2 4.9 4.2 3.5
30	0.3338	27	0.3541	33	2.8239	259	0.9426	10	30	8 6.0 5.6 4.8 4.0
40	0.3365	27	0.3574	33	2.7980	254	0.9416	9	20	9 6.7 6.3 5.4 4.5
50	0.3393	27	0.3607	33	2.7725	250	0.9407	10	10	
20 0	0.3420		0.3639		2.7475		0.9397		0 70	
	Cos.	d.	Cot.	d.	Tan.	d.	Sin.	d.	′ °	P. P.

° ′	Sin.	d.	Tan.	d.	Cot.	d.	Cos.	d.		
20 0	0.3420	27	0.3639	33	2.7475	247	0.9397	10	0	70
10	0.3447	27	0.3672	33	2.7228	242	0.9387	10	50	
20	0.3475	27	0.3705	33	2.6985	239	0.9377	10	40	
30	0.3502	27	0.3739	33	2.6746	235	0.9366	10	30	
40	0.3529	27	0.3772	33	2.6511	232	0.9356	10	20	
50	0.3556	27	0.3805	33	2.6279	228	0.9346	10	10	
21 0	0.3583	27	0.3838	33	2.6051	225	0.9336	10	0	69
10	0.3611	27	0.3872	33	2.5826	221	0.9325	10	50	
20	0.3638	27	0.3905	33	2.5604	218	0.9315	11	40	
30	0.3665	27	0.3939	33	2.5386	215	0.9304	10	30	
40	0.3692	27	0.3972	34	2.5171	212	0.9293	11	20	
50	0.3719	27	0.4006	34	2.4959	208	0.9282	10	10	
22 0	0.3746	27	0.4040	33	2.4751	206	0.9272	11	0	68
10	0.3773	27	0.4074	34	2.4545	203	0.9261	11	50	
20	0.3800	27	0.4108	34	2.4342	200	0.9250	11	40	
30	0.3827	27	0.4142	34	2.4142	197	0.9239	11	30	
40	0.3853	26	0.4176	34	2.3945	194	0.9227	11	20	
50	0.3880	27	0.4210	34	2.3750	192	0.9216	11	10	
23 0	0.3907	27	0.4244	34	2.3558	189	0.9205	11	0	67
10	0.3934	27	0.4279	34	2.3369	187	0.9193	11	50	
20	0.3961	26	0.4313	34	2.3182	184	0.9182	11	40	
30	0.3987	26	0.4348	35	2.2998	182	0.9170	11	30	
40	0.4014	27	0.4383	34	2.2816	179	0.9159	12	20	
50	0.4041	26	0.4417	35	2.2637	177	0.9147	11	10	
24 0	0.4067	26	0.4452	34	2.2460	175	0.9135	12	0	66
10	0.4094	26	0.4487	35	2.2285	172	0.9123	12	50	
20	0.4120	26	0.4522	35	2.2113	170	0.9111	12	40	
30	0.4147	26	0.4557	35	2.1943	168	0.9099	12	30	
40	0.4173	26	0.4592	35	2.1775	166	0.9087	12	20	
50	0.4200	26	0.4627	35	2.1609	164	0.9075	12	10	
25 0	0.4226	26	0.4663	35	2.1445	162	0.9063	12	0	65
10	0.4252	26	0.4698	35	2.1283	159	0.9050	12	50	
20	0.4279	26	0.4734	36	2.1123	158	0.9038	12	40	
30	0.4305	26	0.4770	35	2.0965	156	0.9026	12	30	
40	0.4331	26	0.4805	36	2.0809	154	0.9013	13	20	
50	0.4357	26	0.4841	36	2.0655	152	0.9000	12	10	
26 0	0.4383	26	0.4877	36	2.0503	150	0.8988	13	0	64
10	0.4410	26	0.4913	36	2.0352	148	0.8975	12	50	
20	0.4436	26	0.4949	36	2.0204	147	0.8962	13	40	
30	0.4462	26	0.4986	36	2.0057	145	0.8949	13	30	
40	0.4488	26	0.5022	36	1.9911	143	0.8936	13	20	
50	0.4514	26	0.5058	37	1.9768	142	0.8923	13	10	
27 0	0.4540	26	0.5095	36	1.9626	140	0.8910	13	0	63
10	0.4566	25	0.5132	37	1.9486	139	0.8897	13	50	
20	0.4591	26	0.5169	36	1.9347	137	0.8883	13	40	
30	0.4617	26	0.5205	37	1.9210	136	0.8870	13	30	
40	0.4643	25	0.5242	37	1.9074	134	0.8856	13	20	
50	0.4669	25	0.5280	37	1.8940	132	0.8843	13	10	
28 0	0.4694	26	0.5317	37	1.8807	131	0.8829	13	0	62
10	0.4720	25	0.5354	37	1.8676	130	0.8816	14	50	
20	0.4746	25	0.5392	37	1.8546	128	0.8802	14	40	
30	0.4771	25	0.5429	38	1.8417	127	0.8788	13	30	
40	0.4797	25	0.5467	37	1.8290	125	0.8774	14	20	
50	0.4822	25	0.5505	38	1.8165	124	0.8760	14	10	
29 0	0.4848	25	0.5543	38	1.8040	123	0.8746	14	0	61
10	0.4873	25	0.5581	38	1.7917	122	0.8732	14	50	
20	0.4899	25	0.5619	38	1.7795	120	0.8718	14	40	
30	0.4924	25	0.5657	38	1.7675	119	0.8703	14	30	
40	0.4949	25	0.5696	39	1.7555	118	0.8689	14	20	
50	0.4975	25	0.5735	38	1.7437	117	0.8675	14	10	
30 0	0.5000		0.5773		1.7320		0.8660		0	60
	Cos.	d.	Cot.	d.	Tan.	d.	Sin.	d.	′	°

P. P.

	39	38	37	36
1	3.9	3.8	3.7	3.6
2	7.8	7.6	7.4	7.2
3	11.7	11.4	10.1	10.8
4	15.6	15.2	14.8	14.4
5	19.5	19.0	18.5	18.0
6	23.4	22.8	22.2	21.6
7	27.3	26.6	25.9	25.2
8	31.2	30.4	29.6	28.8
9	35.1	34.2	33.3	32.4

	35	35	34	33
1	3.5	3.5	3.4	3.3
2	7.1	7.0	6.8	6.6
3	10.6	10.5	10.2	9.9
4	14.2	14.0	13.6	13.2
5	17.7	17.5	17.0	16.5
6	21.3	21.0	20.4	19.8
7	24.8	24.5	23.8	23.1
8	28.4	28.0	27.2	26.4
9	31.9	31.5	30.6	29.7

	27	27	26	25
1	2.7	2.7	2.6	2.5
2	5.5	5.4	5.2	5.0
3	8.2	8.1	7.8	7.5
4	11.0	10.8	10.4	10.0
5	13.7	13.5	13.0	12.5
6	16.5	16.2	15.6	15.0
7	19.2	18.9	18.2	17.5
8	22.0	21.6	20.8	20.0
9	24.7	24.3	23.4	22.5

	14	14	13	12
1	1.4	1.4	1.3	1.2
2	2.9	2.8	2.6	2.4
3	4.3	4.2	3.9	3.6
4	5.8	5.6	5.2	4.8
5	7.2	7.0	6.5	6.0
6	8.7	8.4	7.8	7.2
7	10.1	9.8	9.1	8.4
8	11.6	11.2	10.4	9.6
9	13.0	12.6	11.7	10.8

	11	11	10
1	1.1	1.1	1.0
2	2.3	2.2	2.0
3	3.4	3.3	3.0
4	4.6	4.4	4.0
5	5.7	5.5	5.0
6	6.9	6.6	6.0
7	8.0	7.7	7 0
8	9.2	8.8	8 0
9	10.3	9.9	9.0

° ′	Sin.	d.	Tan.	d.	Cot.	d.	Cos.	d.		P. P.
30 0	0.5000		0.5773		1.7320		0.8660		0 60	
10	0.5025	25	0.5812	39	1.7204	116	0.8645	15	50	
20	0.5050	25	0.5851	39	1.7090	114	0.8631	14	40	49 49 48 47 46
30	0.5075	25	0.5890	39	1.6976	113	0.8616	15	30	1 4.9 4.9 4.8 4.7 4.6
40	0.5100	25	0.5929	39	1.6864	112	0.8601	15	20	2 9.9 9.8 9.6 9.4 9.2
50	0.5123	25	0.5969	39	1.6753	111	0.8586	15	10	3 14.8 14.7 14.4 14.1 13.8
31 0	0.5150	25	0.6008	39	1.6643	110	0.8571	15	0 59	4 19.8 19.6 19.2 18.8 18.4
10	0.5175	25	0.6048	40	1.6533	109	0.8556	15	50	5 24.7 24.5 24.0 23.5 23.0
20	0.5200	24	0.6088	39	1.6425	108	0.8541	15	40	6 29.7 29.4 28.8 28.2 27.6
30	0.5225	25	0.6128	40	1.6318	107	0.8526	15	30	7 34.6 34.3 33.6 32.9 32.2
40	0.5250	25	0.6168	40	1.6212	106	0.8511	15	20	8 39.6 39.2 38.4 37.6 36.8
50	0.5274	24	0.6208	40	1.6107	105	0.8496	15	10	9 44.5 44.1 43.2 42.3 41.4
32 0	0.5299	24	0.6248	40	1.6003	104	0.8480	15	0 58	45 45 44 43 42
10	0.5324	25	0.6289	40	1.5900	103	0.8465	15	50	1 4.5 4.5 4.4 4.3 4.2
20	0.5348	24	0.6330	41	1.5798	102	0.8449	15	40	2 9.1 9.0 8.8 8.6 8.4
30	0.5373	24	0.6370	40	1.5697	101	0.8434	15	30	3 13.6 13.5 13.2 12.9 12.6
40	0.5397	24	0.6411	41	1.5596	100	0.8418	16	20	4 18.2 18.0 17.6 17.2 16.8
50	0.5422	24	0.6453	41	1.5497	99	0.8403	15	10	5 22.7 22.5 22.0 21.5 21.0
33 0	0.5446	24	0.6494	41	1.5398	98	0.8386	16	0 57	6 27.3 27.0 26.4 25.8 25.2
10	0.5471	24	0.6535	41	1.5301	97	0.8371	15	50	7 31.8 31.5 30.8 30.1 29.4
20	0.5495	24	0.6577	42	1.5204	96	0.8355	16	40	8 36.4 36.0 35.2 34.4 33.6
30	0.5519	24	0.6619	42	1.5108	96	0.8339	16	30	9 40.9 40.5 39.6 38.7 37.8
40	0.5543	24	0.6661	42	1.5013	95	0.8323	16	20	
50	0.5568	24	0.6703	42	1.4919	94	0.8306	16	10	41 41 40 39
34 0	0.5592	24	0.6745	42	1.4825	93	0.8290	16	0 56	1 4.1 4.1 4.0 3.9
10	0.5616	24	0.6787	42	1.4733	92	0.8274	16	50	2 8.3 8.2 8.0 7.8
20	0.5640	24	0.6830	43	1.4641	92	0.8257	16	40	3 12.4 12.3 12.0 11.7
30	0.5664	24	0.6873	43	1.4550	91	0.8241	16	30	4 16.6 16.4 16.0 15.6
40	0.5688	24	0.6915	42	1.4460	90	0.8225	16	20	5 20.7 20.5 20.0 19.5
50	0.5712	24	0.6959	43	1.4370	89	0.8208	17	10	6 24.9 24.6 24.0 23.4
35 0	0.5736	24	0.7002	43	1.4281	89	0.8191	16	0 55	7 29.0 28.7 28.0 27.3
10	0.5759	23	0.7045	43	1.4193	88	0.8175	16	50	8 33.2 32.8 32.0 31.2
20	0.5783	24	0.7089	43	1.4106	87	0.8158	17	40	9 37.3 36.9 36.0 35.1
30	0.5807	24	0.7133	44	1.4019	86	0.8141	17	30	
40	0.5830	23	0.7177	44	1.3933	86	0.8124	17	20	25 25 24 23
50	0.5854	24	0.7221	44	1.3848	85	0.8107	17	10	1 2.5 2.5 2.4 2.3
36 0	0.5878	24	0.7265	44	1.3764	84	0.8090	17	0 54	2 5.1 5.0 4.8 4.6
10	0.5901	23	0.7310	44	1.3680	84	0.8073	17	50	3 7.6 7.5 7.2 6.9
20	0.5925	23	0.7354	45	1.3597	83	0.8056	17	40	4 10.2 10.0 9.6 9.2
30	0.5948	23	0.7399	45	1.3514	83	0.8038	17	30	5 12.7 12.5 12.0 11.5
40	0.5971	23	0.7444	45	1.3432	82	0.8021	17	20	6 15.3 15.0 14.4 13.8
50	0.5995	23	0.7490	45	1.3351	81	0.8004	17	10	7 17.8 17.5 16.8 16.1
37 0	0.6018	23	0.7535	45	1.3270	80	0.7986	17	0 53	8 20.4 20.0 19.2 18.4
10	0.6041	23	0.7581	46	1.3190	79	0.7969	18	50	9 22.9 22.5 21.6 20.7
20	0.6064	23	0.7627	46	1.3111	78	0.7951	17	40	
30	0.6087	23	0.7673	46	1.3032	78	0.7933	17	30	22 22 18 18
40	0.6110	23	0.7719	46	1.2954	77	0.7916	18	20	1 2.2 2.2 1.8 1.8
50	0.6133	23	0.7766	46	1.2876	77	0.7898	18	10	2 4.5 4.4 3.7 3.6
38 0	0.6156	23	0.7813	47	1.2799	76	0.7880	18	0 52	3 6.7 6.6 5.5 5.4
10	0.6179	23	0.7860	47	1.2723	76	0.7862	18	50	4 9.0 8.8 7.4 7.2
20	0.6202	22	0.7907	47	1.2647	75	0.7844	18	40	5 11.2 11.0 9.2 9.0
30	0.6225	23	0.7954	47	1.2571	74	0.7826	18	30	6 13.5 13.2 11.1 10.8
40	0.6248	23	0.8002	48	1.2497	74	0.7808	18	20	7 15.7 15.4 12.9 12.6
50	0.6271	22	0.8050	48	1.2422	73	0.7789	18	10	8 18.0 17.6 14.8 14.4
39 0	0.6293	23	0.8098	48	1.2349	73	0.7771	18	0 51	9 20.2 19.8 16.6 16.2
10	0.6316	22	0.8146	48	1.2276	73	0.7753	18	50	
20	0.6338	22	0.8194	49	1.2203	72	0.7734	18	40	17 17 16 15 14
30	0.6361	22	0.8243	49	1.2131	71	0.7716	18	30	1 1.7 1.7 1.6 1.5 1.4
40	0.6383	22	0.8292	49	1.2059	71	0.7697	18	20	2 3.5 3.4 3.2 3.0 2.9
50	0.6405	22	0.8341	49	1.1988	71	0.7679	18	10	3 5.2 5.1 4.8 4.5 4.3
40 0	0.6428	22	0.8391	49	1.1917	70	0.7660	18	0 50	4 7.0 6.8 6.4 6.0 6.8
	Cos.	d.	Cot.	d.	Tan.	d.	Sin.	d.	′ °	5 8.7 8.5 8.0 7.5 7.2
										6 10.5 10.2 9.6 9.0 8.7
										7 12.2 11.9 11.2 10.5 10.1
										8 14.0 13.6 12.8 12.0 11.6
										9 15.7 15.3 14.4 13.5 13.0

° ′	Sin.	d.	Tan.	d.	Cot.	d.	Cos.	d.	
40 0	0.6428		0.8391		1.1917		0.7660		0 50
		22		49		70		19	
10	0.6450	22	0.8446	50	1.1847	70	0.7641	18	50
		22		50		69		19	
20	0.6472	22	0.8496	50	1.1777	69	0.7623	19	40
		22		50		68		19	
30	0.6494	22	0.8541	51	1.1708	68	0.7604	19	30
		22		51		68		19	
40	0.6516	22	0.8591	51	1.1640	68	0.7585	19	20
		22		51		68		19	
50	0.6538		0.8642		1.1571		0.7566		10
41 0	0.6560		0.8693		1.1503		0.7547		0 49
		22		51		67		19	
10	0.6582	22	0.8744	51	1.1436	67	0.7528	19	50
		22		52		67		19	
20	0.6604	21	0.8795	52	1.1369	66	0.7509	19	40
		22		51		66		19	
30	0.6626	22	0.8847	52	1.1303	66	0.7489	19	30
		21		52		65		19	
40	0.6648	21	0.8899	52	1.1237	65	0.7470	19	20
		22		52		65		19	
50	0.6669		0.8951		1.1171		0.7451		10
42 0	0.6691		0.9004		1.1106		0.7431		0 48
		21		53		64		19	
10	0.6713	21	0.9057	53	1.1041	64	0.7412	19	50
		21		53		64		19	
20	0.6734	21	0.9110	53	1.0977	64	0.7392	19	40
		21		53		63		20	
30	0.6756	21	0.9163	53	1.0913	63	0.7373	20	30
		21		54		63		20	
40	0.6777	21	0.9217	54	1.0849	63	0.7353	19	20
		21		54		63		20	
50	0.6798		0.9271		1.0786		0.7333		10
43 0	0.6820		0.9325		1.0723		0.7313		0 47
		21		54		62		20	
10	0.6841	21	0.9379	54	1.0661	62	0.7293	20	50
		21		55		62		20	
20	0.6862	21	0.9434	55	1.0599	61	0.7273	20	40
		21		55		61		20	
30	0.6883	21	0.9489	55	1.0538	61	0.7253	20	30
		21		56		60		20	
40	0.6904	21	0.9545	56	1.0478	60	0.7233	20	20
		21		56		60		20	
50	0.6925		0.9601		1.0416		0.7213		10
44 0	0.6946		0.9657		1.0355		0.7193		0 46
		21		56		60		20	
10	0.6967	21	0.9713	56	1.0295	59	0.7173	20	50
		21		57		59		20	
20	0.6988	20	0.9770	57	1.0235	59	0.7153	20	40
		21		57		59		20	
30	0.7009	20	0.9827	57	1.0176	59	0.7132	20	30
		21		58		58		20	
40	0.7030	20	0.9884	57	1.0117	58	0.7112	20	20
		20		58		58		20	
50	0.7050		0.9942		1.0058		0.7091		10
45 0	0.7071		1.0000		1.0000		0.7071		0 45
	Cos.	d.	Cot.	d.	Tan.	d.	Sin.	d.	′ °

P. P.

	70	22	22	21	21
1	7.0	2.2	2.2	2.1	2.1
2	14.0	4.5	4.4	4.3	4.2
3	21.0	6.7	6.6	6.4	6.3
4	28.0	9.0	8.8	8.6	8.4
5	35.0	11.2	11.0	10.7	10.5
6	42.0	13.5	13.2	12.9	12.6
7	49.0	15.7	15.4	15.0	14.7
8	56.0	18.0	17.6	17.2	16.8
9	63.0	20.2	19.8	19.3	18.9

	69	20	20	19	19
1	6.9	2.0	2.0	1.9	1.9
2	13.8	4.1	4.0	3.9	3.8
3	20.7	6.1	6.0	5.8	5.7
4	27.6	8.2	8.0	7.8	7.6
5	34.5	10.2	10.0	9.7	9.5
6	41.4	12.3	12.0	11.7	11.4
7	48.3	14.3	14.0	13.6	13.3
8	55.2	16.4	16.0	15.6	15.2
9	62.1	18.4	18.0	17.5	17.1

	68	68	67	66	18
1	6.8	6.8	6.7	6.6	1.8
2	13.7	13.6	13.4	13.2	3.7
3	20.5	20.4	20.1	19.8	5.5
4	27.4	27.2	26.8	26.4	7.4
5	34.2	34.0	33.5	33.0	9.2
6	41.1	40.8	40.2	39.6	11.1
7	47.9	47.6	46.9	46.2	12.9
8	54.8	54.4	53.6	52.8	14.8
9	61.6	61.2	60.3	59.4	16.6

	65	64	64	63	62	61	60	59	59	58	58	57	57	56	56	55	54	54	53	53	52	52
1	6.5	6.4	6.4	6.3	6.2	6.1	6.0	5.9	5.9	5.8	5.8	5.7	5.7	5.6	5.6	5.5	5.4	5.4	5.3	5.3	5.2	5.2
2	13.1	12.9	12.8	12.6	12.4	12.3	12.1	11.9	11.8	11.7	11.6	11.5	11.4	11.3	11.2	11.0	10.9	10.8	10.7	10.6	10.5	10.4
3	19.6	19.3	19.2	18.9	18.6	18.4	18.1	17.8	17.7	17.5	17.4	17.2	17.1	16.9	16.8	16.5	16.3	16.2	16.0	15.9	15.7	15.6
4	26.2	25.8	25.6	25.2	24.8	24.6	24.2	23.8	23.6	23.4	23.2	23.0	22.8	22.6	22.4	22.0	21.8	21.6	21.4	21.2	21.0	20.8
5	32.7	32.2	32.0	31.5	31.0	30.7	30.2	29.7	29.5	29.2	29.0	28.7	28.5	28.2	28.0	27.5	27.2	27.0	26.7	26.5	26.2	26.0
6	39.3	38.7	38.4	37.8	37.2	36.9	36.3	35.7	35.4	35.1	34.8	34.5	34.2	33.9	33.6	33.0	32.7	32.4	32.1	31.8	31.5	31.2
7	45.8	45.1	44.8	44.1	43.4	43.0	42.3	41.6	41.3	40.9	40.6	40.2	39.9	39.5	39.2	38.5	38.1	37.8	37.4	37.1	36.7	36.4
8	52.4	51.6	51.2	50.4	49.6	49.2	48.4	47.6	47.2	46.8	46.4	46.0	45.6	45.2	44.8	44.0	43.6	43.2	42.8	42.4	42.0	41.6
9	58.9	58.0	57.6	56.7	55.8	55.3	54.4	53.5	53.1	52.6	52.2	51.7	51.3	50.8	50.4	49.5	49.0	48.6	48.1	47.7	47.2	46.8

	51	51	50	50	49
1	5.1	5.1	5.0	5.0	4.9
2	10.3	10.2	10.1	10.0	9.9
3	15.4	15.3	15.1	15.0	14.8
4	20.6	20.4	20.2	20.0	19.8
5	25.7	25.5	25.2	25.0	24.7
6	30.9	30.6	30.3	30.0	29.7
7	36.0	35.7	35.3	35.0	34.6
8	41.2	40.8	40.4	40.0	39.6
9	46.3	45.9	45.4	45.0	44.5

Table for passing from Sexagesimal to Circular Measure.

°	Circular Meas.	′	Circular Meas.	″	Circular Meas.
100	1.74 532 9	10	0.00 290 9	10	0.00 004 8
200	3.49 065 8	20	0.00 581 8	20	0.00 009 7
300	5.23 598 8	30	0.00 872 6	30	0.00 014 5
		40	0.01 163 5	40	0.00 019 4
40	0.69 813 1				
50	0.87 266 4	50	0.01 454 4	50	0.00 024 2
60	1.04 719 7				
		6	0.00 174 5	6	0.00 002 9
70	1.22 173 0	7	0.00 203 6	7	0.00 003 4
80	1.39 626 3	8	0.00 232 7	8	0.00 003 9
90	1.57 079 6	9	0.00 261 8	9	0.00 004 3

TABLE VI.

SQUARES AND SQUARE ROOTS

OF ALL INTEGER NUMBERS

FROM 1 TO 1000.

Num.	Square.	Square Root.	Num.	Square.	Square Root.
1	1	1.0000000	51	26 01	7.1414284
2	4	1.4142136	52	27 04	7.2111026
3	9	1.7320508	53	28 09	7.2801099
4	16	2.0000000	54	29 16	7.3484692
5	25	2.2360680	55	30 25	7.4161985
6	36	2.4494897	56	31 36	7.4833148
7	49	2.6457513	57	32 49	7.5498344
8	64	2.8284271	58	33 64	7.6157731
9	81	3.0000000	59	34 81	7.6811457
10	1 00	3.1622777	60	36 00	7.7459667
11	1 21	3.3166248	61	37 21	7.8102497
12	1 44	3.4641016	62	38 44	7.8740079
13	1 69	3.6055513	63	39 69	7.9372539
14	1 96	3.7416574	64	40 96	8.0000000
15	2 25	3.8729833	65	42 25	8.0622577
16	2 56	4.0000000	66	43 56	8.1240384
17	2 89	4.1231056	67	44 89	8.1853528
18	3 24	4.2426407	68	46 24	8.2462113
19	3 61	4.3588989	69	47 61	8.3066239
20	4 00	4.4721360	70	49 00	8.3666003
21	4 41	4.5825757	71	50 41	8.4261498
22	4 84	4.6904158	72	51 84	8.4852814
23	5 29	4.7958315	73	53 29	8.5440037
24	5 76	4.8989795	74	54 76	8.6023253
25	6 25	5.0000000	75	56 25	8.6602540
26	6 76	5.0990195	76	57 76	8.7177979
27	7 29	5.1961524	77	59 29	8.7749644
28	7 84	5.2915026	78	60 84	8.8317609
29	8 41	5.3851648	79	62 41	8.8881944
30	9 00	5.4772256	80	64 00	8.9442719
31	9 61	5.5677644	81	65 61	9.0000000
32	10 24	5.6568542	82	67 24	9.0553851
33	10 89	5.7445626	83	68 89	9.1104336
34	11 56	5.8309519	84	70 56	9.1651514
35	12 25	5.9160798	85	72 25	9.2195445
36	12 96	6.0000000	86	73 96	9.2736185
37	13 69	6.0827625	87	75 69	9.3273791
38	14 44	6.1644140	88	77 44	9.3808315
39	15 21	6.2449980	89	79 21	9.4339811
40	16 00	6.3245553	90	81 00	9.4868330
41	16 81	6.4031242	91	82 81	9.5393920
42	17 64	6.4807407	92	84 64	9.5916630
43	18 49	6.5574385	93	86 49	9.6436508
44	19 36	6.6332496	94	88 36	9.6953597
45	20 25	6.7082039	95	90 25	9.7467943
46	21 16	6.7823300	96	92 16	9.7979590
47	22 09	6.8556546	97	94 09	9.8488578
48	23 04	6.9282032	98	96 04	9.8994949
49	24 01	7.0000000	99	98 01	9.9498744
50	25 00	7.0710678	100	1 00 00	10.0000000

Num.	Square.	Square Root.	Num.	Square.	Square Root.
101	1 02 01	10.0498756	151	2 28 01	12.2882057
102	1 04 04	10.0995049	152	2 31 04	12.3288280
103	1 06 09	10.1488916	153	2 34 09	12.3693169
104	1 08 16	10.1980390	154	2 37 16	12.4096736
105	1 10 25	10.2469508	155	2 40 25	12.4498996
106	1 12 36	10.2956301	156	2 43 36	12.4899960
107	1 14 49	10.3440804	157	2 46 49	12.5299641
108	1 16 64	10.3923048	158	2 49 64	12.5698051
109	1 18 81	10.4403065	159	2 52 81	12.6095202
110	1 21 00	10.4880885	160	2 56 00	12.6491106
111	1 23 21	10.5356538	161	2 59 21	12.6885775
112	1 25 44	10.5830052	162	2 62 44	12.7279221
113	1 27 69	10.6301458	163	2 65 69	12.7671453
114	1 29 96	10.6770783	164	2 68 96	12.8062485
115	1 32 25	10.7238053	165	2 72 25	12.8452326
116	1 34 56	10.7703296	166	2 75 56	12.8840987
117	1 36 89	10.8166538	167	2 78 89	12.9228480
118	1 39 24	10.8627805	168	2 82 24	12.9614814
119	1 41 61	10.9087121	169	2 85 61	13.0000000
120	1 44 00	10.9544512	170	2 89 00	13.0384048
121	1 46 41	11.0000000	171	2 92 41	13.0766968
122	1 48 84	11.0453610	172	2 95 84	13.1148770
123	1 51 29	11.0905365	173	2 99 29	13.1529464
124	1 53 76	11.1355287	174	3 02 76	13.1909060
125	1 56 25	11.1803399	175	3 06 25	13.2287566
126	1 58 76	11.2249722	176	3 09 76	13.2664992
127	1 61 29	11.2694277	177	3 13 29	13.3041347
128	1 63 84	11.3137085	178	3 16 84	13.3416641
129	1 66 41	11.3578167	179	3 20 41	13.3790882
130	1 69 00	11.4017543	180	3 24 00	13.4164079
131	1 71 61	11.4455231	181	3 27 61	13.4536240
132	1 74 24	11.4891253	182	3 31 24	13.4907376
133	1 76 89	11.5325626	183	3 34 89	13.5277493
134	1 79 56	11.5758369	184	3 38 56	13.5646600
135	1 82 25	11.6189500	185	3 42 25	13.6014705
136	1 84 96	11.6619038	186	3 45 96	13.6381817
137	1 87 69	11.7046999	187	3 49 69	13.6747943
138	1 90 44	11.7473401	188	3 53 44	13.7113092
139	1 93 21	11.7898261	189	3 57 21	13.7477271
140	1 96 00	11.8321596	190	3 61 00	13.7840488
141	1 98 81	11.8743422	191	3 64 81	13.8202750
142	2 01 64	11.9163753	192	3 68 64	13.8564065
143	2 04 49	11.9582607	193	3 72 49	13.8924440
144	2 07 36	12.0000000	194	3 76 36	13.9283883
145	2 10 25	12.0415946	195	3 80 25	13.9642400
146	2 13 16	12.0830460	196	3 84 16	14.0000000
147	2 16 09	12.1243557	197	3 88 09	14.0356688
148	2 19 04	12.1655251	198	3 92 04	14.0712473
149	2 22 01	12.2065556	199	3 96 01	14.1067360
150	2 25 00	12.2474487	200	4 00 00	14.1421356

Num.	Square.	Square Root.	Num.	Square.	Square Root.
201	4 04 01	14.1774469	251	6 30 01	15.8429795
202	4 08 04	14.2126704	252	6 35 04	15.8745079
203	4 12 09	14.2478068	253	6 40 09	15.9059737
204	4 16 16	14.2828569	254	6 45 16	15.9373775
205	4 20 25	14.3178211	255	6 50 25	15.9687194
206	4 24 36	14.3527001	256	6 55 36	16.0000000
207	4 28 49	14.3874946	257	6 60 49	16.0312195
208	4 32 64	14.4222051	258	6 65 64	16.0623784
209	4 36 81	14.4568323	259	6 70 81	16.0934769
210	4 41 00	14.4913767	260	6 76 00	16.1245155
211	4 45 21	14.5258390	261	6 81 21	16.1554944
212	4 49 44	14.5602198	262	6 86 44	16.1864141
213	4 53 69	14.5945195	263	6 91 69	16.2172747
214	4 57 96	14.6287388	264	6 96 96	16.2480768
215	4 62 25	14.6628783	265	7 02 25	16.2788206
216	4 66 56	14.6969385	266	7 07 56	16.3095064
217	4 70 89	14.7309199	267	7 12 89	16.3401346
218	4 75 24	14.7648231	268	7 18 24	16.3707055
219	4 79 61	14.7986486	269	7 23 61	16.4012195
220	4 84 00	14.8323970	270	7 29 00	16.4316767
221	4 88 41	14.8660687	271	7 34 41	16.4620776
222	4 92 84	14.8996644	272	7 39 84	16.4924225
223	4 97 29	14.9331845	273	7 45 29	16.5227116
224	5 01 76	14.9666295	274	7 50 76	16.5529454
225	5 06 25	15.0000000	275	7 56 25	16.5831240
226	5 10 76	15.0332964	276	7 61 76	16.6132477
227	5 15 29	15.0665192	277	7 67 29	16.6433170
228	5 19 84	15.0996689	278	7 72 84	16.6733320
229	5 24 41	15.1327460	279	7 78 41	16.7032931
230	5 29 00	15.1657509	280	7 84 00	16.7332005
231	5 33 61	15.1986842	281	7 89 61	16.7630546
232	5 38 24	15.2315462	282	7 95 24	16.7928556
233	5 42 89	15.2643375	283	8 00 89	16.8226038
234	5 47 56	15.2970585	284	8 06 56	16.8522995
235	5 52 25	15.3297097	285	8 12 25	16.8819430
236	5 56 96	15.3622915	286	8 17 96	16.9115345
237	5 61 69	15.3948043	287	8 23 69	16.9410743
238	5 66 44	15.4272486	288	8 29 44	16.9705627
239	5 71 21	15.4596248	289	8 35 21	17.0000000
240	5 76 00	15.4919334	290	8 41 00	17.0293864
241	5 80 81	15.5241747	291	8 46 81	17.0587221
242	5 85 64	15.5563492	292	8 52 64	17.0880075
243	5 90 49	15.5884573	293	8 58 49	17.1172428
244	5 95 36	15.6204994	294	8 64 36	17.1464282
245	6 00 25	15.6524758	295	8 70 25	17.1755640
246	6 05 16	15.6843871	296	8 76 16	17.2046505
247	6 10 09	15.7162336	297	8 82 09	17.2336879
248	6 15 04	15.7480157	298	8 88 04	17.2626765
249	6 20 01	15.7797338	299	8 94 01	17.2916165
250	6 25 00	15.8113883	300	9 00 00	17.3205081

Num.	Square.	Square Root.	Num.	Square.	Square Root.
301	9 06 01	17.3493516	351	12 32 01	18.7349940
302	9 12 04	17.3781472	352	12 39 04	18.7616630
303	9 18 09	17.4068952	353	12 46 09	18.7882942
304	9 24 16	17.4355958	354	12 53 16	18.8148877
305	9 30 25	17.4642492	355	12 60 25	18.8414437
306	9 36 36	17.4928557	356	12 67 36	18.8679623
307	9 42 49	17.5214155	357	12 74 49	18.8944436
308	9 48 64	17.5499288	358	12 81 64	18.9208879
309	9 54 81	17.5783958	359	12 88 81	18.9472953
310	9 61 00	17.6068169	360	12 96 00	18.9736660
311	9 67 21	17.6351921	361	13 03 21	19.0000000
312	9 73 44	17.6635217	362	13 10 44	19.0262976
313	9 79 69	17.6918060	363	13 17 69	19.0525589
314	9 85 96	17.7200451	364	13 24 96	19.0787840
315	9 92 25	17.7482393	365	13 32 25	19.1049732
316	9 98 56	17.7763888	366	13 39 56	19.1311265
317	10 04 89	17.8044938	367	13 46 89	19.1572441
318	10 11 24	17.8325545	368	13 54 24	19.1833261
319	10 17 61	17.8605711	369	13 61 61	19.2093727
320	10 24 00	17.8885438	370	13 69 00	19.2353841
321	10 30 41	17.9164729	371	13 76 41	19.2613603
322	10 36 84	17.9443584	372	13 83 84	19.2873015
323	10 43 29	17.9722008	373	13 91 29	19.3132079
324	10 49 76	18.0000000	374	13 98 76	19.3390796
325	10 56 25	18.0277564	375	14 06 25	19.3649167
326	10 62 76	18.0554701	376	14 13 76	19.3907194
327	10 69 29	18.0831413	377	14 21 29	19.4164878
328	10 75 84	18.1107703	378	14 28 84	19.4422221
329	10 82 41	18.1383571	379	14 36 41	19.4679223
330	10 89 00	18.1659021	380	14 44 00	19.4935887
331	10 95 61	18.1934054	381	14 51 61	19.5192213
332	11 02 24	18.2208672	382	14 59 24	19.5448203
333	11 08 89	18.2482876	383	14 66 89	19.5703858
334	11 15 56	18.2756669	384	14 74 56	19.5959179
335	11 22 25	18.3030052	385	14 82 25	19.6214169
336	11 28 96	18.3303028	386	14 89 96	19.6468827
337	11 35 69	18.3575598	387	14 97 69	19.6723156
338	11 42 44	18.3847763	388	15 05 44	19.6977156
339	11 49 21	18.4119526	389	15 13 21	19.7230829
340	11 56 00	18.4390889	390	15 21 00	19.7484177
341	11 62 81	18.4661853	391	15 28 81	19.7737199
342	11 69 64	18.4932420	392	15 36 64	19.7989899
343	11 76 49	18.5202592	393	15 44 49	19.8242276
344	11 83 36	18.5472370	394	15 52 36	19.8494332
345	11 90 25	18.5741756	395	15 60 25	19.8746069
346	11 97 16	18.6010752	396	15 68 16	19.8997487
347	12 04 09	18.6279360	397	15 76 09	19.9248588
348	12 11 04	18.6547581	398	15 84 04	19.9499373
349	12 18 01	18.6815417	399	15 92 01	19.9749844
350	12 25 00	18.7082869	400	16 00 00	20.0000000

Num.	Square.	Square Root.	Num.	Square.	Square Root.
401	16 08 01	20.0249844	451	20 34 01	21.2367606
402	16 16 04	20.0499377	452	20 43 04	21.2602916
403	16 24 09	20.0748599	453	20 52 09	21.2837967
404	16 32 16	20.0997512	454	20 61 16	21.3072758
405	16 40 25	20.1246118	455	20 70 25	21.3307290
406	16 48 36	20.1494417	456	20 79 36	21.3541565
407	16 56 49	20.1742410	457	20 88 49	21.3775583
408	16 64 64	20.1990099	458	20 97 64	21.4009346
409	16 72 81	20.2237484	459	21 06 81	21.4242853
410	16 81 00	20.2484567	460	21 16 00	21.4476106
411	16 89 21	20.2731349	461	21 25 21	21.4709106
412	16 97 44	20.2977831	462	21 34 44	21.4941853
413	17 05 69	20.3224014	463	21 43 69	21.5174348
414	17 13 96	20.3469899	464	21 52 96	21.5406592
415	17 22 25	20.3715488	465	21 62 25	21.5638587
416	17 30 56	20.3960781	466	21 71 56	21.5870331
417	17 38 89	20.4205779	467	21 80 89	21.6101828
418	17 47 24	20.4450483	468	21 90 24	21.6333077
419	17 55 61	20.4694895	469	21 99 61	21.6564078
420	17 64 00	20.4939015	470	22 09 00	21.6794834
421	17 72 41	20.5182845	471	22 18 41	21.7025344
422	17 80 84	20.5426386	472	22 27 84	21.7255610
423	17 89 29	20.5669638	473	22 37 29	21.7485632
424	17 97 76	20.5912603	474	22 46 76	21.7715411
425	18 06 25	20.6155281	475	22 56 25	21.7944947
426	18 14 76	20.6397674	476	22 65 76	21.8174242
427	18 23 29	20.6639783	477	22 75 29	21.8403297
428	18 31 84	20.6881609	478	22 84 84	21.8632111
429	18 40 41	20.7123152	479	22 94 41	21.8860686
430	18 49 00	20.7364414	480	23 04 00	21.9089023
431	18 57 61	20.7605395	481	23 13 61	21.9317122
432	18 66 24	20.7846097	482	23 23 24	21.9544984
433	18 74 89	20.8086520	483	23 32 89	21.9772610
434	18 83 56	20.8326667	484	23 42 56	22.0000000
435	18 92 25	20.8566536	485	23 52 25	22.0227155
436	19 00 96	20.8806130	486	23 61 96	22.0454077
437	19 09 69	20.9045450	487	23 71 69	22.0680765
438	19 18 44	20.9284495	488	23 81 44	22.0907220
439	19 27 21	20.9523268	489	23 91 21	22.1133444
440	19 36 00	20.9761770	490	24 01 00	22.1359436
441	19 44 81	21.0000000	491	24 10 81	22.1585198
442	19 53 64	21.0237960	492	24 20 64	22.1810730
443	19 62 49	21.0475652	493	24 30 49	22.2036033
444	19 71 36	21.0713075	494	24 40 36	22.2261108
445	19 80 25	21.0950231	495	24 50 25	22.2485955
446	19 89 16	21.1187121	496	24 60 16	22.2710575
447	19 98 09	21.1423745	497	24 70 09	22.2934968
448	20 07 04	21.1660105	498	24 80 04	22.3159136
449	20 16 01	21.1896201	499	24 90 01	22.3383079
450	20 25 00	21.2132034	500	25 00 00	22.3606798

Num.	Square.	Square Root.	Num.	Square.	Square Root.
501	25 10 01	22.3830293	551	30 36 01	23.4733892
502	25 20 04	22.4053565	552	30 47 04	23.4946802
503	25 30 09	22.4276615	553	30 58 09	23.5159520
504	25 40 16	22.4499443	554	30 69 16	23.5372046
505	25 50 25	22.4722051	555	30 80 25	23.5584380
506	25 60 36	22.4944438	556	30 91 36	23.5796522
507	25 70 49	22.5166605	557	31 02 49	23.6008474
508	25 80 64	22.5388553	558	31 13 64	23.6220236
509	25 90 81	22.5610283	559	31 24 81	23.6431808
510	26 01 00	22.5831796	560	31 36 00	23.6643191
511	26 11 21	22.6053091	561	31 47 21	23.6854386
512	26 21 44	22.6274170	562	31 58 44	23.7065392
513	26 31 69	22.6495033	563	31 69 69	23.7276210
514	26 41 96	22.6715681	564	31 80 96	23.7486842
515	26 52 25	22.6936114	565	31 92 25	23.7697286
516	26 62 56	22.7156334	566	32 03 56	23.7907545
517	26 72 89	22.7376340	567	32 14 89	23.8117618
518	26 83 24	22.7596134	568	32 26 24	23.8327506
519	26 93 61	22.7815715	569	32 37 61	23.8537209
520	27 04 00	22.8035085	570	32 49 00	23.8746728
521	27 14 41	22.8254244	571	32 60 41	23.8956063
522	27 24 84	22.8473193	572	32 71 84	23.9165215
523	27 35 29	22.8691933	573	32 83 29	23.9374184
524	27 45 76	22.8910463	574	32 94 76	23.9582971
525	27 56 25	22.9128785	575	33 06 25	23.9791576
526	27 66 76	22.9346899	576	33 17 76	24.0000000
527	27 77 29	22.9564806	577	33 29 29	24.0208243
528	27 87 84	22.9782506	578	33 40 84	24.0416306
529	27 98 41	23.0000000	579	33 52 41	24.0624188
530	28 09 00	23.0217289	580	33 64 00	24.0831891
531	28 19 61	23.0434372	581	33 75 61	24.1039416
532	28 30 24	23.0651252	582	33 87 24	24.1246762
533	28 40 89	23.0867928	583	33 98 89	24.1453929
534	28 51 56	23.1084400	584	34 10 56	24.1660919
535	28 62 25	23.1300670	585	34 22 25	24.1867732
536	28 72 96	23.1516738	586	34 33 96	24.2074369
537	28 83 69	23.1732605	587	34 45 69	24.2280829
538	28 94 44	23.1948270	588	34 57 44	24.2487113
539	29 05 21	23.2163735	589	34 69 21	24.2693222
540	29 16 00	23.2379001	590	34 81 00	24.2899156
541	29 26 81	23.2594067	591	34 92 81	24.3104916
542	29 37 64	23.2808935	592	35 04 64	24.3310501
543	29 48 49	23.3023604	593	35 16 49	24.3515913
544	29 59 36	23.3238076	594	35 28 36	24.3721152
545	29 70 25	23.3452351	595	35 40 25	24.3926218
546	29 81 16	23.3666429	596	35 52 16	24.4131112
547	29 92 09	23.3880311	597	35 64 09	24.4335834
548	30 03 04	23.4093998	598	35 76 04	24.4540385
549	30 14 01	23.4307490	599	35 88 01	24.4744765
550	30 25 00	23.4520788	600	36 00 00	24.4948974

Num.	Square.	Square Root.	Num.	Square.	Square Root.
601	36 12 01	24.5153013	651	42 38 01	25.5147016
602	36 24 04	24.5356883	652	42 51 04	25.5342907
603	36 36 09	24.5560583	653	42 64 09	25.5538647
604	36 48 16	24.5764115	654	42 77 16	25.5734237
605	36 60 25	24.5967478	655	42 90 25	25.5929678
606	36 72 36	24.6170673	656	43 03 36	25.6124969
607	36 84 49	24.6373700	657	43 16 49	25.6320112
608	36 96 64	24.6576560	658	43 29 64	25.6515107
609	37 08 81	24.6779254	659	43 42 81	25.6709953
610	37 21 00	24.6981781	660	43 56 00	25.6904652
611	37 33 21	24.7184142	661	43 69 21	25.7099203
612	37 45 44	24.7386338	662	43 82 44	25.7293607
613	37 57 69	24.7588368	663	43 95 69	25.7487864
614	37 69 96	24.7790234	664	44 08 96	25.7681975
615	37 82 25	24.7991935	665	44 22 25	25.7875939
616	37 94 56	24.8193473	666	44 35 56	25.8069758
617	38 06 89	24.8394847	667	44 48 89	25.8263431
618	38 19 24	24.8596058	668	44 62 24	25.8456960
619	38 31 61	24.8797106	669	44 75 61	25.8650343
620	38 44 00	24.8997992	670	44 89 00	25.8843582
621	38 56 41	24.9198716	671	45 02 41	25.9036677
622	38 68 84	24.9399278	672	45 15 84	25.9229628
623	38 81 29	24.9599679	673	45 29 29	25.9422435
624	38 93 76	24.9799920	674	45 42 76	25.9615100
625	39 06 25	25.0000000	675	45 56 25	25.9807621
626	39 18 76	25.0199920	676	45 69 76	26.0000000
627	39 31 29	25.0399681	677	45 83 29	26.0192237
628	39 43 84	25.0599282	678	45 96 84	26.0384331
629	39 56 41	25.0798724	679	46 10 41	26.0576284
630	39 69 00	25.0998008	680	46 24 00	26.0768096
631	39 81 61	25.1197134	681	46 37 61	26.0959767
632	39 94 24	25.1396102	682	46 51 24	26.1151297
633	40 06 89	25.1594913	683	46 64 89	26.1342687
634	40 19 56	25.1793566	684	46 78 56	26.1533937
635	40 32 25	25.1992063	685	46 92 25	26.1725047
636	40 44 96	25.2190404	686	47 05 96	26.1916017
637	40 57 69	25.2388589	687	47 19 69	26.2106848
638	40 70 44	25.2586619	688	47 33 44	26.2297541
639	40 83 21	25.2784493	689	47 47 21	26.2488095
640	40 96 00	25.2982213	690	47 61 00	26.2678511
641	41 08 81	25.3179778	691	47 74 81	26.2868789
642	41 21 64	25.3377189	692	47 88 64	26.3058929
643	41 34 49	25.3574447	693	48 02 49	26.3248932
644	41 47 36	25.3771551	694	48 16 36	26.3438797
645	41 60 25	25.3968502	695	48 30 25	26.3628527
646	41 73 16	25.4165301	696	48 44 16	26.3818119
647	41 86 09	25.4361947	697	48 58 09	26.4007576
648	41 99 04	25.4558441	698	48 72 04	26.4196896
649	42 12 01	25.4754784	699	48 86 01	26.4386081
650	42 25 00	25.4950976	700	49 00 00	26.4575131

Num.	Square.	Square Root.	Num.	Square.	Square Root.
701	49 14 01	26.4764046	751	56 40 01	27.4043792
702	49 28 04	26.4952826	752	56 55 04	27.4226184
703	49 42 09	26.5141472	753	56 70 09	27.4408455
704	49 56 16	26.5329983	754	56 85 16	27.4590604
705	49 70 25	26.5518361	755	57 00 25	27.4772633
706	49 84 36	26.5706605	756	57 15 36	27.4954542
707	49 98 49	26.5894716	757	57 30 49	27.5136330
708	50 12 64	26.6082694	758	57 45 64	27.5317998
709	50 26 81	26.6270539	759	57 60 81	27.5499546
710	50 41 00	26.6458252	760	57 76 00	27.5680975
711	50 55 21	26.6645833	761	57 91 21	27.5862284
712	50 69 44	26.6833281	762	58 06 44	27.6043475
713	50 83 69	26.7020598	763	58 21 69	27.6224546
714	50 97 96	26.7207784	764	58 36 96	27.6405499
715	51 12 25	26.7394839	765	58 52 25	27.6586334
716	51 26 56	26.7581763	766	58 67 56	27.6767050
717	51 40 89	26.7768557	767	58 82 89	27.6947648
718	51 55 24	26.7955220	768	58 98 24	27.7128129
719	51 69 61	26.8141754	769	59 13 61	27.7308492
720	51 84 00	26.8328157	770	59 29 00	27.7488739
721	51 98 41	26.8514432	771	59 44 41	27.7668868
722	52 12 84	26.8700577	772	59 59 84	27.7848880
723	52 27 29	26.8886593	773	59 75 29	27.8028775
724	52 41 76	26.9072481	774	59 90 76	27.8208555
725	52 56 25	26.9258240	775	60 06 25	27.8388218
726	52 70 76	26.9443872	776	60 21 76	27.8567766
727	52 85 29	26.9629375	777	60 37 29	27.8747197
728	52 99 84	26.9814751	778	60 52 84	27.8926514
729	53 14 41	27.0000000	779	60 68 41	27.9105715
730	53 29 00	27.0185122	780	60 84 00	27.9284801
731	53 43 61	27.0370117	781	60 99 61	27.9463772
732	53 58 24	27.0554985	782	61 15 24	27.9642629
733	53 72 89	27.0739727	783	61 30 89	27.9821372
734	53 87 56	27.0924344	784	61 46 56	28.0000000
735	54 02 25	27.1108834	785	61 62 25	28.0178515
736	54 16 96	27.1293199	786	61 77 96	28.0356915
737	54 31 69	27.1477439	787	61 93 69	28.0535203
738	54 46 44	27.1661554	788	62 09 44	28.0713377
739	54 61 21	27.1845544	789	62 25 21	28.0891438
740	54 76 00	27.2029410	790	62 41 00	28.1069386
741	54 90 81	27.2213152	791	62 56 81	28.1247222
742	55 05 64	27.2396769	792	62 72 64	28.1424946
743	55 20 49	27.2580263	793	62 88 49	28.1602557
744	55 35 36	27.2763634	794	63 04 36	28.1780056
745	55 50 25	27.2946881	795	63 20 25	28.1957444
746	55 65 16	27.3130006	796	63 36 16	28.2134720
747	55 80 09	27.3313007	797	63 52 09	28.2311884
748	55 95 04	27.3495887	798	63 68 04	28.2488938
749	56 10 01	27.3678644	799	63 84 01	28.2665881
750	56 25 00	27.3861279	800	64 00 00	28.2842712

Num.	Square.	Square Root.	Num.	Square.	Square Root.
801	64 16 01	28.3019434	851	72 42 01	29.1719043
802	64 32 04	28.3196045	852	72 59 04	29.1890390
803	64 48 09	28.3372546	853	72 76 09	29.2061637
804	64 64 16	28.3548938	854	72 93 16	29.2232784
805	64 80 25	28.3725219	855	73 10 25	29.2403830
806	64 96 36	28.3901391	856	73 27 36	29.2574777
807	65 12 49	28.4077454	857	73 44 49	29.2745623
808	65 28 64	28.4253408	858	73 61 64	29.2916370
809	65 44 81	28.4429253	859	73 78 81	29.3087018
810	65 61 00	28.4604989	860	73 96 00	29.3257566
811	65 77 21	28.4780617	861	74 13 21	29.3428015
812	65 93 44	28.4956137	862	74 30 44	29.3598365
813	66 09 69	28.5131549	863	74 47 69	29.3768616
814	66 25 96	28.5306852	864	74 64 96	29.3938769
815	66 42 25	28.5482048	865	74 82 25	29.4108823
816	66 58 56	28.5657137	866	74 99 56	29.4278779
817	66 74 89	28.5832119	867	75 16 89	29.4448637
818	66 91 24	28.6006993	868	75 34 24	29.4618397
819	67 07 61	28.6181760	869	75 51 61	29.4788059
820	67 24 00	28.6356421	870	75 69 00	29.4957624
821	67 40 41	28.6530976	871	75 86 41	29.5127091
822	67 56 84	28.6705424	872	76 03 84	29.5296461
823	67 73 29	28.6879766	873	76 21 29	29.5465734
824	67 89 76	28.7054002	874	76 38 76	29.5634910
825	68 06 25	28.7228132	875	76 56 25	29.5803989
826	68 22 76	28.7402157	876	76 73 76	29.5972972
827	68 39 29	28.7576077	877	76 91 29	29.6141858
828	68 55 84	28.7749891	878	77 08 84	29.6310648
829	68 72 41	28.7923601	879	77 26 41	29.6479342
830	68 89 00	28.8097206	880	77 44 00	29.6647939
831	69 05 61	28.8270706	881	77 61 61	29.6816442
832	69 22 24	28.8444102	882	77 79 24	29.6984848
833	69 38 89	28.8617394	883	77 96 89	29.7153159
834	69 55 56	28.8790582	884	78 14 56	29.7321375
835	69 72 25	28.8963666	885	78 32 25	29.7489496
836	69 88 96	28.9136646	886	78 49 96	29.7657521
837	70 05 69	28.9309523	887	78 67 69	29.7825452
838	70 22 44	28.9482297	888	78 85 44	29.7993289
839	70 39 21	28.9654967	889	79 03 21	29.8161030
840	70 56 00	28.9827535	890	79 21 00	29.8328678
841	70 72 81	29.0000000	891	79 38 81	29.8496231
842	70 89 64	29.0172363	892	79 56 64	29.8663690
843	71 06 49	29.0344623	893	79 74 49	29.8831056
844	71 23 36	29.0516781	894	79 92 36	29.8998328
845	71 40 25	29.0688837	895	80 10 25	29.9165506
846	71 57 16	29.0860791	896	80 28 16	29.9332591
847	71 74 09	29.1032644	897	80 46 09	29.9499583
848	71 91 04	29.1204396	898	80 64 04	29.9666481
849	72 08 01	29.1376046	899	80 82 01	29.9833287
850	72 25 00	29.1547595	900	81 00 00	30.0000000

Num.	Square.	Square Root.	Num.	Square.	Square Root.
901	81 18 01	30.0166620	951	90 44 01	30.8382879
902	81 36 04	30.0333148	952	90 63 04	30.8544972
903	81 54 09	30.0499584	953	90 82 09	30.8706981
904	81 72 16	30.0665928	954	91 01 16	30.8868904
905	81 90 25	30.0832179	955	91 20 25	30.9030743
906	82 08 36	30.0998339	956	91 39 36	30.9192497
907	82 26 49	30.1164407	957	91 58 49	30.9354166
908	82 44 64	30.1330383	958	91 77 64	30.9515751
909	82 62 81	30.1496269	959	91 96 81	30.9677251
910	82 81 00	30.1662063	960	92 16 00	30.9838668
911	82 99 21	30.1827765	961	92 35 21	31.0000000
912	83 17 44	30.1993377	962	92 54 44	31.0161248
913	83 35 69	30.2158899	963	92 73 69	31.0322413
914	83 53 96	30.2324329	964	92 92 96	31.0483494
915	83 72 25	30.2489669	965	93 12 25	31.0644491
916	83 90 56	30.2654919	966	93 31 56	31.0805405
917	84 08 89	30.2820079	967	93 50 89	31.0966236
918	84 27 24	30.2985148	968	93 70 24	31.1126984
919	84 45 61	30.3150128	969	93 89 61	31.1287648
920	84 64 00	30.3315018	970	94 09 00	31.1448230
921	84 82 41	30.3479818	971	94 28 41	31.1608729
922	85 00 84	30.3644529	972	94 47 84	31.1769145
923	85 19 29	30.3809151	973	94 67 29	31.1929479
924	85 37 76	30.3973683	974	94 86 76	31.2089731
925	85 56 25	30.4138127	975	95 06 25	31.2249900
926	85 74 76	30.4302481	976	95 25 76	31.2409987
427	85 93 29	30.4466747	977	95 45 29	31.2569992
928	86 11 84	30.4630924	978	95 64 84	31.2729915
929	86 30 41	30.4795013	979	95 84 41	31.2889757
930	86 49 00	30.4959014	980	96 04 00	31.3049517
931	86 67 61	30.5122926	981	96 23 61	31.3209195
932	86 86 24	30.5286750	982	96 43 24	31.3368792
933	87 04 89	30.5450487	983	96 62 89	31.3528308
934	87 23 56	30.5614136	984	96 82 56	31.3687743
935	87 42 25	30.5777697	985	97 02 25	31.3847097
936	87 60 96	30.5941171	986	97 21 96	31.4006369
937	87 79 69	30.6104557	987	97 41 69	31.4165561
938	87 98 44	30.6267857	988	97 61 44	31.4324673
939	88 17 21	30.6431069	989	97 81 21	31.4483704
940	88 36 00	30.6594194	990	98 01 00	31.4642654
941	88 54 81	30.6757233	991	98 20 81	31.4801525
942	88 73 64	30.6920185	992	98 40 64	31.4960315
943	88 92 49	30.7083051	993	98 60 49	31.5119025
944	89 11 36	30.7245830	994	98 80 36	31.5277655
945	89 30 25	30.7408523	995	99 00 25	31.5436206
946	89 49 16	30.7571130	996	99 20 16	31.5594677
947	89 68 09	30.7733651	997	99 40 09	31.5753068
948	89 87 04	30.7896086	998	99 60 04	31.5911380
949	90 06 01	30.8058436	999	99 80 01	31.6069613
950	90 25 00	30.8220700	1000	1 00 00 00	31.6227766