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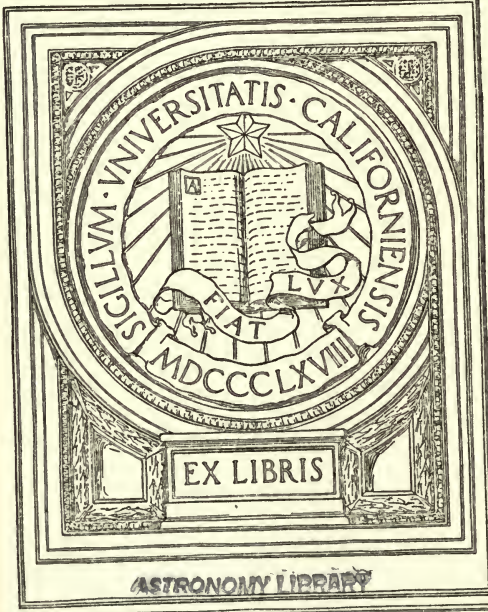

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TABLES OF LOGARITHMS

TO

FIVE PLACES OF DECIMALS,

WITH AUXILIARY TABLES.

EDITED BY

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E. S. CRAWLEY,
UNIVERSITY OF PENNSYLVANIA,
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EDITOR'S NOTE.

THIS collection of logarithmic tables has been prepared to accompany the editor's *Elements of Trigonometry*, in response to the demand of a number of teachers using the latter, who prefer a text bound with tables. In commending the tables to the use of educational institutions and the mathematical public in general, the editor wishes to state that great care has been taken to secure accuracy. The proof has been compared twice, number by number, with different standard tables (Vega's seven-place Tables, the 74th edition, edited by W. L. F. Fischer; and Gauss's five-place Tables, the 20th edition), and the method of differences was applied as a further check. Besides these, other tests were applied to parts of the tables, as in the case of Table III., where the log tan column was checked by taking the difference of log sin and log cos, and the log cot column was checked by taking the arithmetical complement of log tan.

Should any errors be discovered, the editor will be glad to be informed of them.

EDWIN S. CRAWLEY.

UNIVERSITY OF PENNSYLVANIA,
January, 1899.

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EXPLANATION OF THE TABLES.

1. Definitions and Rules. If three numbers n, a, x have such values that the equation

$$n = a^x \qquad (1)$$

is true, then x is called the *logarithm* of n to the *base* a. If, without changing a, we give to n and x all possible values, consistent with this equation, the values of x thus obtained form a *system of logarithms* to the base a.

Hence:—*The logarithm of a number to a given base is the exponent of the power to which the base must be raised to produce the number.*

Suppose 9 is taken for the base, then

log	81	=	2,	because	9^2	=	81
"	729	=	3,	"	9^3	=	729
"	$\frac{1}{9}$	=	−1,	"	9^{-1}	=	$\frac{1}{9}$
"	3	=	$\frac{1}{2}$,	"	$9^{\frac{1}{2}}$	=	3
"	9	=	1,	"	9^1	=	9
"	1	=	0,	"	9^0	=	1

In every system the logarithm of the base is 1, and the logarithm of 1 is 0. This follows directly from the definition, or from (1); for if $n = a$, x must be 1; and if $n = 1$, x must be 0, without respect to the value of a.

It is plain, since any number will serve as the base of a system of logarithms, that the number of such systems is indefinite.

The systems of logarithms commonly used are:

(1.) The common or Briggian* system, with the base 10.

(2.) The natural or Napierian† system with the base

$$e = 2.7182818285\ldots.$$

defined by the convergent infinite series

$$e = 1 + 1 + \frac{1}{1\cdot 2} + \frac{1}{1\cdot 2\cdot 3} + \frac{1}{1\cdot 2\cdot 3\cdot 4} + \ldots$$

Of these two systems, the first is used for all purposes of numerical computation, and the second for purely analytical purposes.

The logarithms of these tables (except in Table VII.) are common or Briggian logarithms.

The corresponding logarithms of any two systems are in a constant ratio to each other. Thus the relation between common and Napierian logarithms is

$$\log_{10} n = \frac{1}{\log_e 10} \log_e n.$$

(This equation is read: "Logarithm of n to the base 10 equals the reciprocal of the logarithm of 10 to the base e, multiplied by the logarithm of n to the base e.") The factor $\frac{1}{\log_e 10}$ is called the *modulus* of the common system. It is represented by M, and its value to ten places is 0.4342944819.

The rules governing the use of logarithms in computation are the following:—

I. *To multiply numbers, find the logarithm of each factor, and add them; the sum is the logarithm of the product.*

II. *To divide one number by another, subtract the logarithm of the divisor from the logarithm of the dividend; the difference is the logarithm of the quotient.*

III. *To raise a number to any power multiply the logarithm of the number by the exponent of the power; the product is the logarithm of the required power of the number.*

---

* Named for Henry Briggs (1556–1631), who first suggested the use of the base 10.

† Named for John Napier, Baron of Merchiston, in Scotland (1550–1617), the inventor of logarithms.

IV. *To extract any root of a number, divide the logarithm of the number by the index of the root; the quotient is the logarithm of the required root of the number.*

These statements and rules are given without proof, as the purpose here is simply to familiarize the student with the mechanism and use of the tables. The theory of logarithms is set forth in text-books on algebra, to which the student is referred. In the same place will be found an explanation of how logarithms are computed.

TABLE I. *Common Logarithms of Numbers.* (*Pages 1–19.*)

2. Characteristic and Mantissa. A logarithm consists, usually, of two parts: a whole number, called the *characteristic*, and an incommensurable decimal fraction, called the *mantissa*. The table gives only the mantissa; the characteristic, which may be positive, negative, or zero, must be supplied in every case by the computer. The mantissa is always positive, except in the logarithms of exact powers of 10, when it is zero.

Since 10 is the base we have:

$$\left.\begin{array}{llll}
\log 1000 = & 3, & \text{because } 10^{3} & = 1000 \\
\log 100 = & 2, & \text{“ } 10^{2} & = 100 \\
\log 10 = & 1, & \text{“ } 10^{1} & = 10 \\
\log 1 = & 0, & \text{“ } 10^{0} & = 1 \\
\log .1 = & -1, & \text{“ } 10^{-1} & = .1 \\
\log .01 = & -2, & \text{“ } 10^{-2} & = .01 \\
\log .001 = & -3, & \text{“ } 10^{-3} & = .001
\end{array}\right\} \qquad (a)$$

This series of equations can be extended indefinitely in both directions.

Let us now consider two numbers which contain the same sequence of figures, with different positions of the decimal point, say 72.936 and .72936. Now $72.936 = 100 \times .72936$. Hence, by Rule I, § 1 $\log 72.936 = \log 100 + \log .72936$, or, by (*a*) $= 2 + \log .72936$.

Hence, since any change in the position of the decimal

point in a number is equivalent to multiplication or division by a power of 10, the effect produced upon the logarithm of the number by a change of this kind is to increase it or diminish it by a whole number; that is, the characteristic is affected by such a change, but not the mantissa. We have, therefore, the following important fact:

I. *The mantissa of the logarithm of a number depends only upon the sequence of figures in the number.*

Referring again to (*a*), we note that for all numbers greater than 1 and less than 10 (all numbers with one significant figure before the decimal point) the logarithm is greater than 0 and less than 1, that is, its characteristic is 0; for all numbers greater than 10 and less than 100 (all numbers with two significant figures before the decimal point) the logarithm is greater than 1 and less than 2, that is, its characteristic is 1; for all numbers greater than 100 and less than 1000 (all numbers with three significant figures before the decimal point) the logarithm is greater than 2 and less than 3, that is, its characteristic is 2; and so on. Hence, we have the following rule:

II. *The characteristic of the logarithm of a number greater than unity is one less than the number of significant figures preceding the decimal point.*

Again, from (*a*) it will be seen that if a number is greater than .1 and less than 1, its logarithm is between 0 and —1; that is, using a positive mantissa, which we always do, it is —1 + the mantissa, hence the characteristic is —1; if the number is greater than .01 and less than .1, the logarithm is between —1 and —2, which is written —2 + the mantissa, that is, the characteristic is —2; if the number is greater than .001 and less than .01, the logarithm is between —2 and —3, which is written —3 + the mantissa, that is, the characteristic is —3, and so on. Hence, we have the following rule:

III. *The characteristic of the logarithm of a number less than unity is negative, and is numerically one greater than the number of ciphers between the decimal point and the first significant figure.*

Verify the following statements:

characteristic of	log	763.92 =	2
" "	log	1.9841 =	0
" "	log	.07296 =	−2
" "	log	26 =	1
" "	log	400000 =	5
" "	log	.9426 =	−1
" "	log	3869 =	3
" "	log	.00042 =	−4
" "	log	.005 =	−3
" "	log	62893 =	4

3. To Find the Logarithm of a Number of Four Figures or Less.

If the number has less than four figures add ciphers on the right until it has four figures, and then proceed in the manner described below.

If the number has four figures, enter the table in the left hand column of the page, the column marked *N*, with the first three figures (the first three significant figures if the number is a decimal fraction) and with the fourth figure in the line running across the page at the extreme top or bottom. Go across the page, in the line containing the first three figures, until the column marked by the fourth figure is reached. The three figures found at this point are the *last three figures of the mantissa.* The first two figures of the mantissa are printed only in the first column of the body of the table, and if they are not found in the same line with the last three figures they will be found a few lines above.

Suppose the number is 48.65. We find 486 in the *N* column on page 9; and the column marked 5 at the top and bottom is the one to the right of the heavy line down the middle of the page. The three figures in this column and on the same line with 486 are 708, which are the last three figures of the mantissa; the first two figures are 68. Hence, mantissa of log 48.65 is .68708. By II. § 2 characteristic of log 48.65 is 1. Hence, log 48.65 = 1.68708.

Find log 6.2. Annexing two ciphers, this becomes 6.200.

Proceeding then as above, we find that the mantissa is 79239. Hence, log 6.2 = 0.79239.

Find log 431. Annexing one cipher this becomes 431.0. Hence, the mantissa is 63448; and log 431. = 2.63448.

An important exception in one point of the usual procedure is exemplified below. Find log .07416. Entering the table on page 14, line 741, we find in the column marked 6, the figures *017. The asterisk is inserted to indicate that the first two figures of the mantissa are to be taken from the line below, instead of from above. Hence, the mantissa of log .07416 is .87017; and by III. § 2 log .07416 = $\bar{2}$.87017. The negative sign is written over the characteristic, instead of before it, as it applies to the characteristic only, the mantissa being positive.

The reason for placing this asterisk in the table is easily seen. The last logarithm that begins with 86 is 86999. The next one in order is 87005, but as this comes in the middle of the page there is not room to print 87 in the same column with 005, so the asterisk is inserted to call the computer's attention to this fact and bid him take the first two figures from below.

Verify the following statements:

log 863.2 = 2.93611	log 3 = 0.47712
log 1.29 = 0.11059	log 2758 = 3.44059
log 18000 = 4.25527	log 64.58 = $\bar{1}$.81010
log .92 = $\bar{1}$.96379	log .00006 = $\bar{5}$.77815
log .04312 = $\bar{2}$.63468	log .00183 = $\bar{3}$.26245

It is proper at this point to explain that in practical computation negative characteristics are very rarely used. Their use is avoided by adding 10 to the characteristic and writing —10 after the logarithm. In this way the true value of the logarithm is not changed. With this modification the four logarithms above with negative characteristics become

log .92 = 9.96379 — 10	log .00006 = 5.77815 — 10
log .04312 = 8.63468 — 10	log .00183 = 7.26245 — 10

This method will be used exclusively in the examples which follow. After a little practice the —10's written after the logarithm may be omitted without danger of error in the final

result. Rule III. § 2 can be changed, therefore, to the following:

The characteristic of the logarithm of a number less than unity is formed by subtracting from 9 *the number of ciphers between the decimal point and the first significant figure, and writing* —10 *after the logarithm.*

Verify the following statements:

log .3628 = 9.55967 — 10	log .0026 = 7.41497 — 10
log .0796 = 8.90091 — 10	log .007 = 7.84510 — 10

4. To Find the Number to Four Figures which Corresponds to a Given Logarithm.

The method is best explained by an example. Given log x = 1.79683, to find x. Disregarding the characteristic for the moment, we enter the table with the first two figures of the mantissa, 79, looking for them in the column headed with 0. We find them on page 12. We then look in that part of the body of the table which contains the logarithms beginning with 79, for the number nearest to 683; we find 685.

The logarithm in the table nearest to our given logarithm is now located. The first three figures of the corresponding number are taken from the column N, on the same line with 685. They are 626. The fourth figure of the number is that which stands at the top of the column containing 685. It is 4. Hence, the number is 6264. To insert the decimal point we note that the characteristic of the given logarithm is 1; hence, we must have two figures before the decimal point. We have, therefore, $x = 62.64$.

Given log $x = 7.14168 - 10$ find x. The nearest logarithm in the table is .14176, on page 2 (notice the asterisk). The corresponding number is 1386. The real value of the characteristic is $7 - 10 = -3$. Hence by III. § 2 there must be two ciphers between the decimal point and the first significant figure. We can also obtain the number of ciphers by subtracting the augmented characteristic 7, from 9, according to the rule above. The result is, therefore, $x = .001386$.

Verify the following statements:

$\log x = 1.73682$,	$x = 54.55$	$\log x = 9.74464 - 10$, $x = .5554$
$\log x = 5.41621$,	$x = 260700$	$\log x = 4.48493$, $x = 30540$
$\log x = 8.91929 - 10$,	$x = .08304$	$\log x = 3.14139$, $x = 1385$
$\log x = 2.43625$,	$x = 273.1$	$\log x = 7.79012 - 10$, $x = .006168$
$\log x = .64443$,	$x = 4.41$	$\log x = 6.56822 - 10$, $x = .00037$

5. Exercises and Examples.

1. Compute the value of $(1.789)^5$.

By III. § 1, we have $\log (1.789)^5 = 5 \times \log 1.789$.

$$\log 1.789 = .25261$$

$$\log (1.789)^5 = 1.26305 \quad \therefore \quad (1.789)^5 = 18.33$$

2. Compute the value of $728 \times 63.86 \times .4792$

$$\log 728 = 2.86213$$
$$\log 63.86 = 1.80523$$
$$\log .4792 = 9.68052 - 10$$
$$14.34788 - 10$$

$\therefore$ by I. § 1, $\log (728 \times 63.86 \times .4792) =$ or 4.34788.

Hence $728 \times 63.86 \times .4792 = 22280$.

3. Compute the value of $\sqrt[3]{73}$.

$$\log 73 = 1.86332.$$

By IV. § 1, $\log \sqrt[3]{73} = \frac{1}{3} \log 73 = .62111$,

$\therefore$ $\sqrt[3]{73} = 4.179$

In dividing log 73 by 3, the division is not exact. Such cases arise with great frequency in logarithmic work; and the student must carefully observe the two following rules:

(1.) *Never carry the work beyond the number of decimal places given in the table, that is with this table, five places.*

(2.) *When the division is not exact, always take in the last place the figure that is nearest to the true result.*

Thus, in the case just above, where we divide 1.86332 by 3, the last step of the division is 2 divided by 3. Now 3 goes into 2 more nearly once than no times; hence, we take 1 for the last figure. Sometimes, when the divisor is an even number, the result falls just half way between two integers in the last place. We then take at pleasure either the larger or smaller of these two figures for the last figure. The following example illustrates this:

4. Find $\sqrt{4711}$. $\log 4711 = 3.67311$,

$\therefore$ $\log \sqrt{4711} = \frac{1}{2} \log 4711 = 1.83655$ or 1.83656.

Both of these logarithms give 68.64 as the result to four figures.

5. Find $\sqrt[7]{.06398}$.

$$\log .06398 = 8.80604 - 10.$$

We cannot divide this logarithm by 7 without getting an awkward result. But if we add and subtract 60, we have

$$\log .06398 = 68.80604 - 70,$$

where the number subtracted from the logarithm is now ten times the number by which we must divide; and hence, after the division, it will be reduced to 10. This is the best practice for such cases. Performing the division, we have

$$\log \sqrt[7]{.06398} = 9.82943 - 10, \qquad \therefore \sqrt[7]{.06398} = .6752.$$

6. $x = \dfrac{\sqrt{27}}{(9.261)^{\frac{3}{7}}}$, find x.

$\log \sqrt{27} = \frac{1}{2} \log 27 = \frac{1}{2} \times 1.43136 = .71568$
$\log (9.261)^{\frac{3}{7}} = \frac{3}{7} \log 9.261 = \frac{3}{7} \times 0.96666 = .41428$
By II. $\S$ 1 $\log x = .30140$
$\therefore$ $x = 2.002.$

7. $x = \dfrac{68.96 \times \sqrt[3]{.4228}}{39 \times (8.642)^{\frac{5}{3}} \times (.96)^2}$, find x.

$\log 68.96 = 1.83860$
$\log \sqrt[3]{.4228} = \frac{1}{3} \log (.4228) = \frac{1}{3} \times 29.62613 - 30 = 9.87538 - 10$
$\log$ of numerator $= 11.71398 - 10$
$\log 39 = 1.59106$
$\log (8.642)^{\frac{5}{3}} = \frac{5}{3} \log 8.642 = \frac{5}{3} \times 0.93661 = 1.56102$
$\log (.96)^2 = 2 \log (.96) = 2 \times 9.98227 - 10 = 19.96454 - 20$
$\log$ of denominator $= \begin{cases} 23.11662 - 20 \\ \text{or} \quad 3.11662 \end{cases}$

$\log x = \log$ of numerator $- \log$ of denominator $= 8.59736 - 10.$

Hence $x = .03957.$

In order to explain clearly each step in working this example, the amount of written work set down is much greater than is allowable in ordinary practice. The work for the same example is arranged below in more concise form, and at the same time the -10's are omitted from the logarithms with negative characteristics.

$\log 39$	$= 1.59106$	$\log 68.96$	$= 1.83860$
$\log (8.642)^{\frac{5}{3}}$	$= 1.56102$	$\log \sqrt[3]{.4228}$	$= 9.87538$
$\log (.96)^2$	$= 9.96454$	log of num.	$= 1.71398$
log of denom.	$= 3.11662$		3.11662
$x =$	$.03957$	$\log x$	$= 8.59736$

EXAMPLES.

Find the values of the following numerical expressions, and give the results to four significant figures:

1. $839.6 \times \sqrt{6129}$. *Ans.* 65730

2. $19.63 \times \sqrt[3]{689.2}$. *Ans.* 173.4

3. $2 \times \frac{3.641}{(2.962)^{\frac{3}{2}}}$. *Ans.* 3.796

4. $\frac{\sqrt{.04968}}{\sqrt[3]{12} \times \sqrt[4]{17}}$. *Ans.* .04795

5. $\frac{21.38 \times 6.296 \times .412}{7 \times \sqrt[3]{41290}}$. *Ans.* .2292

6. $\frac{4.19 \times 6.2 \times \sqrt[3]{.067}}{(3.339)^3 \times 142.9}$. *Ans.* .001983

7. $\frac{298.7 \times 563 \times \sqrt{11}}{(2.96)^4}$. *Ans.* 7266

8. $\frac{(9.8)^3 \times \sqrt[5]{.4621} \times 18}{\sqrt{41.63} \times (2.649)^5}$. *Ans.* 197.0

6. The Arithmetical Complement of the Logarithm or Co-logarithm. To compute the value of $\frac{a}{b}$ by logarithms, we may take either $\log a - \log b$, or $\log a + \log \frac{1}{b}$. $\operatorname{Log} \frac{1}{b} = \log 1 - \log b = 0 - \log b$ is called the *co-logarithm* of b. We have, therefore, the following rule:

To form the co-logarithm of a given number subtract the logarithm of the number from 0.

It is customary in practice to subtract the logarithm from 10 instead of from 0, and then to write —10 after the result; that is, the logarithm is subtracted from 0, written in the form 10.00000 —10. If the logarithm is one which has been itself augmented by 10, the two —10's, that in the subtrahend and that in the minuend, cancel each other.

Ex. Find colog 729.6. Log $729.6 = 2.86308$. Subtracting this from $10.00000 - 10$, the result is colog $729.6 = 7.13692 - 10$.

Ex. Find colog .0641. Log $.0641 = 8.80686 - 10$. Subtracting this from $10.00000 - 10$, the result is colog $.0641 = 1.19314$.

Verify the following statements:

colog $9986 = 6.00061$,
colog $7.298 = 9.13680$,
colog $.4682 = .32957$,
colog $3.9 = 9.40894$,
colog $380.6 = 7.41953$,
colog $.005 = 2.30103$.

With a little practice the student can write down the colog directly from the table, as readily as the log itself. The practical rule is to subtract each figure of the logarithm, beginning at the left, from 9, except the last or right-hand figure, which must be subtracted from 10. When the characteristic of the logarithm is 0, care must be taken not to forget to subtract this from 9, just as any other characteristic would be subtracted.

The practical advantage of using cologs consists in the fact that thereby the number of separate operations required to obtain the log of the result is reduced. For example, suppose we wish to calculate $\log \frac{a \times b \times c}{d \times e \times f}$. Without using co = logs three operations are required:

(1.) to find $\log a + \log b + \log c$,
(2.) " $\log d + \log e + \log f$,
(3.) to subtract (2) from (1).

If, on the other hand, cologs are used, these three operations are reduced to one, viz.: to find $\log a + \log b + \log c + \operatorname{colog} d + \operatorname{colog} e + \operatorname{colog} f$.

Ex. By using cologs the work of *Ex.* 7, p. xv., may be arranged in the following concise form:

$\log 68.96$	$= 1.83860$
$\log \sqrt[3]{.4228}$	$= 9.87538$
$\operatorname{colog} 39$	$= 8.40894$
$\operatorname{colog} (8.642)^{\frac{1}{2}}$	$= 8.43898$
$\operatorname{colog} (.96)^2$	$= \underline{0.03546}$
$\log x$	$= 8.59736$

7. To Find the Logarithm of a Number which Consists of Five Figures.

This is accomplished by the aid of the operation known as *interpolation.* Let the given number be 31.687. The table gives $\log 31.68 = 1.50079$ and $\log 31.69 = 1.50092$. To find log 31,687 a small correction must either be added to log 31.68 or subtracted from log 31.69.

The whole difference between two consecutive logarithms in

the table is called the *tabular difference.* In this case the tabular difference is 13. That is, the logarithm increases by 13 for a change of unity in the fourth place in the number. Hence, for 7 in the fifth place the proportional change in the logarithm will be seven-tenths of 13, or 9.1, the nearest integer to which is 9; hence, 9 is the correction to be added to log 31.68 to obtain 31.687. Therefore,

$$\log 31.687 = 1.50079 + .00009 = 1.50088$$

This method of determining the correction for the fifth figure is not theoretically correct, for it assumes that logarithms vary proportionally with the corresponding numbers; but while this is not true, it is applied here for such a small interval that no appreciable error arises from its use.

The work of computing corrections for the fifth figure is performed in the little auxiliary tables in the column headed Prop. Pts. (Proportional Parts). On the same page with log 31.68 we find one of these tables headed by the tabular difference 13. In this table we look in the column to the left of the vertical line for the fifth figure, 7, of the given number. The corresponding number to the right of the vertical line, which is 9.1, is the required correction, the nearest integer to which must be added to the logarithm corresponding to the first four figures of the given number.

The student should accustom himself to apply the correction for the fifth figure mentally, and to write nothing on the paper except the corrected logarithm.

Verify the following statements:

$\log 414.23 = 2.61724,$	$\log 69.426 = 1.84152,$
$\log 3.8642 = 0.58706,$	$\log 1418.1 = 3.15171,$
$\log .43007 = 9.63354,$	$\log 85672. = 4.93284.$

8. To Find the Number to Five Figures Corresponding to any Logarithm.

Let $\log x = 2.38647$. Look in the table for the nearest mantissa that is *less* than 38647, not for that which is absolutely

nearest, as when only four figures are required. This is found to be 38632, which corresponds to the natural number 2434. These are the first four figures of x. Next find the tabular difference, which is 18. Then subtract the mantissa taken from the table (38632) from the mantissa of the given logarithm (38647); the difference is 15. Hence, we have the problem: If a difference of 18 in the mantissæ makes a change of a unit in the fourth figure of the number, what change will be made by a difference of 15 in the mantissæ? Evidently we have the proportion

$$18 : 1 = 15 : \text{difference required}$$

or $$\text{difference} = \tfrac{15}{18} = \tfrac{5}{6} = .8\,;$$

that is, the correction is .8 of a unit in the fourth place, or 8 units in the fifth place. Hence, the figures in the number x are 24348, and inserting the point after the 3, because the characteristic is 2, we have $x = 243.48$.

The work of determining the fifth figure is performed in the marginal tables of Prop. Pts. Find the one corresponding to the tabular difference 18, and look on the right of the vertical column for the number nearest to 15, the difference between the given log and the next smaller one in the table. We find 14.4 and the corresponding number on the left of the vertical line, which is 8, is the required fifth figure.

Verify the following statements:

$\log x = 3.28642$,	$x = 1933.8$	$\log x = 7.63419 - 10$,	$x = .0043072$
$\log x = 1.46010$,	$x = 28.847$	$\log x = 2.31419$,	$x = 206.15$
$\log x = 9.38642 - 10$,	$x = .24346$	$\log x = .76787$,	$x = 5.8596$

9. Exercises and Examples.

$$x = \frac{(36.842)^{\frac{1}{3}} \times (1.6272)^2 \times 87}{\sqrt{.062416} \times 72.983 \times \sqrt[3]{189}}, \text{ find } x.$$

$\log (36.842)^{\frac{1}{3}} = 1.56634 \times \frac{1}{3} = .52211$
$\log (1.6272)^2 = .21144 \times 2 = .42288$
$\log 87 = 1.93952$
$\operatorname{colog} \sqrt{.062416} = 1.20471 \div 2 = .60235$
$\operatorname{colog} 72.983 = 8.13678$
$\operatorname{colog} \sqrt[3]{189} = 7.72354 \div 3 = 9.24118$
$x = 7.3252 \quad \log x = .86482$

EXAMPLES.

In working these examples use cologs wherever necessary, and arrange the work as on preceding page.

1. $\dfrac{67.284 \times .10003}{\sqrt[3]{742.99} \times 6.7843}$. *Ans.* .10953

2. $\dfrac{63.842 \times \sqrt[4]{.064}}{(42.32)^4 \times (.02478)^3 \div \sqrt{2}}$. *Ans.* .93038

3. $\dfrac{(7.2843)^3 \times \sqrt[4]{.00067894}}{(620.01)^{\frac{1}{3}} \times 489.62}$. *Ans.* 306.49

4. $\dfrac{1986.1 \times \sqrt[3]{92.836}}{\sqrt{11} \times \sqrt[3]{22} \times \sqrt[4]{33}}$. *Ans.* 403.75

5. $.064219 \times \sqrt[3]{\dfrac{.98612 \times 14.612}{28 \div 39.6}}$. *Ans.* .17541

6. $\dfrac{(57.643)^{\frac{2}{3}} \times \dfrac{79.631}{\sqrt[3]{124.37}}}{\sqrt[7]{1000000}}$. *Ans.* 25.243

7. $\sqrt{10} \times \sqrt[3]{100} \times \sqrt[4]{1000}$. *Ans.* 82.542

10. Numbers with Six Figures. As a general rule, we cannot work to six figures in natural numbers with a table of five-place logarithms, for when the correction for the sixth figure is applied it will usually be too small to make any difference in the logarithm. On the first page or two of the table, however, where the logarithms vary rapidly, it can be done with approximate accuracy.

The correction for the sixth figure is always one-tenth of the correction for the same figure in the fifth place.

Ex. To find log 13.9647.

log 13.96 = 1.14489

correction for fifth figure = 12.4
" " sixth " = 2.17
total correction = 14.57, nearest integer = 15
log 13.9647 = 1.14504

Ex. Find x, given $\log x = 2.21647$,

nearest log in table	=	.21643,	corresponding to 1646
difference	=	4	
nearest smaller prop. pt. under tab. diff. 26	=	2.6	corresponding to 1 for the fifth fig.
difference remaining		1.4	

1.4×10 (because sixth figure is required) $= 14$, corresponding to 5 for the sixth figure. Hence, $x = 164.615$.

Verify the following:

$\log 1219.35 = 3.08613$. $\log x = 3.12964$, $x = 1347.84$.

$\log 10.7642 = 1.03198$. $\log x = 0.06432$, $x = 1.15963$.

TABLE II. *Constants and Their Logarithms.* (*Page 20.*)

11. No description of this table is necessary. The logarithms are given to seven places, instead of five, in case a greater degree of accuracy should be required. If only the first five places are used, the fifth figure must be increased by 1, if the sixth figure is 5, or more.

TABLE III. *Logarithmic Sines, Cosines, Tangents and Cotangents.* (*Pages 21–66.*)

12. The logarithms of the trigonometric functions are used in computation much more frequently than the functions themselves, which are called natural functions. For this reason this table is given more prominence than that of the natural functions. The table gives the logarithms of the functions for each minute from 0° to 90°. The functions of angles not expressed evenly in minutes can be found by interpolation, as explained below.

Since sec and csc are the reciprocals of cos and sin respectively, their logs can always be found by taking the cologs of the latter.

The sin and cos of all angles and the tan of angles less than 45° are less than unity; hence, their logarithms have negative characteristics. For this reason the characteristics of all these logarithms are increased by 10 in the tables.

13. To Find the Logarithmic Function of an Angle Less than 90°.

Enter the table with the given number of degrees, which will be found at the top of the page, if it is 44° or less, but at the bottom of the page, if it is greater than 44°. The function required is read at the top or bottom of the page, according as the number of degrees is at the top or bottom, and the required logarithm is taken from the corresponding column. The minutes are read in the left hand column of the page, if the degrees are read at the top, but in the extreme right hand column of the body of the table if the degrees are read at the bottom.

EXERCISES.

1. Find log sin 24° 38′. 24° is at the top of page 46, and the log sin column for 24° is the first column of logarithms on the page. Running down the page until we come to 38′, we find log sin 24° 38′ = 9.61994.

2. Find log tan 57° 16′. 57° is at the bottom of page 54. Running up the page in the column marked at the bottom log tan, until we come to the line with 16′ on the right, we find log tan 57° 16′ = 0.19192.

Verify the following statements:

log sin 39° 16′ = 9.80136,	log cos 8° 19′ = 9.99541,
log tan 63° 24′ = 0.30037,	log cot 54° 9′ = 9.85887,
log cos 41° 31′ = 9.87434,	log tan 82° 56′ = 0.90670,
log cot 26° 12′ = 0.30798,	log cot 7° = 0.91086,
log cos 31° = 9.93307,	log sin 19° 12′ = 9.51702.

14. Interpolating for Seconds.

Find the logarithmic functions for the degrees and minutes as before; then apply a correction for the seconds, as explained below. This correction must be added *if the function is* sin *or* tan, *and* subtracted *if the function is* cos *or* cot.

Find log sin 16° 28′ 35″.

log sin 16° 28′ = 9.45249, and the tabular difference is 43; that is, the log sin increases by 43, while the angle increases by 1′. Hence, the proportional increase for 1″ is $\frac{43}{60}$, and for 35″ it is $\frac{43}{60} \times 35 = \frac{301}{12} = 25.08\ldots$, the nearest integer to which is the required correction. Hence,

$$\log \sin 16° 28' 35'' = 9.45249 + .00025 = 9.45274.$$

The auxiliary table of proportional parts for tabular difference 43 will give the same result. The column to the left of the vertical line in these auxiliary tables gives the number of seconds, arranged in the order 6, 7, 8, 9, 10, 20, 30, 40, 50. If the correction for 1, 2, 3, 4, or 5 seconds is required it is obtained by taking one-tenth of that for 10, 20, 30, 40, or 50 respectively. The work can be arranged concisely as follows, but it is desirable in actual practice to compute the correction mentally and to write only the complete logarithm:

$$\begin{aligned} \log \sin 16^\circ\ 28' &= 9.45249 \\ \text{correction for } 30'' &= \quad 21.5 \\ \text{“ “ } 5'' &= \quad 3.58 \\ \log \sin 16^\circ\ 28'\ 35'' &= 9.45274 \end{aligned}$$

Find $\log \cot 61^\circ\ 13'\ 19''$. $\log \cot 61^\circ\ 13' = 9.73987$

correction for $10''$ (tab. diff. 30) $= 5.0$

“ “ $9''$ “ “ $= 4.5$

nearest integer to total correction $= 10.0$

Subtract correction because function is cot, $\underline{\quad 10}$

$\therefore$ $\log \cot 61^\circ\ 13'\ 19'' =$ 9.73977

On pages 22 to 27 of the table, on account of the large number of differences which occur, owing to the rapid variation of the logarithms, different arrangements of the tables of Prop. Pts. are made. If the logarithm required falls on pages 25 to 27, and it happens that the tabular difference is one for which a table of proportional parts is given, the procedure is the same as above; otherwise as follows:

Find $\log \tan 3^\circ\ 51'\ 26''$

$$\log \tan 3^\circ\ 51' = 8.82799, \text{ tab. diff.} = 188.$$

This tabular difference is not given, so we use the auxiliary tables for 185 and 3 (because $185 + 3 = 188$) instead.

$$\begin{aligned} \text{tab. diff. } 185 &\left\{ \begin{array}{ll} \text{correction for } 20'' = & 61.7 \\ \text{“ “ } 6'' = & 18.5 \end{array} \right. \\ \text{tab. diff. } 3 &\left\{ \begin{array}{ll} \text{“ “ } 20'' = & 1.0 \\ \text{“ “ } 6'' = & 0.3 \end{array} \right. \\ & \qquad\qquad\quad 81.5 \end{aligned}$$

Hence, the total correction to be added is 82 and $\log \tan 3^\circ\ 51'\ 26'' = 8.82881$.

In a case of this kind it is, perhaps, just as easy to compute the correction without using the auxiliary tables.

On pages 22 to 24 the Prop. Pt. is given for one second for each tabular difference for log sin, log tan, and log cot. Log cos varies so slowly in this part of the table that no auxiliary tables are necessary.

Find log sin 1° 48′ 53″.

log sin 1° 48′ = 8.49708, tab. diff. = 400
Prop. pt. for 1″ (tab. diff. 400) = 6.67
" " 53″ = 6.67 × 53 = 353.51
∴ correction to be added = 354.
and log sin 1° 48′ 53″ = 8.49708 + .00354 = 8.50062

On account of the very rapid variation in the log sin and log tan at the beginning of the table, the theory that the variation of the log is proportional to that of the angle, leads to results which are sometimes appreciably in error. For this reason, when great precision is required, Table IV., pp. 67, 68, should be used in finding the log sin and log tan of angles less than 4°. An explanation of this table is given below, § 19.

Verify the following statements:

log cos 17° 38′ 42″ = 9.97907, log tan 5° 38′ 5″ = 8.99416,
log tan 84° 9′ 13″ = 0.98972, log sin 1° 12′ 38″ = 8.32482,
log sin 61° 41′ 31″ = 9.94469, log cos 26° 28′ 37″ = 9.95188,
log cos 87° 6′ 14″ = 8.70351, log cot 9° 1′ 43″ = 0.79889,
log cot 86° 53′ 34″ = 8.73467, log sin 45° 43′ 28″ = 9.85491.

15. To Find the Logarithmic Function of an Angle > 90°.

According to the theorems demonstrated in Elements of Trigonometry §§ 28–31, and the rules on page 40, summarizing the results, the functions of any angle can be found if those of all angles less than 90° are known. These results are given here in the form of the following rules:

I. *To find the function of an angle between* 90° *and* 180° *subtract the angle from* 180° *and look for the same function of the difference, or subtract* 90° *from the angle and look for the co-function of the difference.*

II. *To find a function of an angle between* 180° *and* 270° *subtract the angle from* 270° *and look for the co-function of the differ-*

ence, or subtract 180° *from the angle and look for the same function of the difference.*

III. *To find a function of an angle between* 270° *and* 360° *subtract the angle from* 360° *and look for the same function of the difference, or subtract* 270° *from the angle and look for the co-function of the difference.*

The second alternative in each of these rules is better if the angle has minutes and seconds, for there is less danger of making a mistake in taking the difference.

EXERCISES.

1. Find log cos 117° 19′ 35″.

By rule I. log cos 117° 19′ 35″ = log (—sin 27° 19′ 35″).

NOTE.—In taking the logarithm of a negative quantity we proceed as if the quantity were positive. To the logarithm when found, we prefix the symbol (—) or annex the symbol *n*. Neither of these signs affect the operations to which the logarithm may be subjected, but are used merely to remind the computer that the corresponding numbers are negative.

log sin 27° 19′ 35″ = 9.66187,
∴ log cos 117° 19′ 35″ = (—) 9.66187.

2. Find log tan 242° 20′ 17″.

By rule II. log tan 242° 20′ 17″ = log tan 62° 20′ 17″ = 0.28054.

Verify the following statements:

log sin 300° 24′ = (—) 9.93577
log cos 216° 14′ 33″ = (—) 9.90662
log tan 101° 6′ 52″ = (—) 0.70674
log cot 200° 30′ 30″ = 0.42707
log sin 138° 48′ 6″ = 9.81867
log cos 342° 38′ 15″ = 9.97975

16. To Find an Angle Given one of its Logarithmic Functions.

A further glance at the general constitution of the table is first necessary. Upon each page of the table are four columns of logarithms, the first and fourth are logarithmic sines and cosines, the second and third are logarithmic tangents and cotangents. The logarithms increase, going toward the back of the table in the first and second columns, and then passing into the fourth and third columns respectively, they increase, going toward the front of the table. Remembering this, the place of any given logarithm in the table can be found readily.

The rules for finding an angle from its logarithmic function are as follows:

If the given function is log sin or log cos look for the nearest smaller logarithm in the first or fourth column; if it is log tan or log cot, look in the second or third column.

Read the degrees at the top or bottom of the page, according as the name of the given function is at the top or bottom of the column in which the given logarithm is located.

Read the minutes on the left or right according as the degrees are read at the top or bottom of the page, and in the same line with the nearest logarithm smaller than the given one.

Determine the number of seconds by proportion and add *them to the degrees and minutes found, if the given function is* log sin *or* log tan, *but* subtract *them if it is* log cos *or* log cot.

EXERCISES.

1. Given log sin $\theta = 9.86592$, what is θ?

In the fourth column on p. 64 we find 9.86589, and log sin is read at the bottom. Hence, the degrees and minutes are 47° 15′. The tabular difference is 11 and the difference between the given log and log sin 47° 15′ is 3. Hence, θ exceeds 47° 15′ by $\frac{3}{11}$ of one minute. This fraction reduced to seconds is $\frac{3}{11} \times 60 = 16''$. Hence, $\theta = 47° 15' 16''$.

To use the auxiliary table to find the number of seconds, we arrange the work as follows, using table for tabular difference 11.

whole difference	$= 3$		
nearest smaller prop. pt.	$= 1.8$,	corresponding to	$10''$
difference remaining	$= 1.2$	"	$6''$
whole number of seconds		$=$	$16''$

NOTE.—The number of seconds corresponding to 1.2 under tabular difference 11 is, according to the table, either $6''$ or $7''$; but $6''$ is really a little nearer than $7''$, as we found above.

2. Given log cot $\theta = 0.72654$, find θ.

On p. 32, in the third column, we find 0.72643, and log cot is read at the top; hence, the degrees and minutes are 10° 38′. The tabular difference is 70, and the difference between log cot θ and 0.72643 is 11. Hence, using table of proportional parts, we have

whole difference	$= 11$	
nearest smaller prop. pt.	$= 10.5$,	corresponding to $9''$
difference remaining	$= .5$,	

as this is less than half the prop. pt. for 1″ (1.17), the entire correction is 9″, which is subtracted from 10° 38′, giving $\theta = 10°\ 37'\ 51''$.

3. Given log tan $\theta = 8.61246$, find θ.

On page 24, log tan 2° 20′ = 8.61009.

difference = 237, tab. diff. = 310, prop. pt. for 1″ = 5.17,

no. of seconds $= \frac{237}{5.17} = 46''$. $\therefore\ \theta = 2°\ 20'\ 46''$.

In these three exercises the results are incomplete, because we know from Trigonometry that there are always two angles less than 360° corresponding to any given trigonometric function. The complete answers are as follows: 1. $\theta = 47°\ 15'\ 16''$ and 180° − 47° 15′ 16″ = 132° 44′ 44″, because sin θ is positive in the first and second quadrants. 2. $\theta = 10°\ 37'\ 51''$ and 180° + 10° 37′ 51″ = 190° 37′ 51″. 3. $\theta = 2°\ 20'\ 46''$ and 180° + 2° 20′ 46″ = 182° 20′ 46″, because tan θ and cot θ are positive in the first and third quadrants.

4. Given log cos θ = (—) 9.62983, find θ.

Assume that cos θ is positive and find the angle corresponding to it in the first quadrant. We find on p. 47 log cos 64° 46′ = 9.62972.

whole difference	= 11	
nearest smaller prop. pt.	= 9.0,	corresponding to 20″
difference remaining	= 2.0	" " 4″
number of seconds to be subtracted,		24″

Hence, log cos 64° 45′ 36″ = 9.62983.

Since the cos is negative in the second and third quadrants, we have $\theta = \begin{cases} 180° - 64°\ 45'\ 36'' = 115°\ 14'\ 24'' \\ 180° + 64°\ 45'\ 36'' = 244°\ 45'\ 36''. \end{cases}$

When one or both values of the required angle are not in the first quadrant, the following rules are to be followed:

To find an angle in the second quadrant, subtract the angle taken from the table from 180°.

To find an angle in the third quadrant, add the angle taken from the table to 180°.

To find an angle in the fourth quadrant, subtract the angle taken from the table from 360°.

Verify the following statements:

log sin θ =	9.28642,	θ = 11° 9′ 1″	and 168° 50′ 59″.
log cos θ =	8.46321,	θ = 88° 20′ 6″	" 271° 39′ 54″.
log tan θ =	0.12983,	θ = 53° 26′ 22″	" 233° 26′ 22″.
log cot θ =	9.62412,	θ = 67° 10′ 36″	" 247° 10′ 36″.
log sin θ = (—)	9.96419,	θ = 247° 3′ 0″	" 292° 57′ 0″.
log cos θ = (—)	9.78416,	θ = 127° 28′ 15″	" 232° 31′ 45″.
log tan θ = (—)	9.42317,	θ = 165° 9′ 36″	" 345° 9′ 36″.
log cot θ = (—)	8.76432,	θ = 93° 19′ 35″	" 273° 19′ 35″.

17. Functions of Negative Angles. To find the logarithmic functions of negative angles, follow the formulæ given in § 31, Elements of Trigonometry.

18. General Remarks. In using a five-place table of logarithmic functions the computer should remember that the seconds in his results will be, in general, only approximately correct. Nevertheless, angles can be determined in most parts of the table more closely than to tenths of a minute; so that it seems preferable to give tables of proportional parts for seconds, rather than for tenths of a minute.

Attention is here called to the fact that throughout all the tables a final five is sometimes marked with a small dash over it, thus $\bar{5}$, and sometimes it is not so marked. This mark is used to indicate that if, for any reason, the computer wishes to use a smaller number of decimal places than are given in the table, the 5 is to be dropped without increasing the preceding figure by unity. If the 5 is not marked in this way the preceding figure must be increased by unity if the 5 is dropped.

The student may vary somewhat the procedure in the matter of interpolation as he becomes accustomed to using the tables. For example: in finding log 18769 he may take log 1877 from the tables and subtract the correction for 1, instead of taking log 1876 and adding the correction for 9. Again, in finding log cos 78° 38′ 56″ he may take log cos 78° 39′ and add the correction for 4″ instead of taking log cos 78° 38′ and subtracting the correction for 56″. Numerous points of this kind, which in many cases will shorten the work, will suggest themselves, and need not be specified here.

EXAMPLES.

Find θ in each of the following examples:

1. $\tan\theta = \dfrac{6.2984 \sin^2 63° 18' 20''}{7.5692 \cot 116° 36' 12''}$ $\qquad \theta = \begin{cases} 127° 1' 7'' \\ 307° 1' 7'' \end{cases}$

2. $\cos\theta = -\dfrac{2.93 \tan 48° 6' 38''}{14.12 \sin 26° 13' 42''}$ $\qquad \theta = \begin{cases} 121° 34' 3'' \\ 238° 25' 57'' \end{cases}$

3. $\sin\theta = \sqrt{\dfrac{\sin^3 146° 12' 19'' \times \tan 78° 12' 32''}{\cot^3 12° 14' 6'' \times \cos 64° 4' 55''}}$ $\theta = \begin{cases} 7° 58' 17'' \\ 172° 1' 43'' \\ 187° 58' 17'' \\ 352° 1' 43'' \end{cases}$

4. $\cot\theta = \dfrac{.93862 \cos^2 312° 38' 40''}{.86471 \tan^3 214° 26' 31''}$ $\theta = \begin{cases} 32° 55' 19'' \\ 212° 55' 19'' \end{cases}$

TABLE IV. (*Pages 67 and 68.*)

19. Sine and Tangent of Small Angles. This table derives its usefulness from the fact that when an angle (a) is small the ratios $\frac{\sin a}{a}$ and $\frac{\tan a}{a}$ vary but slowly. The quantities S and T in the table are the logarithms (increased by 10) of these ratios, where the angle is expressed in seconds. Hence, to find log sin and log tan of a small angle we have the formulæ

$$\log \sin a = \log a'' + S$$
$$\log \tan a = \log a'' + T$$

and to find a small angle from its log sin or log tan we have

$$\log a'' = \log \sin a - S$$
$$\log a'' = \log \tan a - T$$

Ex. Find log tan 0° 26′ 51″.

$0° 26' 51'' = 1611''$ $\quad \log 1611 = 3.20710$

T (for 0° 27′) $= 4.68558$

$\therefore$ log tan 0° 26′ 51″ $= \overline{7.89268}$

(the same calculated from Table III. is 7.89264, which is thus shown to be in error four units in the fifth place).

Ex. Given log sin $a = 8.36892$, find a.

From Table III. we find that $a = 1° 20'$ approximately; hence, the proper value of S (from Table IV) is 4.68554. We have, therefore,

$$\log \sin a - S = 3.68338 = \log a''$$
$$\therefore \quad a = 4824'' = 1° 20' 24''.$$

Verify the following statements, by means of Table IV:

log sin 0° 57′ 36″ = 8.22412.

log tan a = 8.19632, a = 0° 54′ 1″.

To find the cosine or cotagent of an angle nearly 90° use the same table, taking the sine or tangent, as the case may be, of the complement of the given angle.

TABLE V. *Natural Functions. (Pages 69–73.)*

20. By the terms *natural sine, cosine, etc.*, are meant the actual values of these functions. The table is used comparatively seldom, and for that reason the functions are given for every five minutes only. To find the functions for intermediate minutes the process of interpolation by simple proportion is used. Thus, to find sin 51° 18′, we have

$$\begin{aligned} \sin 51^\circ 20' &= .78079 \\ \sin 51^\circ 15' &= .77988 \\ \text{difference for } 5' &= \quad 91 \\ \text{hence, correction for } 3' &= \tfrac{3}{5} \text{ of } 91 = 55, \\ \text{and } \sin 51^\circ 18' &= .77988 + .00055 = .78043. \end{aligned}$$

The rules given above, for adding and subtracting corrections and for finding functions of angles greater than 90°, apply here the same as in the case of Table III.

The results of interpolating minutes in that part of the table which gives the cot of angles less than 15° and the tangents of angles between 75° and 90° will, in general, not be correct in the last place. Hence, when considerable precision is required in these cases the function should be found by taking the natural number corresponding to the logarithm found in Table III.

TABLE VI. *Circular Arcs Expressed in Radians. (Page 74.)*

This table gives to seven decimal places the number of radians for every degree up to 180°, with auxiliary tables for minutes and seconds.

EXERCISES.

1. How many radians in 126° 38′ 19″? From the table we have

$$\begin{aligned} \text{number of radians in } 126^\circ &= 2.1991149 \\ \text{“ “ } 38' &= .0110538 \\ \text{“ “ } 19'' &= .0000921 \\ \text{“ “ } 126^\circ\, 38'\, 19'' &= 2.2102608 \end{aligned}$$

2. How many degrees, minutes and seconds in 4.6832964 radians? As this number of radians exceeds 180, we subtract the number of

radians in 180° and find the degrees, minutes and seconds in the remainder. This last added to 180° is the result:

Given number of radians			= 4.6832964
Radians in	180°		= 3.1415927
Difference			= 1.5417037
Radians in	88°		= 1.5358897
			.0058140
Radians in	19′		= .0055269
			.0002871
Radians in		59″	= 2860
Result =		268° 19′ 59″	.0000011

The last difference, .0000011, corresponds to less than half a second.

TABLE VII. *Napierian Logarithms of Numbers. (Pages 75, 76.)*

Although these logarithms are not used for purposes of practical computation, their values are sometimes required in calculating values of transcendental functions, and for other purposes. The table gives the logarithm of each number from 1 to 1000. As the value of the characteristic does not depend upon the position of the decimal point, nor the value of the mantissa solely upon the sequence of figures in the corresponding number, we cannot use the table just as we do a table of common logarithms. If log 363.8 is required we can find it by interpolating between log 363 and log 364; but if log 3638 is required we must find log 363.8 in the manner just indicated, and then add log 10. The work is as follows:

log 363	= 5.89440
log 364	= 5.89715
difference =	275
.8 of difference =	220
adding this to log 363 gives log 363.8	= 5.89660
log 10	= 2.30259
log 3638	= 8.19919

To find the number corresponding to a given Napierian logarithm we first subtract as many times log 10 as may be necessary to bring the logarithm within the limits of the

table. Then find the number corresponding to this difference and multiply it by the power of 10, whose logarithm was subtracted at the beginning. Thus, to find the number whose Napierian logarithm is 9.62983:

$$\log 100 = 2 \log 10 = 4.60517$$

$$9.62983 - 4.60517 = 5.02466$$

5.02466 is the logarithm of some number between 152 and 153.

Given log	= 5.02466
log 152	= 5.02388
difference	= 78
tabular difference	= 656

$78 \div 656 = .12.$

$\therefore$ 5.02466 is the logarithm of 152.12.

Hence, 9.62983 is the logarithm of $152.12 \times 100 = 15212.$

TABLE I.

COMMON LOGARITHMS OF NUMBERS.

N.	0	1	2	3	4	5	6	7	8	9
100	00 000	043	087	130	173	217	260	303	346	389
01	432	475	518	561	604	647	689	732	775	817
02	860	903	945	988	*030	*072	*115	*157	*199	*242
03	01 284	326	368	410	452	494	536	578	620	662
04	703	745	787	828	870	912	953	995	*036	*078
05	02 119	160	202	243	284	325	366	407	449	490
06	531	572	612	653	694	735	776	816	857	898
07	938	979	*019	*060	*100	*141	*181	*222	*262	*302
08	03 342	383	423	463	503	543	583	623	663	703
09	743	782	822	862	902	941	981	*021	*060	*100
110	04 139	179	218	258	297	336	376	415	454	493
11	532	571	610	650	689	727	766	805	844	883
12	922	961	999	*038	*077	*115	*154	*192	*231	*269
13	05 308	346	385	423	461	500	538	576	614	652
14	690	729	767	805	843	881	918	956	994	*032
15	06 070	108	145	183	221	258	296	333	371	408
16	446	483	521	558	595	633	670	707	744	781
17	819	856	893	930	967	*004	*041	*078	*115	*151
18	07 188	225	262	298	335	372	408	445	482	518
19	555	591	628	664	700	737	773	809	846	882
120	918	954	990	*027	*063	*099	*135	*171	*207	*243
21	08 279	314	350	386	422	458	493	529	565	600
22	636	672	707	743	778	814	849	884	920	955
23	991	*026	*061	*096	*132	*167	*202	*237	*272	*307
24	09 342	377	412	447	482	517	552	587	621	656
25	691	726	760	795	830	864	899	934	968	*003
26	10 037	072	106	140	175	209	243	278	312	346
27	380	415	449	483	517	551	585	619	653	687
28	721	755	789	823	857	890	924	958	992	*025
29	11 059	093	126	160	193	227	261	294	327	361
130	394	428	461	494	528	561	594	628	661	694
31	727	760	793	826	860	893	926	959	992	*024
32	12 057	090	123	156	189	222	254	287	320	352
33	385	418	450	483	516	548	581	613	646	678
34	710	743	775	808	840	872	905	937	969	*001
35	13 033	066	098	130	162	194	226	258	290	322
36	354	386	418	450	481	513	545	577	609	640
37	672	704	735	767	799	830	862	893	925	956
38	988	*019	*051	*082	*114	*145	*176	*208	*239	*270
39	14 301	333	364	395	426	457	489	520	551	582
140	613	644	675	706	737	768	799	829	860	891
41	922	953	983	*014	*045	*076	*106	*137	*168	*198
42	15 229	259	290	320	351	381	412	442	473	503
43	534	564	594	625	655	685	715	746	776	806
44	836	866	897	927	957	987	*017	*047	*077	*107
45	16 137	167	197	227	256	286	316	346	376	406
46	435	465	495	524	554	584	613	643	673	702
47	732	761	791	820	850	879	909	938	967	997
48	17 026	056	085	114	143	173	202	231	260	289
49	319	348	377	406	435	464	493	522	551	580
150	609	638	667	696	725	754	782	811	840	869

Prop. Pts.			
	44	43	42
1	4.4	4.3	4.2
2	8.8	8.6	8.4
3	13.2	12.9	12.6
4	17.6	17.2	16.8
5	22.0	21.5	21.0
6	26.4	25.8	25.2
7	30.8	30.1	29.4
8	35.2	34.4	33.6
9	39.6	38.7	37.8
	41	40	39
1	4.1	4.0	3.9
2	8.2	8.0	7.8
3	12.3	12.0	11.7
4	16.4	16.0	15.6
5	20.5	20.0	19.5
6	24.6	24.0	23.4
7	28.7	28.0	27.3
8	32.8	32.0	31.2
9	36.9	36.0	35.1
	38	37	36
1	3.8	3.7	3.6
2	7.6	7.4	7.2
3	11.4	11.1	10.8
4	15.2	14.8	14.4
5	19.0	18.5	18.0
6	22.8	22.2	21.6
7	26.6	25.9	25.2
8	30.4	29.6	28.8
9	34.2	33.3	32.4
	35	34	33
1	3.5	3.4	3.3
2	7.0	6.8	6.6
3	10.5	10.2	9.9
4	14.0	13.6	13.2
5	17.5	17.0	16.5
6	21.0	20.4	19.8
7	24.5	23.8	23.1
8	28.0	27.2	26.4
9	31.5	30.6	29.7
	32	31	30
1	3.2	3.1	3.0
2	6.4	6.2	6.0
3	9.6	9.3	9.0
4	12.8	12.4	12.0
5	16.0	15.5	15.0
6	19.2	18.6	18.0
7	22.4	21.7	21.0
8	25.6	24.8	24.0
9	28.8	27.9	27.0

N. 0 1 2 3 4 5 6 7 8 9 Prop. Pts.

N.	0	1	2	3	4	5	6	7	8	9
150	17 609	638	667	696	725̄	754	782	811	840	869
51	898	926	955	984	*013	*041	*070	*099	*127	*156
52	18 184	213	241	270	298	327	355	384	412	441
53	469	498	526	554	583	611	639	667	696	724
54	752	780	808	837	865̄	893	921	949	977	*005
55	19 033	061	089	117	145	173	201	229	257	285̄
56	312	340	368	396	424	451	479	507	535̄	562
57	590	618	645	673	700	728	756	783	811	838
58	866	893	921	948	976	*003	*030	*058	*085	*112
59	20 140	167	194	222	249	276	303	330	358	385̄
160	412	439	466	493	520	548	575̄	602	629	656
61	683	710	737	763	790	817	844	871	898	925̄
62	952	978	*005	*032	*059	*085	*112	*139	*165	*192
63	21 219	245	272	299	325	352	378	405̄	431	458
64	484	511	537	564	590	617	643	669	696	722
65	748	775̄	801	827	854	880	906	932	958	985̄
66	22 011	037	063	089	115	141	167	194	220	246
67	272	298	324	350	376	401	427	453	479	505
68	531	557	583	608	634	660	686	712	737	763
69	789	814	840	866	891	917	943	968	994	*019
170	23 045̄	070	096	121	147	172	198	223	249	274
71	300	325	350	376	401	426	452	477	502	528
72	553	578	603	629	654	679	704	729	754	779
73	805̄	830	855̄	880	905̄	930	955̄	980	*005̄	*030
74	24 055̄	080	105̄	130	155̄	180	204	229	254	279
75	304	329	353	378	403	428	452	477	502	527
76	551	576	601	625	650	674	699	724	748	773
77	797	822	846	871	895	920	944	969	993	*018
78	25 042	066	091	115	139	164	188	212	237	261
79	285	310	334	358	382	406	431	455̄	479	503
180	527	551	575	600	624	648	672	696	720	744
81	768	792	816	840	864	888	912	935	959	983
82	26 007	031	055̄	079	102	126	150	174	198	221
83	245	269	293	316	340	364	387	411	435̄	458
84	482	505	529	553	576	600	623	647	670	694
85	717	741	764	788	811	834	858	881	905̄	928
86	951	975̄	998	*021	*045̄	*068	*091	*114	*138	*161
87	27 184	207	231	254	277	300	323	346	370	393
88	416	439	462	485	508	531	554	577	600	623
89	646	669	692	715	738	761	784	807	830	852
190	875	898	921	944	967	989	*012	*035	*058	*081
91	28 103	126	149	171	194	217	240	262	285̄	307
92	330	353	375	398	421	443	466	488	511	533
93	556	578	601	623	646	668	691	713	735	758
94	780	803	825̄	847	870	892	914	937	959	981
95	29 003	026	048	070	092	115̄	137	159	181	203
96	226	248	270	292	314	336	358	380	403	425̄
97	447	469	491	513	535̄	557	579	601	623	645̄
98	667	688	710	732	754	776	798	820	842	863
99	885	907	929	951	973	994	*016	*038	*060	*081
200	30 103	125̄	146	168	190	211	233	255̄	276	298

Prop. Pts.		
	29	28
1	2.9	2.8
2	5.8	5.6
3	8.7	8.4
4	11.6	11.2
5	14.5	14.0
6	17.4	16.8
7	20.3	19.6
8	23.2	22.4
9	26.1	25.2
	27	26
1	2.7	2.6
2	5.4	5.2
3	8.1	7.8
4	10.8	10.4
5	13.5	13.0
6	16.2	15.6
7	18.9	18.2
8	21.6	20.8
9	24.3	23.4
	25	
1	2.5	
2	5.0	
3	7.5	
4	10.0	
5	12.5	
6	15.0	
7	17.5	
8	20.0	
9	22.5	
	24	23
1	2.4	2.3
2	4.8	4.6
3	7.2	6.9
4	9.6	9.2
5	12.0	11.5
6	14.4	13.8
7	16.8	16.1
8	19.2	18.4
9	21.6	20.7
	22	21
1	2.2	2.1
2	4.4	4.2
3	6.6	6.3
4	8.8	8.4
5	11.0	10.5
6	13.2	12.6
7	15.4	14.7
8	17.6	16.8
9	19.8	18.9

N. 0 1 2 3 4 5 6 7 8 9 Prop. Pts.

N.	0	1	2	3	4	5	6	7	8	9
200	30 103	125̄	146	168	190	211	233	255̄	276	298
01	320	341	363	384	406	428	449	471	492	514
02	535	557	578	600	621	643	664	685	707	728
03	750	771	792	814	835	856	878	899	920	942
04	963	984	*006	*027	*048	*069	*091	*112	*133	*154
05	31 175	197	218	239	260	281	302	323	345̄	366
06	387	408	429	450	471	492	513	534	555	576
07	597	618	639	660	681	702	723	744	765̄	785
08	806	827	848	869	890	911	931	952	973	994
09	32 015̄	035	056	077	098	118	139	160	181	201
210	222	243	263	284	305̄	325	346	366	387	408
11	428	449	469	490	510	531	552	572	593	613
12	634	654	675̄	695̄	715	736	756	777	797	818
13	838	858	879	899	919	940	960	980	*001	*021
14	33 041	062	082	102	122	143	163	183	203	224
15	244	264	284	304	325̄	345̄	365̄	385	405	425
16	445	465	486	506	526	546	566	586	606	626
17	646	666	686	706	726	746	766	786	806	826
18	846	866	885	905	925	945	965	985̄	*005̄	*025̄
19	34 044	064	084	104	124	143	163	183	203	223
220	242	262	282	301	321	341	361	380	400	420
21	439	459	479	498	518	537	557	577	596	616
22	635	655̄	674	694	713	733	753	772	792	811
23	830	850	869	889	908	928	947	967	986	*005
24	35 025̄	044	064	083	102	122	141	160	180	199
25	218	238	257	276	295	315̄	334	353	372	392
26	411	430	449	468	488	507	526	545	564	583
27	603	622	641	660	679	698	717	736	755	774
28	793	813	832	851	870	889	908	927	946	965̄
29	984	*003	*021	*040	*059	*078	*097	*116	*135	*154
230	36 173	192	211	229	248	267	286	305̄	324	342
31	361	380	399	418	436	455	474	493	511	530
32	549	568	586	605̄	624	642	661	680	698	717
33	736	754	773	791	810	829	847	866	884	903
34	922	940	959	977	996	*014	*033	*051	*070	*088
35	37 107	125	144	162	181	199	218	236	254	273
36	291	310	328	346	365̄	383	401	420	438	457
37	475̄	493	511	530	548	566	585̄	603	621	639
38	658	676	694	712	731	749	767	785	803	822
39	840	858	876	894	912	931	949	967	985̄	*003
240	38 021	039	057	075	093	112	130	148	166	184
41	202	220	238	256	274	292	310	328	346	364
42	382	399	417	435	453	471	489	507	525̄	543
43	561	578	596	614	632	650	668	686	703	721
44	739	757	775̄	792	810	828	846	863	881	899
45	917	934	952	970	987	*005	*023	*041	*058	*076
46	39 094	111	129	146	164	182	199	217	235̄	252
47	270	287	305̄	322	340	358	375	393	410	428
48	445	463	480	498	515	533	550	568	585	602
49	620	637	655̄	672	690	707	724	742	759	777
250	794	811	829	846	863	881	898	915	933	950

Prop. Pts.		
	22	21
1	2.2	2.1
2	4.4	4.2
3	6.6	6.3
4	8.8	8.4
5	11.0	10.5
6	13.2	12.6
7	15.4	14.7
8	17.6	16.8
9	19.8	18.9

	20
1	2.0
2	4.0
3	6.0
4	8.0
5	10.0
6	12.0
7	14.0
8	16.0
9	18.0

	19
1	1.9
2	3.8
3	5.7
4	7.6
5	9.5
6	11.4
7	13.3
8	15.2
9	17.1

	18
1	1.8
2	3.6
3	5.4
4	7.2
5	9.0
6	10.8
7	12.6
8	14.4
9	16.2

	17
1	1.7
2	3.4
3	5.1
4	6.8
5	8.5
6	10.2
7	11.9
8	13.6
9	15.3

N. 0 1 2 3 4 5 6 7 8 9 Prop. Pts.

N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.
250	39 794	811	829	846	863	881	898	915	933	950	
51	967	985	*002	*019	*037	*054	*071	*088	*106	*123	18
52	40 140	157	175	192	209	226	243	261	278	295	1 1.8
53	312	329	346	364	381	398	415	432	449	466	2 3.6
54	483	500	518	535	552	569	586	603	620	637	3 5.4
55	654	671	688	705	722	739	756	773	790	807	4 7.2
56	824	841	858	875	892	909	926	943	960	976	5 9.0
57	993	*010	*027	*044	*061	*078	*095	*111	*128	*145	6 10.8
58	41 162	179	196	212	229	246	263	280	296	313	7 12.6
59	330	347	363	380	397	414	430	447	464	481	8 14.4
260	497	514	531	547	564	581	597	614	631	647	9 16.2
61	664	681	697	714	731	747	764	780	797	814	17
62	830	847	863	880	896	913	929	946	963	979	1 1.7
63	996	*012	*029	*045	*062	*078	*095	*111	*127	*144	2 3.4
64	42 160	177	193	210	226	243	259	275	292	308	3 5.1
65	325	341	357	374	390	406	423	439	455	472	4 6.8
66	488	504	521	537	553	570	586	602	619	635	5 8.5
67	651	667	684	700	716	732	749	765	781	797	6 10.2
68	813	830	846	862	878	894	911	927	943	959	7 11.9
69	975	991	*008	*024	*040	*056	*072	*088	*104	*120	8 13.6
270	43 136	152	169	185	201	217	233	249	265	281	9 15.3
71	297	313	329	345	361	377	393	409	425	441	16
72	457	473	489	505	521	537	553	569	584	600	1 1.6
73	616	632	648	664	680	696	712	727	743	759	2 3.2
74	775	791	807	823	838	854	870	886	902	917	3 4.8
75	933	949	965	981	996	*012	*028	*044	*059	*075	4 6.4
76	44 091	107	122	138	154	170	185	201	217	232	5 8.0
77	248	264	279	295	311	326	342	358	373	389	6 9.6
78	404	420	436	451	467	483	498	514	529	545	7 11.2
79	560	576	592	607	623	638	654	669	685	700	8 12.8
280	716	731	747	762	778	793	809	824	840	855	9 14.4
81	871	886	902	917	932	948	963	979	994	*010	15
82	45 025	040	056	071	086	102	117	133	148	163	1 1.5
83	179	194	209	225	240	255	271	286	301	317	2 3.0
84	332	347	362	378	393	408	423	439	454	469	3 4.5
85	484	500	515	530	545	561	576	591	606	621	4 6.0
86	637	652	667	682	697	712	728	743	758	773	5 7.5
87	788	803	818	834	849	864	879	894	909	924	6 9.0
88	939	954	969	984	*000	*015	*030	*045	*060	*075	7 10.5
89	46 090	105	120	135	150	165	180	195	210	225	8 12.0
290	240	255	270	285	300	315	330	345	359	374	9 13.5
91	389	404	419	434	449	464	479	494	509	523	14
92	538	553	568	583	598	613	627	642	657	672	1 1.4
93	687	702	716	731	746	761	776	790	805	820	2 2.8
94	835	850	864	879	894	909	923	938	953	967	3 4.2
95	982	997	*012	*026	*041	*056	*070	*085	*100	*114	4 5.6
96	47 129	144	159	173	188	202	217	232	246	261	5 7.0
97	276	290	305	319	334	349	363	378	392	407	6 8.4
98	422	436	451	465	480	494	509	524	538	553	7 9.8
99	567	582	596	611	625	640	654	669	683	698	8 11.2
300	712	727	741	756	770	784	799	813	828	842	9 12.6

N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.

N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.
300	47 712	727	741	756	770	784	799	813	828	842	
01	857	871	885	900	914	929	943	958	972	986	
02	48 001	015	029	044	058	073	087	101	116	130	
03	144	159	173	187	202	216	230	244	259	273	15
04	287	302	316	330	344	359	373	387	401	416	1 1.5
05	430	444	458	473	487	501	515	530	544	558	2 3.0
06	572	586	601	615	629	643	657	671	686	700	3 4.5
07	714	728	742	756	770	785	799	813	827	841	4 6.0
08	855	869	883	897	911	926	940	954	968	982	5 7.5
09	996	*010	*024	*038	*052	*066	*080	*094	*108	*122	6 9.0
310	49 136	150	164	178	192	206	220	234	248	262	7 10.5
11	276	290	304	318	332	346	360	374	388	402	8 12.0
12	415	429	443	457	471	485	499	513	527	541	9 13.5
13	554	568	582	596	610	624	638	651	665	679	
14	693	707	721	734	748	762	776	790	803	817	
15	831	845	859	872	886	900	914	927	941	955	14
16	969	982	996	*010	*024	*037	*051	*065	*079	*092	1 1.4
17	50 106	120	133	147	161	174	188	202	215	229	2 2.8
18	243	256	270	284	297	311	325	338	352	365	3 4.2
19	379	393	406	420	433	447	461	474	488	501	4 5.6
320	515	529	542	556	569	583	596	610	623	637	5 7.0
21	651	664	678	691	705	718	732	745	759	772	6 8.4
22	786	799	813	826	840	853	866	880	893	907	7 9.8
23	920	934	947	961	974	987	*001	*014	*028	*041	8 11.2
24	51 055	068	081	095	108	121	135	148	162	175	9 12.6
25	188	202	215	228	242	255	268	282	295	308	
26	322	335	348	362	375	388	402	415	428	441	
27	455	468	481	495	508	521	534	548	561	574	13
28	587	601	614	627	640	654	667	680	693	706	1 1.3
29	720	733	746	759	772	786	799	812	825	838	2 2.6
330	851	865	878	891	904	917	930	943	957	970	3 3.9
31	983	996	*009	*022	*035	*048	*061	*075	*088	*101	4 5.2
32	52 114	127	140	153	166	179	192	205	218	231	5 6.5
33	244	257	270	284	297	310	323	336	349	362	6 7.8
34	375	388	401	414	427	440	453	466	479	492	7 9.1
35	504	517	530	543	556	569	582	595	608	621	8 10.4
36	634	647	660	673	686	699	711	724	737	750	9 11.7
37	763	776	789	802	815	827	840	853	866	879	
38	892	905	917	930	943	956	969	982	994	*007	
39	53 020	033	046	058	071	084	097	110	122	135	12
340	148	161	173	186	199	212	224	237	250	263	1 1.2
41	275	288	301	314	326	339	352	364	377	390	2 2.4
42	403	415	428	441	453	466	479	491	504	517	3 3.6
43	529	542	555	567	580	593	605	618	631	643	4 4.8
44	656	668	681	694	706	719	732	744	757	769	5 6.0
45	782	794	807	820	832	845	857	870	882	895	6 7.2
46	908	920	933	945	958	970	983	995	*008	*020	7 8.4
47	54 033	045	058	070	083	095	108	120	133	145	8 9.6
48	158	170	183	195	208	220	233	245	258	270	9 10.8
49	283	295	307	320	332	345	357	370	382	394	
350	407	419	432	444	456	469	481	494	506	518	
N.	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Prop. Pts.**

N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.
350	54 407	419	432	444	456	469	481	494	506	518	
51	531	543	555	568	580	593	605	617	630	642	
52	654	667	679	691	704	716	728	741	753	765	
53	777	790	802	814	827	839	851	864	876	888	13
54	900	913	925	937	949	962	974	986	998	*011	1 1.3
55	55 023	035	047	060	072	084	096	108	121	133	2 2.6
56	145	157	169	182	194	206	218	230	242	255	3 3.9
57	267	279	291	303	315	328	340	352	364	376	4 5.2
58	388	400	413	425	437	449	461	473	485	497	5 6.5
59	509	522	534	546	558	570	582	594	606	618	6 7.8
360	630	642	654	666	678	691	703	715	727	739	7 9.1
61	751	763	775	787	799	811	823	835	847	859	8 10.4
62	871	883	895	907	919	931	943	955	967	979	9 11.7
63	991	*003	*015	*027	*038	*050	*062	*074	*086	*098	
64	56 110	122	134	146	158	170	182	194	205	217	
65	229	241	253	265	277	289	301	312	324	336	12
66	348	360	372	384	396	407	419	431	443	455	1 1.2
67	467	478	490	502	514	526	538	549	561	573	2 2.4
68	585	597	608	620	632	644	656	667	679	691	3 3.6
69	703	714	726	738	750	761	773	785	797	808	4 4.8
370	820	832	844	855	867	879	891	902	914	926	5 6.0
71	937	949	961	972	984	996	*008	*019	*031	*043	6 7.2
72	57 054	066	078	089	101	113	124	136	148	159	7 8.4
73	171	183	194	206	217	229	241	252	264	276	8 9.6
74	287	299	310	322	334	345	357	368	380	392	9 10.8
75	403	415	426	438	449	461	473	484	496	507	
76	519	530	542	553	565	576	588	600	611	623	
77	634	646	657	669	680	692	703	715	726	738	11
78	749	761	772	784	795	807	818	830	841	852	1 1.1
79	864	875	887	898	910	921	933	944	955	967	2 2.2
380	978	990	*001	*013	*024	*035	*047	*058	*070	*081	3 3.3
81	58 092	104	115	127	138	149	161	172	184	195	4 4.4
82	206	218	229	240	252	263	274	286	297	309	5 5.5
83	320	331	343	354	365	377	388	399	410	422	6 6.6
84	433	444	456	467	478	490	501	512	524	535	7 7.7
85	546	557	569	580	591	602	614	625	636	647	8 8.8
86	659	670	681	692	704	715	726	737	749	760	9 9.9
87	771	782	794	805	816	827	838	850	861	872	
88	883	894	906	917	928	939	950	961	973	984	
89	995	*006	*017	*028	*040	*051	*062	*073	*084	*095	10
390	59 106	118	129	140	151	162	173	184	195	207	1 1.0
91	218	229	240	251	262	273	284	295	306	318	2 2.0
92	329	340	351	362	373	384	395	406	417	428	3 3.0
93	439	450	461	472	483	494	506	517	528	539	4 4.0
94	550	561	572	583	594	605	616	627	638	649	5 5.0
95	660	671	682	693	704	715	726	737	748	759	6 6.0
96	770	780	791	802	813	824	835	846	857	868	7 7.0
97	879	890	901	912	923	934	945	956	966	977	8 8.0
98	988	999	*010	*021	*032	*043	*054	*065	*076	*086	9 9.0
99	60 097	108	119	130	141	152	163	173	184	195	
400	206	217	228	239	249	260	271	282	293	304	
N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.

N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.
400	60 206	217	228	239	249	260	271	282	293	304	
01	314	325	336	347	358	369	379	390	401	412	
02	423	433	444	455	466	477	487	498	509	520	
03	531	541	552	563	574	584	595	606	617	627	
04	638	649	660	670	681	692	703	713	724	735	
05	746	756	767	778	788	799	810	821	831	842	
06	853	863	874	885	895	906	917	927	938	949	11
07	959	970	981	991	*002	*013	*023	*034	*045	*055	1 1.1
08	61 066	077	087	098	109	119	130	140	151	162	2 2.2
09	172	183	194	204	215	225	236	247	257	268	3 3.3
410	278	289	300	310	321	331	342	352	363	374	4 4.4
11	384	395	405	416	426	437	448	458	469	479	5 5.5
12	490	500	511	521	532	542	553	563	574	584	6 6.6
13	595	606	616	627	637	648	658	669	679	690	7 7.7
14	700	711	721	731	742	752	763	773	784	794	8 8.8
15	805	815	826	836	847	857	868	878	888	899	9 9.9
16	909	920	930	941	951	962	972	982	993	*003	
17	62 014	024	034	045	055	066	076	086	097	107	
18	118	128	138	149	159	170	180	190	201	211	
19	221	232	242	252	263	273	284	294	304	315	
420	325	335	346	356	366	377	387	397	408	418	
21	428	439	449	459	469	480	490	500	511	521	10
22	531	542	552	562	572	583	593	603	613	624	1 1.0
23	634	644	655	665	675	685	696	706	716	726	2 2.0
24	737	747	757	767	778	788	798	808	818	829	3 3.0
25	839	849	859	870	880	890	900	910	921	931	4 4.0
26	941	951	961	972	982	992	*002	*012	*022	*033	5 5.0
27	63 043	053	063	073	083	094	104	114	124	134	6 6.0
28	144	155	165	175	185	195	205	215	225	236	7 7.0
29	246	256	266	276	286	296	306	317	327	337	8 8.0
430	347	357	367	377	387	397	407	417	428	438	9 9.0
31	448	458	468	478	488	498	508	518	528	538	
32	548	558	568	579	589	599	609	619	629	639	
33	649	659	669	679	689	699	709	719	729	739	
34	749	759	769	779	789	799	809	819	829	839	
35	849	859	869	879	889	899	909	919	929	939	
36	949	959	969	979	988	998	*008	*018	*028	*038	
37	64 048	058	068	078	088	098	108	118	128	137	9
38	147	157	167	177	187	197	207	217	227	237	1 0.9
39	246	256	266	276	286	296	306	316	326	335	2 1.8
440	345	355	365	375	385	395	404	414	424	434	3 2.7
41	444	454	464	473	483	493	503	513	523	532	4 3.6
42	542	552	562	572	582	591	601	611	621	631	5 4.5
43	640	650	660	670	680	689	699	709	719	729	6 5.4
44	738	748	758	768	777	787	797	807	816	826	7 6.3
45	836	846	856	865	875	885	895	904	914	924	8 7.2
46	933	943	953	963	972	982	992	*002	*011	*021	9 8.1
47	65 031	040	050	060	070	079	089	099	108	118	
48	128	137	147	157	167	176	186	196	205	215	
49	225	234	244	254	263	273	283	292	302	312	
450	321	331	341	350	360	369	379	389	398	408	
N.	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Prop. Pts.**

N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.
450	65 321	331	341	350	360	369	379	389	398	408	
51	418	427	437	447	456	466	475	485	495	504	
52	514	523	533	543	552	562	571	581	591	600	
53	610	619	629	639	648	658	667	677	686	696	
54	706	715	725	734	744	753	763	772	782	792	
55	801	811	820	830	839	849	858	868	877	887	
56	896	906	916	925	935	944	954	963	973	982	10
57	992	*001	*011	*020	*030	*039	*049	*058	*068	*077	1 1.0
58	66 087	096	106	115	124	134	143	153	162	172	2 2.0
59	181	191	200	210	219	229	238	247	257	266	3 3.0
460	276	285	295	304	314	323	332	342	351	361	4 4.0
61	370	380	389	398	408	417	427	436	445	455	5 5.0
62	464	474	483	492	502	511	521	530	539	549	6 6.0
63	558	567	577	586	596	605	614	624	633	642	7 7.0
64	652	661	671	680	689	699	708	717	727	736	8 8.0
65	745	755	764	773	783	792	801	811	820	829	9 9.0
66	839	848	857	867	876	885	894	904	913	922	
67	932	941	950	960	969	978	987	997	*006	*015	
68	67 025	034	043	052	062	071	080	089	099	108	
69	117	127	136	145	154	164	173	182	191	201	
470	210	219	228	237	247	256	265	274	284	293	
71	302	311	321	330	339	348	357	367	376	385	9
72	394	403	413	422	431	440	449	459	468	477	1 0.9
73	486	495	504	514	523	532	541	550	560	569	2 1.8
74	578	587	596	605	614	624	633	642	651	660	3 2.7
75	669	679	688	697	706	715	724	733	742	752	4 3.6
76	761	770	779	788	797	806	815	825	834	843	5 4.5
77	852	861	870	879	888	897	906	916	925	934	6 5.4
78	943	952	961	970	979	988	997	*006	*015	*024	7 6.3
79	68 034	043	052	061	070	079	088	097	106	115	8 7.2
480	124	133	142	151	160	169	178	187	196	205	9 8.1
81	215	224	233	242	251	260	269	278	287	296	
82	305	314	323	332	341	350	359	368	377	386	
83	395	404	413	422	431	440	449	458	467	476	
84	485	494	502	511	520	529	538	547	556	565	
85	574	583	592	601	610	619	628	637	646	655	
86	664	673	681	690	699	708	717	726	735	744	8
87	753	762	771	780	789	797	806	815	824	833	1 0.8
88	842	851	860	869	878	886	895	904	913	922	2 1.6
89	931	940	949	958	966	975	984	993	*002	*011	3 2.4
490	69 020	028	037	046	055	064	073	082	090	099	4 3.2
91	108	117	126	135	144	152	161	170	179	188	5 4.0
92	197	205	214	223	232	241	249	258	267	276	6 4.8
93	285	294	302	311	320	329	338	346	355	364	7 5.6
94	373	381	390	399	408	417	425	434	443	452	8 6.4
95	461	469	478	487	496	504	513	522	531	539	9 7.2
96	548	557	566	574	583	592	601	609	618	627	
97	636	644	653	662	671	679	688	697	705	714	
98	723	732	740	749	758	767	775	784	793	801	
99	810	819	827	836	845	854	862	871	880	888	
500	897	906	914	923	932	940	949	958	966	975	
N.	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Prop. Pts.**

N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.
500	69 897	906	914	923	932	940	949	958	966	975	
01	984	992	*001	*010	*018	*027	*036	*044	*053	*062	
02	70 070	079	088	096	105	114	122	131	140	148	
03	157	165	174	183	191	200	209	217	226	234	
04	243	252	260	269	278	286	295	303	312	321	
05	329	338	346	355	364	372	381	389	398	406	
06	415	424	432	441	449	458	467	475	484	492	9
07	501	509	518	526	535	544	552	561	569	578	1 0.9
08	586	595	603	612	621	629	638	646	655	663	2 1.8
09	672	680	689	697	706	714	723	731	740	749	3 2.7
510	757	766	774	783	791	800	808	817	825	834	4 3.6
11	842	851	859	868	876	885	893	902	910	919	5 4.5
12	927	935	944	952	961	969	978	986	995	*003	6 5.4
13	71 012	020	029	037	046	054	063	071	079	088	7 6.3
14	096	105	113	122	130	139	147	155	164	172	8 7.2
15	181	189	198	206	214	223	231	240	248	257	9 8.1
16	265	273	282	290	299	307	315	324	332	341	
17	349	357	366	374	383	391	399	408	416	425	
18	433	441	450	458	466	475	483	492	500	508	
19	517	525	533	542	550	559	567	575	584	592	
520	600	609	617	625	634	642	650	659	667	675	
21	684	692	700	709	717	725	734	742	750	759	8
22	767	775	784	792	800	809	817	825	834	842	1 0.8
23	850	858	867	875	883	892	900	908	917	925	2 1.6
24	933	941	950	958	966	975	983	991	999	*008	3 2.4
25	72 016	024	032	041	049	057	066	074	082	090	4 3.2
26	099	107	115	123	132	140	148	156	165	173	5 4.0
27	181	189	198	206	214	222	230	239	247	255	6 4.8
28	263	272	280	288	296	304	313	321	329	337	7 5.6
29	346	354	362	370	378	387	395	403	411	419	8 6.4
530	428	436	444	452	460	469	477	485	493	501	9 7.2
31	509	518	526	534	542	550	558	567	575	583	
32	591	599	607	616	624	632	640	648	656	665	
33	673	681	689	697	705	713	722	730	738	746	
34	754	762	770	779	787	795	803	811	819	827	
35	835	843	852	860	868	876	884	892	900	908	
36	916	925	933	941	949	957	965	973	981	989	7
37	997	*006	*014	*022	*030	*038	*046	*054	*062	*070	1 0.7
38	73 078	086	094	102	111	119	127	135	143	151	2 1.4
39	159	167	175	183	191	199	207	215	223	231	3 2.1
540	239	247	255	263	272	280	288	296	304	312	4 2.8
41	320	328	336	344	352	360	368	376	384	392	5 3.5
42	400	408	416	424	432	440	448	456	464	472	6 4.2
43	480	488	496	504	512	520	528	536	544	552	7 4.9
44	560	568	576	584	592	600	608	616	624	632	8 5.6
45	640	648	656	664	672	679	687	695	703	711	9 6.3
46	719	727	735	743	751	759	767	775	783	791	
47	799	807	815	823	830	838	846	854	862	870	
48	878	886	894	902	910	918	926	933	941	949	
49	957	965	973	981	989	997	*005	*013	*020	*028	
550	74 036	044	052	060	068	076	084	092	099	107	
N.	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Prop. Pts.**

N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.
550	74 036	044	052	060	068	076	084	092	099	107	
51	115	123	131	139	147	155	162	170	178	186	
52	194	202	210	218	225	233	241	249	257	265	
53	273	280	288	296	304	312	320	327	335	343	
54	351	359	367	374	382	390	398	406	414	421	
55	429	437	445	453	461	468	476	484	492	500	
56	507	515	523	531	539	547	554	562	570	578	
57	586	593	601	609	617	624	632	640	648	656	
58	663	671	679	687	695	702	710	718	726	733	
59	741	749	757	764	772	780	788	796	803	811	
560	819	827	834	842	850	858	865	873	881	889	
61	896	904	912	920	927	935	943	950	958	966	8
62	974	981	989	997	*005	*012	*020	*028	*035	*043	1 0.8
63	75 051	059	066	074	082	089	097	105	113	120	2 1.6
64	128	136	143	151	159	166	174	182	189	197	3 2.4
65	205	213	220	228	236	243	251	259	266	274	4 3.2
66	282	289	297	305	312	320	328	335	343	351	5 4.0
67	358	366	374	381	389	397	404	412	420	427	6 4.8
68	435	442	450	458	465	473	481	488	496	504	7 5.6
69	511	519	526	534	542	549	557	565	572	580	8 6.4
570	587	595	603	610	618	626	633	641	648	656	9 7.2
71	664	671	679	686	694	702	709	717	724	732	
72	740	747	755	762	770	778	785	793	800	808	
73	815	823	831	838	846	853	861	868	876	884	
74	891	899	906	914	921	929	937	944	952	959	
75	967	974	982	989	997	*005	*012	*020	*027	*035	
76	76 042	050	057	065	072	080	087	095	103	110	
77	118	125	133	140	148	155	163	170	178	185	
78	193	200	208	215	223	230	238	245	253	260	
79	268	275	283	290	298	305	313	320	328	335	
580	343	350	358	365	373	380	388	395	403	410	
81	418	425	433	440	448	455	462	470	477	485	
82	492	500	507	515	522	530	537	545	552	559	
83	567	574	582	589	597	604	612	619	626	634	7
84	641	649	656	664	671	678	686	693	701	708	1 0.7
85	716	723	730	738	745	753	760	768	775	782	2 1.4
86	790	797	805	812	819	827	834	842	849	856	3 2.1
87	864	871	879	886	893	901	908	916	923	930	4 2.8
88	938	945	953	960	967	975	982	989	997	*004	5 3.5
89	77 012	019	026	034	041	048	056	063	070	078	6 4.2
590	085	093	100	107	115	122	129	137	144	151	7 4.9
91	159	166	173	181	188	195	203	210	217	225	8 5.6
92	232	240	247	254	262	269	276	283	291	298	9 6.3
93	305	313	320	327	335	342	349	357	364	371	
94	379	386	393	401	408	415	422	430	437	444	
95	452	459	466	474	481	488	495	503	510	517	
96	525	532	539	546	554	561	568	576	583	590	
97	597	605	612	619	627	634	641	648	656	663	
98	670	677	685	692	699	706	714	721	728	735	
99	743	750	757	764	772	779	786	793	801	808	
600	815	822	830	837	844	851	859	866	873	880	
N.	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Prop. Pts.**

N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.
600	77 815	822	830	837	844	851	859	866	873	880	
01	887	895	902	909	916	924	931	938	945	952	
02	960	967	974	981	988	996	*003	*010	*017	*025	
03	78 032	039	046	053	061	068	075	082	089	097	
04	104	111	118	125	132	140	147	154	161	168	
05	176	183	190	197	204	211	219	226	233	240	
06	247	254	262	269	276	283	290	297	305	312	8
07	319	326	333	340	347	355	362	369	376	383	1 0.8
08	390	398	405	412	419	426	433	440	447	455	2 1.6
09	462	469	476	483	490	497	504	512	519	526	3 2.4
610	533	540	547	554	561	569	576	583	590	597	4 3.2
11	604	611	618	625	633	640	647	654	661	668	5 4.0
12	675	682	689	696	704	711	718	725	732	739	6 4.8
13	746	753	760	767	774	781	789	796	803	810	7 5.6
14	817	824	831	838	845	852	859	866	873	880	8 6.4
15	888	895	902	909	916	923	930	937	944	951	9 7.2
16	958	965	972	979	986	993	*000	*007	*014	*021	
17	79 029	036	043	050	057	064	071	078	085	092	
18	099	106	113	120	127	134	141	148	155	162	
19	169	176	183	190	197	204	211	218	225	232	
620	239	246	253	260	267	274	281	288	295	302	
21	309	316	323	330	337	344	351	358	365	372	7
22	379	386	393	400	407	414	421	428	435	442	1 0.7
23	449	456	463	470	477	484	491	498	505	511	2 1.4
24	518	525	532	539	546	553	560	567	574	581	3 2.1
25	588	595	602	609	616	623	630	637	644	650	4 2.8
26	657	664	671	678	685	692	699	706	713	720	5 3.5
27	727	734	741	748	754	761	768	775	782	789	6 4.2
28	796	803	810	817	824	831	837	844	851	858	7 4.9
29	865	872	879	886	893	900	906	913	920	927	8 5.6
630	934	941	948	955	962	969	975	982	989	996	9 6.3
31	80 003	010	017	024	030	037	044	051	058	065	
32	072	079	085	092	099	106	113	120	127	134	
33	140	147	154	161	168	175	182	188	195	202	
34	209	216	223	229	236	243	250	257	264	271	
35	277	284	291	298	305	312	318	325	332	339	
36	346	353	359	366	373	380	387	393	400	407	6
37	414	421	428	434	441	448	455	462	468	475	1 0.6
38	482	489	496	502	509	516	523	530	536	543	2 1.2
39	550	557	564	570	577	584	591	598	604	611	3 1.8
640	618	625	632	638	645	652	659	665	672	679	4 2.4
41	686	693	699	706	713	720	726	733	740	747	5 3.0
42	754	760	767	774	781	787	794	801	808	814	6 3.6
43	821	828	835	841	848	855	862	868	875	882	7 4.2
44	889	895	902	909	916	922	929	936	943	949	8 4.8
45	956	963	969	976	983	990	996	*003	*010	*017	9 5.4
46	81 023	030	037	043	050	057	064	070	077	084	
47	090	097	104	111	117	124	131	137	144	151	
48	158	164	171	178	184	191	198	204	211	218	
49	224	231	238	245	251	258	265	271	278	285	
650	291	298	305	311	318	325	331	338	345	351	
N.	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Prop. Pts.**

N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.
650	81 291	298	305	311	318	325	331	338	345	351	
51	358	365	371	378	385	391	398	405	411	418	
52	425	431	438	445	451	458	465	471	478	485	
53	491	498	505	511	518	525	531	538	544	551	
54	558	564	571	578	584	591	598	604	611	617	
55	624	631	637	644	651	657	664	671	677	684	
56	690	697	704	710	717	723	730	737	743	750	
57	757	763	770	776	783	790	796	803	809	816	
58	823	829	836	842	849	856	862	869	875	882	
59	889	895	902	908	915	921	928	935	941	948	
660	954	961	968	974	981	987	994	*000	*007	*014	
61	82 020	027	033	040	046	053	060	066	073	079	7
62	086	092	099	105	112	119	125	132	138	145	
63	151	158	164	171	178	184	191	197	204	210	1 0.7
64	217	223	230	236	243	249	256	263	269	276	2 1.4
65	282	289	295	302	308	315	321	328	334	341	3 2.1
66	347	354	360	367	373	380	387	393	400	406	4 2.8
67	413	419	426	432	439	445	452	458	465	471	5 3.5
68	478	484	491	497	504	510	517	523	530	536	6 4.2
69	543	549	556	562	569	575	582	588	595	601	7 4.9
670	607	614	620	627	633	640	646	653	659	666	8 5.6
71	672	679	685	692	698	705	711	718	724	730	9 6.3
72	737	743	750	756	763	769	776	782	789	795	
73	802	808	814	821	827	834	840	847	853	860	
74	866	872	879	885	892	898	905	911	918	924	
75	930	937	943	950	956	963	969	975	982	988	
76	995	*001	*008	*014	*020	*027	*033	*040	*046	*052	
77	83 059	065	072	078	085	091	097	104	110	117	
78	123	129	136	142	149	155	161	168	174	181	
79	187	193	200	206	213	219	225	232	238	245	
680	251	257	264	270	276	283	289	296	302	308	
81	315	321	327	334	340	347	353	359	366	372	
82	378	385	391	398	404	410	417	423	429	436	
83	442	448	455	461	467	474	480	487	493	499	6
84	506	512	518	525	531	537	544	550	556	563	1 0.6
85	569	575	582	588	594	601	607	613	620	626	2 1.2
86	632	639	645	651	658	664	670	677	683	689	3 1.8
87	696	702	708	715	721	727	734	740	746	753	4 2.4
88	759	765	771	778	784	790	797	803	809	816	5 3.0
89	822	828	835	841	847	853	860	866	872	879	6 3.6
690	885	891	897	904	910	916	923	929	935	942	7 4.2
91	948	954	960	967	973	979	985	992	998	*004	8 4.8
92	84 011	017	023	029	036	042	048	055	061	067	9 5.4
93	073	080	086	092	098	105	111	117	123	130	
94	136	142	148	155	161	167	173	180	186	192	
95	198	205	211	217	223	230	236	242	248	255	
96	261	267	273	280	286	292	298	305	311	317	
97	323	330	336	342	348	354	361	367	373	379	
98	386	392	398	404	410	417	423	429	435	442	
99	448	454	460	466	473	479	485	491	497	504	
700	510	516	522	528	535	541	547	553	559	566	
N.	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Prop. Pts.**

N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.
800	90 309	314	320	325	331	336	342	347	352	358	
01	363	369	374	380	385	390	396	401	407	412	
02	417	423	428	434	439	445	450	455	461	466	
03	472	477	482	488	493	499	504	509	515	520	
04	526	531	536	542	547	553	558	563	569	574	
05	580	585	590	596	601	607	612	617	623	628	
06	634	639	644	650	655	660	666	671	677	682	
07	687	693	698	703	709	714	720	725	730	736	
08	741	747	752	757	763	768	773	779	784	789	
09	795	800	806	811	816	822	827	832	838	843	
810	849	854	859	865	870	875	881	886	891	897	
11	902	907	913	918	924	929	934	940	945	950	
12	956	961	966	972	977	982	988	993	998	*004	
13	91 009	014	020	025	030	036	041	046	052	057	
14	062	068	073	078	084	089	094	100	105	110	
15	116	121	126	132	137	142	148	153	158	164	
16	169	174	180	185	190	196	201	206	212	217	
17	222	228	233	238	243	249	254	259	265	270	
18	275	281	286	291	297	302	307	312	318	323	
19	328	334	339	344	350	355	360	365	371	376	
820	381	387	392	397	403	408	413	418	424	429	
21	434	440	445	450	455	461	466	471	477	482	
22	487	492	498	503	508	514	519	524	529	535	
23	540	545	551	556	561	566	572	577	582	587	
24	593	598	603	609	614	619	624	630	635	640	
25	645	651	656	661	666	672	677	682	687	693	
26	698	703	709	714	719	724	730	735	740	745	
27	751	756	761	766	772	777	782	787	793	798	
28	803	808	814	819	824	829	834	840	845	850	
29	855	861	866	871	876	882	887	892	897	903	
830	908	913	918	924	929	934	939	944	950	955	
31	960	965	971	976	981	986	991	997	*002	*007	
32	92 012	018	023	028	033	038	044	049	054	059	
33	065	070	075	080	085	091	096	101	106	111	
34	117	122	127	132	137	143	148	153	158	163	
35	169	174	179	184	189	195	200	205	210	215	
36	221	226	231	236	241	247	252	257	262	267	
37	273	278	283	288	293	298	304	309	314	319	
38	324	330	335	340	345	350	355	361	366	371	
39	376	381	387	392	397	402	407	412	418	423	
840	428	433	438	443	449	454	459	464	469	474	
41	480	485	490	495	500	505	511	516	521	526	
42	531	536	542	547	552	557	562	567	572	578	
43	583	588	593	598	603	609	614	619	624	629	
44	634	639	645	650	655	660	665	670	675	681	
45	686	691	696	701	706	711	716	722	727	732	
46	737	742	747	752	758	763	768	773	778	783	
47	788	793	799	804	809	814	819	824	829	834	
48	840	845	850	855	860	865	870	875	881	886	
49	891	896	901	906	911	916	921	927	932	937	
850	942	947	952	957	962	967	973	978	983	988	
N.	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Prop. Pts.**

6	
1	0.6
2	1.2
3	1.8
4	2.4
5	3.0
6	3.6
7	4.2
8	4.8
9	5.4

5	
1	0.5
2	1.0
3	1.5
4	2.0
5	2.5
6	3.0
7	3.5
8	4.0
9	4.5

N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.
850	92 942	947	952	957	962	967	973	978	983	988	
51	993	998	*003	*008	*013	*018	*024	*029	*034	*039	
52	93 044	049	054	059	064	069	075	080	085	090	
53	095	100	105	110	115	120	125	131	136	141	
54	146	151	156	161	166	171	176	181	186	192	
55	197	202	207	212	217	222	227	232	237	242	
56	247	252	258	263	268	273	278	283	288	293	6
57	298	303	308	313	318	323	328	334	339	344	1 0.6
58	349	354	359	364	369	374	379	384	389	394	2 1.2
59	399	404	409	414	420	425	430	435	440	445	3 1.8
860	450	455	460	465	470	475	480	485	490	495	4 2.4
61	500	505	510	515	520	526	531	536	541	546	5 3.0
62	551	556	561	566	571	576	581	586	591	596	6 3.6
63	601	606	611	616	621	626	631	636	641	646	7 4.2
64	651	656	661	666	671	676	682	687	692	697	8 4.8
65	702	707	712	717	722	727	732	737	742	747	9 5.4
66	752	757	762	767	772	777	782	787	792	797	
67	802	807	812	817	822	827	832	837	842	847	
68	852	857	862	867	872	877	882	887	892	897	
69	902	907	912	917	922	927	932	937	942	947	
870	952	957	962	967	972	977	982	987	992	997	
71	94 002	007	012	017	022	027	032	037	042	047	5
72	052	057	062	067	072	077	082	086	091	096	1 0.5
73	101	106	111	116	121	126	131	136	141	146	2 1.0
74	151	156	161	166	171	176	181	186	191	196	3 1.5
75	201	206	211	216	221	226	231	236	240	245	4 2.0
76	250	255	260	265	270	275	280	285	290	295	5 2.5
77	300	305	310	315	320	325	330	335	340	345	6 3.0
78	349	354	359	364	369	374	379	384	389	394	7 3.5
79	399	404	409	414	419	424	429	433	438	443	8 4.0
880	448	453	458	463	468	473	478	483	488	493	9 4.5
81	498	503	507	512	517	522	527	532	537	542	
82	547	552	557	562	567	571	576	581	586	591	
83	596	601	606	611	616	621	626	630	635	640	
84	645	650	655	660	665	670	675	680	685	689	
85	694	699	704	709	714	719	724	729	734	738	
86	743	748	753	758	763	768	773	778	783	787	4
87	792	797	802	807	812	817	822	827	832	836	1 0.4
88	841	846	851	856	861	866	871	876	880	885	2 0.8
89	890	895	900	905	910	915	919	924	929	934	3 1.2
890	939	944	949	954	959	963	968	973	978	983	4 1.6
91	988	993	998	*002	*007	*012	*017	*022	*027	*032	5 2.0
92	95 036	041	046	051	056	061	066	071	075	080	6 2.4
93	085	090	095	100	105	109	114	119	124	129	7 2.8
94	134	139	143	148	153	158	163	168	173	177	8 3.2
95	182	187	192	197	202	207	211	216	221	226	9 3.6
96	231	236	240	245	250	255	260	265	270	274	
97	279	284	289	294	299	303	308	313	318	323	
98	328	332	337	342	347	352	357	361	366	371	
99	376	381	386	390	395	400	405	410	415	419	
900	424	429	434	439	444	448	453	458	463	468	
N.	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Prop. Pts.**

N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.
900	95 424	429	434	439	444	448	453	458	463	468	
01	472	477	482	487	492	497	501	506	511	516	
02	521	525	530	535	540	545	550	554	559	564	
03	569	574	578	583	588	593	598	602	607	612	
04	617	622	626	631	636	641	646	650	655	660	
05	665	670	674	679	684	689	694	698	703	708	
06	713	718	722	727	732	737	742	746	751	756	
07	761	766	770	775	780	785	789	794	799	804	
08	809	813	818	823	828	832	837	842	847	852	
09	856	861	866	871	875	880	885	890	895	899	
910	904	909	914	918	923	928	933	938	942	947	
11	952	957	961	966	971	976	980	985	990	995	5
12	999	*004	*009	*014	*019	*023	*028	*033	*038	*042	1 0.5
13	96 047	052	057	061	066	071	076	080	085	090	2 1.0
14	095	099	104	109	114	118	123	128	133	137	3 1.5
15	142	147	152	156	161	166	171	175	180	185	4 2.0
16	190	194	199	204	209	213	218	223	227	232	5 2.5
17	237	242	246	251	256	261	265	270	275	280	6 3.0
18	284	289	294	298	303	308	313	317	322	327	7 3.5
19	332	336	341	346	350	355	360	365	369	374	8 4.0
920	379	384	388	393	398	402	407	412	417	421	9 4.5
21	426	431	435	440	445	450	454	459	464	468	
22	473	478	483	487	492	497	501	506	511	515	
23	520	525	530	534	539	544	548	553	558	562	
24	567	572	577	581	586	591	595	600	605	609	
25	614	619	624	628	633	638	642	647	652	656	
26	661	666	670	675	680	685	689	694	699	703	
27	708	713	717	722	727	731	736	741	745	750	
28	755	759	764	769	774	778	783	788	792	797	
29	802	806	811	816	820	825	830	834	839	844	
930	848	853	858	862	867	872	876	881	886	890	
31	895	900	904	909	914	918	923	928	932	937	4
32	942	946	951	956	960	965	970	974	979	984	1 0.4
33	988	993	997	*002	*007	*011	*016	*021	*025	*030	2 0.8
34	97 035	039	044	049	053	058	063	067	072	077	3 1.2
35	081	086	090	095	100	104	109	114	118	123	4 1.6
36	128	132	137	142	146	151	155	160	165	169	5 2.0
37	174	179	183	188	192	197	202	206	211	216	6 2.4
38	220	225	230	234	239	243	248	253	257	262	7 2.8
39	267	271	276	280	285	290	294	299	304	308	8 3.2
940	313	317	322	327	331	336	340	345	350	354	9 3.6
41	359	364	368	373	377	382	387	391	396	400	
42	405	410	414	419	424	428	433	437	442	447	
43	451	456	460	465	470	474	479	483	488	493	
44	497	502	506	511	516	520	525	529	534	539	
45	543	548	552	557	562	566	571	575	580	585	
46	589	594	598	603	607	612	617	621	626	630	
47	635	640	644	649	653	658	663	667	672	676	
48	681	685	690	695	699	704	708	713	717	722	
49	727	731	736	740	745	749	754	759	763	768	
950	772	777	782	786	791	795	800	804	809	813	
N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.

N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.
950	97 772	777	782	786	791	795	800	804	809	813	
51	818	823	827	832	836	841	845	850	855	859	
52	864	868	873	877	882	886	891	896	900	905	
53	909	914	918	923	928	932	937	941	946	950	
54	955	959	964	968	973	978	982	987	991	996	
55	98 000	005	009	014	019	023	028	032	037	041	
56	046	050	055	059	064	068	073	078	082	087	
57	091	096	100	105	109	114	118	123	127	132	
58	137	141	146	150	155	159	164	168	173	177	
59	182	186	191	195	200	204	209	214	218	223	
960	227	232	236	241	245	250	254	259	263	268	
61	272	277	281	286	290	295	299	304	308	313	5
62	318	322	327	331	336	340	345	349	354	358	1 0.5
63	363	367	372	376	381	385	390	394	399	403	2 1.0
64	408	412	417	421	426	430	435	439	444	448	3 1.5
65	453	457	462	466	471	475	480	484	489	493	4 2.0
66	498	502	507	511	516	520	525	529	534	538	5 2.5
67	543	547	552	556	561	565	570	574	579	583	6 3.0
68	588	592	597	601	605	610	614	619	623	628	7 3.5
69	632	637	641	646	650	655	659	664	668	673	8 4.0
970	677	682	686	691	695	700	704	709	713	717	9 4.5
71	722	726	731	735	740	744	749	753	758	762	
72	767	771	776	780	784	789	793	798	802	807	
73	811	816	820	825	829	834	838	843	847	851	
74	856	860	865	869	874	878	883	887	892	896	
75	900	905	909	914	918	923	927	932	936	941	
76	945	949	954	958	963	967	972	976	981	985	
77	989	994	998	*003	*007	*012	*016	*021	*025	*029	
78	99 034	038	043	047	052	056	061	065	069	074	
79	078	083	087	092	096	100	105	109	114	118	
980	123	127	131	136	140	145	149	154	158	162	
81	167	171	176	180	185	189	193	198	202	207	4
82	211	216	220	224	229	233	238	242	247	251	1 0.4
83	255	260	264	269	273	277	282	286	291	295	2 0.8
84	300	304	308	313	317	322	326	330	335	339	3 1.2
85	344	348	352	357	361	366	370	374	379	383	4 1.6
86	388	392	396	401	405	410	414	419	423	427	5 2.0
87	432	436	441	445	449	454	458	463	467	471	6 2.4
88	476	480	484	489	493	498	502	506	511	515	7 2.8
89	520	524	528	533	537	542	546	550	555	559	8 3.2
990	564	568	572	577	581	585	590	594	599	603	9 3.6
91	607	612	616	621	625	629	634	638	642	647	
92	651	656	660	664	669	673	677	682	686	691	
93	695	699	704	708	712	717	721	726	730	734	
94	739	743	747	752	756	760	765	769	774	778	
95	782	787	791	795	800	804	808	813	817	822	
96	826	830	835	839	843	848	852	856	861	865	
97	870	874	878	883	887	891	896	900	904	909	
98	913	917	922	926	930	935	939	944	948	952	
99	957	961	965	970	974	978	983	987	991	996	
1000	00 000	004	009	013	017	022	026	030	035	039	
N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.

TABLE II.

CONSTANTS WITH THEIR LOGARITHMS.

	Number.	Logarithm.
π (ratio of circumference to diameter) . . .	3.14159265	0.49714 99
π^2	9.86960440	0.99429 97
$\sqrt{\pi}$	1.77245385	0.24857 49
$\frac{1}{\pi}$	0.31830989	9.50285 01—10
$\frac{1}{\pi^2}$	0.10132118	9.00570 03—10
$\frac{1}{\sqrt{\pi}}$	0.56418958	9.75142 51—10
Number of degrees in circumference	360°	2.55630 25
" minutes "	21600′	4.33445 38
" seconds "	1296000″	6.11260 50
Degrees in arc equal to radius	57°.2957795	1.75812 26
Minutes " " "	3437′.74677	3.53627 39
Seconds " " "	206264″.806	5.31442 51
Length of arc of 1 degree	.01745329	8.24187 74—10
" " 1 minute	.00029089	6.46372 61—10
" " 1 second	.000004848	4.68557 49—10
Napierian base	2.718281828	0.43429 45
Modulus of common logarithms	0.434294482	9.63778 43—10
Hours in which earth revolves through arc equal to radius	3.8197186	0.58203 14
Equat. radius of earth, miles (Clarke, 1878)	3963.296	3.59805 65
Polar " " " " "	3949.790	3.59657 40
Mean " " "	3956.	3.59725 63
Inches in 1 metre (U. S. Standard)	39.37	1.59516 54
" 1 " (British Standard)	39.37079	1.59517 41
" 1 " (Clarke, 1866)	39.37043	1.59517 01
Feet in 1 mile	5280.	3.72263 39
Feet in 1 nautical mile (U. S. Coast Survey)	6080.290	3.78392 43
Feet per second in 1 mile per hour	1.466667	.16633 15
Miles per hour in 1 foot per second	0.681818	9.83366 86—10

TABLE III.

LOGARITHMS

OF THE

SINE, COSINE, TANGENT, AND COTANGENT

FOR

EACH MINUTE OF THE QUADRANT.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.		Prop. Pts.
0	. . . .		. . . .		. . . .	0.00 000	60	
1	6.46 373	30103	6.46 373	30103	3.53 627	0.00 000	59	d. p. p. 1″
2	6.76 476	17609	6.76 476	17609	3.23 524	0.00 000	58	30103 501.72
3	6.94 085	12494	6.94 085	12494	3.05 915	0.00 000	57	17609 293.48
4	7.06 579	9691	7.06 579	9691	2.93 421	0.00 000	56	12494 208.23
5	7.16 270	7918	7.16 270	7918	2.83 730	0.00 000	55	9691 161.52
6	7.24 188	6694	7.24 188	6694	2.75 812	0.00 000	54	7918 131.97
7	7.30 882	5800	7.30 882	5800	2.69 118	0.00 000	53	6694 111.57
8	7.36 682	5115	7.36 682	5115	2.63 318	0.00 000	52	5800 96.67
9	7.41 797	4576	7.41 797	4576	2.58 203	0.00 000	51	5115 85.25
10	7.46 373	4139	7.46 373	4139	2.53 627	0.00 000	50	4576 76.27
11	7.50 512	3779	7.50 512	3779	2.49 488	0.00 000	49	4139 68.98
12	7.54 291	3476	7.54 291	3476	2.45 709	0.00 000	48	3779 62.98
13	7.57 767	3218	7.57 767	3219	2.42 233	0.00 000	47	3476 57.93
14	7.60 985	2997	7.60 986	2996	2.39 014	0.00 000	46	3219 53.65
15	7.63 982	2802	7.63 982	2803	2.36 018	0.00 000	45	3218 53.63
16	7.66 784	2633	7.66 785	2633	2.33 215	0.00 000	44	2997 49.95
17	7.69 417	2483	7.69 418	2482	2.30 582	9.99 999	43	2996 49.93
18	7.71 900	2348	7.71 900	2348	2.28 100	9.99 999	42	2803 46.72
19	7.74 248	2227	7.74 248	2228	2.25 752	9.99 999	41	2802 46.70
20	7.76 475	2119	7.76 476	2119	2.23 524	9.99 999	40	2633 43.88
21	7.78 594	2021	7.78 595	2020	2.21 405	9.99 999	39	2483 41.38
22	7.80 615	1930	7.80 615	1931	2.19 385	9.99 999	38	2482 41.37
23	7.82 545	1848	7.82 546	1848	2.17 454	9.99 999	37	2348 39.13
24	7.84 393	1773	7.84 394	1773	2.15 606	9.99 999	36	2228 37.13
25	7.86 166	1704	7.86 167	1704	2.13 833	9.99 999	35	2227 37.12
26	7.87 870	1639	7.87 871	1639	2.12 129	9.99 999	34	2119 35.32
27	7.89 509	1579	7.89 510	1579	2.10 490	9.99 999	33	2021 33.68
28	7.91 088	1524	7.91 089	1524	2.08 911	9.99 999	32	2020 33.67
29	7.92 612	1472	7.92 613	1473	2.07 387	9.99 998	31	1931 32.18
30	7.94 084	1424	7.94 086	1424	2.05 914	9.99 998	30	1930 32.17
31	7.95 508	1379	7.95 510	1379	2.04 490	9.99 998	29	1848 30.80
32	7.96 887	1336	7.96 889	1336	2.03 111	9.99 998	28	1773 29.55
33	7.98 223	1297	7.98 225	1297	2.01 775	9.99 998	27	1704 28.40
34	7.99 520	1259	7.99 522	1259	2.00 478	9.99 998	26	1639 27.32
35	8.00 779	1223	8.00 781	1223	1.99 219	9.99 998	25	1579 26.32
36	8.02 002	1190	8.02 004	1190	1.97 996	9.99 998	24	1524 25.40
37	8.03 192	1158	8.03 194	1159	1.96 806	9.99 997	23	1473 24.55
38	8.04 350	1128	8.04 353	1128	1.95 647	9.99 997	22	1472 24.53
39	8.05 478	1100	8.05 481	1100	1.94 519	9.99 997	21	1424 23.73
40	8.06 578	1072	8.06 581	1072	1.93 419	9.99 997	20	1379 22.98
41	8.07 650	1046	8.07 653	1047	1.92 347	9.99 997	19	
42	8.08 696	1022	8.08 700	1022	1.91 300	9.99 997	18	
43	8.09 718	999	8.09 722	998	1.90 278	9.99 997	17	
44	8.10 717	976	8.10 720	976	1.89 280	9.99 996	16	
45	8.11 693	954	8.11 696	955	1.88 304	9.99 996	15	
46	8.12 647	934	8.12 651	934	1.87 349	9.99 996	14	
47	8.13 581	914	8.13 585	915	1.86 415	9.99 996	13	
48	8.14 495	896	8.14 500	895	1.85 500	9.99 996	12	
49	8.15 391	877	8.15 395	878	1.84 603	9.99 996	11	
50	8.16 268	860	8.16 273	860	1.83 727	9.99 995	10	
51	8.17 128	843	8.17 133	843	1.82 867	9.99 995	9	
52	8.17 971	827	8.17 976	828	1.82 024	9.99 995	8	
53	8.18 798	812	8.18 804	812	1.81 196	9.99 995	7	
54	8.19 610	797	8.19 616	797	1.80 384	9.99 995	6	
55	8.20 407	782	8.20 413	782	1.79 587	9.99 994	5	
56	8.21 189	769	8.21 195	769	1.78 805	9.99 994	4	
57	8.21 958	755	8.21 964	756	1.78 036	9.99 994	3	
58	8.22 713	743	8.22 720	742	1.77 280	9.99 994	2	
59	8.23 456	730	8.23 462	730	1.76 538	9.99 994	1	
60	8.24 186		8.24 192		1.75 808	9.99 993	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.		Prop. Pts.
0	8.24 186		8.24 192		1.75 808	9.99 993	60	
1	8.24 903	717	8.24 910	718	1.75 090	9.99 993	59	
2	8.25 609	706	8.25 616	706	1.74 384	9.99 993	58	
3	8.26 304	695	8.26 312	696	1.73 688	9.99 993	57	
4	8.26 988	684	8.26 996	684	1.73 004	9.99 992	56	
5	8.27 661	673	8.27 669	673	1.72 331	9.99 992	55	
6	8.28 324	663	8.28 332	663	1.71 668	9.99 992	54	
7	8.28 977	653	8.28 986	654	1.71 014	9.99 992	53	
8	8.29 621	644	8.29 629	643	1.70 371	9.99 992	52	
9	8.30 255	634	8.30 263	634	1.69 737	9.99 991	51	
10	8.30 879	624	8.30 888	625	1.69 112	9.99 991	50	
11	8.31 495	616	8.31 505	617	1.68 495	9.99 991	49	
12	8.32 103	608	8.32 112	607	1.67 888	9.99 990	48	
13	8.32 702	599	8.32 711	599	1.67 289	9.99 990	47	
14	8.33 292	590	8.33 302	591	1.66 698	9.99 990	46	
15	8.33 875	583	8.33 886	584	1.66 114	9.99 990	45	
16	8.34 450	575	8.34 461	575	1.65 539	9.99 989	44	
17	8.35 018	568	8.35 029	568	1.64 971	9.99 989	43	
18	8.35 578	560	8.35 590	561	1.64 410	9.99 989	42	
19	8.36 131	553	8.36 143	553	1.63 857	9.99 989	41	
20	8.36 678	547	8.36 689	546	1.63 311	9.99 988	40	
21	8.37 217	539	8.37 229	540	1.62 771	9.99 988	39	
22	8.37 750	533	8.37 762	533	1.62 238	9.99 988	38	
23	8.38 276	526	8.38 289	527	1.61 711	9.99 987	37	
24	8.38 796	520	8.38 809	520	1.61 191	9.99 987	36	
25	8.39 310	514	8.39 323	514	1.60 677	9.99 987	35	
26	8.39 818	508	8.39 832	509	1.60 168	9.99 986	34	
27	8.40 320	502	8.40 334	502	1.59 666	9.99 986	33	
28	8.40 816	496	8.40 830	496	1.59 170	9.99 986	32	
29	8.41 307	491	8.41 321	491	1.58 679	9.99 985	31	
30	8.41 792	485	8.41 807	486	1.58 193	9.99 985	30	
31	8.42 272	480	8.42 287	480	1.57 713	9.99 985	29	
32	8.42 746	474	8.42 762	475	1.57 238	9.99 984	28	
33	8.43 216	470	8.43 232	470	1.56 768	9.99 984	27	
34	8.43 680	464	8.43 696	464	1.56 304	9.99 984	26	
35	8.44 139	459	8.44 156	460	1.55 844	9.99 983	25	
36	8.44 594	455	8.44 611	455	1.55 389	9.99 983	24	
37	8.45 044	450	8.45 061	450	1.54 939	9.99 983	23	
38	8.45 489	445	8.45 507	446	1.54 493	9.99 982	22	
39	8.45 930	441	8.45 948	441	1.54 052	9.99 982	21	
40	8.46 366	436	8.46 385	437	1.53 615	9.99 982	20	
41	8.46 799	433	8.46 817	432	1.53 183	9.99 981	19	
42	8.47 226	427	8.47 245	428	1.52 755	9.99 981	18	
43	8.47 650	424	8.47 669	424	1.52 331	9.99 981	17	
44	8.48 069	419	8.48 089	420	1.51 911	9.99 980	16	
45	8.48 485	416	8.48 505	416	1.51 495	9.99 980	15	
46	8.48 896	411	8.48 917	412	1.51 083	9.99 979	14	
47	8.49 304	408	8.49 325	408	1.50 675	9.99 979	13	
48	8.49 708	404	8.49 729	404	1.50 271	9.99 979	12	
49	8.50 108	400	8.50 130	401	1.49 870	9.99 978	11	
50	8.50 504	396	8.50 527	397	1.49 473	9.99 978	10	
51	8.50 897	393	8.50 920	393	1.49 080	9.99 977	9	
52	8.51 287	390	8.51 310	390	1.48 690	9.99 977	8	
53	8.51 673	386	8.51 696	386	1.48 304	9.99 977	7	
54	8.52 055	382	8.52 079	383	1.47 921	9.99 976	6	
55	8.52 434	379	8.52 459	380	1.47 541	9.99 976	5	
56	8.52 810	376	8.52 835	376	1.47 165	9.99 975	4	
57	8.53 183	373	8.53 208	373	1.46 792	9.99 975	3	
58	8.53 552	369	8.53 578	370	1.46 422	9.99 974	2	
59	8.53 919	367	8.53 945	367	1.46 055	9.99 974	1	
60	8.54 282	363	8.54 308	363	1.45 692	9.99 974	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	′	Prop. Pts.

d.	p. p. 1″	d.	p. p. 1″
718	11.97	485	8.08
717	11.95	480	8.00
706	11.77	475	7.92
696	11.60	474	7.90
695	11.58	470	7.83
684	11.40	464	7.73
673	11.22	460	7.67
663	11.05	459	7.65
654	10.90	455	7.58
653	10.88	450	7.50
644	10.73	446	7.43
643	10.72	445	7.42
634	10.57	441	7.35
625	10.42	437	7.28
624	10.40	436	7.27
617	10.28	433	7.22
616	10.27	432	7.20
608	10.13	428	7.13
607	10.12	427	7.12
599	9.98	424	7.07
591	9.85	420	7.00
590	9.83	419	6.98
584	9.73	416	6.93
583	9.72	412	6.87
575	9.58	411	6.85
568	9.47	408	6.80
561	9.35	404	6.73
560	9.33	401	6.68
553	9.22	400	6.67
547	9.12	397	6.62
546	9.10	396	6.60
540	9.00	393	6.55
539	8.98	390	6.50
533	8.88	386	6.43
527	8.78	383	6.38
526	8.77	382	6.37
520	8.67	380	6.33
514	8.57	379	6.32
509	8.48	376	6.27
508	8.47	373	6.22
502	8.37	370	6.17
496	8.27	369	6.15
491	8.18	367	6.12
486	8.10	363	6.05

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.		Prop. Pts.
0	8.54 282		8.54 308		1.45 692	9.99 974	60	
1	8.54 642	360	8.54 669	361	1.45 331	9.99 973	59	
2	8.54 999	357	8.55 027	358	1.44 973	9.99 973	58	
3	8.55 354	355	8.55 382	355	1.44 618	9.99 972	57	
4	8.55 705	351	8.55 734	352	1.44 266	9.99 972	56	
5	8.56 054	349	8.56 083	349	1.43 917	9.99 971	55	
6	8.56 400	346	8.56 429	346	1.43 571	9.99 971	54	
7	8.56 743	343	8.56 773	344	1.43 227	9.99 970	53	
8	8.57 084	341	8.57 114	341	1.42 886	9.99 970	52	
9	8.57 421	337	8.57 452	338	1.42 548	9.99 969	51	
10	8.57 757	336	8.57 788	336	1.42 212	9.99 969	50	
11	8.58 089	332	8.58 121	333	1.41 879	9.99 968	49	
12	8.58 419	330	8.58 451	330	1.41 549	9.99 968	48	
13	8.58 747	328	8.58 779	328	1.41 221	9.99 967	47	
14	8.59 072	325	8.59 105	326	1.40 895	9.99 967	46	
15	8.59 395	323	8.59 428	323	1.40 572	9.99 967	45	
16	8.59 715	320	8.59 749	321	1.40 251	9.99 966	44	
17	8.60 033	318	8.60 068	319	1.39 932	9.99 966	43	
18	8.60 349	316	8.60 384	316	1.39 616	9.99 965	42	
19	8.60 662	313	8.60 698	314	1.39 302	9.99 964	41	
20	8.60 973	311	8.61 009	311	1.38 991	9.99 964	40	
21	8.61 282	309	8.61 319	310	1.38 681	9.99 963	39	
22	8.61 589	307	8.61 626	307	1.38 374	9.99 963	38	
23	8.61 894	305	8.61 931	305	1.38 069	9.99 962	37	
24	8.62 196	302	8.62 234	303	1.37 766	9.99 962	36	
25	8.62 497	301	8.62 535	301	1.37 465	9.99 961	35	
26	8.62 795	298	8.62 834	299	1.37 166	9.99 961	34	
27	8.63 091	296	8.63 131	297	1.36 869	9.99 960	33	
28	8.63 385	294	8.63 426	295	1.36 574	9.99 960	32	
29	8.63 678	293	8.63 718	292	1.36 282	9.99 959	31	
30	8.63 968	290	8.64 009	291	1.35 991	9.99 959	30	
31	8.64 256	288	8.64 298	289	1.35 702	9.99 958	29	
32	8.64 543	287	8.64 585	287	1.35 415	9.99 958	28	
33	8.64 827	284	8.64 870	285	1.35 130	9.99 957	27	
34	8.65 110	283	8.65 154	284	1.34 846	9.99 956	26	
35	8.65 391	281	8.65 435	281	1.34 565	9.99 956	25	
36	8.65 670	279	8.65 715	280	1.34 285	9.99 955	24	
37	8.65 947	277	8.65 993	278	1.34 007	9.99 955	23	
38	8.66 223	276	8.66 269	276	1.33 731	9.99 954	22	
39	8.66 497	274	8.66 543	274	1.33 457	9.99 954	21	
40	8.66 769	272	8.66 816	273	1.33 184	9.99 953	20	
41	8.67 039	270	8.67 087	271	1.32 913	9.99 952	19	
42	8.67 308	269	8.67 356	269	1.32 644	9.99 952	18	
43	8.67 575	267	8.67 624	268	1.32 376	9.99 951	17	
44	8.67 841	266	8.67 890	266	1.32 110	9.99 951	16	
45	8.68 104	263	8.68 154	264	1.31 846	9.99 950	15	
46	8.68 367	263	8.68 417	263	1.31 583	9.99 949	14	
47	8.68 627	260	8.68 678	261	1.31 322	9.99 949	13	
48	8.68 886	259	8.68 938	260	1.31 062	9.99 948	12	
49	8.69 144	258	8.69 196	258	1.30 804	9.99 948	11	
50	8.69 400	256	8.69 453	257	1.30 547	9.99 947	10	
51	8.69 654	254	8.69 708	255	1.30 292	9.99 946	9	
52	8.69 907	253	8.69 962	254	1.30 038	9.99 946	8	
53	8.70 159	252	8.70 214	252	1.29 786	9.99 945	7	
54	8.70 409	250	8.70 465	251	1.29 535	9.99 944	6	
55	8.70 658	249	8.70 714	249	1.29 286	9.99 944	5	
56	8.70 905	247	8.70 962	248	1.29 038	9.99 943	4	
57	8.71 151	246	8.71 208	246	1.28 792	9.99 942	3	
58	8.71 395	244	8.71 453	245	1.28 547	9.99 942	2	
59	8.71 638	243	8.71 697	244	1.28 303	9.99 941	1	
60	8.71 880	242	8.71 940	243	1.28 060	9.99 940	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	′	Prop. Pts.

d.	p. p. 1″	d.	p. p. 1″
361	6.02	291	4.85
360	6.00	290	4.83
358	5.97	289	4.82
357	5.95	288	4.80
355	5.92	287	4.78
352	5.87	285	4.75
351	5.85	284	4.73
349	5.82	283	4.72
346	5.77	281	4.68
344	5.73	280	4.67
343	5.72	279	4.65
341	5.68	278	4.63
338	5.63	277	4.62
337	5.62	276	4.60
336	5.60	274	4.57
333	5.55	273	4.55
332	5.53	272	4.53
330	5.50	271	4.52
328	5.47	270	4.50
326	5.43	269	4.48
325	5.42	268	4.47
323	5.38	267	4.45
321	5.35	266	4.43
320	5.33	264	4.40
319	5.32	263	4.38
318	5.30	261	4.35
316	5.27	260	4.33
314	5.23	259	4.32
313	5.22	258	4.30
311	5.18	257	4.28
310	5.17	256	4.27
309	5.15	255	4.25
307	5.12	254	4.23
305	5.08	253	4.22
303	5.05	252	4.20
302	5.03	251	4.18
301	5.02	250	4.17
299	4.98	249	4.15
298	4.97	248	4.13
297	4.95	247	4.12
296	4.93	246	4.10
295	4.92	245	4.08
294	4.90	244	4.07
293	4.88	243	4.05
292	4.87	242	4.03

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.		Prop. Pts.
0	8.71 880	240	8.71 940	241	1.28 060	9.99 940	60	
1	8.72 120	239	8.72 181	239	1.27 819	9.99 940	59	
2	8.72 359	238	8.72 420	239	1.27 580	9.99 939	58	
3	8.72 597	237	8.72 659	237	1.27 341	9.99 938	57	
4	8.72 834	235	8.72 896	236	1.27 104	9.99 938	56	
5	8.73 069	234	8.73 132	234	1.26 868	9.99 937	55	
6	8.73 303	232	8.73 366	234	1.26 634	9.99 936	54	
7	8.73 535	232	8.73 600	232	1.26 400	9.99 936	53	
8	8.73 767	230	8.73 832	231	1.26 168	9.99 935	52	
9	8.73 997	229	8.74 063	229	1.25 937	9.99 934	51	
10	8.74 226	228	8.74 292	229	1.25 708	9.99 934	50	
11	8.74 454	226	8.74 521	227	1.25 479	9.99 933	49	
12	8.74 680	226	8.74 748	226	1.25 252	9.99 932	48	
13	8.74 906	224	8.74 974	225	1.25 026	9.99 932	47	
14	8.75 130	223	8.75 199	224	1.24 801	9.99 931	46	
15	8.75 353	222	8.75 423	222	1.24 577	9.99 930	45	
16	8.75 575	220	8.75 645	222	1.24 355	9.99 929	44	
17	8.75 795	220	8.75 867	220	1.24 133	9.99 929	43	
18	8.76 015	219	8.76 087	219	1.23 913	9.99 928	42	
19	8.76 234	217	8.76 306	219	1.23 694	9.99 927	41	
20	8.76 451	216	8.76 525	217	1.23 475	9.99 926	40	
21	8.76 667	216	8.76 742	216	1.23 258	9.99 926	39	
22	8.76 883	214	8.76 958	215	1.23 042	9.99 925	38	
23	8.77 097	213	8.77 173	214	1.22 827	9.99 924	37	
24	8.77 310	212	8.77 387	213	1.22 613	9.99 923	36	
25	8.77 522	211	8.77 600	211	1.22 400	9.99 923	35	
26	8.77 733	210	8.77 811	211	1.22 189	9 99 922	34	
27	8.77 943	209	8.78 022	210	1.21 978	9.99 921	33	
28	8.78 152	208	8.78 232	209	1.21 768	9.99 920	32	
29	8.78 360	208	8.78 441	208	1.21 559	9.99 920	31	
30	8.78 568	206	8.78 649	208	1.21 351	9.99 919	30	
31	8.78 774	205	8.78 855	206	1.21 145	9.99 918	29	
32	8.78 979	204	8.79 061	206	1.20 939	9.99 917	28	
33	8.79 183	203	8.79 266	205	1.20 734	9.99 917	27	
34	8.79 386	202	8.79 470	204	1.20 530	9.99 916	26	
35	8.79 588	201	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	8.79 990	199	8.80 076	201	1.19 924	9.99 913	23	
38	8.80 189	199	8.80 277	201	1.19 723	9.99 913	22	
39	8.80 388	197	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	196	8.80 872	198	1.19 128	9.99 910	19	
42	8.80 978	195	8.81 068	196	1.18 932	9.99 909	18	
43	8.81 173	194	8.81 264	196	1.18 736	9.99 909	17	
44	8.81 367	193	8.81 459	195	1.18 541	9.99 908	16	
45	8.81 560	192	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	8.81 944	190	8.82 038	192	1.17 962	9.99 905	13	
48	8.82 134	190	8.82 230	192	1.17 770	9.99 904	12	
49	8.82 324	189	8.82 420	190	1.17 580	9.99 904	11	
50	8.82 513	188	8.82 610	190	1.17 390	9.99 903	10	
51	8.82 701	187	8.82 799	189	1.17 201	9.99 902	9	
52	8.82 888	187	8.82 987	188	1.17 013	9.99 901	8	
53	8.83 075	186	8.83 175	188	1.16 825	9.99 900	7	
54	8.83 261	185	8.83 361	186	1.16 639	9.99 899	6	
55	8.83 446	184	8.83 547	186	1.16 453	9.99 898	5	
56	8.83 630	183	8.83 732	185	1.16 268	9.99 898	4	
57	8.83 813	183	8.83 916	184	1.16 084	9.99 897	3	
58	8.83 996	181	8.84 100	184	1.15 900	9.99 896	2	
59	8.84 177	181	8.84 282	182	1.15 718	9.99 895	1	
60	8.84 358		8.84 464		1.15 536	9.99 894	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	′	Prop. Pts.

	238	234	229
6	23.8	23.4	22.9
7	27.8	27.3	26.7
8	31.7	31.2	30.5
9	35.7	35.1	34.4
10	39.7	39.0	38.2
20	79.3	78.0	76.3
30	119.0	117.0	114.5
40	158.7	156.0	152.7
50	198.3	195.0	190.8

	225	220	216
6	22.5	22.0	21.6
7	26.3	25.7	25.2
8	30.0	29.3	28.8
9	33.8	33.0	32.4
10	37.5	36.7	36.0
20	75.0	73.3	72.0
30	112.5	110.0	108.0
40	150.0	146.7	144.0
50	187.5	183.3	180.0

	212	208	204
6	21.2	20.8	20.4
7	24.7	24.3	23.8
8	28.3	27.7	27.2
9	31.8	31.2	30.6
10	35.3	34.7	34.0
20	70.7	69.3	68.0
30	106.0	104.0	102.0
40	141.3	138.7	136.0
50	176.7	173.3	170.0

	201	197	193
6	20.1	19.7	19.3
7	23.5	23.0	22.5
8	26.8	26.3	25.7
9	30.2	29.6	29.0
10	33.5	32.8	32.2
20	67.0	65.7	64.3
30	100.5	98.5	96.5
40	134.0	131.3	128.7
50	167.5	164.2	160.8

	189	185	181
6	18.9	18.5	18.1
7	22.1	21.6	21.1
8	25.2	24.7	24.1
9	28.4	27.8	27.2
10	31.5	30.8	30.2
20	63.0	61.7	60.3
30	94.5	92.5	90.5
40	126.0	123.3	120.7
50	157.5	154.2	150.8

	4	3	2	1
6	0.4	0.3	0.2	0.1
7	0.5	0.4	0.2	0.1
8	0.5	0.4	0.3	0.1
9	0.6	0.5	0.3	0.2
10	0.7	0.5	0.3	0.2
20	1.3	1.0	0.7	0.3
30	2.0	1.5	1.0	0.5
40	2.7	2.0	1.3	0.7
50	3.3	2.5	1.7	0.8

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.		Prop. Pts.
0	8.84 358		8.84 464		1.15 536	9.99 894	60	
1	8.84 539	181	8.84 646	182	1.15 354	9.99 893	59	180 177 174
2	8.84 718	179	8.84 826	180	1.15 174	9.99 892	58	6 18.0 17.7 17.4
3	8.84 897	179	8.85 006	180	1.14 994	9.99 891	57	7 21.0 20.7 20.3
4	8.85 075	178	8.85 185	179	1.14 815	9.99 891	56	8 24.0 23.6 23.2
5	8.85 252	177	8.85 363	178	1.14 637	9.99 890	55	9 27.0 26.6 26.1
6	8.85 429	177	8.85 540	177	1.14 460	9.99 889	54	10 30.0 29.5 29.0
7	8.85 605	176	8.85 717	177	1.14 283	9.99 888	53	20 60.0 59.0 58.0
8	8.85 780	175	8.85 893	176	1.14 107	9.99 887	52	30 90.0 88.5 87.0
9	8.85 955	175	8.86 069	176	1.13 931	9.99 886	51	40 120.0 118.0 116.0
10	8.86 128	173	8.86 243	174	1.13 757	9.99 885	50	50 150.0 147.5 145.0
11	8.86 301	173	8.86 417	174	1.13 583	9.99 884	49	
12	8.86 474	173	8.86 591	174	1.13 409	9.99 883	48	171 169 167
13	8.86 645	171	8.86 763	172	1.13 237	9.99 882	47	6 17.1 16.9 16.7
14	8.86 816	171	8.86 935	172	1.13 065	9.99 881	46	7 20.0 19.7 19.5
15	8.86 987	171	8.87 106	171	1.12 894	9.99 880	45	8 22.8 22.5 22.3
16	8.87 156	169	8.87 277	171	1.12 723	9.99 879	44	9 25.7 25.4 25.1
17	8.87 325	169	8.87 447	170	1.12 553	9.99 879	43	10 28.5 28.2 27.8
18	8.87 494	169	8.87 616	169	1.12 384	9.99 878	42	20 57.0 56.3 55.7
19	8.87 661	167	8.87 785	169	1.12 215	9.99 877	41	30 85.5 84.5 83.5
20	8.87 829	168	8.87 953	168	1.12 047	9.99 876	40	40 114.0 112.7 111.3
21	8.87 995	166	8.88 120	167	1.11 880	9.99 875	39	50 142.5 140.8 139.2
22	8.88 161	166	8.88 287	167	1.11 713	9.99 874	38	
23	8.88 326	165	8.88 453	166	1.11 547	9.99 873	37	165 163 160
24	8.88 490	164	8.88 618	165	1.11 382	9.99 872	36	6 16.5 16.3 16.0
25	8 88 654	164	8.88 783	165	1.11 217	9.99 871	35	7 19.3 19.0 18.7
26	8.88 817	163	8.88 948	165	1.11 052	9.99 870	34	8 22.0 21.7 21.3
27	8.88 980	163	8.89 111	163	1.10 889	9.99 869	33	9 24.8 24.5 24.0
28	8.89 142	162	8.89 274	163	1.10 726	9.99 868	32	10 27.5 27.2 26.7
29	8.89 304	162	8.89 437	163	1.10 563	9.99 867	31	20 55.0 54.3 53.3
30	8.89 464	160	8.89 598	161	1.10 402	9.99 866	30	30 82.5 81.5 80.0
31	8.89 625	161	8.89 760	162	1.10 240	9.99 865	29	40 110.0 108.7 106.7
32	8.89 784	159	8.89 920	160	1.10 080	9.99 864	28	50 137.5 135.8 133.3
33	8.89 943	159	8.90 080	160	1.09 920	9.99 863	27	
34	8.90 102	159	8.90 240	160	1.09 760	9.99 862	26	157 155 153
35	8.90 260	158	8.90 399	159	1.09 601	9 99 861	25	6 15.7 15.5 15.3
36	8.90 417	157	8.90 557	158	1.09 443	9.99 860	24	7 18.3 18.1 17.9
37	8.90 574	157	8.90 715	158	1.09 285	9.99 859	23	8 20.9 20.7 20.4
38	8.90 730	156	8.90 872	157	1.09 128	9.99 858	22	9 23.6 23.3 23.0
39	8.90 885	155	8.91 029	157	1.08 971	9.99 857	21	10 26.2 25.8 25.5
40	8.91 040	155	8.91 185	156	1.08 815	9.99 856	20	20 52.3 51.7 51.0
41	8.91 195	155	8.91 340	155	1.08 660	9.99 855	19	30 78.5 77.5 76.5
42	8.91 349	154	8.91 495	155	1.08 505	9.99 854	18	40 104.7 103.3 102.0
43	8.91 502	153	8.91 650	155	1.08 350	9.99 853	17	50 130.8 129.2 127.5
44	8.91 655	153	8.91 803	153	1.08 197	9.99 852	16	
45	8.91 807	152	8.91 957	154	1.08 043	9.99 851	15	151 149 147
46	8.91 959	152	8.92 110	153	1.07 890	9.99 850	14	6 15.1 14.9 14.7
47	8.92 110	151	8.92 262	152	1.07 738	9.99 848	13	7 17.6 17.4 17.2
48	8.92 261	151	8.92 414	152	1.07 586	9.99 847	12	8 20.1 19.9 19.6
49	8.92 411	150	8.92 565	151	1.07 435	9.99 846	11	9 22.7 22.4 22.1
50	8.92 561	150	8.92 716	151	1.07 284	9.99 845	10	10 25.2 24.8 24.5
51	8.92 710	149	8.92 866	150	1.07 134	9.99 844	9	20 50.3 49.7 49.0
52	8.92 859	149	8.93 016	150	1.06 984	9.99 843	8	30 75.5 74.5 73.5
53	8 93 007	148	8.93 165	149	1.06 835	9.99 842	7	40 100.7 99.3 98.0
54	8.93 154	147	8.93 313	148	1.06 687	9.99 841	6	50 125.8 124.2 122.5
55	8.93 301	147	8.93 462	149	1.06 538	9.99 840	5	
56	8.93 448	147	8.93 609	147	1.06 391	9.99 839	4	146 2 1
57	8.93 594	146	8.93 756	147	1.06 244	9.99 838	3	6 14.6 0.2 0.1
58	8.93 740	146	8.93 903	147	1.06 097	9.99 837	2	7 17.0 0.2 0.1
59	8.93 885	145	8.94 049	146	1.05 951	9.99 836	1	8 19.5 0.3 0.1
60	8.94 030	145	8.94 195	146	1.05 805	9.99 834	0	9 21.9 0.3 0.2
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	′	10 24.3 0.3 0.2
								20 48.7 0.7 0.3
								30 73.0 1.0 0.5
								40 97.3 1.3 0.7
								50 121.7 1.7 0.8

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.		Prop. Pts.		
0	8.94 030		8.94 195		1.05 805	9.99 834	60			
1	8.94 174	144	8.94 340	145	1.05 660	9.99 833	59		145	143	141
2	8.94 317	143	8.94 485	145	1.05 515	9.99 832	58	6	14.5	14.3	14.1
3	8.94 461	144	8.94 630	145	1.05 370	9.99 831	57	7	16.9	16.7	16.5
4	8.94 603	142	8.94 773	143	1.05 227	9.99 830	56	8	19.3	19.1	18.8
5	8.94 746	143	8.94 917	144	1.05 083	9.99 829	55	9	21.8	21.5	21.2
6	8.94 887	141	8.95 060	143	1.04 940	9.99 828	54	10	24.2	23.8	23.5
7	8.95 029	142	8.95 202	142	1.04 798	9.99 827	53	20	48.3	47.7	47.0
8	8.95 170	141	8.95 344	142	1.04 656	9.99 825	52	30	72.5	71.5	70.5
9	8.95 310	140	8.95 486	142	1.04 514	9.99 824	51	40	96.7	95.3	94.0
10	8.95 450	140	8.95 627	141	1.04 373	9.99 823	50	50	120.8	119.2	117.5
11	8.95 589	139	8.95 767	140	1.04 233	9.99 822	49		139	138	136
12	8.95 728	139	8.95 908	141	1.04 092	9.99 821	48	6	13.9	13.8	13.6
13	8.95 867	139	8.96 047	139	1.03 953	9.99 820	47	7	16.2	16.1	15.9
14	8.96 005	138	8.96 187	140	1.03 813	9.99 819	46	8	18.5	18.4	18.1
15	8.96 143	138	8.96 325	138	1.03 675	9.99 817	45	9	20.9	20.7	20.4
16	8.96 280	137	8.96 464	139	1.03 536	9.99 816	44	10	23.2	23.0	22.7
17	8.96 417	137	8.96 602	138	1.03 398	9.99 815	43	20	46.3	46.0	45.3
18	8.96 553	136	8.96 739	137	1.03 261	9.99 814	42	30	69.5	69.0	68.0
19	8.96 689	136	8.96 877	138	1.03 123	9 99 813	41	40	92.7	92.0	90.7
20	8.96 825	136	8.97 013	136	1.02 987	9.99 812	40	50	115.8	115.0	113.3
21	8.96 960	135	8.97 150	137	1.02 850	9.99 810	39		135	133	131
22	8.97 095	135	8.97 285	135	1.02 715	9.99 809	38	6	13.5	13.3	13.1
23	8.97 229	134	8.97 421	136	1.02 579	9.99 808	37	7	15.8	15.5	15.3
24	8.97 363	134	8.97 556	135	1.02 444	9.99 807	36	8	18.0	17.7	17.5
25	8.97 496	133	8.97 691	135	1.02 309	9.99 806	35	9	20.3	20.0	19.7
26	8.97 629	133	8.97 825	134	1.02 175	9.99 804	34	10	22.5	22.2	21.8
27	8.97 762	133	8.97 959	134	1.02 041	9.99 803	33	20	45.0	44.3	43.7
28	8.97 894	132	8.98 092	133	1.01 908	9.99 802	32	30	67.5	66.5	65.5
29	8.98 026	132	8.98 225	133	1.01 775	9.99 801	31	40	90.0	88.7	87.3
30	8.98 157	131	8.98 358	133	1.01 642	9.99 800	30	50	112.5	110.8	109.2
31	8.98 288	131	8.98 490	132	1.01 510	9.99 798	29		129	128	126
32	8.98 419	131	8.98 622	132	1.01 378	9.99 797	28	6	12.9	12.8	12.6
33	8.98 549	130	8.98 753	131	1.01 247	9.99 796	27	7	15.1	14.9	14.7
34	8.98 679	130	8.98 884	131	1.01 116	9.99 795	26	8	17.2	17.1	16.8
35	8.98 808	129	8.99 015	131	1.00 985	9.99 793	25	9	19.4	19.2	18.9
36	8.98 937	129	8.99 145	130	1.00 855	9.99 792	24	10	21.5	21.3	21.0
37	8.99 066	129	8.99 275	130	1.00 725	9.99 791	23	20	43.0	42.7	42.0
38	8.99 194	128	8.99 405	130	1.00 595	9.99 790	22	30	64.5	64.0	63.0
39	8.99 322	128	8.99 534	129	1.00 466	9.99 788	21	40	86.0	85.3	84.0
40	8.99 450	128	8.99 662	128	1.00 338	9.99 787	20	50	107.5	106.7	105.0
41	8.99 577	127	8.99 791	129	1.00 209	9.99 786	19		125	123	122
42	8.99 704	127	8.99 919	128	1.00 081	9.99 785	18	6	12.5	12.3	12.2
43	8.99 830	126	9.00 046	127	0.99 954	9.99 783	17	7	14.6	14.4	14.2
44	8.99 956	126	9.00 174	128	0.99 826	9.99 782	16	8	16.7	16.4	16.3
45	9.00 082	126	9.00 301	127	0.99 699	9.99 781	15	9	18.8	18.5	18.3
46	9.00 207	125	9.00 427	126	0.99 573	9.99 780	14	10	20.8	20.5	20.3
47	9.00 332	125	9.00 553	126	0.99 447	9.99 778	13	20	41.7	41.0	40.7
48	9.00 456	124	9.00 679	126	0.99 321	9.99 777	12	30	62.5	61.5	61.0
49	9.00 581	125	9.00 805	126	0.99 195	9.99 776	11	40	83.3	82.0	81.3
50	9.00 704	123	9.00 930	125	0.99 070	9.99 775	10	50	104.2	102.5	101.7
51	9.00 828	124	9.01 055	125	0.98 945	9.99 773	9		121	120	1
52	9.00 951	123	9.01 179	124	0.98 821	9.99 772	8	6	12.1	12.0	0.1
53	9.01 074	123	9.01 303	124	0.98 697	9.99 771	7	7	14.1	14.0	0.1
54	9.01 196	122	9.01 427	124	0.98 573	9.99 769	6	8	16.1	16.0	0.1
55	9.01 318	122	9.01 550	123	0.98 450	9.99 768	5	9	18.2	18.0	0.2
56	9.01 440	122	9.01 673	123	0.98 327	9.99 767	4	10	20.2	20.0	0.2
57	9.01 561	121	9.01 796	123	0.98 204	9.99 765	3	20	40.3	40.0	0.3
58	9.01 682	121	9.01 918	122	0.98 082	9.99 764	2	30	60.5	60.0	0.5
59	9.01 803	121	9.02 040	122	0 97 960	9.99 763	1	40	80.7	80.0	0.7
60	9.01 923	120	9.02 162	122	0.97 838	9.99 761	0	50	100.8	100.0	0.8
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	′	Prop. Pts.		

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.		Prop. Pts.
0	9.01 923	120	9.02 162	121	0.97 838	9.99 761	60	
1	9.02 043	120	9.02 283	121	0.97 717	9.99 760	59	121 120 119
2	9.02 163	120	9.02 404	121	0.97 596	9.99 759	58	6 12.1 12.0 11.9
3	9.02 283	119	9.02 525	120	0.97 47$\bar{3}$	9.99 757	57	7 14.1 14.0 13.9
4	9.02 402	118	9.02 645	121	0.97 35$\bar{5}$	9.99 756	56	8 16.1 16.0 15.9
5	9.02 520	119	9.02 766	119	0.97 234	9.99 75$\bar{5}$	55	9 18.2 18.0 17.9
6	9.02 639	118	9.02 88$\bar{5}$	120	0.97 11$\bar{5}$	9.99 753	54	10 20.2 20.0 19.8
7	9.02 757	117	9.03 00$\bar{3}$	119	0.96 995	9.99 752	53	20 40.3 40.0 39.7
8	9.02 874	118	9.03 124	118	0.96 876	9.99 751	52	30 60.5 60.0 59.5
9	9.02 992	117	9.03 242	119	0.96 758	9.99 749	51	40 80.7 80.0 79.3
10	9.03 109	117	9.03 361	118	0.96 639	9.99 748	50	50 100.8 100.0 99.2
11	9.03 226	116	9.03 479	118	0.96 521	9.99 747	49	
12	9.03 342	116	9.03 597	117	0.96 403	9.99 745	48	118 117 116
13	9.03 458	116	9.03 714	118	0.96 286	9.99 744	47	6 11.8 11.7 11.6
14	9.03 574	116	9.03 832	116	0.96 168	9.99 742	46	7 13.8 13.7 13.5
15	9.03 690	115	9.03 948	117	0.96 052	9.99 741	45	8 15.7 15.6 15.$\bar{5}$
16	9.03 80$\bar{5}$	115	9.04 065	116	0.95 93$\bar{5}$	9.99 740	44	9 17.7 17.6 17.4
17	9.03 920	114	9.04 181	116	0.95 819	9.99 738	43	10 19.7 19.5 19.3
18	9.04 034	115	9.04 297	116	0.95 703	9.99 737	42	20 39.3 39.0 38.7
19	9.04 149	113	9.04 413	115	0.95 587	9.99 736	41	30 59.0 58.5 58.0
20	9.04 262	114	9.04 528	115	0.95 472	9.99 734	40	40 78.7 78.0 77.3
21	9.04 376	114	9.04 643	115	0.95 357	9.99 733	39	50 98.3 97.5 96.7
22	9.04 490	113	9.04 758	115	0.95 242	9.99 731	38	
23	9.04 603	112	9.04 873	115	0.95 127	9.99 730	37	115 114 113
24	9.04 715	113	9.04 987	114	0.95 013	9.99 728	36	6 11.5 11.4 11.3
25	9.04 828	112	9.05 101	114	0.94 899	9.99 727	35	7 13.4 13.3 13.2
26	9.04 940	112	9.05 214	113	0.94 786	9.99 726	34	8 15.3 15.2 15.1
27	9.05 052	112	9.05 328	114	0.94 672	9.99 724	33	9 17.3 17.1 17.0
28	9.05 164	111	9.05 441	113	0.94 559	9.99 723	32	10 19.2 19.0 18.8
29	9.05 27$\bar{3}$	111	9.05 553	112	0.94 447	9.99 721	31	20 38.3 38.0 37.7
30	9.05 386	111	9.05 666	113	0.94 334	9.99 720	30	30 57.5 57.0 56.5
31	9.05 497	110	9.05 778	112	0.94 222	9.99 718	29	40 76.7 76.0 75.3
32	9.05 607	110	9.05 890	112	0.94 110	9.99 717	28	50 95.8 95.0 94.2
33	9.05 717	110	9.06 002	112	0.93 998	9.99 716	27	
34	9.05 827	110	9.06 113	111	0.93 887	9.99 714	26	112 111 110
35	9.05 937	109	9.06 224	111	0.93 776	9.99 713	25	6 11.2 11.1 11.0
36	9.06 046	109	9.06 33$\bar{3}$	111	0.93 66$\bar{5}$	9.99 711	24	7 13.1 13.0 12.8
37	9.06 155	109	9.06 445	110	0.93 55$\bar{5}$	9.99 710	23	8 14.9 14.8 14.7
38	9.06 264	109	9.06 556	111	0.93 444	9.99 708	22	9 16.8 16.7 16.5
39	9.06 372	108	9.06 666	110	0.93 334	9.99 707	21	10 18.7 18.5 18.3
40	9.06 481	109	9.06 775	109	0.93 22$\bar{5}$	9.99 705	20	20 37.3 37.0 36.7
41	9.06 589	108	9.06 88$\bar{5}$	110	0.93 115	9.99 704	19	30 56.0 55.5 55.0
42	9.06 696	107	9.06 994	109	0.93 006	9.99 702	18	40 74.7 74.0 73.3
43	9.06 804	108	9.07 103	109	0.92 897	9.99 701	17	50 93.3 92.5 91.7
44	9.06 911	107	9.07 211	108	0.92 789	9.99 699	16	
45	9.07 018	107	9.07 320	109	0.92 680	9.99 698	15	109 108 107
46	9.07 124	106	9.07 428	108	0.92 572	9.99 696	14	6 10.9 10.8 10.7
47	9.07 231	107	9.07 536	108	0.92 464	9.99 69$\bar{5}$	13	7 12.7 12.6 12.$\bar{5}$
48	9.07 337	106	9.07 643	107	0.92 357	9.99 693	12	8 14.5 14.4 14.3
49	9.07 442	105	9.07 751	108	0.92 249	9.99 692	11	9 16.4 16.2 16.1
50	9.07 548	106	9.07 858	107	0.92 142	9.99 690	10	10 18.2 18.0 17.8
51	9.07 653	105	9.07 964	106	0.92 036	9.99 689	9	20 36.3 36.0 35.7
52	9.07 758	105	9.08 071	107	0.91 929	9.99 687	8	30 54.5 54.0 53.5
53	9.07 863	105	9.08 177	106	0.91 823	9.99 686	7	40 72.7 72.0 71.3
54	9.07 968	105	9.08 283	106	0.91 717	9.99 684	6	50 90.8 90.0 89.2
55	9.08 072	104	9.08 389	106	0.91 611	9.99 683	5	
56	9.08 176	104	9.08 49$\bar{5}$	106	0.91 505	9.99 681	4	106 105 104
57	9.08 280	104	9.08 600	105	0.91 400	9.99 680	3	6 10.6 10.5 10.4
58	9.08 383	103	9.08 705	105	0.91 29$\bar{5}$	9.99 678	2	7 12.4 12.3 12.1
59	9.08 486	103	9.08 810	105	0.91 190	9.99 677	1	8 14.1 14.0 13.9
60	9.08 589	103	9.08 914	104	0.91 086	9.99 675	0	9 15.9 15.8 15.6
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	′	10 17.7 17.5 17.3
								20 35.3 35.0 34.7
								30 53.0 52.5 52.0
								40 70.7 70.0 69.3
								50 88.3 87.5 86.7
								Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.		Prop. Pts.			
0	9.08 589		9.08 914		0.91 086	9.99 675	60				
1	9.08 692	103	9.09 019	105	0.90 981	9.99 674	59		105	104	103
2	9.08 795	103	9.09 123	104	0.90 877	9.99 672	58	6	10.5	10.4	10.3
3	9.08 897	102	9.09 227	104	0.90 773	9.99 670	57	7	12.3	12.1	12.0
4	9.08 999	102	9.09 330	103	0.90 670	9.99 669	56	8	14.0	13.9	13.7
				104				9	15.8	15.6	15.5
5	9.09 101		9.09 434		0.90 566	9.99 667	55	10	17.5	17.3	17.2
6	9.09 202	101	9.09 537	103	0.90 463	9.99 666	54	20	35.0	34.7	34.3
7	9.09 304	102	9.09 640	103	0.90 360	9.99 664	53	30	52.5	52.0	51.5
8	9.09 405	101	9.09 742	102	0.90 258	9.99 663	52	40	70.0	69.3	68.7
9	9.09 506	101	9.09 845	103	0.90 155	9.99 661	51	50	87.5	86.7	85.8
		100		102							
10	9.09 606		9.09 947		0.90 053	9.99 659	50		102	101	100
11	9.09 707	101	9.10 049	102	0.89 951	9.99 658	49	6	10.2	10.1	10.0
12	9.09 807	100	9.10 150	101	0.89 850	9.99 656	48	7	11.9	11.8	11.7
13	9.09 907	100	9.10 252	102	0.89 748	9.99 655	47	8	13.6	13.5	13.3
14	9.10 006	99	9.10 353	101	0.89 647	9.99 653	46	9	15.3	15.2	15.0
		100		101				10	17.0	16.8	16.7
15	9.10 106		9.10 454		0.89 546	9.99 651	45	20	34.0	33.7	33.3
16	9.10 205	99	9.10 555	101	0.89 445	9.99 650	44	30	51.0	50.5	50.0
17	9.10 304	99	9.10 656	101	0.89 344	9.99 648	43	40	68.0	67.3	66.7
18	9.10 402	98	9.10 756	100	0.89 244	9.99 647	42	50	85.0	84.2	83.3
19	9.10 501	99	9.10 856	100	0.89 144	9.99 645	41				
		98		100							
20	9.10 599		9.10 956		0.89 044	9.99 643	40		99	98	97
21	9.10 697	98	9.11 056	100	0.88 944	9.99 642	39	6	9.9	9.8	9.7
22	9.10 795	98	9.11 155	99	0.88 845	9.99 640	38	7	11.6	11.4	11.3
23	9.10 893	98	9.11 254	99	0.88 746	9.99 638	37	8	13.2	13.1	12.9
24	9.10 990	97	9.11 353	99	0.88 647	9.99 637	36	9	14.9	14.7	14.6
		97		99				10	16.5	16.3	16.2
25	9.11 087		9.11 452		0.88 548	9.99 635	35	20	33.0	32.7	32.3
26	9.11 184	97	9.11 551	99	0.88 449	9.99 633	34	30	49.5	49.0	48.5
27	9.11 281	97	9.11 649	98	0.88 351	9.99 632	33	40	66.0	65.3	64.7
28	9.11 377	96	9.11 747	98	0.88 253	9.99 630	32	50	82.5	81.7	80.8
29	9.11 474	97	9.11 845	98	0.88 155	9.99 629	31				
		96		98							
30	9.11 570		9.11 943		0.88 057	9.99 627	30		96	95	94
31	9 11 666	96	9.12 040	97	0.87 960	9.99 625	29	6	9.6	9.5	9.4
32	9.11 761	95	9.12 138	98	0.87 862	9.99 624	28	7	11.2	11.1	11.0
33	9.11 857	96	9.12 235	97	0.87 765	9.99 622	27	8	12.8	12.7	12.5
34	9.11 952	95	9.12 332	97	0.87 668	9.99 620	26	9	14.4	14.3	14.1
		95		96				10	16.0	15.8	15.7
35	9.12 047		9.12 428		0.87 572	9.99 618	25	20	32.0	31.7	31.3
36	9.12 142	95	9.12 525	97	0.87 475	9.99 617	24	30	48.0	47.5	47.0
37	9.12 236	94	9.12 621	96	0.87 379	9.99 615	23	40	64.0	63.3	62.7
38	9.12 331	95	9.12 717	96	0.87 283	9.99 613	22	50	80.0	79.2	78.3
39	9.12 425	94	9.12 813	96	0.87 187	9.99 612	21				
		94		96							
40	9.12 519		9.12 909		0.87 091	9.99 610	20		93	92	91
41	9.12 612	93	9.13 004	95	0.86 996	9.99 608	19	6	9.3	9.2	9.1
42	9.12 706	94	9.13 099	95	0.86 901	9.99 607	18	7	10.9	10.7	10.6
43	9.12 799	93	9.13 194	95	0.86 806	9.99 605	17	8	12.4	12.3	12.1
44	9.12 892	93	9.13 289	95	0.86 711	9.99 603	16	9	14.0	13.8	13.7
		93		95				10	15.5	15.3	15.2
45	9.12 985		9.13 384		0.86 616	9.99 601	15	20	31.0	30.7	30.3
46	9.13 078	93	9.13 478	94	0.86 522	9.99 600	14	30	46.5	46.0	45.5
47	9.13 171	93	9.13 573	95	0.86 427	9.99 598	13	40	62.0	61.3	60.7
48	9.13 263	92	9.13 667	94	0.86 333	9.99 596	12	50	77.5	76.7	75.8
49	9.13 355	92	9.13 761	94	0.86 239	9.99 595	11				
		92		93							
50	9.13 447		9.13 854		0.86 146	9.99 593	10		90	2	1
51	9.13 539	92	9.13 948	94	0.86 052	9.99 591	9	6	9.0	0.2	0.1
52	9.13 630	91	9 14 041	93	0.85 959	9.99 589	8	7	10.5	0.2	0.1
53	9.13 722	92	9.14 134	93	0.85 866	9.99 588	7	8	12.0	0.3	0.1
54	9.13 813	91	9.14 227	93	0.85 773	9.99 586	6	9	13.5	0.3	0.2
		91		93				10	15.0	0.3	0.2
55	9.13 904		9.14 320		0.85 680	9.99 584	5	20	30.0	0.7	0.3
56	9.13 994	90	9.14 412	92	0.85 588	9.99 582	4	30	45.0	1.0	0.5
57	9.14 085	91	9.14 504	92	0.85 496	9.99 581	3	40	60.0	1.3	0.7
58	9.14 175	90	9.14 597	93	0.85 403	9.99 579	2	50	75.0	1.7	0.8
59	9.14 266	91	9.14 688	91	0.85 312	9.99 577	1				
		90		92							
60	9.14 356		9.14 780		0.85 220	9.99 575	0				
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	′	Prop. Pts.			

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.		Prop. Pts.
0	9.14 356		9.14 780		0.85 220	9.99 575	60	
1	9.14 445	89	9.14 872	92	0.85 128	9.99 574	59	92 91 90
2	9.14 535	90	9.14 963	91	0.85 037	9.99 572	58	6 9.2 9.1 9.0
3	9.14 624	89	9.15 054	91	0.84 946	9.99 570	57	7 10.7 10.6 10.5
4	9.14 714	90	9.15 145	91	0.84 855	9.99 568	56	8 12.3 12.1 12.0
5	9.14 803	89	9.15 236	91	0.84 764	9.99 566	55	9 13.8 13.7 13.5
6	9.14 891	88	9.15 327	91	0.84 673	9.99 565	54	10 15.3 15.2 15.0
7	9.14 980	89	9.15 417	90	0.84 583	9.99 563	53	20 30.7 30.3 30.0
8	9.15 069	89	9.15 508	91	0.84 492	9.99 561	52	30 46.0 45.5 45.0
9	9.15 157	88	9.15 598	90	0.84 402	9.99 559	51	40 61.3 60.7 60.0
10	9.15 245	88	9.15 688	90	0.84 312	9.99 557	50	50 76.7 75.8 75.0
11	9.15 333	88	9.15 777	89	0.84 223	9.99 556	49	
12	9.15 421	88	9.15 867	90	0.84 133	9.99 554	48	89 88
13	9.15 508	87	9.15 956	89	0.84 044	9.99 552	47	6 8.9 8.8
14	9.15 596	88	9.16 046	90	0.83 954	9.99 550	46	7 10.4 10.3
15	9.15 683	87	9.16 135	89	0.83 865	9.99 548	45	8 11 9 11.7
16	9.15 770	87	9.16 224	89	0.83 776	9.99 546	44	9 13.4 13.2
17	9.15 857	87	9.16 312	88	0.83 688	9.99 545	43	10 14.8 14.7
18	9.15 944	87	9.16 401	89	0.83 599	9.99 543	42	20 29.7 29.3
19	9.16 030	86	9.16 489	88	0.83 511	9.99 541	41	30 44.5 44.0
20	9.16 116	86	9.16 577	88	0.83 423	9.99 539	40	40 59.3 58.7
21	9.16 203	87	9.16 665	88	0.83 335	9.99 537	39	50 74.2 73.3
22	9.16 289	86	9.16 753	88	0.83 247	9.99 535	38	
23	9.16 374	85	9.16 841	88	0.83 159	9.99 533	37	87 86 85
24	9.16 460	86	9.16 928	87	0.83 072	9.99 532	36	6 8.7 8.6 8.5
25	9.16 545	85	9.17 016	88	0.82 984	9.99 530	35	7 10.2 10.0 9.9
26	9.16 631	86	9.17 103	87	0.82 897	9.99 528	34	8 11.6 11.5 11.3
27	9.16 716	85	9.17 190	87	0.82 810	9.99 526	33	9 13.1 12.9 12.8
28	9.16 801	85	9.17 277	87	0.82 723	9.99 524	32	10 14.5 14.3 14.2
29	9.16 886	85	9.17 363	86	0.82 637	9.99 522	31	20 29.0 28.7 28.3
30	9.16 970	84	9 17 450	87	0.82 550	9.99 520	30	30 43.5 43.0 42.5
31	9.17 055	85	9.17 536	86	0.82 464	9.99 518	29	40 58.0 57.3 56.7
32	9.17 139	84	9.17 622	86	0.82 378	9.99 517	28	50 72.5 71.7 70.8
33	9.17 223	84	9.17 708	86	0.82 292	9.99 515	27	
34	9.17 307	84	9.17 794	86	0.82 206	9.99 513	26	84 83
35	9.17 391	84	9.17 880	86	0.82 120	9.99 511	25	6 8.4 8.3
36	9.17 474	83	9.17 965	85	0.82 035	9.99 509	24	7 9.8 9.7
37	9.17 558	84	9.18 051	86	0 81 949	9.99 507	23	8 11.2 11.1
38	9.17 641	83	9.18 136	85	0.81 864	9.99 505	22	9 12.6 12.5
39	9.17 724	83	9.18 221	85	0.81 779	9.99 503	21	10 14.0 13.8
40	9.17 807	83	9.18 306	85	0.81 694	9.99 501	20	20 28.0 27.7
41	9.17 890	83	9.18 391	85	0.81 609	9.99 499	19	30 42.0 41.5
42	9.17 973	83	9.18 475	84	0.81 525	9.99 497	18	40 56.0 55.3
43	9.18 055	82	9.18 560	85	0.81 440	9.99 495	17	50 70.0 69.2
44	9.18 137	82	9.18 644	84	0.81 356	9.99 494	16	
45	9.18 220	83	9.18 728	84	0.81 272	9.99 492	15	82 81 80
46	9.18 302	82	9.18 812	84	0.81 188	9.99 490	14	6 8.2 8.1 8.0
47	9.18 383	81	9.18 896	84	0.81 104	9.99 488	13	7 9.6 9.5 9.3
48	9.18 465	82	9.18 979	83	0.81 021	9.99 486	12	8 10.9 10.8 10.7
49	9.18 547	82	9.19 063	84	0.80 937	9.99 484	11	9 12.3 12.2 12.0
50	9.18 628	81	9.19 146	83	0.80 854	9.99 482	10	10 13.7 13.5 13.3
51	9.18 709	81	9.19 229	83	0.80 771	9.99 480	9	20 27.3 27.0 26.7
52	9.18 790	81	9.19 312	83	0.80 688	9.99 478	8	30 41.0 40.5 40.0
53	9.18 871	81	9.19 395	83	0.80 605	9.99 476	7	40 54.7 54.0 53.3
54	9.18 952	81	9.19 478	83	0.80 522	9.99 474	6	50 68.3 67.5 66.7
55	9.19 033	80	9.19 561	83	0.80 439	9.99 472	5	
56	9.19 113	80	9.19 643	82	0.80 357	9.99 470	4	2 1
57	9.19 193	80	9.19 725	82	0.80 275	9.99 468	3	6 0.2 0.1
58	9.19 273	80	9.19 807	82	0.80 193	9.99 466	2	7 0.2 0.1
59	9.19 353	80	9.19 889	82	0.80 111	9.99 464	1	8 0.3 0.1
60	9.19 433	80	9.19 971	82	0.80 029	9.99 462	0	9 0.3 0.2
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	′	10 0.3 0.2
								20 0.7 0.3
								30 1.0 0.5
								40 1.3 0.7
								50 1.7 0.8

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.		′
0	9.19 433	80	9.19 971	82	0.80 029	9.99 462	60	
1	9.19 513	79	9.20 053	81	0.79 947	9.99 460	59	
2	9.19 592	80	9.20 134	82	0.79 866	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	9.20 067	79	9.20 621	80	0.79 379	9.99 446	52	
9	9.20 145	78	9.20 701	81	0.79 299	9.99 444	51	
10	9.20 223	78	9.20 782	80	0.79 218	9.99 442	50	
11	9.20 302	79	9.20 862	80	0.79 138	9.99 440	49	
12	9.20 380	78	9.20 942	80	0.79 058	9.99 438	48	
13	9.20 458	78	9.21 022	80	0.78 978	9.99 436	47	
14	9.20 535	77	9.21 102	80	0.78 898	9.99 434	46	
15	9.20 613	78	9.21 182	79	0.78 818	9.99 432	45	
16	9.20 691	78	9.21 261	80	0.78 739	9.99 429	44	
17	9.20 768	77	9.21 341	79	0.78 659	9.99 427	43	
18	9.20 845	77	9.21 420	79	0.78 580	9.99 425	42	
19	9.20 922	77	9.21 499	79	0.78 501	9.99 423	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	9.21 153	77	9.21 736	79	0.78 264	9.99 417	38	
23	9.21 229	76	9.21 814	78	0.78 186	9.99 415	37	
24	9.21 306	77	9.21 893	79	0.78 107	9.99 413	36	
25	9.21 382	76	9.21 971	78	0.78 029	9.99 411	35	
26	9.21 458	76	9.22 049	78	0.77 951	9.99 409	34	
27	9.21 534	76	9.22 127	78	0.77 873	9.99 407	33	
28	9.21 610	76	9.22 205	78	0.77 795	9.99 404	32	
29	9.21 685	75	9.22 283	78	0.77 717	9.99 402	31	
30	9.21 761	76	9.22 361	77	0.77 639	9.99 400	30	
31	9.21 836	75	9.22 438	78	0.77 562	9.99 398	29	
32	9.21 912	76	9.22 516	77	0.77 484	9.99 396	28	
33	9.21 987	75	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	9.22 137	74	9.22 747	77	0.77 253	9.99 390	25	
36	9.22 211	75	9.22 824	77	0.77 176	9.99 388	24	
37	9.22 286	75	9.22 901	77	0.77 099	9.99 385	23	
38	9.22 361	74	9.22 977	76	0.77 023	9.99 383	22	
39	9.22 435	74	9.23 054	77	0.76 946	9.99 381	21	
40	9.22 509	74	9.23 130	76	0.76 870	9.99 379	20	
41	9.22 583	74	9.23 206	76	0.76 794	9.99 377	19	
42	9.22 657	74	9.23 283	77	0.76 717	9.99 375	18	
43	9.22 731	74	9.23 359	76	0.76 641	9.99 372	17	
44	9.22 805	74	9.23 435	76	0.76 565	9.99 370	16	
45	9.22 878	73	9.23 510	75	0.76 490	9.99 368	15	
46	9.22 952	74	9.23 586	76	0.76 414	9.99 366	14	
47	9.23 025	73	9.23 661	75	0.76 339	9.99 364	13	
48	9.23 098	73	9.23 737	76	0.76 263	9.99 362	12	
49	9.23 171	73	9.23 812	75	0.76 188	9.99 359	11	
50	9.23 244	73	9.23 887	75	0.76 113	9.99 357	10	
51	9.23 317	73	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	9.23 462	72	9.24 112	75	0.75 888	9.99 351	7	
54	9.23 535	73	9.24 186	74	0.75 814	9.99 348	6	
55	9.23 607	72	9.24 261	75	0.75 739	9.99 346	5	
56	9.23 679	72	9.24 335	74	0.75 665	9.99 344	4	
57	9.23 752	73	9.24 410	75	0.75 590	9.99 342	3	
58	9.23 823	71	9.24 484	74	0.75 516	9.99 340	2	
59	9.23 895	72	9.24 558	74	0.75 442	9.99 337	1	
60	9.23 967	72	9.24 632	74	0.75 368	9.99 335	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	′	

Prop. Pts.

	82	81	80
6	8.2	8.1	8.0
7	9.6	9.5	9.3
8	10.9	10.8	10.7
9	12.3	12.2	12.0
10	13.7	13.5	13.3
20	27.3	27.0	26.7
30	41.0	40.5	40.0
40	54.7	54.0	53.3
50	68.3	67.5	66.7

	79	78
6	7.9	7.8
7	9.2	9.1
8	10.5	10.4
9	11.9	11.7
10	13.2	13.0
20	26.3	26.0
30	39.5	39.0
40	52.7	52.0
50	65.8	65.0

	77	76
6	7.7	7.6
7	9.0	8.9
8	10.3	10.1
9	11.6	11.4
10	12.8	12.7
20	25.7	25.3
30	38.5	38.0
40	51.3	50.7
50	64.2	63.3

	75	74
6	7.5	7.4
7	8.8	8.6
8	10.0	9.9
9	11.3	11.1
10	12.5	12.3
20	25.0	24.7
30	37.5	37.0
40	50.0	49.3
50	62.5	61.7

	73	72	71
6	7.3	7.2	7.1
7	8.5	8.4	8.3
8	9.7	9.6	9.5
9	11.0	10.8	10.7
10	12.2	12.0	11.8
20	24.3	24.0	23.7
30	36.5	36.0	35.5
40	48.7	48.0	47.3
50	60.8	60.0	59.2

	3	2
6	0.3	0.2
7	0.4	0.2
8	0.4	0.3
9	0.5	0.3
10	0.5	0.3
20	1.0	0.7
30	1.5	1.0
40	2.0	1.3
50	2.5	1.7

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.		
0	9.23 967		9.24 632		0.75 368	9.99 335		60			
1	9.24 039	72	9.24 706	74	0.75 294	9.99 333	2	59		74	73
2	9.24 110	71	9.24 779	73	0.75 221	9.99 331	2	58	6	7.4	7.3
3	9.24 181	71	9.24 853	74	0.75 147	9.99 328	3	57	7	8.6	8.5
4	9.24 253	72	9.24 926	73	0.75 074	9.99 326	2	56	8	9.9	9.7
5	9.24 324	71	9.25̄ 000	74	0.75 000	9.99 324	2	55	9	11.1	11.0
6	9.24 395̄	71	9.25 073	73	0.74 927	9.99 322	2	54	10	12.3	12.2
7	9.24 466	71	9.25 146	73	0.74 854	9.99 319	3	53	20	24.7	24.3
8	9.24 536	70	9.25 219	73	0.74 781	9.99 317	2	52	30	37.0	36.5
9	9.24 607	71	9.25 292	73	0.74 708	9.99 315̄	2	51	40	49.3	48.7
10	9.24 677	70	9.25 365̄	73	0.74 635	9.99 313	2	50	50	61.7	60.8
11	9.24 748	71	9.25 437	72	0.74 563	9.99 310	3	49		72	71
12	9.24 818	70	9.25 510	73	0.74 490	9.99 308	2	48	6	7.2	7.1
13	9.24 888	70	9.25 582	72	0.74 418	9.99 306	2	47	7	8.4	8.3
14	9.24 958	70	9.25 653̄	73	0.74 345	9.99 304	2	46	8	9.6	9.5̄
15	9.25 028	70	9.25 727	72	0.74 273	9.99 301	3	45	9	10.8	10.7
16	9.25 098	70	9.25 799	72	0.74 201	9.99 299	2	44	10	12.0	11.8
17	9.25 168	70	9.25 871	72	0.74 129	9.99 297	2	43	20	24.0	23.7
18	9.25 237	69	9.25 943	72	0.74 057	9.99 294	3	42	30	36.0	35.5
19	9.25 307	70	9.26 015̄	72	0.73 985	9.99 292	2	41	40	48.0	47.3
20	9.25 376	69	9.26 086	71	0.73 914	9.99 290	2	40	50	60.0	59.2
21	9.25 445	69	9.26 158	72	0.73 842	9.99 288	2	39		70	69
22	9.25 514	69	9.26 229	71	0.73 771	9.99 285	3	38	6	7.0	6.9
23	9.25 583	69	9.26 301	72	0.73 699	9.99 283	2	37	7	8.2	8.1
24	9.25 652	69	9.26 372	71	0.73 628	9.99 281	2	36	8	9.3	9.2
25	9.25 721	69	9.26 443	71	0.73 557	9.99 278	3	35	9	10.5	10.4
26	9.25 790	69	9.26 514	71	0.73 486	9.99 276	2	34	10	11.7	11.5
27	9.25 858	68	9.26 585̄	71	0.73 415	9.99 274	2	33	20	23.3	23.0
28	9.25 927	69	9.26 655	70	0.73 345̄	9.99 271	3	32	30	35.0	34.5
29	9.25 995	68	9.26 726	71	0.73 274	9.99 269	2	31	40	46.7	46.0
30	9.26 063	68	9.26 797	71	0.73 203	9.99 267	2	30	50	58.3	57.5
31	9.26 131	68	9.26 867	70	0.73 133	9.99 264	3	29		68	67
32	9.26 199	68	9.26 937	70	0.73 063	9.99 262	2	28	6	6.8	6.7
33	9.26 267	68	9.27 008	71	0.72 992	9.99 260	2	27	7	7.9	7.8
34	9.26 335	68	9.27 078	70	0.72 922	9.99 257	3	26	8	9.1	8.9
35	9.26 403	67	9.27 148	70	0.72 852	9.99 255̄	2	25	9	10.2	10.1
36	9.26 470	68	9.27 218	70	0.72 782	9.99 252	3	24	10	11.3	11.2
37	9.26 538	67	9.27 288	70	0.72 712	9.99 250	2	23	20	22.7	22.3
38	9.26 605	67	9.27 357	69	0.72 643	9.99 248	2	22	30	34.0	33.5
39	9.26 672	67	9.27 427	70	0.72 573	9.99 245	3	21	40	45.3	44.7
40	9.26 739	67	9.27 496	69	0.72 504	9.99 243	2	20	50	56.7	55.8
41	9.26 806	67	9.27 566	70	0.72 434	9.99 241	2	19		66	65
42	9.26 873	67	9.27 635	69	0.72 365̄	9.99 238	3	18	6	6.6	6.5
43	9.26 940	67	9.27 704	69	0.72 296	9.99 236	2	17	7	7.7	7.6
44	9.27 007	67	9.27 773	69	0.72 227	9.99 233	3	16	8	8.8	8.7
45	9.27 073	66	9.27 842	69	0.72 158	9.99 231	2	15	9	9.9	9.8
46	9.27 140	67	9.27 911	69	0.72 089	9.99 229	2	14	10	11.0	10.8
47	9.27 206	66	9.27 980	69	0.72 020	9.99 226	3	13	20	22.0	21.7
48	9.27 273	67	9.28 049	69	0.71 951	9.99 224	2	12	30	33.0	32.5
49	9.27 339	66	9.28 117	68	0.71 883	9.99 221	3	11	40	44.0	43.3
50	9.27 405̄	66	9.28 186	69	0.71 814	9.99 219	2	10	50	55.0	54.2
51	9.27 471	66	9.28 254	68	0.71 746	9.99 217	2	9		3	2
52	9.27 537	66	9.28 323	69	0.71 677	9.99 214	3	8	6	0.3	0.2
53	9.27 602	65	9.28 391	68	0.71 609	9.99 212	2	7	7	0.4	0.2
54	9.27 668	66	9.28 459	68	0.71 541	9.99 209	3	6	8	0.4	0.3
55	9.27 734	66	9.28 527	68	0.71 473	9.99 207	2	5	9	0.5̄	0.3
56	9.27 799	65	9.28 595̄	67	0.71 405	9.99 204	3	4	10	0.5	0.3
57	9.27 864	65	9.28 662	68	0.71 338	9.99 202	2	3	20	1.0	0.7
58	9.27 930	66	9.28 730	68	0.71 270	9.99 200	2	2	30	1.5	1.0
59	9.27 995̄	65	9.28 798	67	0.71 202	9.99 197	3	1	40	2.0	1.3
60	9.28 060	65	9.28 865		0.71 135̄	9.99 195̄	2	0	50	2.5	1.7
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.		

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.28 060		9.28 865		0.71 135	9.99 195		60	
1	9.28 125	65	9.28 933	68	0.71 067	9.99 192	3	59	68 67
2	9.28 190	65	9.29 000	67	0.71 000	9.99 190	2	58	6 6.8 6.7
3	9.28 254	64	9.29 067	67	0.70 933	9.99 187	3	57	7 7.9 7.8
4	9.28 319	65	9.29 134	67	0.70 866	9.99 185	2	56	8 9.1 8.9
5	9.28 384	65	9.29 201	67	0.70 799	9.99 182	3	55	9 10.2 10.1
6	9.28 448	64	9.29 268	67	0.70 732	9.99 180	2	54	10 11.3 11.2
7	9.28 512	64	9.29 335	67	0.70 665	9.99 177	3	53	20 22.7 22.3
8	9.28 577	65	9.29 402	66	0.70 598	9.99 175	2	52	30 34.0 33.5
9	9.28 641	64	9.29 468	67	0.70 532	9.99 172	3	51	40 45.3 44.7
10	9.28 705	64	9.29 535	66	0.70 465	9.99 170	2	50	50 56.7 55.8
11	9.28 769	64	9.29 601	67	0.70 399	9.99 167	3	49	66 65
12	9.28 833	64	9.29 668	66	0.70 332	9.99 165	2	48	6 6.6 6.5
13	9.28 896	63	9.29 734	66	0.70 266	9.99 162	3	47	7 7.7 7.6
14	9.28 960	64	9.29 800	66	0.70 200	9.99 160	2	46	8 8.8 8.7
15	9.29 024	64	9.29 866	66	0.70 134	9.99 157	3	45	9 9.9 9.8
16	9.29 087	63	9.29 932	66	0.70 068	9.99 155	2	44	10 11.0 10.8
17	9.29 150	63	9.29 998	66	0.70 002	9.99 152	3	43	20 22.0 21.7
18	9.29 214	64	9.30 064	66	0.69 936	9.99 150	2	42	30 33.0 32.5
19	9.29 277	63	9.30 130	66	0.69 870	9.99 147	3	41	40 44.0 43.3
20	9.29 340	63	9.30 195	65	0.69 805	9.99 145	2	40	50 55.0 54.2
21	9.29 403	63	9.30 261	66	0.69 739	9.99 142	3	39	64 63
22	9.29 466	63	9.30 326	65	0.69 674	9.99 140	2	38	6 6.4 6.3
23	9.29 529	63	9.30 391	65	0.69 609	9.99 137	3	37	7 7.5 7.4
24	9.29 591	62	9.30 457	66	0.69 543	9.99 135	2	36	8 8.5 8.4
25	9.29 654	63	9.30 522	65	0.69 478	9.99 132	3	35	9 9.6 9.5
26	9.29 716	62	9.30 587	65	0.69 413	9.99 130	2	34	10 10.7 10.5
27	9.29 779	63	9.30 652	65	0.69 348	9.99 127	3	33	20 21.3 21.0
28	9.29 841	62	9.30 717	65	0.69 283	9.99 124	3	32	30 32.0 31.5
29	9.29 903	62	9.30 782	65	0.69 218	9.99 122	2	31	40 42.7 42.0
30	9.29 966	63	9.30 846	64	0.69 154	9.99 119	3	30	50 53.3 52.5
31	9.30 028	62	9.30 911	65	0.69 089	9.99 117	2	29	62 61
32	9.30 090	62	9.30 975	64	0.69 025	9.99 114	3	28	6 6.2 6.1
33	9.30 151	61	9.31 040	65	0.68 960	9.99 112	2	27	7 7.2 7.1
34	9.30 213	62	9.31 104	64	0.68 896	9.99 109	3	26	8 8.3 8.1
35	9.30 275	62	9.31 168	64	0.68 832	9.99 106	3	25	9 9.3 9.2
36	9.30 336	61	9.31 233	65	0.68 767	9.99 104	2	24	10 10.3 10.2
37	9.30 398	62	9.31 297	64	0.68 703	9.99 101	3	23	20 20.7 20.3
38	9.30 459	61	9.31 361	64	0.68 639	9.99 099	2	22	30 31.0 30.5
39	9.30 521	62	9.31 425	64	0.68 575	9.99 096	3	21	40 41.3 40.7
40	9.30 582	61	9.31 489	64	0.68 511	9.99 093	3	20	50 51.7 50.8
41	9.30 643	61	9.31 552	63	0.68 448	9.99 091	2	19	60 59
42	9.30 704	61	9.31 616	64	0.68 384	9.99 088	3	18	6 6.0 5.9
43	9.30 765	61	9.31 679	63	0.68 321	9.99 086	2	17	7 7.0 6.9
44	9.30 826	61	9.31 743	64	0.68 257	9.99 083	3	16	8 8.0 7.9
45	9.30 887	61	9.31 806	63	0.68 194	9.99 080	3	15	9 9.0 8.9
46	9.30 947	60	9.31 870	64	0.68 130	9.99 078	2	14	10 10.0 9.8
47	9.31 008	61	9.31 933	63	0.68 067	9.99 075	3	13	20 20.0 19.7
48	9.31 068	60	9.31 996	63	0.68 004	9.99 072	3	12	30 30.0 29.5
49	9.31 129	61	9.32 059	63	0.67 941	9.99 070	2	11	40 40.0 39.3
50	9.31 189	60	9.32 122	63	0.67 878	9.99 067	3	10	50 50.0 49.2
51	9.31 250	61	9.32 185	63	0.67 815	9.99 064	3	9	3 2
52	9.31 310	60	9.32 248	63	0.67 752	9.99 062	2	8	6 0.3 0.2
53	9.31 370	60	9.32 311	63	0.67 689	9.99 059	3	7	7 0.4 0.2
54	9.31 430	60	9.32 373	62	0.67 627	9.99 056	3	6	8 0.4 0.3
55	9.31 490	60	9.32 436	63	0.67 564	9.99 054	2	5	9 0.5 0.3
56	9.31 549	59	9.32 498	62	0.67 502	9.99 051	3	4	10 0.5 0.3
57	9.31 609	60	9.32 561	63	0.67 439	9.99 048	3	3	20 1.0 0.7
58	9.31 669	60	9.32 623	62	0.67 377	9.99 046	2	2	30 1.5 1.0
59	9.31 728	59	9.32 685	62	0.67 315	9.99 043	3	1	40 2.0 1.3
60	9.31 788	60	9.32 747	62	0.67 253	9.99 040	3	0	50 2.5 1.7
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.31 788		9.32 747		0.67 253	9.99 040		60	
1	9.31 847	59	9.32 810	63	0.67 190	9.99 038	2	59	
2	9.31 907	60	9.32 872	62	0.67 128	9.99 035	3	58	63 62
3	9.31 966	59	9.32 933	61	0.67 067	9.99 032	3	57	6 6.3 6.2
4	9.32 025	59	9.32 995	62	0.67 005	9.99 030	2	56	7 7.4 7.2
5	9.32 084	59	9.33 057	62	0.66 943	9.99 027	3	55	8 8.4 8.3
6	9.32 143	59	9.33 119	61	0.66 881	9.99 024	3	54	9 9.5 9.3
7	9.32 202	59	9.33 180	62	0.66 820	9.99 022	2	53	10 10.5 10.3
8	9.32 261	59	9.33 242	61	0.66 758	9.99 019	3	52	20 21.0 20.7
9	9.32 319	58	9.33 303	62	0.66 697	9.99 016	3	51	30 31.5 31.0
10	9.32 378	59	9.33 365	61	0.66 635	9.99 013	3	50	40 42.0 41.3
11	9.32 437	59	9.33 426	61	0.66 574	9.99 011	2	49	50 52.5 51.7
12	9.32 495	58	9.33 487	61	0.66 513	9.99 008	3	48	61 60
13	9.32 553	58	9.33 548	61	0.66 452	9.99 005	3	47	6 6.1 6.0
14	9.32 612	59	9.33 609	61	0.66 391	9.99 002	3	46	7 7.1 7.0
15	9.32 670	58	9.33 670	61	0.66 330	9.99 000	3	45	8 8.1 8.0
16	9.32 728	58	9.33 731	61	0.66 269	9.98 997	3	44	9 9.2 9.0
17	9.32 786	58	9.33 792	61	0.66 208	9.98 994	3	43	10 10.2 10.0
18	9.32 844	58	9.33 853	60	0.66 147	9.98 991	3	42	20 20.3 20.0
19	9.32 902	58	9.33 913	61	0.66 087	9.98 989	2	41	30 30.5 30.0
20	9.32 960	58	9.33 974	60	0.66 026	9.98 986	3	40	40 40.7 40.0
21	9.33 018	57	9.34 034	61	0.65 966	9.98 983	3	39	50 50.8 50.0
22	9.33 075	58	9.34 095	60	0.65 905	9.98 980	3	38	59
23	9.33 133	57	9.34 155	60	0.65 845	9.98 978	2	37	6 5.9
24	9.33 190	58	9.34 215	61	0.65 785	9.98 975	3	36	7 6.9
25	9.33 248	57	9.34 276	60	0.65 724	9.98 972	3	35	8 7.9
26	9.33 305	57	9.34 336	60	0.65 664	9.98 969	3	34	9 8.9
27	9.33 362	58	9.34 396	60	0.65 604	9.98 967	2	33	10 9.8
28	9.33 420	57	9.34 456	60	0.65 544	9.98 964	3	32	20 19.7
29	9.33 477	57	9.34 516	60	0.65 484	9.98 961	3	31	30 29.5
30	9.33 534	57	9.34 576	59	0.65 424	9.98 958	3	30	40 39.3
31	9.33 591	57	9.34 635	60	0.65 365	9.98 955	3	29	50 49.2
32	9.33 647	56	9.34 695	60	0.65 305	9.98 953	2	28	58 57
33	9.33 704	57	9.34 755	60	0.65 245	9.98 950	3	27	6 5.8 5.7
34	9.33 761	57	9.34 814	59	0.65 186	9.98 947	3	26	7 6.8 6.7
35	9.33 818	57	9.34 874	60	0.65 126	9.98 944	3	25	8 7.7 7.6
36	9.33 874	56	9.34 933	59	0.65 067	9.98 941	3	24	9 8.7 8.6
37	9.33 931	57	9.34 992	59	0.65 008	9.98 938	3	23	10 9.7 9.5
38	9.33 987	56	9.35 051	59	0.64 949	9.98 936	2	22	20 19.3 19.0
39	9.34 043	56	9.35 111	60	0.64 889	9.98 933	3	21	30 29.0 28.5
40	9.34 100	57	9.35 170	59	0.64 830	9.98 930	3	20	40 38.7 38.0
41	9.34 156	56	9.35 229	59	0.64 771	9.98 927	3	19	50 48.3 47.5
42	9.34 212	56	9.35 288	59	0.64 712	9.98 924	3	18	56 55
43	9.34 268	56	9.35 347	59	0.64 653	9.98 921	3	17	6 5.6 5.5
44	9.34 324	56	9.35 405	58	0.64 595	9.98 919	2	16	7 6.5 6.4
45	9.34 380	56	9.35 464	59	0.64 536	9.98 916	3	15	8 7.5 7.3
46	9.34 436	56	9.35 523	59	0.64 477	9.98 913	3	14	9 8.4 8.3
47	9.34 491	55	9.35 581	58	0.64 419	9.98 910	3	13	10 9.3 9.2
48	9.34 547	56	9.35 640	59	0.64 360	9.98 907	3	12	20 18.7 18.3
49	9.34 602	55	9.35 698	58	0.64 302	9.98 904	3	11	30 28.0 27.5
50	9.34 658	56	9.35 757	59	0.64 243	9.98 901	3	10	40 37.3 36.7
51	9.34 713	55	9.35 815	58	0.64 185	9.98 898	3	9	50 46.7 45.8
52	9.34 769	56	9.35 873	58	0.64 127	9.98 896	2	8	3 2
53	9.34 824	55	9.35 931	58	0.64 069	9.98 893	3	7	6 0.3 0.2
54	9.34 879	55	9.35 989	58	0.64 011	9.98 890	3	6	7 0.4 0.2
55	9.34 934	55	9.36 047	58	0.63 953	9.98 887	3	5	8 0.4 0.3
56	9.34 989	55	9.36 105	58	0.63 895	9.98 884	3	4	9 0.5 0.3
57	9.35 044	55	9.36 163	58	0.63 837	9.98 881	3	3	10 0.5 0.3
58	9.35 099	55	9.36 221	58	0.63 779	9.98 878	3	2	20 1.0 0.7
59	9.35 154	55	9.36 279	58	0.63 721	9.98 875	3	1	30 1.5 1.0
60	9.35 209		9.36 336	57	0.63 664	9.98 872	3	0	40 2.0 1.3
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	50 2.5 1.7

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.35 209		9.36 336		0.63 664	9.98 872		60	
1	9.35 263	54	9.36 394	58	0.63 606	9.98 869	3	59	
2	9.35 318	55	9.36 452	58	0.63 548	9.98 867	2	58	58 57
3	9.35 373	55	9.36 509	57	0.63 491	9.98 864	3	57	6 5.8 5.7
4	9.35 427	54	9.36 566	57	0.63 434	9.98 861	3	56	7 6.8 6.7
5	9.35 481	54	9.36 624	58	0.63 376	9.98 858	3	55	8 7.7 7.6
6	9.35 536	55	9.36 681	57	0.63 319	9.98 855	3	54	9 8.7 8.6
7	9.35 590	54	9.36 738	57	0.63 262	9.98 852	3	53	10 9.7 9.5
8	9.35 644	54	9.36 795	57	0.63 205	9.98 849	3	52	20 19.3 19.0
9	9.35 698	54	9.36 852	57	0.63 148	9.98 846	3	51	30 29.0 28.5
10	9.35 752	54	9.36 909	57	0.63 091	9.98 843	3	50	40 38.7 38.0
11	9.35 806	54	9.36 966	57	0.63 034	9.98 840	3	49	50 48.3 47.5
12	9.35 860	54	9.37 023	57	0.62 977	9.98 837	3	48	
13	9.35 914	54	9.37 080	57	0.62 920	9.98 834	3	47	56 55
14	9.35 968	54	9.37 137	56	0.62 863	9.98 831	3	46	6 5.6 5.5
15	9.36 022	53	9.37 193	57	0.62 807	9.98 828	3	45	7 6.5 6.4
16	9.36 075	54	9.37 250	56	0.62 750	9.98 825	3	44	8 7.5 7.3
17	9.36 129	53	9.37 306	57	0.62 694	9.98 822	3	43	9 8.4 8.3
18	9.36 182	54	9.37 363	56	0.62 637	9.98 819	3	42	10 9.3 9.2
19	9.36 236	53	9.37 419	57	0.62 581	9.98 816	3	41	20 18.7 18.3
20	9.36 289	53	9.37 476	56	0.62 524	9.98 813	3	40	30 28.0 27.5
21	9.36 342	53	9.37 532	56	0.62 468	9.98 810	3	39	40 37.3 36.7
22	9.36 395	53	9.37 588	56	0.62 412	9.98 807	3	38	50 46.7 45.8
23	9.36 449	54	9.37 644	56	0.62 356	9.98 804	3	37	
24	9.36 502	53	9.37 700	56	0.62 300	9.98 801	3	36	54
25	9.36 555	53	9.37 756	56	0.62 244	9.98 798	3	35	6 5.4
26	9.36 608	53	9.37 812	56	0.62 188	9.98 795	3	34	7 6.3
27	9.36 660	52	9.37 868	56	0.62 132	9.98 792	3	33	8 7.2
28	9.36 713	53	9.37 924	56	0.62 076	9.98 789	3	32	9 8.1
29	9.36 766	53	9.37 980	56	0.62 020	9.98 786	3	31	10 9.0
30	9.36 819	53	9.38 035	55	0.61 965	9.98 783	3	30	20 18.0
31	9.36 871	52	9.38 091	56	0.61 909	9.98 780	3	29	30 27.0
32	9.36 924	53	9.38 147	56	0.61 853	9.98 777	3	28	40 36.0
33	9.36 976	52	9.38 202	55	0.61 798	9.98 774	3	27	50 45.0
34	9.37 028	52	9.38 257	55	0.61 743	9.98 771	3	26	
35	9.37 081	53	9.38 313	56	0.61 687	9.98 768	3	25	53 52
36	9.37 133	52	9.38 368	55	0.61 632	9.98 765	3	24	6 5.3 5.2
37	9.37 185	52	9.38 423	55	0.61 577	9.98 762	3	23	7 6.2 6.1
38	9.37 237	52	9.38 479	56	0.61 521	9.98 759	3	22	8 7.1 6.9
39	9.37 289	52	9.38 534	55	0.61 466	9.98 756	3	21	9 8.0 7.8
40	9.37 341	52	9.38 589	55	0.61 411	9.98 753	3	20	10 8.8 8.7
41	9.37 393	52	9.38 644	55	0.61 356	9.98 750	3	19	20 17.7 17.3
42	9.37 445	52	9.38 699	55	0.61 301	9.98 746	4	18	30 26.5 26.0
43	9.37 497	52	9.38 754	55	0.61 246	9.98 743	3	17	40 35.3 34.7
44	9.37 549	52	9.38 808	54	0.61 192	9.98 740	3	16	50 44.2 43.3
45	9.37 600	51	9.38 863	55	0.61 137	9.98 737	3	15	
46	9.37 652	52	9.38 918	55	0.61 082	9.98 734	3	14	51 4
47	9.37 703	51	9.38 972	54	0.61 028	9.98 731	3	13	6 5.1 0.4
48	9.37 755	52	9.39 027	55	0.60 973	9.98 728	3	12	7 6.0 0.5
49	9.37 806	51	9.39 082	55	0.60 918	9.98 725	3	11	8 6.8 0.5
50	9.37 858	52	9.39 136	54	0.60 864	9.98 722	3	10	9 7.7 0.6
51	9.37 909	51	9.39 190	54	0.60 810	9.98 719	3	9	10 8.5 0.7
52	9.37 960	51	9.39 245	55	0.60 755	9.98 715	4	8	20 17.0 1.3
53	9.38 011	51	9.39 299	54	0.60 701	9.98 712	3	7	30 25.5 2.0
54	9.38 062	51	9.39 353	54	0.60 647	9.98 709	3	6	40 34.0 2.7
55	9.38 113	51	9.39 407	54	0.60 593	9.98 706	3	5	50 42.5 3.3
56	9.38 164	51	9.39 461	54	0.60 539	9.98 703	3	4	
57	9.38 215	51	9.39 515	54	0.60 485	9.98 700	3	3	3 2
58	9.38 266	51	9.39 569	54	0.60 431	9.98 697	3	2	6 0.3 0.2
59	9.38 317	51	9.39 623	54	0.60 377	9 98 694	3	1	7 0.4 0.2
60	9.38 368	51	9.39 677	54	0.60 323	9.98 690	4	0	8 0.4 0.3
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	9 0.5 0.3
									10 0.5 0.3
									20 1.0 0.7
									30 1.5 1.0
									40 2.0 1.3
									50 2.5 1.7

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.38 368		9.39 677		0.60 323	9.98 690		60	
1	9.38 418	50	9.39 731	54	0.60 269	9.98 687	3	59	
2	9.38 469	51	9.39 785	54	0.60 215	9.98 684	3	58	
3	9.38 519	50	9.39 838	53	0.60 162	9.98 681	3	57	54 53
4	9.38 570	51	9.39 892	54	0.60 108	9.98 678	3	56	6 5.4 5.3
5	9.38 620	50	9.39 945	53	0.60 055	9.98 675	3	55	7 6.3 6.2
6	9.38 670	50	9.39 999	54	0.60 001	9.98 671	4	54	8 7.2 7.1
7	9.38 721	51	9.40 052	53	0.59 948	9.98 668	3	53	9 8.1 8.0
8	9.38 771	50	9.40 106	54	0.59 894	9.98 665	3	52	10 9.0 8.8
9	9.38 821	50	9.40 159	53	0.59 841	9.98 662	3	51	20 18.0 17.7
10	9.38 871	50	9.40 212	53	0.59 788	9.98 659	3	50	30 27.0 26.5
11	9.38 921	50	9.40 266	54	0.59 734	9.98 656	3	49	40 36.0 35.3
12	9.38 971	50	9.40 319	53	0.59 681	9.98 652	4	48	50 45.0 44.2
13	9.39 021	50	9.40 372	53	0.59 628	9.98 649	3	47	
14	9.39 071	50	9.40 425	53	0.59 575	9 98 646	3	46	52 51
15	9.39 121	49	9.40 478	53	0.59 522	9.98 643	3	45	6 5.2 5.1
16	9.39 170	50	9.40 531	53	0.59 469	9.98 640	3	44	7 6.1 6.0
17	9.39 220	50	9.40 584	53	0.59 416	9.98 636	4	43	8 6.9 6.8
18	9.39 270	49	9.40 636	52	0.59 364	9.98 633	3	42	9 7.8 7.7
19	9.39 319	50	9.40 689	53	0.59 311	9.98 630	3	41	10 8.7 8.5
20	9.39 369	49	9.40 742	53	0.59 258	9.98 627	3	40	20 17.3 17.0
21	9.39 418	49	9.40 795	53	0.59 205	9.98 623	4	39	30 26.0 25.5
22	9.39 467	50	9.40 847	52	0.59 153	9.98 620	3	38	40 34.7 34.0
23	9.39 517	49	9.40 900	53	0.59 100	9.98 617	3	37	50 43.3 42.5
24	9.39 566	49	9.40 952	52	0.59 048	9.98 614	3	36	
25	9.39 615	49	9.41 005	53	0.58 995	9.98 610	4	35	
26	9.39 664	49	9.41 057	52	0.58 943	9.98 607	3	34	50 49
27	9.39 713	49	9.41 109	52	0.58 891	9.98 604	3	33	6 5.0 4.9
28	9.39 762	49	9.41 161	52	0.58 839	9.98 601	3	32	7 5.8 5.7
29	9.39 811	49	9.41 214	53	0.58 786	9 98 597	4	31	8 6.7 6.5
30	9.39 860	49	9.41 266	52	0.58 734	9.98 594	3	30	9 7.5 7.4
31	9.39 909	49	9.41 318	52	0.58 682	9.98 591	3	29	10 8.3 8.2
32	9.39 958	49	9.41 370	52	0.58 630	9.98 588	3	28	20 16.7 16.3
33	9.40 006	48	9.41 422	52	0.58 578	9.98 584	4	27	30 25.0 24.5
34	9.40 053	49	9.41 474	52	0.58 526	9.98 581	3	26	40 33.3 32.7
35	9.40 103	48	9.41 526	52	0.58 474	9.98 578	3	25	50 41.7 40.8
36	9.40 152	49	9.41 578	52	0.58 422	9.98 574	4	24	
37	9.40 200	48	9.41 629	51	0.58 371	9.98 571	3	23	
38	9.40 249	49	9.41 681	52	0.58 319	9.98 568	3	22	48 47
39	9.40 297	48	9.41 733	52	0.58 267	9.98 565	3	21	6 4.8 4.7
40	9.40 346	49	9.41 784	51	0.58 216	9.98 561	4	20	7 5.6 5.5
41	9.40 394	48	9.41 836	52	0.58 164	9.98 558	3	19	8 6.4 6.3
42	9.40 442	48	9.41 887	51	0.58 113	9.98 555	3	18	9 7.2 7.1
43	9.40 490	48	9.41 939	52	0.58 061	9.98 551	4	17	10 8.0 7.8
44	9.40 538	48	9.41 990	51	0.58 010	9.98 548	3	16	20 16.0 15.7
45	9.40 586	48	9.42 041	51	0.57 959	9.98 545	3	15	30 24.0 23.5
46	9.40 634	48	9.42 093	52	0.57 907	9.98 541	4	14	40 32.0 31.3
47	9.40 682	48	9.42 144	51	0.57 856	9.98 538	3	13	50 40.0 39.2
48	9.40 730	48	9.42 195	51	0.57 805	9.98 535	3	12	
49	9.40 778	48	9.42 246	51	0.57 754	9.98 531	4	11	
50	9.40 825	47	9.42 297	51	0.57 703	9.98 528	3	10	4 3
51	9.40 873	48	9.42 348	51	0.57 652	9.98 525	3	9	6 0.4 0.3
52	9.40 921	48	9.42 399	51	0.57 601	9.98 521	4	8	7 0.5 0.4
53	9.40 968	47	9.42 450	51	0.57 550	9.98 518	3	7	8 0.5 0.4
54	9.41 016	48	9.42 501	51	0.57 499	9.98 515	3	6	9 0.6 0.5
55	9.41 063	47	9.42 552	51	0.57 448	9.98 511	4	5	10 0.7 0.5
56	9.41 111	48	9.42 603	51	0.57 397	9.98 508	3	4	20 1.3 1.0
57	9.41 158	47	9.42 653	50	0.57 347	9.98 505	3	3	30 2.0 1.5
58	9.41 205	47	9.42 704	51	0.57 296	9.98 501	4	2	40 2.7 2.0
59	9.41 252	47	9.42 755	51	0.57 245	9.98 498	3	1	50 3.3 2.5
60	9.41 300	48	9.42 805	50	0.57 195	9.98 494	4	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.		
0	9.41 300		9.42 805		0.57 195	9.98 494		60			
1	9.41 347	47	9.42 856	51	0.57 144	9.98 491	3	59			
2	9.41 394	47	9.42 906	50	0.57 094	9.98 488	3	58			
3	9.41 441	47	9.42 957	51	0.57 043	9.98 484	4	57		51	50
4	9.41 488	47	9.43 007	50	0.56 993	9.98 481	3	56	6	5.1	5.0
5	9.41 535	47	9.43 057	50	0.56 943	9.98 477	4	55	7	6.0	5.8
6	9.41 582	46	9.43 108	51	0.56 892	9.98 474	3	54	8	6.8	6.7
7	9.41 628	47	9.43 158	50	0.56 842	9.98 471	3	53	9	7.7	7.5
8	9.41 675	47	9.43 208	50	0.56 792	9.98 467	4	52	10	8.5	8.3
9	9.41 722	46	9.43 258	50	0.56 742	9.98 464	3	51	20	17.0	16.7
10	9.41 768	47	9.43 308	50	0.56 692	9.98 460	4	50	30	25.5	25.0
11	9.41 815	46	9.43 358	50	0.56 642	9.98 457	3	49	40	34.0	33.3
12	9.41 861	47	9.43 408	50	0.56 592	9.98 453	4	48	50	42.5	41.7
13	9.41 908	46	9.43 458	50	0.56 542	9.98 450	3	47			
14	9.41 954	47	9 43 508	50	0.56 492	9.98 447	3	46			
15	9.42 001	46	9.43 558	49	0.56 442	9.98 443	4	45		49	48
16	9.42 047	46	9.43 607	50	0.56 393	9.98 440	3	44	6	4.9	4.8
17	9.42 093	47	9.43 657	50	0.56 343	9.98 436	4	43	7	5.7	5.6
18	9.42 140	46	9.43 707	49	0.56 293	9.98 433	3	42	8	6.5	6.4
19	9.42 186	46	9.43 756	50	0.56 244	9 98 429	4	41	9	7.4	7.2
20	9.42 232	46	9.43 806	49	0.56 194	9.98 426	3	40	10	8.2	8.0
21	9.42 278	46	9.43 855	50	0.56 145	9.98 422	4	39	20	16.3	16.0
22	9.42 324	46	9.43 905	49	0.56 095	9.98 419	3	38	30	24.5	24.0
23	9.42 370	46	9.43 954	50	0.56 046	9.98 415	4	37	40	32.7	32.0
24	9.42 416	45	9.44 004	49	0.55 996	9.98 412	3	36	50	40.8	40.0
25	9.42 461	46	9.44 053	49	0.55 947	9.98 409	3	35			
26	9.42 507	46	9.44 102	49	0.55 898	9.98 405	4	34		47	46
27	9.42 553	46	9.44 151	50	0.55 849	9.98 402	3	33	6	4.7	4.6
28	9.42 599	45	9.44 201	49	0.55 799	9.98 398	4	32	7	5.5	5.4
29	9.42 644	46	9.44 250	49	0.55 750	9.98 395	3	31	8	6.3	6.1
30	9.42 690	45	9.44 299	49	0.55 701	9.98 391	4	30	9	7.1	6.9
31	9.42 735	46	9.44 348	49	0.55 652	9.98 388	3	29	10	7.8	7.7
32	9.42 781	45	9.44 397	49	0.55 603	9.98 384	4	28	20	15.7	15.3
33	9.42 826	46	9.44 446	49	0.55 554	9.98 381	3	27	30	23.5	23.0
34	9.42 872	45	9.44 495	49	0.55 505	9.98 377	4	26	40	31.3	30.7
35	9.42 917	45	9.44 544	48	0.55 456	9.98 373	3	25	50	39.2	38.3
36	9.42 962	46	9.44 592	49	0.55 408	9.98 370	4	24			
37	9.43 008	45	9.44 641	49	0.55 359	9.98 366	3	23			
38	9.43 053	45	9.44 690	48	0.55 310	9.98 363	4	22		45	44
39	9.43 098	45	9.44 738	49	0.55 262	9.98 359	3	21	6	4.5	4.4
40	9.43 143	45	9.44 787	49	0.55 213	9.98 356	4	20	7	5.3	5.1
41	9.43 188	45	9.44 836	48	0.55 164	9 98 352	3	19	8	6.0	5.9
42	9.43 233	45	9.44 884	49	0.55 116	9.98 349	3	18	9	6.8	6.6
43	9.43 278	45	9.44 933	48	0.55 067	9.98 345	4	17	10	7.5	7.3
44	9.43 323	44	9.44 981	48	0.55 019	9.98 342	3	16	20	15.0	14.7
45	9.43 367	45	9.45 029	49	0.54 971	9.98 338	4	15	30	22.5	22.0
46	9.43 412	45	9.45 078	48	0.54 922	9.98 334	4	14	40	30.0	29.3
47	9.43 457	45	9.45 126	48	0.54 874	9.98 331	3	13	50	37.5	36.7
48	9.43 502	44	9.45 174	48	0.54 826	9.98 327	4	12			
49	9.43 546	45	9.45 222	48	0.54 778	9.98 324	3	11			
50	9.43 591	44	9.45 271	49	0.54 729	9.98 320	4	10		4	3
51	9.43 635	45	9.45 319	48	0.54 681	9.98 317	3	9	6	0.4	0.3
52	9.43 680	44	9.45 367	48	0.54 633	9.98 313	4	8	7	0.5	0.4
53	9.43 724	45	9.45 415	48	0.54 585	9.98 309	4	7	8	0.5	0.4
54	9.43 769	44	9.45 463	48	0.54 537	9.98 306	3	6	9	0.6	0.5
55	9.43 813	44	9.45 511	48	0.54 489	9.98 302	4	5	10	0.7	0.5
56	9.43 857	44	9.45 559	47	0.54 441	9.98 299	3	4	20	1.3	1.0
57	9.43 901	44	9.45 606	48	0.54 394	9.98 295	4	3	30	2.0	1.5
58	9.43 946	45	9.45 654	48	0.54 346	9.98 291	4	2	40	2.7	2.0
59	9.43 990	44	9.45 702	48	0.54 298	9.98 288	3	1	50	3.3	2.5
60	9.44 034	44	9.45 750	48	0.54 250	9.98 284	4	0			
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.		

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.44 034		9.45 750		0.54 250	9.98 284		60	
1	9.44 078	44	9.45 797	47	0.54 203	9.98 281	3	59	
2	9.44 122	44	9.45 845	48	0.54 155	9.98 277	4	58	
3	9.44 166	44	9.45 892	47	0.54 108	9.98 273	4	57	48 47
4	9.44 210	44	9.45 940	48	0.54 060	9.98 270	3	56	6 4.8 4.7
5	9.44 253	43	9.45 987	47	0.54 013	9.98 266	4	55	7 5.6 5.5
6	9.44 297	44	9.46 035	48	0.53 965	9.98 262	4	54	8 6.4 6.3
7	9.44 341	44	9.46 082	47	0.53 918	9 98 259	3	53	9 7.2 7.1
8	9 44 385	44	9.46 130	48	0.53 870	9.98 255	4	52	10 8.0 7.8
9	9.44 428	43	9.46 177	47	0.53 823	9.98 251	4	51	20 16.0 15.7
10	9.44 472	44	9.46 224	47	0.53 776	9.98 248	3	50	30 24.0 23.5
11	9.44 516	44	9.46 271	47	0.53 729	9.98 244	4	49	40 32.0 31.3
12	9.44 559	43	9.46 319	48	0.53 681	9.98 240	4	48	50 40.0 39.2
13	9.44 602	43	9.46 366	47	0.53 634	9.98 237	3	47	
14	9.44 646	44	9.46 413	47	0.53 587	9.98 233	4	46	
15	9.44 689	43	9.46 460	47	0.53 540	9.98 229	4	45	46 45
16	9.44 733	44	9.46 507	47	0.53 493	9.98 226	3	44	6 4.6 4.5
17	9.44 776	43	9.46 554	47	0.53 446	9.98 222	4	43	7 5.4 5.3
18	9.44 819	43	9.46 601	47	0.53 399	9.98 218	4	42	8 6.1 6.0
19	9.44 862	43	9.46 648	47	0.53 352	9.98 215	3	41	9 6.9 6.8
20	9.44 905	43	9.46 694	46	0.53 306	9.98 211	4	40	10 7.7 7.5
21	9.44 948	43	9.46 741	47	0.53 259	9.98 207	4	39	20 15.3 15.0
22	9.44 992	44	9.46 788	47	0.53 212	9.98 204	3	38	30 23.0 22.5
23	9.45 035	43	9.46 835	47	0.53 165	9.98 200	4	37	40 30.7 30.0
24	9.45 077	42	9.46 881	46	0.53 119	9.98 196	4	36	50 38.3 37.5
25	9.45 120	43	9.46 928	47	0.53 072	9.98 192	4	35	
26	9.45 163	43	9.46 975	47	0.53 025	9.98 189	3	34	44 43
27	9.45 206	43	9.47 021	46	0.52 979	9.98 185	4	33	6 4.4 4.3
28	9.45 249	43	9.47 068	47	0.52 932	9.98 181	4	32	7 5.1 5.0
29	9.45 292	43	9.47 114	46	0.52 886	9.98 177	4	31	8 5.9 5.7
30	9.45 334	42	9.47 160	46	0.52 840	9.98 174	3	30	9 6.6 6.5
31	9.45 377	43	9.47 207	47	0.52 793	9.98 170	4	29	10 7.3 7.2
32	9.45 419	42	9.47 253	46	0.52 747	9.98 166	4	28	20 14 7 14.3
33	9.45 462	43	9.47 299	46	0.52 701	9.98 162	4	27	30 22.0 21.5
34	9.45 504	42	9.47 346	47	0.52 654	9.98 159	3	26	40 29.3 28.7
35	9.45 547	43	9.47 392	46	0.52 608	9.98 155	4	25	50 36.7 35.8
36	9.45 589	42	9.47 438	46	0.52 562	9.98 151	4	24	
37	9.45 632	43	9.47 484	46	0.52 516	9.98 147	4	23	
38	9.45 674	42	9.47 530	46	0.52 470	9.98 144	3	22	42 41
39	9.45 716	42	9.47 576	46	0.52 424	9.98 140	4	21	6 4.2 4.1
40	9.45 758	42	9.47 622	46	0.52 378	9.98 136	4	20	7 4.9 4.8
41	9.45 801	43	9.47 668	46	0.52 332	9.98 132	4	19	8 5.6 5.5
42	9.45 843	42	9.47 714	46	0.52 286	9.98 129	3	18	9 6.3 6.2
43	9.45 885	42	9.47 760	46	0.52 240	9.98 125	4	17	10 7.0 6.8
44	9.45 927	42	9.47 806	46	0.52 194	9.98 121	4	16	20 14.0 13.7
45	9.45 969	42	9.47 852	46	0.52 148	9.98 117	4	15	30 21.0 20.5
46	9.46 011	42	9.47 897	45	0.52 103	9.98 113	4	14	40 28.0 27.3
47	9.46 053	42	9.47 943	46	0.52 057	9.98 110	3	13	50 35.0 34.2
48	9.46 095	42	9.47 989	46	0.52 011	9.98 106	4	12	
49	9.46 136	41	9.48 035	46	0.51 965	9.98 102	4	11	
50	9.46 178	42	9.48 080	45	0.51 920	9.98 098	4	10	4 3
51	9.46 220	42	9.48 126	46	0.51 874	9.98 094	4	9	6 0.4 0.3
52	9.46 262	42	9.48 171	45	0.51 829	9.98 090	4	8	7 0.5 0.4
53	9.46 303	41	9.48 217	46	0.51 783	9.98 087	3	7	8 0.5 0.4
54	9.46 345	42	9.48 262	45	0.51 738	9.98 083	4	6	9 0.6 0.5
55	9.46 386	41	9.48 307	45	0.51 693	9.98 079	4	5	10 0.7 0.5
56	9.46 428	42	9.48 353	46	0.51 647	9.98 075	4	4	20 1.3 1.0
57	9.46 469	41	9.48 398	45	0.51 602	9.98 071	4	3	30 2.0 1.5
58	9.46 511	42	9.48 443	45	0.51 557	9.98 067	4	2	40 2.7 2.0
59	9.46 552	41	9.48 489	46	0.51 511	9.98 063	4	1	50 3.3 2.5
60	9.46 594	42	9.48 534	45	0.51 466	9.98 060	3	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.46 594		9.48 534		0.51 466	9.98 060		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	0.51 331	9.98 048	4	57	45 44
4	9.46 758	41	9.48 714	45	0.51 286	9.98 044	4	56	6 4.5 4.4
5	9.46 800	42	9.48 759	45	0.51 241	9.98 040	4	55	7 5.3 5.1
6	9.46 841	41	9.48 804	45	0.51 196	9.98 036	4	54	8 6.0 5.9
7	9.46 882	41	9.48 849	45	0.51 151	9.98 032	4	53	9 6.8 6.6
8	9.46 923	41	9.48 894	45	0.51 106	9.98 029	3	52	10 7.5 7.3
9	9.46 964	41	9.48 939	45	0.51 061	9.98 025	4	51	20 15.0 14.7
10	9.47 005	41	9.48 984	45	0.51 016	9.98 021	4	50	30 22.5 22.0
11	9.47 045	40	9.49 029	45	0.50 971	9 98 017	4	49	40 30.0 29.3
12	9.47 086	41	9.49 073	44	0.50 927	9 98 013	4	48	50 37.5 36.7
13	9.47 127	41	9.49 118	45	0.50 882	9.98 009	4	47	
14	9.47 168	41	9.49 163	45	0.50 837	9.98 005	4	46	43
15	9.47 209	41	9.49 207	44	0.50 793	9.98 001	4	45	6 4.3
16	9.47 249	40	9.49 252	45	0.50 748	9.97 997	4	44	7 5.0
17	9.47 290	41	9.49 296	44	0.50 704	9.97 993	4	43	8 5.7
18	9.47 330	40	9.49 341	45	0.50 659	9.97 989	4	42	9 6.5
19	9.47 371	41	9.49 385	44	0.50 615	9.97 986	3	41	10 7.2
20	9.47 411	40	9.49 430	45	0.50 570	9.97 982	4	40	20 14.3
21	9 47 452	41	9.49 474	44	0.50 526	9.97 978	4	39	30 21.5
22	9.47 492	40	9.49 519	45	0.50 481	9.97 974	4	38	40 28.7
23	9.47 533	41	9.49 563	44	0.50 437	9.97 970	4	37	50 35.8
24	9.47 573	40	9.49 607	44	0.50 393	9.97 966	4	36	
25	9.47 613	40	9.49 652	45	0.50 348	9.97 962	4	35	
26	9.47 654	41	9.49 696	44	0.50 304	9.97 958	4	34	42 41
27	9.47 694	40	9.49 740	44	0.50 260	9.97 954	4	33	6 4.2 4.1
28	9.47 734	40	9.49 784	44	0.50 216	9.97 950	4	32	7 4.9 4.8
29	9.47 774	40	9.49 828	44	0.50 172	9.97 946	4	31	8 5.6 5.5
30	9.47 814	40	9 49 872	44	0.50 128	9.97 942	4	30	9 6.3 6.2
31	9.47 854	40	9.49 916	44	0.50 084	9.97 938	4	29	10 7.0 6.8
32	9.47 894	40	9.49 960	44	0.50 040	9.97 934	4	28	20 14.0 13.7
33	9.47 934	40	9.50 004	44	0.49 996	9.97 930	4	27	30 21.0 20.5
34	9.47 974	40	9.50 048	44	0.49 952	9.97 926	4	26	40 28.0 27.3
35	9.48 014	40	9.50 092	44	0.49 908	9.97 922	4	25	50 35.0 34.2
36	9.48 054	40	9.50 136	44	0.49 864	9.97 918	4	24	
37	9.48 094	40	9.50 180	44	0 49 820	9.97 914	4	23	
38	9.48 133	39	9.50 223	43	0.49 777	9.97 910	4	22	40 39
39	9.48 173	40	9.50 267	44	0.49 733	9.97 906	4	21	6 4.0 3.9
40	9.48 213	40	9.50 311	44	0.49 689	9.97 902	4	20	7 4.7 4.6
41	9.48 252	39	9 50 355	44	0.49 645	9.97 898	4	19	8 5.3 5.2
42	9.48 292	40	9.50 398	43	0.49 602	9.97 894	4	18	9 6.0 5.9
43	9.48 332	40	9.50 442	44	0.49 558	9.97 890	4	17	10 6.7 6.5
44	9.48 371	39	9.50 485	43	0 49 515	9.97 886	4	16	20 13.3 13.0
45	9.48 411	40	9.50 529	44	0.49 471	9.97 882	4	15	30 20.0 19.5
46	9.48 450	39	9.50 572	43	0.49 428	9.97 878	4	14	40 26.7 26.0
47	9.48 490	40	9.50 616	44	0.49 384	9.97 874	4	13	50 33.3 32.5
48	9.48 529	39	9.50 659	43	0.49 341	9.97 870	4	12	
49	9.48 568	39	9.50 703	44	0.49 297	9.97 866	4	11	
50	9.48 607	39	9.50 746	43	0.49 254	9.97 861	5	10	5 4 3
51	9.48 647	40	9.50 789	43	0.49 211	9.97 857	4	9	6 0.5 0.4 0.3
52	9.48 686	39	9.50 833	44	0.49 167	9.97 853	4	8	7 0.6 0.5 0.4
53	9.48 725	39	9.50 876	43	0.49 124	9.97 849	4	7	8 0.7 0.5 0.4
54	9.48 764	39	9.50 919	43	0.49 081	9.97 845	4	6	9 0.8 0 6 0.5
55	9.48 803	39	9.50 962	43	0.49 038	9.97 841	4	5	10 0.8 0.7 0.5
56	9.48 842	39	9.51 005	43	0.48 995	9.97 837	4	4	20 1.7 1.3 1.0
57	9.48 881	39	9.51 048	43	0.48 952	9.97 833	4	3	30 2.5 2.0 1.5
58	9.48 920	39	9.51 092	44	0.48 908	9.97 829	4	2	40 3.3 2.7 2.0
59	9.48 959	39	9.51 135	43	0.48 865	9.97 825	4	1	50 4.2 3.3 2.5
60	9.48 998	39	9.51 178	43	0.48 822	9.97 821	4	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.48 998		9.51 178		0.48 822	9.97 821		60	
1	9.49 037	39	9.51 221	43	0.48 779	9.97 817	4	59	
2	9.49 076	39	9.51 264	43	0.48 736	9.97 812	5	58	
3	9.49 115	39	9.51 306	42	0.48 694	9.97 808	4	57	43 42
4	9.49 153	38	9.51 349	43	0.48 651	9.97 804	4	56	6 4.3 4.2
5	9.49 192	39	9.51 392	43	0.48 608	9.97 800	4	55	7 5.0 4.9
6	9.49 231	39	9.51 435	43	0.48 565	9.97 796	4	54	8 5.7 5.6
7	9.49 269	38	9.51 478	43	0.48 522	9.97 792	4	53	9 6.5 6.3
8	9.49 308	39	9.51 520	42	0.48 480	9.97 788	4	52	10 7.2 7.0
9	9.49 347	39	9.51 563	43	0.48 437	9.97 784	4	51	20 14.3 14.0
10	9.49 385	38	9.51 606	43	0.48 394	9.97 779	5	50	30 21.5 21.0
11	9.49 424	39	9.51 648	42	0.48 352	9.97 775	4	49	40 28.7 28.0
12	9.49 462	38	9.51 691	43	0.48 309	9.97 771	4	48	50 35.8 35.0
13	9.49 500	38	9.51 734	43	0.48 266	9.97 767	4	47	
14	9.49 539	39	9.51 776	42	0.48 224	9.97 763	4	46	
15	9.49 577	38	9.51 819	43	0.48 181	9.97 759	4	45	41
16	9.49 615	38	9.51 861	42	0.48 139	9.97 754	5	44	6 4.1
17	9.49 654	39	9.51 903	42	0.48 097	9.97 750	4	43	7 4.8
18	9.49 692	38	9.51 946	43	0.48 054	9.97 746	4	42	8 5.5
19	9.49 730	38	9.51 988	42	0.48 012	9.97 742	4	41	9 6.2
20	9.49 768	38	9.52 031	43	0.47 969	9.97 738	4	40	10 6.8
21	9.49 806	38	9.52 073	42	0.47 927	9.97 734	4	39	20 13.7
22	9.49 844	38	9.52 115	42	0.47 885	9.97 729	5	38	30 20.5
23	9.49 882	38	9.52 157	42	0.47 843	9.97 725	4	37	40 27.3
24	9.49 920	38	9.52 200	43	0.47 800	9.97 721	4	36	50 34.2
25	9.49 958	38	9.52 242	42	0.47 758	9.97 717	4	35	
26	9.49 996	38	9.52 284	42	0.47 716	9.97 713	4	34	39 38
27	9.50 034	38	9.52 326	42	0.47 674	9.97 708	5	33	6 3.9 3.8
28	9.50 072	38	9.52 368	42	0.47 632	9.97 704	4	32	7 4.6 4.4
29	9.50 110	38	9.52 410	42	0.47 590	9.97 700	4	31	8 5.2 5.1
30	9.50 148	37	9.52 452	42	0.47 548	9.97 696	4	30	9 5.9 5.7
31	9.50 185	38	9.52 494	42	0.47 506	9.97 691	5	29	10 6.5 6.3
32	9.50 223	38	9.52 536	42	0.47 464	9.97 687	4	28	20 13.0 12.7
33	9.50 261	37	9.52 578	42	0.47 422	9.97 683	4	27	30 19.5 19.0
34	9.50 298	38	9.52 620	42	0.47 380	9.97 679	4	26	40 26.0 25.3
35	9.50 336	38	9.52 661	41	0.47 339	9.97 674	5	25	50 32.5 31.7
36	9.50 374	37	9.52 703	42	0.47 297	9.97 670	4	24	
37	9.50 411	38	9.52 745	42	0.47 255	9.97 666	4	23	
38	9.50 449	37	9.52 787	42	0.47 213	9.97 662	4	22	37 36
39	9.50 486	37	9.52 829	42	0.47 171	9.97 657	5	21	6 3.7 3.6
40	9.50 523	37	9.52 870	41	0.47 130	9.97 653	4	20	7 4.3 4.2
41	9.50 561	38	9.52 912	42	0.47 088	9.97 649	4	19	8 4.9 4.8
42	9.50 598	37	9.52 953	41	0.47 047	9.97 645	4	18	9 5.6 5.4
43	9.50 635	37	9.52 995	42	0.47 005	9.97 640	5	17	10 6.2 6.0
44	9.50 673	38	9.53 037	42	0.46 963	9.97 636	4	16	20 12.3 12.0
45	9.50 710	37	9.53 078	41	0.46 922	9.97 632	4	15	30 18.5 18.0
46	9.50 747	37	9.53 120	42	0.46 880	9.97 628	4	14	40 24.7 24.0
47	9.50 784	37	9.53 161	41	0.46 839	9.97 623	5	13	50 30.8 30.0
48	9.50 821	37	9.53 202	41	0.46 798	9.97 619	4	12	
49	9.50 858	37	9.53 244	42	0.46 756	9.97 615	4	11	
50	9.50 896	38	9.53 285	41	0.46 715	9.97 610	5	10	5 4
51	9.50 933	37	9.53 327	42	0.46 673	9.97 606	4	9	6 0.5 0.4
52	9.50 970	37	9.53 368	41	0.46 632	9.97 602	4	8	7 0.6 0.5
53	9.51 007	37	9.53 409	41	0.46 591	9.97 597	5	7	8 0.7 0.5
54	9.51 043	36	9.53 450	41	0.46 550	9.97 593	4	6	9 0.8 0.6
55	9.51 080	37	9.53 492	42	0.46 508	9.97 589	4	5	10 0.8 0.7
56	9.51 117	37	9.53 533	41	0.46 467	9.97 584	5	4	20 1.7 1.3
57	9.51 154	37	9.53 574	41	0.46 426	9.97 580	4	3	30 2.5 2.0
58	9.51 191	37	9.53 615	41	0.46 385	9.97 576	4	2	40 3.3 2.7
59	9.51 227	36	9.53 656	41	0.46 344	9.97 571	5	1	50 4.2 3.3
60	9.51 264	37	9.53 697	41	0.46 303	9.97 567	4	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.51 264		9.53 697		0.46 303	9.97 567		60	
1	9.51 301	37	9.53 738	41	0.46 262	9.97 563	4	59	
2	9.51 338	37	9.53 779	41	0.46 221	9.97 558	5	58	
3	9.51 374	36	9.53 820	41	0.46 180	9.97 554	4	57	41 40
4	9.51 411	37	9.53 861	41	0.46 139	9.97 550	4	56	6 4.1 4.0
		36		41			5		7 4.8 4.7
5	9.51 447		9.53 902		0.46 098	9.97 545		55	8 5.5̄ 5.3
6	9.51 484	37	9.53 943	41	0.46 057	9.97 541	4	54	9 6.2 6.0
7	9.51 520	36	9.53 984	41	0.46 016	9.97 536	5	53	10 6.8 6.7
8	9.51 557	37	9.54 025̄	41	0.45 975	9.97 532	4	52	20 13.7 13.3
9	9.51 593	36	9.54 065	40	0.45 935̄	9.97 528	4	51	30 20.5 20.0
		36		41			5		40 27.3 26.7
10	9.51 629		9.54 106		0.45 894	9.97 523		50	50 34.2 33.3
11	9.51 666	37	9.54 147	41	0.45 853	9.97 519	4	49	
12	9.51 702	36	9.54 187	40	0.45 813	9.97 515̄	4	48	
13	9.51 738	36	9.54 228	41	0.45 772	9.97 510	5	47	
14	9.51 774	36	9.54 269	41	0.45 731	9.97 506	4	46	39
		37		40			5		6 3.9
15	9.51 811		9.54 309		0.45 691	9.97 501		45	7 4.6
16	9.51 847	36	9.54 350̄	41	0.45 650	9.97 497	4	44	8 5.2
17	9.51 883	36	9.54 390	40	0.45 610	9.97 492	5	43	9 5.9
18	9.51 919	36	9.54 431	41	0.45 569	9.97 488	4	42	10 6.5
19	9.51 955	36	9.54 471	40	0.45 529	9.97 484	4	41	20 13.0
		36		41			5		30 19.5
20	9.51 991		9.54 512		0.45 488	9.97 479		40	40 26.0
21	9.52 027	36	9.54 552	40	0.45 448	9.97 475̄	4	39	50 32.5
22	9.52 063	36	9.54 593	41	0.45 407	9.97 470	5	38	
23	9.52 099	36	9.54 633	40	0.45 367	9.97 466	4	37	
24	9.52 135̄	36	9.54 673	40	0.45 327	9.97 461	5	36	
		36		41			4		
25	9.52 171		9.54 714		0.45 286	9.97 457		35	
26	9.52 207	36	9.54 754	40	0.45 246	9.97 453	4	34	37 36
27	9.52 242	35	9.54 794	40	0.45 206	9.97 448	5	33	6 3.7 3.6
28	9.52 278	36	9.54 835̄	41	0.45 165	9.97 444	4	32	7 4.3 4.2
29	9.52 314	36	9.54 875̄	40	0.45 125	9.97 439	5	31	8 4.9 4.8
		36		40			4		9 5.6 5.4
30	9.52 350̄		9.54 915̄		0.45 085̄	9.97 435̄		30	10 6.2 6.0
31	9.52 385	35	9.54 955	40	0.45 045̄	9.97 430	5	29	20 12.3 12.0
32	9.52 421	36	9.54 995	40	0.45 005̄	9.97 426	4	28	30 18.5 18.0
33	9.52 456	35	9.55 035	40	0.44 965̄	9.97 421	5	27	40 24.7 24.0
34	9.52 492	36	9.55 075	40	0.44 925̄	9.97 417	4	26	50 30.8 30.0
		35		40			5		
35	9.52 527		9.55 115		0.44 885̄	9.97 412		25	
36	9.52 563	36	9.55 155	40	0.44 845̄	9.97 408	4	24	
37	9.52 598	35	9.55 195	40	0.44 805̄	9.97 403	5	23	
38	9.52 634	36	9.55 235	40	0.44 765̄	9.97 399	4	22	35 34
39	9.52 669	35	9.55 275	40	0.44 725̄	9.97 394	5	21	6 3.5 3.4
		36		40			4		7 4.1 4.0
40	9.52 705̄		9.55 315̄		0.44 685	9.97 390		20	8 4.7 4.5
41	9.52 740	35	9.55 355̄	40	0.44 645	9.97 385	5	19	9 5.3 5.1
42	9.52 775	35	9.55 395̄	40	0.44 605	9.97 381	4	18	10 5.8 5.7
43	9.52 811	36	9.55 434	39	0.44 566	9.97 376	5	17	20 11.7 11.3
44	9.52 846	35	9.55 474	40	0.44 526	9.97 372	4	16	30 17.5 17.0
		35		40			5		40 23.3 22.7
45	9.52 881		9.55 514		0.44 486	9.97 367		15	50 29.2 28.3
46	9.52 916	35	9.55 554	40	0.44 446	9.97 363	4	14	
47	9.52 951	35	9.55 593	39	0.44 407	9.97 358	5	13	
48	9.52 986	35	9.55 633	40	0.44 367	9.97 353	5	12	
49	9.53 021	35	9.55 673	40	0.44 327	9.97 349	4	11	
		35		39			5		5 4
50	9.53 056		9.55 712		0.44 288	9.97 344		10	6 0.5 0.4
51	9.53 092	36	9.55 752	40	0.44 248	9.97 340	4	9	7 0.6 0.5̄
52	9.53 126	34	9.55 791	39	0.44 209	9.97 335	5	8	8 0.7 0.5
53	9.53 161	35	9.55 831	40	0.44 169	9.97 331	4	7	9 0.8 0.6
54	9.53 196	35	9.55 870	39	0.44 130	9.97 326	5	6	10 0.8 0.7
		35		40			4		20 1.7 1.3
55	9.53 231		9.55 910		0.44 090	9.97 322		5	30 2.5 2.0
56	9.53 266	35	9.55 949	39	0.44 051	9.97 317	5	4	40 3.3 2.7
57	9.53 301	35	9.55 989	40	0.44 011	9.97 312	5	3	50 4.2 3.3
58	9.53 336	35	9.56 028	39	0.43 972	9.97 308	4	2	
59	9.53 370	34	9.56 067	39	0.43 933	9.97 303	5	1	
		35		40			4		
60	9.53 405		9.56 107		0.43 893	9.97 299		0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.53 405		9.56 107		0.43 893	9.97 299		60	
1	9.53 440	35	9.56 146	39	0.43 854	9.97 294	5	59	
2	9.53 475	35	9.56 185	39	0.43 815	9.97 289	5	58	
3	9.53 509	34	9.56 224	39	0.43 776	9.97 285	4	57	40 39
4	9.53 544	35	9.56 264	40	0.43 736	9.97 280	5	56	6 4.0 3.9
5	9.53 578	34	9.56 303	39	0.43 697	9.97 276	4	55	7 4.7 4.6
6	9.53 613	35	9.56 342	39	0.43 658	9.97 271	5	54	8 5.3 5.2
7	9.53 647	34	9.56 381	39	0.43 619	9.97 266	5	53	9 6.0 5.9
8	9.53 682	35	9.56 420	39	0.43 580	9.97 262	5	52	10 6.7 6.5
9	9.53 716	34	9.56 459	39	0.43 541	9.97 257	4	51	20 13.3 13.0
10	9.53 751	35	9.56 498	39	0.43 502	9.97 252	5	50	30 20.0 19.5
11	9.53 785	34	9.56 537	39	0.43 463	9.97 248	4	49	40 26.7 26.0
12	9.53 819	34	9.56 576	39	0.43 424	9.97 243	5	48	50 33.3 32.5
13	9.53 854	35	9.56 615	39	0.43 385	9.97 238	5	47	
14	9.53 888	34	9.56 654	39	0.43 346	9.97 234	4	46	38 37
15	9.53 922	34	9.56 693	39	0.43 307	9.97 229	5	45	6 3.8 3.7
16	9.53 957	35	9.56 732	39	0.43 268	9.97 224	5	44	7 4.4 4.3
17	9.53 991	34	9.56 771	39	0.43 229	9.97 220	4	43	8 5.1 4.9
18	9.54 025	34	9.56 810	39	0.43 190	9.97 215	5	42	9 5.7 5.6
19	9.54 059	34	9.56 849	39	0.43 151	9.97 210	5	41	10 6.3 6.2
20	9.54 093	34	9.56 887	38	0.43 113	9.97 206	4	40	20 12.7 12.3
21	9.54 127	34	9.56 926	39	0.43 074	9.97 201	5	39	30 19.0 18.5
22	9.54 161	34	9.56 965	39	0.43 035	9.97 196	5	38	40 25.3 24.7
23	9.54 195	34	9.57 004	39	0.42 996	9.97 192	4	37	50 31.7 30.8
24	9.54 229	34	9.57 042	38	0.42 958	9.97 187	5	36	
25	9.54 263	34	9.57 081	39	0.42 919	9.97 182	5	35	
26	9.54 297	34	9.57 120	39	0.42 880	9.97 178	4	34	35
27	9.54 331	34	9.57 158	38	0.42 842	9.97 173	5	33	6 3.5
28	9.54 365	34	9.57 197	39	0.42 803	9.97 168	5	32	7 4.1
29	9.54 399	34	9.57 235	38	0.42 765	9.97 163	5	31	8 4.7
30	9.54 433	34	9.57 274	39	0.42 726	9.97 159	4	30	9 5.3
31	9.54 466	33	9.57 312	38	0.42 688	9.97 154	5	29	10 5.8
32	9.54 500	34	9.57 351	39	0.42 649	9.97 149	5	28	20 11.7
33	9.54 534	34	9.57 389	38	0.42 611	9.97 145	4	27	30 17.5
34	9.54 567	33	9.57 428	39	0.42 572	9.97 140	5	26	40 23.3
35	9.54 601	34	9.57 466	38	0.42 534	9.97 135	5	25	50 29.2
36	9.54 635	34	9.57 504	38	0.42 496	9.97 130	5	24	
37	9.54 668	33	9.57 543	39	0.42 457	9.97 126	4	23	
38	9.54 702	34	9.57 581	38	0.42 419	9.97 121	5	22	34 33
39	9.54 735	33	9.57 619	38	0.42 381	9.97 116	5	21	6 3.4 3.3
40	9.54 769	34	9.57 658	39	0.42 342	9.97 111	5	20	7 4.0 3.9
41	9.54 802	33	9.57 696	38	0.42 304	9.97 107	4	19	8 4.5 4.4
42	9.54 836	34	9.57 734	38	0.42 266	9.97 102	5	18	9 5.1 5.0
43	9.54 869	33	9.57 772	38	0.42 228	9.97 097	5	17	10 5.7 5.5
44	9.54 903	34	9.57 810	38	0.42 190	9.97 092	5	16	20 11.3 11.0
45	9.54 936	33	9.57 849	39	0.42 151	9.97 087	5	15	30 17.0 16.5
46	9.54 969	33	9.57 887	38	0.42 113	9.97 083	4	14	40 22.7 22.0
47	9.55 003	34	9.57 925	38	0.42 075	9.97 078	5	13	50 28.3 27.5
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	5	11	
50	9.55 102	33	9.58 039	38	0.41 961	9.97 063	5	10	5 4
51	9.55 136	34	9.58 077	38	0.41 923	9.97 059	4	9	6 0.5 0.4
52	9.55 169	33	9.58 115	38	0.41 885	9.97 054	5	8	7 0.6 0.5
53	9.55 202	33	9.58 153	38	0.41 847	9.97 049	5	7	8 0.7 0.6
54	9.55 235	33	9.58 191	38	0.41 809	9.97 044	5	6	9 0.8 0.7
55	9.55 268	33	9.58 229	38	0.41 771	9.97 039	5	5	10 0.8 0.7
56	9.55 301	33	9.58 267	38	0.41 733	9.97 035	4	4	20 1.7 1.3
57	9.55 334	33	9.58 304	37	0.41 696	9.97 030	5	3	30 2.5 2.0
58	9.55 367	33	9.58 342	38	0.41 658	9.97 025	5	2	40 3.3 2.7
59	9.55 400	33	9.58 380	38	0.41 620	9.97 020	5	1	50 4.2 3.3
60	9.55 433	33	9.58 418	38	0.41 582	9.97 015	5	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.55 433		9.58 418		0.41 582	9.97 015		60	
1	9.55 466	33	9.58 455	37	0.41 545	9.97 010	5	59	
2	9.55 499	33	9.58 493	38	0.41 507	9.97 005	5	58	
3	9.55 532	33	9.58 531	38	0.41 469	9.97 001	4	57	38 37
4	9.55 564	32	9.58 569	38	0.41 431	9.96 996	5	56	6 3.8 3.7
5	9.55 597	33	9.58 606	37	0.41 394	9.96 991	5	55	7 4.4 4.3
6	9.55 630	33	9.58 644	38	0.41 356	9.96 986	5	54	8 5.1 4.9
7	9.55 663	33	9.58 681	37	0.41 319	9.96 981	5	53	9 5.7 5.6
8	9.55 695	32	9.58 719	38	0.41 281	9.96 976	5	52	10 6.3 6.2
9	9.55 728	33	9.58 757	38	0.41 243	9.96 971	5	51	20 12.7 12.3
10	9.55 761	33	9.58 794	37	0.41 206	9.96 966	5	50	30 19.0 18.5
11	9.55 793	32	9.58 832	38	0.41 168	9.96 962	4	49	40 25.3 24.7
12	9.55 826	33	9.58 869	37	0.41 131	9.96 957	5	48	50 31.7 30.8
13	9.55 858	32	9.58 907	38	0.41 093	9.96 952	5	47	
14	9.55 891	33	9.58 944	37	0.41 056	9.96 947	5	46	
15	9.55 923	32	9.58 981	37	0.41 019	9.96 942	5	45	36 33
16	9.55 956	33	9.59 019	38	0.40 981	9.96 937	5	44	6 3.6 3.3
17	9.55 988	32	9.59 056	37	0.40 944	9.96 932	5	43	7 4.2 3.9
18	9.56 021	33	9.59 094	38	0.40 906	9.96 927	5	42	8 4.8 4.4
19	9.56 053	32	9.59 131	37	0.40 869	9.96 922	5	41	9 5.4 5.0
20	9.56 085	32	9.59 168	37	0.40 832	9.96 917	5	40	10 6.0 5.5
21	9.56 118	33	9.59 205	37	0.40 795	9.96 912	5	39	20 12.0 11.0
22	9.56 150	32	9.59 243	38	0.40 757	9.96 907	5	38	30 18.0 16.5
23	9.56 182	32	9.59 280	37	0.40 720	9.96 903	4	37	40 24.0 22.0
24	9.56 215	33	9.59 317	37	0.40 683	9.96 898	5	36	50 30.0 27.5
25	9.56 247	32	9.59 354	37	0.40 646	9.96 893	5	35	
26	9.56 279	32	9.59 391	37	0.40 609	9.96 888	5	34	32
27	9.56 311	32	9.59 429	38	0.40 571	9.96 883	5	33	6 3.2
28	9.56 343	32	9.59 466	37	0.40 534	9.96 878	5	32	7 3.7
29	9.56 375	32	9.59 503	37	0.40 497	9.96 873	5	31	8 4.3
30	9.56 408	33	9.59 540	37	0.40 460	9.96 868	5	30	9 4.8
31	9.56 440	32	9.59 577	37	0.40 423	9.96 863	5	29	10 5.3
32	9.56 472	32	9.59 614	37	0.40 386	9.96 858	5	28	20 10.7
33	9.56 504	32	9.59 651	37	0.40 349	9.96 853	5	27	30 16.0
34	9.56 536	32	9.59 688	37	0.40 312	9.96 848	5	26	40 21.3
35	9.56 568	32	9.59 725	37	0.40 275	9.96 843	5	25	50 26.7
36	9.56 599	31	9.59 762	37	0.40 238	9.96 838	5	24	
37	9.56 631	32	9.59 799	37	0.40 201	9.96 833	5	23	
38	9.56 663	32	9.59 835	36	0.40 165	9.96 828	5	22	31 6
39	9.56 695	32	9.59 872	37	0.40 128	9.96 823	5	21	6 3.1 0.6
40	9.56 727	32	9.59 909	37	0.40 091	9.96 818	5	20	7 3.6 0.7
41	9.56 759	32	9.59 946	37	0.40 054	9.96 813	5	19	8 4.1 0.8
42	9.56 790	31	9.59 983	37	0.40 017	9.96 808	5	18	9 4.7 0.9
43	9.56 822	32	9.60 019	36	0.39 981	9.96 803	5	17	10 5.2 1.0
44	9.56 854	32	9.60 056	37	0.39 944	9.96 798	5	16	20 10.3 2.0
45	9.56 886	32	9.60 093	37	0.39 907	9.96 793	5	15	30 15.5 3.0
46	9.56 917	31	9.60 130	37	0.39 870	9.96 788	5	14	40 20.7 4.0
47	9.56 949	32	9.60 166	36	0.39 834	9.96 783	5	13	50 25.8 5.0
48	9.56 980	31	9.60 203	37	0.39 797	9.96 778	5	12	
49	9.57 012	32	9.60 240	37	0.39 760	9.96 772	6	11	
50	9.57 044	32	9.60 276	36	0.39 724	9.96 767	5	10	5 4
51	9.57 075	31	9.60 313	37	0.39 687	9.96 762	5	9	6 0.5 0.4
52	9.57 107	32	9.60 349	36	0.39 651	9.96 757	5	8	7 0.6 0.5
53	9.57 138	31	9.60 386	37	0.39 614	9.96 752	5	7	8 0.7 0.5
54	9.57 169	31	9.60 422	36	0.39 578	9.96 747	5	6	9 0.8 0.6
55	9.57 201	32	9.60 459	37	0.39 541	9.96 742	5	5	10 0.8 0.7
56	9.57 232	31	9.60 495	36	0.39 505	9.96 737	5	4	20 1.7 1.3
57	9.57 264	32	9.60 532	37	0.39 468	9.96 732	5	3	30 2.5 2.0
58	9.57 295	31	9.60 568	36	0.39 432	9.96 727	5	2	40 3.3 2.7
59	9.57 326	31	9.60 605	37	0.39 395	9.96 722	5	1	50 4.2 3.3
60	9.57 358	32	9.60 641	36	0.39 359	9.96 717	5	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.57 358		9.60 641		0.39 359	9.96 717		60	
1	9.57 389	31	9.60 677	36	0.39 323	9.96 711	6	59	
2	9.57 420	31	9.60 714	37	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	37 36
4	9.57 482	31	9.60 786	36	0.39 214	9.96 696	5	56	6 3.7 3.6
5	9.57 514	32	9.60 823	37	0.39 177	9.96 691	5	55	7 4.3 4.2
6	9.57 545	31	9.60 859	36	0.39 141	9.96 686	5	54	8 4.9 4.8
7	9.57 576	31	9.60 895	36	0.39 105	9.96 681	5	53	9 5.6 5.4
8	9.57 607	31	9.60 931	36	0.39 069	9.96 676	5	52	10 6.2 6.0
9	9.57 638	31	9.60 967	36	0.39 033	9.96 670	6	51	20 12.3 12.0
10	9.57 669	31	9.61 004	37	0.38 996	9.96 665	5	50	30 18.5 18.0
11	9.57 700	31	9.61 040	36	0.38 960	9.96 660	5	49	40 24.7 24.0
12	9.57 731	31	9.61 076	36	0.38 924	9.96 655	5	48	50 30.8 30.0
13	9.57 762	31	9.61 112	36	0.38 888	9.96 650	5	47	
14	9.57 793	31	9.61 148	36	0.38 852	9.96 645	5	46	
15	9.57 824	31	9.61 184	36	0.38 816	9.96 640	5	45	35
16	9.57 855	31	9.61 220	36	0.38 780	9.96 634	6	44	.6 3.5
17	9.57 885	30	9.61 256	36	0.38 744	9.96 629	5	43	7 4.1
18	9.57 916	31	9.61 292	36	0.38 708	9.96 624	5	42	8 4.7
19	9.57 947	31	9.61 328	36	0.38 672	9.96 619	5	41	9 5.3
20	9.57 978	31	9.61 364	36	0.38 636	9.96 614	5	40	10 5.8
21	9.58 008	30	9.61 400	36	0.38 600	9.96 608	6	39	20 11.7
22	9.58 039	31	9.61 436	36	0.38 564	9.96 603	5	38	30 17.5
23	9.58 070	31	9.61 472	36	0.38 528	9.96 598	5	37	40 23.3
24	9.58 101	31	9.61 508	36	0.38 492	9.96 593	5	36	50 29.2
25	9.58 131	30	9.61 544	36	0.38 456	9.96 588	5	35	
26	9.58 162	31	9.61 579	35	0.38 421	9.96 582	6	34	32 31
27	9.58 192	30	9.61 615	36	0.38 385	9.96 577	5	33	6 3.2 3.1
28	9.58 223	31	9.61 651	36	0.38 349	9.96 572	5	32	7 3.7 3.6
29	9.58 253	30	9.61 687	36	0.38 313	9.96 567	5	31	8 4.3 4.1
30	9.58 284	31	9.61 722	35	0.38 278	9.96 562	5	30	9 4.8 4.7
31	9.58 314	30	9.61 758	36	0.38 242	9.96 556	6	29	10 5.3 5.2
32	9.58 345	31	9.61 794	36	0.38 206	9.96 551	5	28	20 10.7 10.3
33	9.58 375	30	9.61 830	36	0.38 170	9.96 546	5	27	30 16.0 15.5
34	9.58 406	31	9.61 865	35	0.38 135	9.96 541	5	26	40 21.3 20.7
35	9.58 436	30	9.61 901	36	0.38 099	9.96 535	6	25	50 26.7 25.8
36	9.58 467	31	9.61 936	35	0.38 064	9.96 530	5	24	
37	9.58 497	30	9.61 972	36	0.38 028	9.96 525	5	23	
38	9.58 527	30	9.62 008	36	0.37 992	9.96 520	5	22	30 29
39	9.58 557	30	9.62 043	35	0.37 957	9.96 514	6	21	6 3.0 2.9
40	9.58 588	31	9.62 079	36	0.37 921	9.96 509	5	20	7 3.5 3.4
41	9.58 618	30	9.62 114	35	0.37 886	9.96 504	5	19	8 4.0 3.9
42	9.58 648	30	9.62 150	36	0.37 850	9.96 498	6	18	9 4.5 4.4
43	9.58 678	30	9.62 185	35	0.37 815	9.96 493	5	17	10 5.0 4.8
44	9.58 709	31	9.62 221	36	0.37 779	9.96 488	5	16	20 10.0 9.7
45	9.58 739	30	9.62 256	35	0.37 744	9.96 483	5	15	30 15.0 14.5
46	9.58 769	30	9.62 292	36	0.37 708	9.96 477	6	14	40 20.0 19.3
47	9.58 799	30	9.62 327	35	0.37 673	9.96 472	5	13	50 25.0 24.2
48	9.58 829	30	9.62 362	35	0.37 638	9.96 467	5	12	
49	9.58 859	30	9.62 398	36	0.37 602	9.96 461	6	11	
50	9.58 889	30	9.62 433	35	0.37 567	9.96 456	5	10	. 6 5
51	9.58 919	30	9.62 468	35	0.37 532	9.96 451	5	9	6 0.6 0.5
52	9.58 949	30	9.62 504	36	0.37 496	9.96 445	6	8	7 0.7 0.6
53	9.58 979	30	9.62 539	35	0.37 461	9.96 440	5	7	8 0.8 0.7
54	9.59 009	30	9.62 574	35	0.37 426	9.96 435	5	6	9 0.9 0.8
55	9.59 039	30	9.62 609	35	0.37 391	9.96 429	6	5	10 1.0 0.8
56	9.59 069	30	9.62 645	36	0.37 355	9.96 424	5	4	20 2.0 1.7
57	9.59 098	29	9.62 680	35	0.37 320	9.96 419	5	3	30 3.0 2.5
58	9.59 128	30	9.62 715	35	0.37 285	9.96 413	6	2	40 4.0 3.3
59	9.59 158	30	9.62 750	35	0.37 250	9.96 408	5	1	50 5.0 4.2
60	9.59 188	30	9.62 785	35	0.37 215	9.96 403	5	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.59 188		9.62 785		0.37 21$\bar{5}$	9.96 403		60	
1	9.59 218	30	9.62 820	35	0.37 180	9.96 397	6	59	
2	9.59 247	29	9.62 855	35	0.37 14$\bar{5}$	9.96 392	5	58	
3	9.59 277	30	9.62 890	35	0.37 110	9.96 387	5	57	36 35
4	9.59 307	30	9.62 926	36	0.37 074	9.96 381	6	56	6 3.6 3.5
5	9.59 336	29	9.62 961	35	0.37 039	9.96 376	5	55	7 4.2 4.1
6	9.59 366	30	9.62 996	35	0.37 004	9.96 370	6	54	8 4.8 4.7
7	9.59 396	30	9.63 031	35	0.36 969	9.96 36$\bar{5}$	5	53	9 5.4 5.3
8	9.59 425	29	9.63 066	35	0.36 934	9.96 360	5	52	10 6.0 5.8
9	9.59 45$\bar{5}$	30	9.63 101	35	0.36 899	9.96 354	6	51	20 12.0 11.7
10	9.59 484	29	9.63 135	34	0.36 86$\bar{5}$	9.96 349	5	50	30 18.0 17.5
11	9.59 514	30	9.63 170	35	0.36 830	9.96 343	6	49	40 24.0 23.3
12	9.59 543	29	9.63 205	35	0.36 79$\bar{5}$	9.96 338	5	48	50 30.0 29.2
13	9.59 573	30	9.63 240	35	0.36 760	9.96 333	5	47	
14	9.59 602	29	9.63 275	35	0.36 72$\bar{5}$	9.96 327	6	46	34
15	9.59 632	30	9.63 310	35	0.36 690	9.96 322	5	45	6 3.4
16	9.59 661	29	9.63 345	35	0.36 655	9.96 316	6	44	7 4.0
17	9.59 690	29	9.63 379	34	0.36 621	9 96 311	5	43	8 4.5
18	9.59 720	30	9.63 414	35	0.36 586	9.96 305	6	42	9 5 1
19	9.59 749	29	9.63 449	35	0.36 551	9.96 300	5	41	10 5.7
20	9.59 778	29	9.63 484	35	0.36 516	9.96 294	6	40	20 11.3
21	9.59 808	30	9.63 519	35	0.36 481	9.96 289	5	39	30 17.0
22	9.59 837	29	9.63 553	34	0.36 447	9.96 284	5	38	40 22.7
23	9.59 866	29	9.63 588	35	0.36 412	9.96 278	6	37	50 28.3
24	9.59 895	29	9.63 623	35	0.36 377	9.96 273	5	36	
25	9.59 924	29	9.63 657	34	0.36 343	9.96 267	6	35	
26	9.59 954	30	9.63 692	35	0.36 308	9.96 262	5	34	30 29
27	9.59 983	29	9.63 726	34	0.36 274	9.96 256	6	33	6 3.0 2.9
28	9.60 012	29	9.63 761	35	0 36 239	9.96 251	5	32	7 3.5 3.4
29	9.60 041	29	9.63 796	35	0.36 204	9.96 245	6	31	8 4.0 3.9
30	9.60 070	29	9.63 830	34	0.36 170	9.96 240	5	30	9 4.5 4.4
31	9.60 099	29	9.63 86$\bar{5}$	35	0.36 135	9.96 234	6	29	10 5.0 4.8
32	9.60 128	29	9.63 899	34	0.36 101	9 96 229	5	28	20 10.0 9.7
33	9.60 157	29	9.63 934	35	0.36 066	9.96 223	6	27	30 15.0 14.5
34	9.60 186	29	9.63 968	34	0.36 032	9.96 218	5	26	40 20.0 19.3
35	9.60 21$\bar{5}$	29	9.64 003	35	0.35 997	9.96 212	6	25	50 25.0 24.2
36	9.60 244	29	9.64 037	34	0.35 963	9.96 207	5	24	
37	9.60 273	29	9.64 072	35	0.35 928	9.96 201	6	23	
38	9.60 302	29	9.64 106	34	0.35 894	9.96 196	5	22	28
39	9.60 331	29	9.64 140	34	0.35 860	9.96 190	6	21	6 2.8
40	9.60 359	28	9.64 17$\bar{5}$	35	0.35 825	9.96 18$\bar{5}$	5	20	7 3.3
41	9.60 388	29	9.64 209	34	0.35 791	9.96 179	6	19	8 3.7
42	9.60 417	29	9.64 243	34	0.35 757	9.96 174	5	18	9 4.2
43	9.60 446	29	9.64 278	35	0.35 722	9.96 168	6	17	10 4.7
44	9.60 474	28	9.64 312	34	0.35 688	9.96 162	6	16	20 9.3
45	9.60 503	29	9.64 346	34	0.35 654	9.96 157	5	15	30 14.0
46	9.60 532	29	9.64 381	35	0.35 619	9 96 151	6	14	40 18.7
47	9.60 561	29	9.64 41$\bar{5}$	34	0.35 585	9.96 146	5	13	50 23.3
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 13$\bar{5}$	5	11	
50	9.60 646	28	9.64 517	34	0.35 483	9.96 129	6	10	6 5
51	9.60 675	29	9.64 552	35	0.35 448	9.96 123	6	9	6 0.6 0.5
52	9.60 704	29	9.64 586	34	0.35 414	9.96 118	5	8	7 0.7 0 6
53	9.60 732	28	9.64 620	34	0.35 380	9.96 112	6	7	8 0.8 0.7
54	9.60 761	29	9.64 654	34	0.35 346	9.96 107	6	6	9 0.9 0.8
55	9.60 789	28	9.64 688	34	0.35 312	9.96 101	6	5	10 1.0 0.8
56	9.60 818	29	9.64 722	34	0.35 278	9.96 095	6	4	20 2.0 1.7
57	9.60 846	28	9 64 756	34	0.35 244	9.96 090	5	3	30 3.0 2.5
58	9.60 87$\bar{5}$	29	9.64 790	34	0.35 210	9.96 084	6	2	40 4.0 3.3
59	9.60 903	28	9.64 824	34	0.35 176	9.96 079	5	1	50 5.0 4.2
60	9.60 931	28	9.64 858	34	0.35 142	9.96 073	6	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.60 931		9.64 858		0.35 142	9.96 073		60	
1	9.60 960	29	9.64 892	34	0.35 108	9.96 067	6	59	
2	9.60 988	28	9.64 926	34	0.35 074	9.96 062	5	58	
3	9.61 016	28	9.64 960	34	0.35 040	9.96 056	6	57	34 | 33
4	9.61 04$\bar{5}$	29	9.64 994	34	0.35 006	9.96 050	6	56	6 | 3.4 | 3.3
5	9.61 073	28	9.65 028	34	0.34 972	9.96 04$\bar{5}$	5	55	7 | 4.0 | 3.9
6	9.61 101	28	9.65 062	34	0.34 938	9.96 039	6	54	8 | 4.5 | 4.4
7	9.61 129	28	9.65 096	34	0.34 904	9.96 034	5	53	9 | 5.1 | 5.0
8	9.61 158	29	9.65 130	34	0.34 870	9.96 028	6	52	10 | 5.7 | 5.5
9	9.61 186	28	9.65 164	34	0.34 836	9.96 022	6	51	20 | 11.3 | 11.0
10	9.61 214	28	9.65 197	33	0.34 803	9.96 017	5	50	30 | 17.0 | 16.5
11	9.61 242	28	9.65 231	34	0.34 769	9.96 011	6	49	40 | 22.7 | 22.0
12	9.61 270	28	9.65 265	34	0.34 73$\bar{5}$	9.96 005	6	48	50 | 28.3 | 27.5
13	9.61 298	28	9.65 299	34	0.34 701	9.96 000	5	47	
14	9.61 326	28	9.65 333	34	0.34 667	9.95 994	6	46	
15	9.61 354	28	9.65 366	33	0.34 634	9.95 988	6	45	29
16	9.61 382	28	9.65 400	34	0.34 600	9.95 982	6	44	6 | 2.9
17	9.61 411	29	9.65 434	34	0.34 566	9.95 977	5	43	7 | 3.4
18	9.61 438	27	9.65 467	33	0.34 533	9.95 971	6	42	8 | 3.9
19	9.61 466	28	9.65 501	34	0.34 499	9.95 965	6	41	9 | 4.4
20	9.61 494	28	9.65 53$\bar{5}$	34	0.34 465	9.95 960	5	40	10 | 4.8
21	9.61 522	28	9.65 568	33	0.34 432	9.95 954	6	39	20 | 9.7
22	9.61 550	28	9.65 602	34	0.34 398	9.95 948	6	38	30 | 14.5
23	9.61 578	28	9.65 636	34	0.34 364	9.95 942	6	37	40 | 19.3
24	9.61 606	28	9.65 669	33	0.34 331	9.95 937	5	36	50 | 24.2
25	9.61 634	28	9.65 703	34	0.34 297	9.95 931	6	35	
26	9.61 662	28	9.65 736	33	0.34 264	9.95 925	6	34	28
27	9.61 689	27	9.65 770	34	0.34 230	9.95 920	5	33	6 | 2.8
28	9.61 717	28	9.65 803	33	0.34 197	9.95 914	6	32	7 | 3.3
29	9.61 74$\bar{5}$	28	9.65 837	34	0.34 163	9.95 908	6	31	8 | 3.7
30	9.61 773	28	9.65 870	33	0.34 130	9.95 902	6	30	9 | 4.2
31	9.61 800	27	9.65 904	34	0.34 096	9.95 897	5	29	10 | 4.7
32	9.61 828	28	9.65 937	33	0.34 063	9.95 891	6	28	20 | 9.3
33	9.61 856	28	9.65 971	34	0.34 029	9.95 88$\bar{5}$	6	27	30 | 14.0
34	9.61 883	27	9.66 004	33	0.33 996	9.95 879	6	26	40 | 18.7
35	9.61 911	28	9.66 038	34	0.33 962	9.95 873	6	25	50 | 23.3
36	9.61 939	28	9.66 071	33	0.33 929	9.95 868	5	24	
37	9.61 966	27	9.66 104	33	0.33 896	9.95 862	6	23	
38	9.61 994	28	9.66 138	34	0.33 862	9.95 856	6	22	27
39	9.62 021	27	9.66 171	33	0.33 829	9.95 850	6	21	6 | 2.7
40	9.62 049	28	9.66 204	33	0.33 796	9.95 844	6	20	7 | 3.2
41	9.62 076	27	9.66 238	34	0.33 762	9.95 839	5	19	8 | 3.6
42	9.62 104	28	9.66 271	33	0.33 729	9.95 833	6	18	9 | 4.1
43	9.62 131	27	9.66 304	33	0.33 696	9.95 827	6	17	10 | 4.5
44	9.62 159	28	9.66 337	33	0.33 663	9.95 821	6	16	20 | 9.0
45	9.62 185	27	9.66 371	34	0.33 629	9.95 815	6	15	30 | 13.5
46	9.62 214	28	9.66 404	33	0.33 596	9.95 810	5	14	40 | 18.0
47	9.62 241	27	9.66 437	33	0.33 563	9.95 804	6	13	50 | 22.5
48	9.62 268	27	9.66 470	33	0.33 530	9.95 798	6	12	
49	9.62 296	28	9.66 503	33	0.33 497	9.95 792	6	11	
50	9.62 323	27	9.66 537	34	0.33 463	9.95 786	6	10	
51	9.62 350	27	9.66 570	33	0.33 430	9.95 780	6	9	6 | 5
52	9.62 377	27	9.66 603	33	0.33 397	9.95 77$\bar{5}$	5	8	6 | 0.6 | 0.5
53	9.62 40$\bar{5}$	28	9.66 636	33	0.33 364	9.95 769	6	7	7 | 0.7 | 0.6
54	9.62 432	27	9.66 669	33	0.33 331	9.95 763	6	6	8 | 0.8 | 0.7
55	9.62 459	27	9.66 702	33	0.33 298	9.95 757	6	5	9 | 0.9 | 0.8
56	9.62 486	27	9.66 735	33	0.33 26$\bar{5}$	9.95 751	6	4	10 | 1.0 | 0.8
57	9.62 513	27	9.66 768	33	0.33 232	9.95 745	6	3	20 | 2.0 | 1.7
58	9.62 541	28	9.66 801	33	0.33 199	9.95 739	6	2	30 | 3.0 | 2.5
59	9.62 568	27	9.66 834	33	0.33 166	9.95 733	6	1	40 | 4.0 | 3.3
60	9.62 59$\bar{5}$	27	9.66 867	33	0.33 133	9.95 728	5	0	50 | 5.0 | 4.2
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.62 595		9.66 867		0.33 133	9.95 728		60	
1	9.62 622	27	9.66 900	33	0.33 100	9.95 722	6	59	
2	9.62 649	27	9.66 933	33	0.33 067	9.95 716	6	58	
3	9.62 676	27	9.66 966	33	0.33 034	9.95 710	6	57	33 32
4	9.62 703	27	9.66 999	33	0.33 001	9.95 704	6	56	6 3.3 3.2
5	9.62 730	27	9.67 032	33	0.32 968	9.95 698	6	55	7 3.9 3.7
6	9.62 757	27	9.67 065	33	0.32 935	9.95 692	6	54	8 4.4 4.3
7	9.62 784	27	9.67 098	33	0.32 902	9.95 686	6	53	9 5.0 4.8
8	9.62 811	27	9.67 131	33	0.32 869	9.95 680	6	52	10 5.5 5.3
9	9.62 838	27	9.67 163	32	0.32 837	9.95 674	6	51	20 11.0 10.7
10	9.62 865	27	9.67 196	33	0.32 804	9.95 668	6	50	30 16.5 16.0
11	9.62 892	27	9.67 229	33	0.32 771	9.95 663	5	49	40 22.0 21.3
12	9.62 918	26	9.67 262	33	0.32 738	9.95 657	6	48	50 27.5 26.7
13	9.62 945	27	9.67 295	33	0.32 705	9.95 651	6	47	
14	9.62 972	27	9.67 327	32	0.32 673	9.95 645	6	46	
15	9.62 999	27	9.67 360	33	0.32 640	9.95 639	6	45	27
16	9.63 026	27	9.67 393	33	0.32 607	9.95 633	6	44	6 2.7
17	9.63 052	26	9.67 426	33	0.32 574	9.95 627	6	43	7 3.2
18	9.63 079	27	9.67 458	32	0.32 542	9.95 621	6	42	8 3.6
19	9.63 106	27	9.67 491	33	0.32 509	9.95 615	6	41	9 4.1
20	9.63 133	27	9.67 524	33	0.32 476	9.95 609	6	40	10 4.5
21	9.63 159	26	9.67 556	32	0.32 444	9.95 603	6	39	20 9.0
22	9.63 186	27	9.67 589	33	0.32 411	9.95 597	6	38	30 13.5
23	9.63 213	27	9.67 622	33	0.32 378	9.95 591	6	37	40 18.0
24	9.63 239	26	9.67 654	32	0.32 346	9.95 585	6	36	50 22.5
25	9.63 266	27	9.67 687	33	0.32 313	9.95 579	6	35	
26	9.63 292	26	9.67 719	32	0.32 281	9.95 573	6	34	26
27	9.63 319	27	9.67 752	33	0.32 248	9.95 567	6	33	6 2.6
28	9.63 345	26	9.67 785	33	0.32 215	9.95 561	6	32	7 3.0
29	9.63 372	27	9.67 817	32	0.32 183	9.95 555	6	31	8 3.5
30	9.63 398	26	9.67 850	33	0.32 150	9.95 549	6	30	9 3.9
31	9.63 425	27	9.67 882	32	0.32 118	9.95 543	6	29	10 4.3
32	9.63 451	26	9.67 915	33	0.32 085	9.95 537	6	28	20 8.7
33	9.63 478	27	9.67 947	32	0.32 053	9.95 531	6	27	30 13.0
34	9.63 504	26	9.67 980	33	0.32 020	9.95 525	6	26	40 17.3
35	9.63 531	27	9.68 012	32	0.31 988	9.95 519	6	25	50 21.7
36	9.63 557	26	9.68 044	32	0.31 956	9.95 513	6	24	
37	9.63 583	26	9.68 077	33	0.31 923	9.95 507	6	23	
38	9.63 610	27	9.68 109	32	0.31 891	9.95 500	7	22	7
39	9.63 636	26	9.68 142	33	0.31 858	9.95 494	6	21	6 0.7
40	9.63 662	26	9.68 174	32	0.31 826	9.95 488	6	20	7 0.8
41	9.63 689	27	9.68 206	32	0.31 794	9.95 482	6	19	8 0.9
42	9.63 715	26	9.68 239	33	0.31 761	9.95 476	6	18	9 1.1
43	9.63 741	26	9.68 271	32	0.31 729	9.95 470	6	17	10 1.2
44	9.63 767	26	9.68 303	32	0.31 697	9.95 464	6	16	20 2.3
45	9.63 794	27	9.68 336	33	0.31 664	9.95 458	6	15	30 3.5
46	9.63 820	26	9.68 368	32	0.31 632	9.95 452	6	14	40 4.7
47	9.63 846	26	9.68 400	32	0.31 600	9.95 446	6	13	50 5.8
48	9.63 872	26	9.68 432	32	0.31 568	9.95 440	6	12	
49	9.63 898	26	9.68 465	33	0.31 535	9.95 434	6	11	
50	9.63 924	26	9.68 497	32	0.31 503	9.95 427	7	10	6 5
51	9.63 950	26	9.68 529	32	0.31 471	9.95 421	6	9	6 0.6 0.5
52	9.63 976	26	9.68 561	32	0.31 439	9.95 415	6	8	7 0.7 0.6
53	9.64 002	26	9.68 593	32	0.31 407	9.95 409	6	7	8 0.8 0.7
54	9.64 028	26	9.68 626	33	0.31 374	9.95 403	6	6	9 0.9 0.8
55	9.64 054	26	9.68 658	32	0.31 342	9.95 397	6	5	10 1.0 0.8
56	9.64 080	26	9.68 690	32	0.31 310	9.95 391	7	4	20 2.0 1.7
57	9.64 106	26	9.68 722	32	0.31 278	9.95 384	6	3	30 3.0 2.5
58	9.64 132	26	9.68 754	32	0.31 246	9.95 378	6	2	40 4.0 3.3
59	9.64 158	26	9.68 786	32	0.31 214	9.95 372	6	1	50 5.0 4.2
60	9.64 184		9.68 818		0.31 182	9.95 366		0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.64 184		9.68 818		0.31 182	9.95 366		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	0.31 118	9.95 354	6	58	
3	9.64 262	26	9.68 914	32	0.31 086	9.95 348	6	57	32 31
4	9.64 288	26	9.68 946	32	0.31 054	9.95 341	7	56	6 3.2 3.1
5	9.64 313	25	9.68 978	32	0.31 022	9.95 335	6	55	7 3.7 3.6
6	9.64 339	26	9.69 010	32	0.30 990	9.95 329	6	54	8 4.3 4.1
7	9.64 365	26	9.69 042	32	0.30 958	9.95 323	6	53	9 4.8 4.7
8	9.64 391	26	9.69 074	32	0.30 926	9.95 317	6	52	10 5.3 5.2
9	9.64 417	26	9.69 106	32	0.30 894	9.95 310	7	51	20 10.7 10.3
10	9.64 442	25	9.69 138	32	0.30 862	9.95 304	6	50	30 16.0 15.5
11	9.64 468	26	9.69 170	32	0.30 830	9.95 298	6	49	40 21.3 20.7
12	9.64 494	26	9.69 202	32	0.30 798	9.95 292	6	48	50 26.7 25.8
13	9.64 519	25	9.69 234	32	0.30 766	9.95 286	6	47	
14	9.64 545	26	9.69 266	32	0.30 734	9.95 279	7	46	
15	9.64 571	26	9.69 298	32	0.30 702	9.95 273	6	45	26
16	9.64 596	25	9.69 329	31	0.30 671	9.95 267	6	44	6 2.6
17	9.64 622	26	9.69 361	32	0.30 639	9.95 261	6	43	7 3.0
18	9.64 647	25	9.69 393	32	0.30 607	9.95 254	7	42	8 3.5
19	9.64 673	26	9.69 425	32	0.30 575	9.95 248	6	41	9 3.9
20	9.64 698	25	9.69 457	32	0.30 543	9.95 242	6	40	10 4.3
21	9.64 724	26	9.69 488	31	0.30 512	9.95 236	6	39	20 8.7
22	9.64 749	25	9.69 520	32	0.30 480	9.95 229	7	38	30 13.0
23	9.64 775	26	9.69 552	32	0.30 448	9.95 223	6	37	40 17.3
24	9.64 800	25	9.69 584	32	0.30 416	9.95 217	6	36	50 21.7
25	9.64 826	26	9.69 615	31	0.30 385	9.95 211	6	35	
26	9.64 851	25	9.69 647	32	0.30 353	9.95 204	7	34	25
27	9.64 877	26	9.69 679	32	0.30 321	9.95 198	6	33	6 2.5
28	9.64 902	25	9.69 710	31	0.30 290	9.95 192	6	32	7 2.9
29	9.64 927	25	9.69 742	32	0.30 258	9.95 185	7	31	8 3.3
30	9.64 953	26	9.69 774	32	0.30 226	9.95 179	6	30	9 3.8
31	9.64 978	25	9.69 805	31	0.30 195	9.95 173	6	29	10 4.2
32	9.65 003	25	9.69 837	32	0.30 163	9.95 167	6	28	20 8.3
33	9.65 029	26	9.69 868	31	0.30 132	9.95 160	7	27	30 12.5
34	9.65 054	25	9.69 900	32	0.30 100	9.95 154	6	26	40 16.7
35	9.65 079	25	9.69 932	32	0.30 068	9.95 148	6	25	50 20.8
36	9.65 104	25	9.69 963	31	0.30 037	9.95 141	7	24	
37	9.65 130	26	9.69 995	32	0.30 005	9.95 135	6	23	
38	9.65 155	25	9.70 026	31	0.29 974	9.95 129	6	22	24
39	9.65 180	25	9.70 058	32	0.29 942	9.95 122	7	21	6 2.4
40	9.65 205	25	9.70 089	31	0.29 911	9.95 116	6	20	7 2.8
41	9.65 230	25	9.70 121	32	0.29 879	9.95 110	6	19	8 3.2
42	9.65 255	25	9.70 152	31	0.29 848	9.95 103	7	18	9 3.6
43	9.65 281	26	9.70 184	32	0.29 816	9.95 097	6	17	10 4.0
44	9.65 306	25	9.70 215	31	0.29 785	9.95 090	7	16	20 8.0
45	9.65 331	25	9.70 247	32	0.29 753	9.95 084	6	15	30 12.0
46	9.65 356	25	9.70 278	31	0.29 722	9.95 078	6	14	40 16.0
47	9.65 381	25	9.70 309	31	0.29 691	9.95 071	7	13	50 20.0
48	9.65 406	25	9.70 341	32	0.29 659	9.95 065	6	12	
49	9.65 431	25	9.70 372	31	0.29 628	9.95 059	6	11	
50	9.65 456	25	9.70 404	32	0.29 596	9.95 052	7	10	7 6
51	9.65 481	25	9.70 435	31	0.29 565	9.95 046	6	9	6 0.7 0.6
52	9.65 506	25	9.70 466	31	0.29 534	9.95 039	7	8	7 0.8 0.7
53	9.65 531	25	9.70 498	32	0.29 502	9.95 033	6	7	8 0.9 0.8
54	9.65 556	25	9.70 529	31	0.29 471	9.95 027	6	6	9 1.1 0.9
55	9.65 580	24	9.70 560	31	0.29 440	9.95 020	7	5	10 1.2 1.0
56	9.65 605	25	9.70 592	32	0.29 408	9.95 014	6	4	20 2.3 2.0
57	9.65 630	25	9.70 623	31	0.29 377	9.95 007	7	3	30 3.5 3.0
58	9.65 655	25	9.70 654	31	0.29 346	9.95 001	6	2	40 4.7 4.0
59	9.65 680	25	9.70 685	31	0.29 315	9.94 995	6	1	50 5.8 5.0
60	9.65 705	25	9.70 717	32	0.29 283	9.94 988	7	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.65 705		9.70 717		0.29 283	9.94 988		60	
1	9.65 729	24	9.70 748	31	0.29 252	9.94 982	6	59	
2	9.65 754	25	9.70 779	31	0.29 221	9.94 975	7	58	
3	9.65 779	25	9.70 810	31	0.29 190	9.94 969	6	57	32 31
4	9.65 804	25	9.70 841	31	0.29 159	9.94 962	7	56	6 3.2 3.1
5	9.65 828	24	9.70 873	32	0.29 127	9.94 956	6	55	7 3.7 3.6
6	9.65 853	25	9.70 904	31	0.29 096	9.94 949	7	54	8 4.3 4.1
7	9.65 878	25	9.70 935	31	0.29 065	9.94 943	6	53	9 4.8 4.7
8	9.65 902	24	9.70 966	31	0.29 034	9.94 936	7	52	10 5.3 5.2
9	9.65 927	25	9.70 997	31	0.29 003	9.94 930	6	51	20 10.7 10.3
10	9.65 952	25	9.71 028	31	0.28 972	9.94 923	7	50	30 16.0 15.5
11	9.65 976	24	9.71 059	31	0.28 941	9.94 917	6	49	40 21.3 20.7
12	9.66 001	25	9.71 090	31	0.28 910	9.94 911	6	48	50 26.7 25.8
13	9.66 025	24	9.71 121	31	0.28 879	9.94 904	7	47	
14	9.66 050	25	9 71 153	32	0.28 847	9.94 898	6	46	
15	9.66 075	25	9.71 184	31	0.28 816	9.94 891	7	45	30
16	9.66 099	24	9.71 215	31	0.28 785	9.94 885	6	44	6 3.0
17	9.66 124	25	9.71 246	31	0.28 754	9.94 878	7	43	7 3.5
18	9.66 148	24	9.71 277	31	0.28 723	9.94 871	7	42	8 4.0
19	9.66 173	25	9.71 308	31	0.28 692	9.94 865	6	41	9 4.5
20	9.66 197	24	9.71 339	31	0.28 661	9.94 858	7	40	10 5.0
21	9.66 221	24	9.71 370	31	0.28 630	9.94 852	6	39	20 10.0
22	9.66 246	25	9.71 401	31	0.28 599	9.94 845	7	38	30 15.0
23	9.66 270	24	9.71 431	30	0.28 569	9.94 839	6	37	40 20.0
24	9.66 295	25	9.71 462	31	0.28 538	9.94 832	7	36	50 25.0
25	9.66 319	24	9.71 493	31	0.28 507	9.94 826	6	35	
26	9.66 343	24	9.71 524	31	0.28 476	9.94 819	7	34	25 24
27	9.66 368	25	9.71 555	31	0.28 445	9.94 813	6	33	6 2.5 2.4
28	9.66 392	24	9.71 586	31	0.28 414	9.94 806	7	32	7 2.9 2.8
29	9.66 416	24	9.71 617	31	0.28 383	9.94 799	7	31	8 3.3 3.2
30	9.66 441	25	9.71 648	31	0.28 352	9.94 793	6	30	9 3.8 3.6
31	9.66 465	24	9.71 679	31	0.28 321	9.94 786	7	29	10 4.2 4.0
32	9.66 489	24	9.71 709	30	0.28 291	9.94 780	6	28	20 8.3 8.0
33	9.66 513	24	9.71 740	31	0.28 260	9.94 773	7	27	30 12.5 12.0
34	9.66 537	24	9.71 771	31	0.28 229	9.94 767	6	26	40 16.7 16.0
35	9.66 562	25	9.71 802	31	0.28 198	9.94 760	7	25	50 20.8 20.0
36	9.66 586	24	9.71 833	31	0.28 167	9.94 753	7	24	
37	9.66 610	24	9.71 863	30	0.28 137	9.94 747	6	23	
38	9.66 634	24	9.71 894	31	0.28 106	9.94 740	7	22	23
39	9.66 658	24	9.71 925	31	0.28 075	9.94 734	6	21	6 2.3
40	9.66 682	24	9.71 955	30	0.28 045	9.94 727	7	20	7 2.7
41	9.66 706	24	9.71 986	31	0.28 014	9.94 720	7	19	8 3.1
42	9.66 731	25	9.72 017	31	0.27 983	9.94 714	6	18	9 3.5
43	9.66 755	24	9.72 048	31	0.27 952	9.94 707	7	17	10 3.8
44	9.66 779	24	9.72 078	30	0.27 922	9.94 700	7	16	20 7.7
45	9.66 803	24	9.72 109	31	0.27 891	9.94 694	6	15	30 11.5
46	9.66 827	24	9.72 140	31	0.27 860	9.94 687	7	14	40 15.3
47	9.66 851	24	9.72 170	30	0.27 830	9.94 680	7	13	50 19.2
48	9.66 875	24	9.72 201	31	0.27 799	9.94 674	6	12	
49	9.66 899	24	9.72 231	30	0.27 769	9.94 667	7	11	
50	9.66 922	23	9.72 262	31	0.27 738	9.94 660	7	10	7 6
51	9.66 946	24	9.72 293	31	0.27 707	9.94 654	6	9	6 0.7 0.6
52	9.66 970	24	9.72 323	30	0.27 677	9.94 647	7	8	7 0.8 0.7
53	9.66 994	24	9.72 354	31	0.27 646	9.94 640	7	7	8 0.9 0.8
54	9.67 018	24	9.72 384	30	0.27 616	9.94 634	6	6	9 1.1 0.9
55	9.67 042	24	9.72 415	31	0.27 585	9.94 627	7	5	10 1.2 1.0
56	9.67 066	24	9.72 445	30	0.27 555	9.94 620	7	4	20 2.3 2.0
57	9.67 090	24	9.72 476	31	0.27 524	9.94 614	6	3	30 3.5 3.0
58	9.67 113	23	9.72 506	30	0.27 494	9.94 607	7	2	40 4.7 4.0
59	9.67 137	24	9.72 537	31	0.27 463	9.94 600	7	1	50 5.8 5.0
60	9.67 161	24	9.72 567	30	0.27 433	9.94 593	7	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.67 161	24	9.72 567	31	0.27 433	9.94 593	6	60	
1	9.67 185	23	9.72 598	30	0.27 402	9.94 587	7	59	
2	9.67 208	24	9.72 628	31	0.27 372	9.94 580	7	58	
3	9.67 232	24	9.72 659	30	0.27 341	9.94 573	6	57	31 30
4	9.67 256	24	9.72 689	31	0.27 311	9.94 567	7	56	6 3.1 3.0
5	9.67 280	23	9.72 720	30	0.27 280	9.94 560	7	55	7 3.6 3.5
6	9.67 303	24	9.72 750	30	0.27 250	9.94 553	7	54	8 4.1 4.0
7	9.67 327	23	9.72 780	31	0.27 220	9.94 546	6	53	9 4.7 4.5
8	9.67 350	24	9.72 811	30	0.27 189	9.94 540	7	52	10 5.2 5.0
9	9.67 374	24	9.72 841	31	0.27 159	9.94 533	7	51	20 10.3 10.0
10	9.67 398	23	9.72 872	30	0.27 128	9.94 526	7	50	30 15.5 15.0
11	9.67 421	24	9.72 902	30	0.27 098	9.94 519	6	49	40 20.7 20.0
12	9.67 445	23	9.72 932	31	0.27 068	9.94 513	7	48	50 25.8 25.0
13	9.67 468	24	9.72 963	30	0.27 037	9.94 506	7	47	
14	9.67 492	23	9.72 993	30	0.27 007	9.94 499	7	46	
15	9.67 515	24	9.73 023	31	0.26 977	9.94 492	7	45	29
16	9.67 539	23	9.73 054	30	0.26 946	9.94 485	7	44	6 2.9
17	9.67 562	24	9.73 084	30	0.26 916	9.94 479	6	43	7 3.4
18	9.67 586	23	9.73 114	30	0.26 886	9.94 472	7	42	8 3.9
19	9.67 609	24	9.73 144	30	0.26 856	9.94 465	7	41	9 4.4
20	9.67 633	23	9.73 173	31	0.26 825	9.94 458	7	40	10 4.8
21	9.67 656	24	9.73 205	30	0.26 795	9.94 451	7	39	20 9.7
22	9.67 680	23	9.73 235	30	0.26 765	9.94 445	6	38	30 14.5
23	9.67 703	23	9.73 265	30	0.26 735	9.94 438	7	37	40 19.3
24	9.67 726	24	9.73 295	30	0.26 705	9.94 431	7	36	50 24.2
25	9.67 750	23	9.73 326	31	0.26 674	9.94 424	7	35	
26	9.67 773	23	9.73 356	30	0.26 644	9.94 417	7	34	24 23
27	9.67 796	24	9.73 386	30	0.26 614	9.94 410	7	33	6 2.4 2.3
28	9.67 820	23	9.73 416	30	0.26 584	9.94 404	6	32	7 2.8 2.7
29	9.67 843	23	9.73 446	30	0.26 554	9.94 397	7	31	8 3.2 3.1
30	9.67 866	24	9.73 476	30	0.26 524	9.94 390	7	30	9 3.6 3.5
31	9.67 890	23	9.73 507	31	0.26 493	9.94 383	7	29	10 4.0 3.8
32	9.67 913	23	9.73 537	30	0.26 463	9.94 376	7	28	20 8.0 7.7
33	9.67 936	23	9.73 567	30	0.26 433	9.94 369	7	27	30 12.0 11.5
34	9.67 959	23	9.73 597	30	0.26 403	9.94 362	7	26	40 16.0 15.3
35	9.67 982	24	9.73 627	30	0.26 373	9.94 355	7	25	50 20.0 19.2
36	9.68 006	23	9.73 657	30	0.26 343	9.94 349	6	24	
37	9.68 029	23	9.73 687	30	0.26 313	9.94 342	7	23	
38	9.68 052	23	9.73 717	30	0.26 283	9.94 335	7	22	22
39	9.68 075	23	9.73 747	30	0.26 253	9.94 328	7	21	6 2.2
40	9.68 098	23	9.73 777	30	0.26 223	9.94 321	7	20	7 2.6
41	9.68 121	23	9.73 807	30	0.26 193	9.94 314	7	19	8 2.9
42	9.68 144	23	9.73 837	30	0.26 163	9.94 307	7	18	9 3.3
43	9.68 167	23	9.73 867	30	0.26 133	9.94 300	7	17	10 3.7
44	9.68 190	23	9.73 897	30	0.26 103	9.94 293	7	16	20 7.3
45	9.68 213	23	9.73 927	30	0.26 073	9.94 286	7	15	30 11.0
46	9.68 237	24	9.73 957	30	0.26 043	9.94 279	7	14	40 14.7
47	9.68 260	23	9.73 987	30	0.26 013	9.94 273	6	13	50 18.3
48	9.68 283	23	9.74 017	30	0.25 983	9.94 266	7	12	
49	9.68 305	22	9.74 047	30	0.25 953	9.94 259	7	11	
50	9.68 328	23	9.74 077	30	0.25 923	9.94 252	7	10	7 6
51	9.68 351	23	9.74 107	30	0.25 893	9.94 245	7	9	6 0.7 0.6
52	9.68 374	23	9.74 137	30	0.25 863	9.94 238	7	8	7 0.8 0.7
53	9.68 397	23	9.74 166	29	0.25 834	9.94 231	7	7	8 0.9 0.8
54	9.68 420	23	9.74 196	30	0.25 804	9.94 224	7	6	9 1.1 0.9
55	9.68 443	23	9.74 226	30	0.25 774	9.94 217	7	5	10 1.2 1.0
56	9.68 466	23	9.74 256	30	0.25 744	9.94 210	7	4	20 2.3 2.0
57	9.68 489	23	9.74 286	30	0.25 714	9.94 203	7	3	30 3.5 3.0
58	9.68 512	23	9.74 316	30	0.25 684	9.94 196	7	2	40 4.7 4.0
59	9.68 534	22	9.74 345	29	0.25 655	9.94 189	7	1	50 5.8 5.0
60	9.68 557	23	9.74 375	30	0.25 625	9.94 182	7	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.68 557		9.74 375		0.25 625	9.94 182		60	
1	9.68 580	23	9.74 405	30	0.25 595	9.94 173	7	59	
2	9.68 603	23	9.74 435	30	0.25 565	9.94 168	7	58	
3	9.68 625	22	9.74 465	30	0.25 535	9.94 161	7	57	30
4	9.68 648	23	9.74 494	29	0.25 506	9.94 154	7	56	6 3.0
5	9.68 671	23	9.74 524	30	0.25 476	9.94 147	7	55	7 3.5
6	9.68 694	23	9.74 554	30	0.25 446	9.94 140	7	54	8 4.0
7	9.68 716	22	9.74 583	29	0.25 417	9.94 133	7	53	9 4.5
8	9.68 739	23	9.74 613	30	0.25 387	9.94 126	7	52	10 5.0
9	9.68 762	23	9.74 643	30	0.25 357	9.94 119	7	51	20 10.0
10	9.68 784	22	9.74 673	30	0.25 327	9.94 112	7	50	30 15.0
11	9.68 807	23	9.74 702	29	0.25 298	9.94 105	7	49	40 20.0
12	9.68 829	22	9.74 732	30	0.25 268	9.94 098	7	48	50 25.0
13	9.68 852	23	9.74 762	30	0.25 238	9.94 090	8	47	
14	9.68 875	23	9.74 791	29	0.25 209	9.94 083	7	46	
15	9.68 897	22	9.74 821	30	0.25 179	9.94 076	7	45	29
16	9.68 920	23	9.74 851	30	0.25 149	9.94 069	7	44	6 2.9
17	9.68 942	22	9.74 880	29	0.25 120	9.94 062	7	43	7 3.4
18	9.68 965	23	9.74 910	30	0.25 090	9.94 055	7	42	8 3.9
19	9.68 987	22	9.74 939	29	0.25 061	9.94 048	7	41	9 4.4
20	9.69 010	23	9.74 969	30	0.25 031	9.94 041	7	40	10 4.8
21	9.69 032	22	9.74 998	29	0.25 002	9.94 034	7	39	20 9.7
22	9.69 055	23	9.75 028	30	0.24 972	9.94 027	7	38	30 14.5
23	9.69 077	22	9.75 058	30	0.24 942	9.94 020	7	37	40 19.3
24	9.69 100	23	9.75 087	29	0.24 913	9.94 012	8	36	50 24.2
25	9.69 122	22	9.75 117	30	0.24 883	9.94 005	7	35	
26	9.69 144	22	9.75 146	29	0.24 854	9.93 998	7	34	23
27	9.69 167	23	9.75 176	30	0.24 824	9.93 991	7	33	6 2.3
28	9.69 189	22	9.75 205	29	0.24 795	9.93 984	7	32	7 2.7
29	9.69 212	23	9.75 235	30	0.24 765	9.93 977	7	31	8 3.1
30	9.69 234	22	9.75 264	29	0.24 736	9.93 970	7	30	9 3.5
31	9.69 256	22	9.75 294	30	0.24 706	9.93 963	7	29	10 3.8
32	9.69 279	23	9.75 323	29	0.24 677	9.93 955	8	28	20 7.7
33	9.69 301	22	9.75 353	30	0.24 647	9.93 948	7	27	30 11.5
34	9.69 323	22	9.75 382	29	0.24 618	9.93 941	7	26	40 15.3
35	9.69 345	22	9.75 411	29	0.24 589	9.93 934	7	25	50 19.2
36	9.69 368	23	9.75 441	30	0.24 559	9.93 927	7	24	
37	9.69 390	22	9.75 470	29	0.24 530	9.93 920	7	23	
38	9.69 412	22	9.75 500	30	0.24 500	9.93 912	8	22	22
39	9.69 434	22	9.75 529	29	0.24 471	9.93 905	7	21	6 2.2
40	9.69 456	22	9.75 558	29	0.24 442	9.93 898	7	20	7 2.6
41	9.69 479	23	9.75 588	30	0.24 412	9.93 891	7	19	8 2.9
42	9.69 501	22	9.75 617	29	0.24 383	9.93 884	7	18	9 3.3
43	9.69 523	22	9.75 647	30	0.24 353	9.93 876	8	17	10 3.7
44	9.69 545	22	9.75 676	29	0.24 324	9.93 869	7	16	20 7.3
45	9.69 567	22	9.75 705	29	0.24 295	9.93 862	7	15	30 11.0
46	9.69 589	22	9.75 735	30	0.24 265	9.93 855	7	14	40 14.7
47	9.69 611	22	9.75 764	29	0.24 236	9.93 847	8	13	50 18.3
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	0.24 178	9.93 833	7	11	
50	9.69 677	22	9.75 852	30	0.24 148	9.93 826	7	10	8 7
51	9.69 699	22	9.75 881	29	0.24 119	9.93 819	7	9	6 0.8 0.7
52	9.69 721	22	9.75 910	29	0.24 090	9.93 811	8	8	7 0.9 0.8
53	9.69 743	22	9.75 939	29	0.24 061	9.93 804	7	7	8 1.1 0.9
54	9.69 765	22	9.75 969	30	0.24 031	9.93 797	7	6	9 1.2 1.1
55	9.69 787	22	9.75 998	29	0.24 002	9.93 789	8	5	10 1.3 1.2
56	9.69 809	22	9.76 027	29	0.23 973	9.93 782	7	4	20 2.7 2.3
57	9.69 831	22	9.76 056	29	0.23 944	9.93 775	7	3	30 4.0 3.5
58	9.69 853	22	9.76 086	30	0.23 914	9.93 768	7	2	40 5.3 4.7
59	9.69 875	22	9.76 115	29	0.23 885	9.93 760	8	1	50 6.7 5.8
60	9.69 897		9.76 144		0.23 856	9.93 753	7	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.69 897	22	9.76 144	29	0.23 856	9.93 753	7	60	
1	9.69 919	22	9.76 173	29	0.23 827	9.93 746	8	59	
2	9.69 941	22	9.76 202	29	0.23 798	9.93 738	7	58	
3	9.69 963	21	9.76 231	30	0.23 769	9.93 731	7	57	30 29
4	9.69 984	22	9.76 261	29	0.23 739	9.93 724	7	56	6 3.0 2.9
5	9.70 006	22	9.76 290	29	0.23 710	9.93 717	8	55	7 3.5 3.4
6	9.70 028	22	9.76 319	29	0.23 681	9.93 709	7	54	8 4.0 3.9
7	9.70 050	22	9.76 348	29	0.23 652	9.93 702	7	53	9 4.5 4.4
8	9.70 072	22	9.76 377	29	0.23 623	9.93 695	8	52	10 5.0 4.8
9	9.70 093	21	9.76 406	29	0.23 594	9.93 687	7	51	20 10.0 9.7
10	9.70 115	22	9.76 435	29	0.23 565	9.93 680	7	50	30 15.0 14.5
11	9.70 137	22	9.76 464	29	0.23 536	9.93 673	7	49	40 20.0 19.3
12	9.70 159	22	9.76 493	29	0.23 507	9.93 665	8	48	50 25.0 24.2
13	9.70 180	21	9.76 522	29	0.23 478	9.93 658	7	47	
14	9.70 202	22	9.76 551	29	0.23 449	9.93 650	8	46	
15	9.70 224	22	9.76 580	29	0.23 420	9.93 643	7	45	28
16	9.70 245	21	9.76 609	29	0.23 391	9.93 636	7	44	6 2.8
17	9.70 267	22	9.76 639	30	0.23 361	9.93 628	8	43	7 3.3
18	9.70 288	21	9.76 668	29	0.23 332	9.93 621	7	42	8 3.7
19	9.70 310	22	9.76 697	29	0.23 303	9.93 614	7	41	9 4.2
20	9.70 332	22	9.76 725	28	0.23 275	9.93 606	8	40	10 4.7
21	9.70 353	21	9.76 754	29	0.23 246	9.93 599	7	39	20 9.3
22	9.70 375	22	9.76 783	29	0.23 217	9.93 591	8	38	30 14.0
23	9.70 396	21	9.76 812	29	0.23 188	9.93 584	7	37	40 18.7
24	9.70 418	22	9.76 841	29	0.23 159	9.93 577	7	36	50 23.3
25	9.70 439	21	9.76 870	29	0.23 130	9.93 569	8	35	
26	9.70 461	22	9.76 899	29	0.23 101	9.93 562	7	34	22
27	9.70 482	21	9.76 928	29	0.23 072	9.93 554	8	33	6 2.2
28	9.70 504	22	9.76 957	29	0.23 043	9.93 547	7	32	7 2.6
29	9.70 525	21	9.76 986	29	0.23 014	9.93 539	8	31	8 2.9
30	9.70 547	22	9.77 015	29	0.22 985	9.93 532	7	30	9 3.3
31	9.70 568	21	9.77 044	29	0.22 956	9.93 525	7	29	10 3.7
32	9.70 590	22	9.77 073	29	0.22 927	9.93 517	8	28	20 7.3
33	9.70 611	21	9.77 101	28	0.22 899	9.93 510	7	27	30 11.0
34	9.70 633	22	9.77 130	29	0.22 870	9.93 502	8	26	40 14.7
35	9.70 654	21	9.77 159	29	0.22 841	9.93 495	7	25	50 18.3
36	9.70 675	21	9.77 188	29	0.22 812	9.93 487	8	24	
37	9.70 697	22	9.77 217	29	0.22 783	9.93 480	7	23	
38	9.70 718	21	9.77 246	29	0.22 754	9.93 472	8	22	21
39	9.70 739	21	9.77 274	28	0.22 726	9.93 465	7	21	6 2.1
40	9.70 761	22	9.77 303	29	0.22 697	9.93 457	8	20	7 2.5
41	9.70 782	21	9.77 332	29	0.22 668	9.93 450	7	19	8 2.8
42	9.70 803	21	9.77 361	29	0.22 639	9.93 442	8	18	9 3.2
43	9.70 824	21	9.77 390	29	0.22 610	9.93 435	7	17	10 3.5
44	9.70 846	22	9.77 418	28	0.22 582	9.93 427	8	16	20 7.0
45	9.70 867	21	9.77 447	29	0.22 553	9.93 420	7	15	30 10.5
46	9.70 888	21	9.77 476	29	0.22 524	9.93 412	8	14	40 14.0
47	9.70 909	21	9.77 505	29	0.22 495	9.93 405	7	13	50 17.5
48	9.70 931	22	9.77 533	28	0.22 467	9.93 397	8	12	
49	9.70 952	21	9.77 562	29	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	8 7
51	9.70 994	21	9.77 619	28	0.22 381	9.93 375	7	9	6 0.8 0.7
52	9.71 015	21	9.77 648	29	0.22 352	9.93 367	8	8	7 0.9 0.8
53	9.71 036	21	9.77 677	29	0.22 323	9.93 360	7	7	8 1.1 0.9
54	9.71 058	22	9.77 706	29	0.22 294	9.93 352	8	6	9 1.2 1.1
55	9.71 079	21	9.77 734	28	0.22 266	9.93 344	8	5	10 1.3 1.2
56	9.71 100	21	9.77 763	29	0.22 237	9.93 337	7	4	20 2.7 2.3
57	9.71 121	21	9.77 791	28	0.22 209	9.93 329	8	3	30 4.0 3.5
58	9.71 142	21	9.77 820	29	0.22 180	9.93 322	7	2	40 5.3 4.7
59	9.71 163	21	9.77 849	29	0.22 151	9.93 314	8	1	50 6.7 5.8
60	9.71 184		9.77 877	28	0.22 123	9.93 307	7	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.71 184	21	9.77 877	29	0.22 123	9.93 307	8	60	
1	9.71 205	21	9.77 906	29	0.22 094	9.93 299	8	59	
2	9.71 226	21	9.77 935	28	0.22 065	9.93 291	7	58	29
3	9.71 247	21	9.77 963	29	0.22 037	9.93 284	8	57	6 2.9
4	9.71 268	21	9.77 992	28	0.22 008	9.93 276	7	56	7 3.4
5	9.71 289	21	9.78 020	29	0.21 980	9.93 269	8	55	8 3.9
6	9.71 310	21	9.78 049	28	0.21 951	9.93 261	8	54	9 4.4
7	9.71 331	21	9.78 077	29	0.21 923	9.93 253	7	53	10 4.8
8	9.71 352	21	9.78 106	29	0.21 894	9.93 246	8	52	20 9.7
9	9.71 373	20	9.78 135	28	0.21 865	9.93 238	8	51	30 14.5
10	9.71 393	21	9.78 163	29	0.21 837	9.93 230	7	50	40 19.3
11	9.71 414	21	9.78 192	28	0.21 808	9.93 223	8	49	50 24.2
12	9.71 435	21	9.78 220	29	0.21 780	9.93 215	8	48	
13	9.71 456	21	9.78 249	28	0.21 751	9.93 207	8	47	
14	9.71 477	21	9.78 277	29	0.21 723	9.93 200	7	46	28
15	9.71 498	21	9.78 306	28	0.21 694	9.93 192	8	45	6 2.8
16	9.71 519	20	9.78 334	29	0.21 666	9.93 184	8	44	7 3.3
17	9.71 539	21	9.78 363	28	0.21 637	9.93 177	7	43	8 3.7
18	9.71 560	21	9.78 391	28	0.21 609	9.93 169	8	42	9 4.2
19	9.71 581	21	9.78 419	29	0.21 581	9.93 161	8	41	10 4.7
20	9.71 602	21	9.78 448	28	0.21 552	9.93 154	7	40	20 9.3
21	9.71 622	20	9.78 476	29	0.21 524	9.93 146	8	39	30 14.0
22	9.71 643	21	9.78 505	28	0.21 495	9.93 138	8	38	40 18.7
23	9.71 664	21	9.78 533	29	0.21 467	9.93 131	7	37	50 23.3
24	9.71 685	21	9.78 562	28	0.21 438	9.93 123	8	36	
25	9.71 705	20	9.78 590	28	0.21 410	9.93 115	8	35	
26	9.71 726	21	9.78 618	28	0.21 382	9.93 108	7	34	21
27	9.71 747	21	9.78 647	29	0.21 353	9.93 100	8	33	6 2.1
28	9.71 767	20	9.78 675	28	0.21 325	9.93 092	8	32	7 2.5
29	9.71 788	21	9.78 704	29	0.21 296	9.93 084	8	31	8 2.8
30	9.71 809	21	9.78 732	28	0.21 268	9.93 077	7	30	9 3.2
31	9.71 829	20	9.78 760	28	0.21 240	9.93 069	8	29	10 3.5
32	9.71 850	21	9.78 789	29	0.21 211	9.93 061	8	28	20 7.0
33	9.71 870	20	9.78 817	28	0.21 183	9.93 053	8	27	30 10.5
34	9.71 891	21	9.78 845	28	0.21 155	9.93 046	7	26	40 14.0
35	9.71 911	20	9.78 874	29	0.21 126	9.93 038	8	25	50 17.5
36	9.71 932	21	9.78 902	28	0.21 098	9.93 030	8	24	
37	9.71 952	20	9.78 930	28	0.21 070	9.93 022	8	23	
38	9.71 973	21	9.78 959	29	0.21 041	9.93 014	8	22	20
39	9.71 994	21	9.78 987	28	0.21 013	9.93 007	7	21	6 2.0
40	9.72 014	20	9.79 015	28	0.20 985	9.92 999	8	20	7 2.3
41	9.72 034	20	9.79 043	28	0.20 957	9.92 991	8	19	8 2.7
42	9.72 055	21	9.79 072	29	0.20 928	9.92 983	8	18	9 3.0
43	9.72 075	20	9.79 100	28	0.20 900	9.92 976	7	17	10 3.3
44	9.72 096	21	9.79 128	28	0.20 872	9.92 968	8	16	20 6.7
45	9.72 116	20	9.79 156	28	0.20 844	9.92 960	8	15	30 10.0
46	9.72 137	21	9.79 185	29	0.20 815	9.92 952	8	14	40 13.3
47	9.72 157	20	9.79 213	28	0.20 787	9.92 944	8	13	50 16.7
48	9.72 177	20	9.79 241	28	0.20 759	9.92 936	8	12	
49	9.72 198	21	9.79 269	28	0.20 731	9.92 929	7	11	
50	9.72 218	20	9.79 297	28	0.20 703	9.92 921	8	10	8 7
51	9.72 238	20	9.79 326	29	0.20 674	9.92 913	8	9	6 0.8 0.7
52	9.72 259	21	9.79 354	28	0.20 646	9.92 905	8	8	7 0.9 0.8
53	9.72 279	20	9.79 382	28	0.20 618	9.92 897	8	7	8 1.1 0.9
54	9.72 299	20	9.79 410	28	0.20 590	9.92 889	8	6	9 1.2 1.1
55	9.72 320	21	9.79 438	28	0.20 562	9.92 881	8	5	10 1.3 1.2
56	9.72 340	20	9.79 466	28	0.20 534	9.92 874	7	4	20 2.7 2.3
57	9.72 360	20	9.79 495	29	0.20 505	9.92 866	8	3	30 4.0 3.5
58	9.72 381	21	9.79 523	28	0.20 477	9.92 858	8	2	40 5.3 4.7
59	9.72 401	20	9.79 551	28	0.20 449	9.92 850	8	1	50 6.7 5.8
60	9.72 421	20	9.79 579	28	0.20 421	9.92 842	8	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.72 421		9.79 579		0.20 421	9.92 842		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	9.72 482	21	9.79 663	28	0.20 337	9.92 818	8	57	29 28
4	9.72 502	20	9.79 691	28	0.20 309	9.92 810	8	56	6 2.9 2.8
5	9.72 522	20	9.79 719	28	0.20 281	9.92 803	7	55	7 3.4 3.3
6	9.72 542	20	9.79 747	28	0.20 253	9.92 795	8	54	8 3.9 3.7
7	9.72 562	20	9.79 776	29	0.20 224	9.92 787	8	53	9 4.4 4.2
8	9.72 582	20	9.79 804	28	0.20 196	9.92 779	8	52	10 4.8 4.7
9	9.72 602	20	9.79 832	28	0.20 168	9.92 771	8	51	20 9.7 9.3
10	9.72 622		9.79 860	28	0.20 140	9.92 763	8	50	30 14.5 14.0
11	9.72 643	21	9.79 888	28	0.20 112	9.92 755	8	49	40 19.3 18.7
12	9.72 663	20	9.79 916	28	0.20 084	9.92 747	8	48	50 24.2 23.3
13	9.72 683	20	9.79 944	28	0.20 056	9.92 739	8	47	
14	9.72 703	20	9.79 972	28	0.20 028	9.92 731	8	46	
15	9.72 723	20	9.80 000	28	0.20 000	9.92 723	8	45	27
16	9.72 743	20	9.80 028	28	0.19 972	9.92 715	8	44	6 2.7
17	9.72 763	20	9.80 056	28	0.19 944	9.92 707	8	43	7 3.2
18	9.72 783	20	9.80 084	28	0.19 916	9.92 699	8	42	8 3.6
19	9.72 803	20	9.80 112	28	0.19 888	9.92 691	8	41	9 4.1
20	9.72 823		9.80 140	28	0.19 860	9.92 683	8	40	10 4.5
21	9.72 843	20	9.80 168	28	0.19 832	9.92 675	8	39	20 9.0
22	9.72 863	20	9.80 195	27	0.19 805	9.92 667	8	38	30 13.5
23	9.72 883	20	9.80 223	28	0.19 777	9.92 659	8	37	40 18.0
24	9.72 902	19	9.80 251	28	0.19 749	9.92 651	8	36	50 22.5
25	9.72 922	20	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	21 20
27	9.72 962	20	9.80 335	28	0.19 665	9.92 627	8	33	6 2.1 2.0
28	9.72 982	20	9.80 363	28	0.19 637	9.92 619	8	32	7 2.5 2.3
29	9.73 002	20	9.80 391	28	0.19 609	9.92 611	8	31	8 2.8 2.7
30	9.73 022	20	9.80 419	28	0.19 581	9.92 603	8	30	9 3.2 3.0
31	9.73 041	19	9.80 447	28	0.19 553	9.92 595	8	29	10 3.5 3.3
32	9.73 061	20	9.80 474	27	0.19 526	9.92 587	8	28	20 7.0 6.7
33	9.73 081	20	9.80 502	28	0.19 498	9.92 579	8	27	30 10.5 10.0
34	9.73 101	20	9.80 530	28	0.19 470	9.92 571	8	26	40 14.0 13.3
35	9.73 121	20	9.80 558	28	0.19 442	9.92 563	8	25	50 17.5 16.7
36	9.73 140	19	9.80 586	28	0.19 414	9.92 555	8	24	
37	9.73 160	20	9.80 614	28	0.19 386	9.92 546	9	23	
38	9.73 180	20	9.80 642	28	0.19 358	9.92 538	8	22	19 9
39	9.73 200	20	9.80 669	27	0.19 331	9.92 530	8	21	6 1.9 0.9
40	9.73 219	19	9.80 697	28	0.19 303	9.92 522	8	20	7 2.2 1.1
41	9.73 239	20	9.80 725	28	0.19 275	9.92 514	8	19	8 2.5 1.2
42	9.73 259	20	9.80 753	28	0.19 247	9.92 506	8	18	9 2.9 1.4
43	9.73 278	19	9.80 781	28	0.19 219	9.92 498	8	17	10 3.2 1.5
44	9.73 298	20	9.80 808	27	0.19 192	9.92 490	8	16	20 6.3 3.0
45	9.73 318	20	9.80 836	28	0.19 164	9.92 482	8	15	30 9.5 4.5
46	9.73 337	19	9.80 864	28	0.19 136	9.92 473	9	14	40 12.7 6.0
47	9.73 357	20	9.80 892	28	0.19 108	9.92 465	8	13	50 15.8 7.5
48	9.73 377	20	9.80 919	27	0.19 081	9.92 457	8	12	
49	9.73 396	19	9.80 947	28	0.19 053	9.92 449	8	11	
50	9.73 416	20	9.80 975	28	0.19 025	9.92 441	8	10	8 7
51	9.73 435	19	9.81 003	28	0.18 997	9.92 433	8	9	6 0.8 0.7
52	9.73 455	20	9.81 030	27	0.18 970	9.92 425	8	8	7 0.9 0.8
53	9.73 474	19	9.81 058	28	0.18 942	9.92 416	9	7	8 1.1 0.9
54	9.73 494	20	9.81 086	28	0.18 914	9.92 408	8	6	9 1.2 1.1
55	9.73 513	19	9.81 113	27	0.18 887	9.92 400	8	5	10 1.3 1.2
56	9.73 533	20	9.81 141	28	0.18 859	9.92 392	8	4	20 2.7 2.3
57	9.73 552	19	9.81 169	28	0.18 831	9.92 384	8	3	30 4.0 3.5
58	9.73 572	20	9.81 196	27	0.18 804	9.92 376	8	2	40 5.3 4.7
59	9.73 591	19	9.81 224	28	0.18 776	9.92 367	9	1	50 6.7 5.8
60	9.73 611	20	9.81 252	28	0.18 748	9.92 359	8	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.73 611		9.81 252		0.18 748	9.92 359		60	
1	9.73 630	19	9.81 279	27	0.18 721	9.92 351	8	59	
2	9.73 650	20	9.81 307	28	0.18 693	9.92 343	8	58	
3	9.73 669	19	9.81 335	28	0.18 665	9.92 335	8	57	28 27
4	9.73 689	20	9.81 362	27	0.18 638	9.92 326	9	56	6 2.8 2.7
		19		28			8		7 3.3 3.2
5	9.73 708		9.81 390		0.18 610	9.92 318		55	8 3.7 3.6
6	9.73 727	19	9.81 418	28	0.18 582	9.92 310	8	54	9 4.2 4.1
7	9.73 747	20	9.81 445	27	0.18 555	9.92 302	8	53	10 4.7 4.5
8	9.73 766	19	9.81 473	28	0.18 527	9.92 293	9	52	20 9.3 9.0
9	9.73 785	19	9.81 500	27	0.18 500	9.92 285	8	51	30 14.0 13.5
		20		28			8		40 18.7 18.0
10	9.73 805		9.81 528		0.18 472	9.92 277		50	50 23.3 22.5
11	9.73 824	19	9.81 556	28	0.18 444	9.92 269	8	49	
12	9.73 843	19	9.81 583	27	0.18 417	9.92 260	9	48	
13	9.73 863	20	9.81 611	28	0.18 389	9.92 252	8	47	
14	9.73 882	19	9.81 638	27	0.18 362	9.92 244	8	46	20
		19		28			9		6 2.0
15	9.73 901		9.81 666		0.18 334	9.92 235	8	45	7 2.3
16	9.73 921	20	9.81 693	27	0.18 307	9.92 227	8	44	8 2.7
17	9.73 940	19	9.81 721	28	0.18 279	9.92 219	8	43	9 3.0
18	9.73 959	19	9.81 748	27	0.18 252	9.92 211	8	42	10 3.3
19	9.73 978	19	9.81 776	28	0.18 224	9.92 202	9	41	20 6.7
		19		27			8		30 10.0
20	9.73 997		9.81 803	28	0.18 197	9.92 194		40	40 13.3
21	9.74 017	20	9.81 831	27	0.18 169	9.92 186	8	39	50 16.7
22	9.74 036	19	9.81 858	28	0.18 142	9.92 177	9	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	28	0.18 087	9.92 161	8	36	
		19		27			9		
25	9.74 093		9.81 941	28	0.18 059	9.92 152	8	35	
26	9.74 113	20	9.81 968	27	0.18 032	9.92 144	8	34	19
27	9.74 132	19	9.81 996	28	0.18 004	9.92 136	8	33	6 1.9
28	9.74 151	19	9.82 023	27	0.17 977	9.92 127	9	32	7 2.2
29	9.74 170	19	9.82 051	28	0.17 949	9.92 119	8	31	8 2.5
		19		27			8		9 2.9
30	9.74 189		9.82 078	28	0.17 922	9.92 111		30	10 3.2
31	9.74 208	19	9.82 106	27	0.17 894	9.92 102	9	29	20 6.3
32	9.74 227	19	9.82 133	28	0.17 867	9.92 094	8	28	30 9.5
33	9.74 246	19	9.82 161	27	0.17 839	9.92 086	8	27	40 12.7
34	9.74 265	19	9.82 188	27	0.17 812	9.92 077	9	26	50 15.8
		19		28			8		
35	9.74 284		9.82 215		0.17 785	9.92 069		25	
36	9.74 303	19	9.82 243	27	0.17 757	9.92 060	9	24	
37	9.74 322	19	9.82 270	28	0.17 730	9.92 052	8	23	
38	9.74 341	19	9.82 298	27	0.17 702	9.92 044	8	22	18
39	9.74 360	19	9.82 325	27	0.17 675	9.92 035	9	21	6 1.8
		19		28			8		7 2.1
40	9.74 379		9.82 352		0.17 648	9.92 027		20	8 2.4
41	9.74 398	19	9.82 380	28	0.17 620	9.92 018	9	19	9 2.7
42	9.74 417	19	9.82 407	27	0.17 593	9.92 010	8	18	10 3.0
43	9.74 436	19	9.82 435	28	0.17 565	9.92 002	8	17	20 6.0
44	9.74 455	19	9.82 462	27	0.17 538	9.91 993	9	16	30 9.0
		19		27			8		40 12.0
45	9.74 474		9.82 489	28	0.17 511	9.91 985		15	50 15.0
46	9.74 493	19	9.82 517	27	0.17 483	9.91 976	9	14	
47	9.74 512	19	9.82 544	27	0.17 456	9.91 968	8	13	
48	9.74 531	19	9.82 571	27	0.17 429	9.91 959	9	12	
49	9.74 549	18	9.82 599	28	0.17 401	9.91 951	8	11	
		19		27			9		9 8
50	9.74 568		9.82 626		0.17 374	9.91 942	8	10	6 0.9 0.8
51	9.74 587	19	9.82 653	27	0.17 347	9.91 934	9	9	7 1.1 0.9
52	9.74 606	19	9.82 681	28	0.17 319	9.91 925	8	8	8 1.2 1.1
53	9.74 625	19	9.82 708	27	0.17 292	9.91 917	8	7	9 1.4 1.2
54	9.74 644	19	9.82 735	27	0.17 265	9.91 908	9	6	10 1.5 1.3
		18		27			8		20 3.0 2.7
55	9.74 662		9.82 762	28	0.17 238	9.91 900		5	30 4.5 4.0
56	9.74 681	19	9.82 790	27	0.17 210	9.91 891	9	4	40 6.0 5.3
57	9.74 700	19	9.82 817	27	0.17 183	9.91 883	8	3	50 7.5 6.7
58	9.74 719	19	9.82 844	27	0.17 156	9.91 874	9	2	
59	9.74 737	18	9.82 871	27	0.17 129	9.91 866	8	1	
		19		28			9		
60	9.74 756		9.82 899		0.17 101	9.91 857		0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.74 756		9.82 899		0.17 101	9.91 857		60	
1	9.74 775	19	9.82 926	27	0.17 074	9.91 849	8	59	
2	9.74 794	19	9.82 953	27	0.17 047	9.91 840	9	58	
3	9.74 812	18	9.82 980	27	0.17 020	9.91 832	8	57	28 27
4	9.74 831	19	9.83 008	28	0.16 992	9.91 823	9	56	6 2.8 2.7
5	9.74 850	18	9.83 035	27	0.16 965	9.91 815	8	55	7 3.3 3.2
6	9.74 868	19	9.83 062	27	0.16 938	9.91 806	9	54	8 3.7 3.6
7	9.74 887	19	9.83 089	27	0.16 911	9.91 798	8	53	9 4.2 4.1
8	9.74 906	18	9.83 117	28	0.16 883	9.91 789	9	52	10 4.7 4.5
9	9.74 924	19	9.83 144	27	0.16 856	9.91 781	8	51	20 9.3 9.0
10	9.74 943	18	9.83 171	27	0.16 829	9.91 772	9	50	30 14.0 13.5
11	9.74 961	19	9.83 198	27	0.16 802	9.91 763	9	49	40 18.7 18.0
12	9.74 980	19	9.83 225	27	0.16 775	9.91 755	8	48	50 23.3 22.5
13	9.74 999	19	9.83 252	27	0.16 748	9.91 746	9	47	
14	9.75 017	18	9.83 280	28	0.16 720	9.91 738	8	46	26
15	9.75 036	19	9.83 307	27	0.16 693	9.91 729	9	45	6 2.6
16	9.75 054	18	9.83 334	27	0.16 666	9.91 720	9	44	7 3.0
17	9.75 073	19	9.83 361	27	0.16 639	9.91 712	8	43	8 3.5
18	9.75 091	18	9.83 388	27	0.16 612	9.91 703	9	42	9 3.9
19	9.75 110	19	9.83 415	27	0.16 585	9.91 695	8	41	10 4.3
20	9.75 128	18	9.83 442	27	0.16 558	9.91 686	9	40	20 8.7
21	9.75 147	19	9.83 470	28	0.16 530	9.91 677	9	39	30 13.0
22	9.75 165	18	9.83 497	27	0.16 503	9.91 669	8	38	40 17.3
23	9.75 184	19	9.83 524	27	0.16 476	9.91 660	9	37	50 21.7
24	9.75 202	18	9.83 551	27	0.16 449	9.91 651	9	36	
25	9.75 221	19	9.83 578	27	0.16 422	9.91 643	8	35	
26	9.75 239	18	9.83 605	27	0.16 395	9.91 634	9	34	19
27	9.75 258	19	9.83 632	27	0.16 368	9.91 625	9	33	6 1.9
28	9.75 276	18	9.83 659	27	0.16 341	9.91 617	8	32	7 2.2
29	9.75 294	18	9.83 686	27	0.16 314	9.91 608	9	31	8 2.5
30	9.75 313	19	9.83 713	27	0.16 287	9.91 599	9	30	9 2.9
31	9.75 331	18	9.83 740	27	0.16 260	9.91 591	8	29	10 3.2
32	9.75 350	19	9.83 768	28	0.16 232	9.91 582	9	28	20 6.3
33	9.75 368	18	9.83 795	27	0.16 205	9.91 573	9	27	30 9.5
34	9.75 386	18	9.83 822	27	0.16 178	9.91 565	8	26	40 12.7
35	9.75 405	19	9.83 849	27	0.16 151	9.91 556	9	25	50 15.8
36	9.75 423	18	9.83 876	27	0.16 124	9.91 547	9	24	
37	9.75 441	18	9.83 903	27	0.16 097	9.91 538	9	23	
38	9.75 459	18	9.83 930	27	0.16 070	9.91 530	8	22	18
39	9.75 478	19	9.83 957	27	0.16 043	9.91 521	9	21	6 1.8
40	9.75 496	18	9.83 984	27	0.16 016	9.91 512	9	20	7 2.1
41	9.75 514	18	9.84 011	27	0.15 989	9.91 504	8	19	8 2.4
42	9.75 533	19	9.84 038	27	0.15 962	9.91 495	9	18	9 2.7
43	9.75 551	18	9.84 065	27	0.15 935	9.91 486	9	17	10 3.0
44	9.75 569	18	9.84 092	27	0.15 908	9.91 477	9	16	20 6.0
45	9.75 587	18	9.84 119	27	0.15 881	9.91 469	8	15	30 9.0
46	9.75 605	18	9.84 146	27	0.15 854	9.91 460	9	14	40 12.0
47	9.75 624	19	9.84 173	27	0.15 827	9.91 451	9	13	50 15.0
48	9.75 642	18	9.84 200	27	0.15 800	9.91 442	9	12	
49	9.75 660	18	9.84 227	27	0.15 773	9.91 433	9	11	
50	9.75 678	18	9.84 254	27	0.15 746	9.91 425	8	10	
51	9.75 696	18	9.84 280	26	0.15 720	9.91 416	9	9	9 8
52	9.75 714	18	9.84 307	27	0.15 693	9.91 407	9	8	6 0.9 0.8
53	9.75 733	19	9.84 334	27	0.15 666	9.91 398	9	7	7 1.1 0.9
54	9.75 751	18	9.84 361	27	0.15 639	9.91 389	9	6	8 1.2 1.1
55	9.75 769	18	9.84 388	27	0.15 612	9.91 381	8	5	9 1.4 1.2
56	9.75 787	18	9.84 415	27	0.15 585	9.91 372	9	4	10 1.5 1.3
57	9.75 805	18	9.84 442	27	0.15 558	9.91 363	9	3	20 3.0 2.7
58	9.75 823	18	9.84 469	27	0.15 531	9.91 354	9	2	30 4.5 4.0
59	9.75 841	18	9.84 496	27	0.15 504	9.91 345	9	1	40 6.0 5.3
60	9.75 859		9.84 523		0.15 477	9.91 336		0	50 7.5 6.7
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.75 859	18	9.84 523	27	0.15 477	9.91 336	8	60	
1	9.75 877	18	9.84 550	26	0.15 450	9.91 328	9	59	
2	9.75 895	18	9.84 576	27	0.15 424	9.91 319	9	58	27 26
3	9.75 913	18	9.84 603	27	0.15 397	9.91 310	9	57	6 2.7 2.6
4	9.75 931	18	9.84 630	27	0.15 370	9.91 301	9	56	7 3.2 3.0
5	9.75 949	18	9.84 657	27	0.15 343	9.91 292	9	55	8 3.6 3.5̄
6	9.75 967	18	9.84 684	27	0.15 316	9.91 283	9	54	9 4.1 3.9
7	9.75 985	18	9.84 711	27	0.15 289	9 91 274	9	53	10 4.5 4.3
8	9.76 003	18	9.84 738	27	0.15 262	9.91 266	8	52	20 9.0 8.7
9	9.76 021	18	9.84 764	26	0.15 236	9.91 257	9	51	30 13.5 13.0
10	9.76 039	18	9.84 791	27	0.15 209	9.91 248	9	50	40 18.0 17.3
11	9.76 057	18	9.84 818	27	0.15 182	9.91 239	9	49	50 22.5 21.7
12	9.76 075̄	18	9.84 845̄	27	0.15 155	9.91 230	9	48	
13	9.76 093	18	9.84 872	27	0.15 128	9.91 221	9	47	
14	9.76 111	18	9.84 899	27	0.15 101	9.91 212	9	46	18
15	9.76 129	17	9.84 925	26	0.15 075̄	9.91 203	9	45	6 1.8
16	9.76 146	18	9.84 952	27	0.15 048	9.91 194	9	44	7 2.1
17	9.76 164	18	9.84 979	27	0.15 021	9.91 185	9	43	8 2.4
18	9.76 182	18	9.85 006	27	0.14 994	9.91 176	9	42	9 2.7
19	9.76 200	18	9.85 033	27	0.14 967	9.91 167	9	41	10 3.0
20	9.76 218	18	9.85 059	26	0.14 941	9.91 158	9	40	20 6.0
21	9.76 236	17	9.85 086	27	0.14 914	9.91 149	9	39	30 9.0
22	9.76 253	18	9.85 113	27	0.14 887	9.91 141	8	38	40 12.0
23	9.76 271	18	9.85 140	27	0.14 860	9.91 132	9	37	50 15.0
24	9.76 289	18	9.85 166	26	0.14 834	9.91 123	9	36	
25	9.76 307	17	9.85 193	27	0.14 807	9.91 114	9	35	
26	9.76 324	18	9.85 220	27	0.14 780	9.91 105̄	9	34	17
27	9.76 342	18	9.85 247	27	0.14 753	9.91 096	9	33	6 1.7
28	9.76 360	18	9.85 273	26	0.14 727	9.91 087	9	32	7 2.0
29	9.76 378	17	9.85 300	27	0.14 700	9.91 078	9	31	8 2.3
30	9.76 395	18	9.85 327	27	0.14 673	9.91 069	9	30	9 2.6
31	9.76 413	18	9.85 354	27	0.14 646	9.91 060	9	29	10 2.8
32	9.76 431	17	9.85 380	26	0.14 620	9.91 051	9	28	20 5.7
33	9.76 448	18	9.85 407	27	0.14 593	9.91 042	9	27	30 8.5
34	9.76 466	18	9.85 434	27	0.14 566	9.91 033	9	26	40 11.3
35	9.76 484	17	9.85 460	26	0.14 540	9.91 023	10	25	50 14.2
36	9.76 501	18	9.85 487	27	0.14 513	9.91 014	9	24	
37	9.76 519	18	9.85 514	27	0.14 486	9.91 005	9	23	
38	9.76 537	17	9.85 540	26	0.14 460	9.90 996	9	22	10
39	9.76 554	18	9.85 567	27	0.14 433	9.90 987	9	21	6 1.0
40	9.76 572	18	9.85 594	27	0.14 406	9.90 978	9	20	7 1.2
41	9.76 590	17	9.85 620	26	0.14 380	9.90 969	9	19	8 1.3
42	9.76 607	18	9.85 647	27	0.14 353	9.90 960	9	18	9 1.5
43	9.76 625̄	17	9.85 674	27	0.14 326	9.90 951	9	17	10 1.7
44	9.76 642	18	9.85 700	26	0.14 300	9.90 942	9	16	20 3.3
45	9.76 660	17	9.85 727	27	0.14 273	9.90 933	9	15	30 5.0
46	9.76 677	18	9.85 754	27	0.14 246	9.90 924	9	14	40 6.7
47	9.76 695̄	17	9.85 780	26	0.14 220	9.90 915̄	9	13	50 8.3
48	9.76 712	18	9.85 807	27	0.14 193	9.90 906	9	12	
49	9.76 730	17	9.85 834	27	0.14 166	9.90 896	10	11	
50	9.76 747	18	9.85 860	26	0.14 140	9.90 887	9	10	9 8
51	9.76 765̄	17	9.85 887	27	0.14 113	9.90 878	9	9	6 0.9 0.8
52	9.76 782	18	9.85 913	26	0.14 087	9.90 869	9	8	7 1.1 0.9
53	9.76 800	17	9.85 940	27	0.14 060	9.90 860	9	7	8 1.2 1.1
54	9.76 817	18	9.85 967	27	0.14 033	9.90 851	9	6	9 1.4 1.2
55	9.76 835̄	17	9.85 993	26	0.14 007	9.90 842	9	5	10 1.5 1.3
56	9.76 852	18	9.86 020	27	0.13 980	9.90 832	10	4	20 3.0 2.7
57	9.76 870	17	9.86 046	26	0.13 954	9.90 823	9	3	30 4.5 4.0
58	9.76 887	17	9.86 073	27	0.13 927	9.90 814	9	2	40 6.0 5.3
59	9.76 904	18	9.86 100	27	0.13 900	9.90 805̄	9	1	50 7.5 6.7
60	9.76 922		9.86 126	26	0.13 874	9.90 796	9	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.76 922		9.86 126		0.13 874	9.90 796		60	
1	9.76 939	17	9.86 153	27	0.13 847	9.90 787	9	59	
2	9.76 957	18	9.86 179	26	0.13 821	9.90 777	10	58	
3	9.76 974	17	9.86 206	27	0.13 794	9.90 768	9	57	27 26
4	9.76 991	17	9.86 232	26	0.13 768	9.90 759	9	56	6 2.7 2.6
5	9.77 009	18	9.86 259	27	0.13 741	9.90 750	9	55	7 3.2 3.0
6	9.77 026	17	9.86 285	26	0.13 715	9.90 741	9	54	8 3.6 3.5
7	9.77 043	17	9.86 312	27	0.13 688	9.90 731	10	53	9 4.1 3.9
8	9.77 061	18	9.86 338	26	0.13 662	9.90 722	9	52	10 4.5 4.3
9	9.77 078	17	9.86 365	27	0.13 635	9.90 713	9	51	20 9.0 8.7
10	9.77 095	17	9.86 392	27	0.13 608	9.90 704	9	50	30 13.5 13.0
11	9.77 112	17	9.86 418	26	0.13 582	9.90 694	10	49	40 18.0 17.3
12	9.77 130	18	9.86 445	27	0.13 555	9.90 685	9	48	50 22.5 21.7
13	9.77 147	17	9.86 471	26	0.13 529	9.90 676	9	47	
14	9.77 164	17	9.86 498	27	0.13 502	9.90 667	9	46	18
15	9.77 181	17	9.86 524	26	0.13 476	9.90 657	10	45	6 1.8
16	9.77 199	18	9.86 551	27	0.13 449	9.90 648	9	44	7 2.1
17	9.77 216	17	9.86 577	26	0.13 423	9.90 639	9	43	8 2.4
18	9.77 233	17	9.86 603	26	0.13 397	9.90 630	9	42	9 2.7
19	9.77 250	17	9.86 630	27	0.13 370	9.90 620	10	41	10 3.0
20	9.77 268	18	9.86 656	26	0.13 344	9.90 611	9	40	20 6.0
21	9.77 285	17	9.86 683	27	0.13 317	9.90 602	9	39	30 9.0
22	9.77 302	17	9.86 709	26	0.13 291	9.90 592	10	38	40 12.0
23	9.77 319	17	9.86 736	27	0.13 264	9.90 583	9	37	50 15.0
24	9.77 336	17	9.86 762	26	0.13 238	9.90 574	9	36	
25	9.77 353	17	9.86 789	27	0.13 211	9.90 565	9	35	
26	9.77 370	17	9.86 815	26	0.13 185	9.90 555	10	34	17
27	9.77 387	17	9.86 842	27	0.13 158	9.90 546	9	33	6 1.7
28	9.77 405	18	9.86 868	26	0.13 132	9.90 537	9	32	7 2.0
29	9.77 422	17	9.86 894	26	0.13 106	9.90 527	10	31	8 2.3
30	9.77 439	17	9.86 921	27	0.13 079	9.90 518	9	30	9 2.6
31	9.77 456	17	9.86 947	26	0.13 053	9.90 509	9	29	10 2.8
32	9.77 473	17	9.86 974	27	0.13 026	9.90 499	10	28	20 5.7
33	9.77 490	17	9.87 000	26	0.13 000	9.90 490	9	27	30 8.5
34	9.77 507	17	9.87 027	27	0.12 973	9.90 480	10	26	40 11.3
35	9.77 524	17	9.87 053	26	0.12 947	9.90 471	9	25	50 14.2
36	9.77 541	17	9.87 079	26	0.12 921	9.90 462	9	24	
37	9.77 558	17	9.87 106	27	0.12 894	9.90 452	10	23	
38	9.77 575	17	9.87 132	26	0.12 868	9.90 443	9	22	16
39	9.77 592	17	9.87 158	26	0.12 842	9.90 434	9	21	6 1.6
40	9.77 609	17	9.87 185	27	0.12 815	9.90 424	10	20	7 1.9
41	9.77 626	17	9.87 211	26	0.12 789	9.90 415	9	19	8 2.1
42	9.77 643	17	9.87 238	27	0.12 762	9.90 405	10	18	9 2.4
43	9.77 660	17	9.87 264	26	0.12 736	9.90 396	9	17	10 2.7
44	9.77 677	17	9.87 290	26	0.12 710	9.90 386	10	16	20 5.3
45	9.77 694	17	9.87 317	27	0.12 683	9.90 377	9	15	30 8.0
46	9.77 711	17	9.87 343	26	0.12 657	9.90 368	9	14	40 10.7
47	9.77 728	17	9.87 369	26	0.12 631	9.90 358	10	13	50 13.3
48	9.77 744	16	9.87 396	27	0.12 604	9.90 349	9	12	
49	9.77 761	17	9.87 422	26	0.12 578	9.90 339	10	11	
50	9.77 778	17	9.87 448	26	0.12 552	9.90 330	9	10	10 9
51	9.77 795	17	9.87 475	27	0.12 525	9.90 320	10	9	6 1.0 0.9
52	9.77 812	17	9.87 501	26	0.12 499	9.90 311	9	8	7 1.2 1.1
53	9.77 829	17	9.87 527	26	0.12 473	9.90 301	10	7	8 1.3 1.2
54	9.77 846	17	9.87 554	27	0.12 446	9.90 292	9	6	9 1.5 1.4
55	9.77 862	16	9.87 580	26	0.12 420	9.90 282	10	5	10 1.7 1.5
56	9.77 879	17	9.87 606	26	0.12 394	9.90 273	9	4	20 3.3 3.0
57	9.77 896	17	9.87 633	27	0.12 367	9.90 263	10	3	30 5.0 4.5
58	9.77 913	17	9.87 659	26	0.12 341	9.90 254	9	2	40 6.7 6.0
59	9.77 930	17	9.87 685	26	0.12 315	9.90 244	10	1	50 8.3 7.5
60	9.77 946	16	9.87 711	26	0.12 289	9.90 235	9	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.77 946		9.87 711		0.12 289	9.90 23$\bar{5}$		60	
1	9.77 963	17	9.87 738	27	0.12 262	9.90 225	10	59	
2	9.77 980	17	9.87 764	26	0.12 236	9.90 216	9	58	
3	9.77 997	17	9.87 790	26	0.12 210	9.90 206	10	57	27
4	9.78 013	16	9.87 817	27	0.12 183	9.90 197	9	56	6 2.7
5	9.78 030	17	9.87 843	26	0.12 157	9.90 187	10	55	7 3.2
6	9.78 047	17	9.87 869	26	0.12 131	9.90 178	9	54	8 3.6
7	9.78 063	16	9.87 895	26	0.12 10$\bar{5}$	9.90 168	10	53	9 4.1
8	9.78 080	17	9.87 922	27	0.12 078	9.90 159	9	52	10 4.5
9	9.78 097	17	9.87 948	26	0.12 052	9.90 149	10	51	20 9.0
10	9.78 113	16	9.87 974	26	0.12 026	9.90 139	10	50	30 13.5
11	9.78 130	17	9.88 000	26	0.12 000	9.90 130	9	49	40 18.0
12	9.78 147	17	9.88 027	27	0.11 973	9.90 120	10	48	50 22.5
13	9.78 163	16	9.88 053	26	0.11 947	9.90 111	9	47	
14	9.78 180	17	9.88 079	26	0.11 921	9.90 101	10	46	
15	9.78 197	17	9.88 105	26	0.11 89$\bar{5}$	9.90 091	10	45	26
16	9.78 213	16	9.88 131	26	0.11 869	9.90 082	9	44	6 2.6
17	9.78 230	17	9.88 158	27	0.11 842	9.90 072	10	43	7 3.0
18	9.78 246	16	9.88 184	26	0.11 816	9.90 063	9	42	8 3.$\bar{5}$
19	9.78 263	17	9.88 210	26	0.11 790	9.90 053	10	41	9 3.9
20	9.78 280	17	9.88 236	26	0.11 764	9.90 043	10	40	10 4.3
21	9.78 296	16	9.88 262	26	0.11 738	9.90 034	9	39	20 8.7
22	9.78 313	17	9.88 289	27	0.11 711	9.90 024	10	38	30 13.0
23	9.78 329	16	9.88 31$\bar{5}$	26	0.11 685	9.90 014	10	37	40 17.3
24	9.78 346	17	9.88 341	26	0.11 659	9.90 00$\bar{5}$	9	36	50 21.7
25	9.78 362	16	9.88 367	26	0.11 633	9.89 995	10	35	
26	9.78 379	17	9.88 393	26	0.11 607	9.89 985	10	34	17
27	9.78 395	16	9.88 420	27	0.11 580	9.89 976	9	33	6 1.7
28	9.78 412	17	9.88 446	26	0.11 554	9.89 966	10	32	7 2.0
29	9.78 428	16	9.88 472	26	0.11 528	9.89 956	10	31	8 2.3
30	9.78 44$\bar{5}$	17	9.88 498	26	0.11 502	9.89 947	9	30	9 2.6
31	9.78 461	16	9.88 524	26	0.11 476	9.89 937	10	29	10 2.8
32	9.78 478	17	9.88 550	27	0.11 45$\bar{0}$	9.89 927	10	28	20 5.7
33	9.78 494	16	9.88 577	26	0.11 423	9.89 918	9	27	30 8.5
34	9.78 510	16	9.88 603	26	0.11 397	9.89 908	10	26	40 11.3
35	9.78 527	17	9.88 629	26	0.11 371	9.89 898	10	25	50 14.2
36	9.78 543	16	9.88 65$\bar{5}$	26	0.11 345	9.89 888	10	24	
37	9.78 560	17	9.88 681	26	0.11 319	9.89 879	9	23	
38	9.78 576	16	9.88 707	26	0.11 293	9.89 869	10	22	16
39	9.78 592	16	9.88 733	26	0.11 267	9.89 859	10	21	6 1.6
40	9.78 609	17	9.88 759	26	0.11 241	9.89 849	10	20	7 1.9
41	9.78 625	16	9.88 786	27	0.11 214	9.89 840	9	19	8 2.1
42	9.78 642	17	9.88 812	26	0.11 188	9.89 830	10	18	9 2.4
43	9.78 658	16	9.88 838	26	0.11 162	9.89 820	10	17	10 2.7
44	9.78 674	16	9.88 864	26	0.11 136	9.89 810	10	16	20 5.3
45	9.78 691	17	9.88 890	26	0.11 110	9.89 801	9	15	30 8.0
46	9.78 707	16	9.88 916	26	0.11 084	9.89 791	10	14	40 10.7
47	9.78 723	16	9.88 942	26	0.11 058	9.89 781	10	13	50 13.3
48	9.78 739	16	9.88 968	26	0.11 032	9.89 771	10	12	
49	9.78 756	17	9.88 994	26	0.11 006	9.89 761	10	11	
50	9.78 772	16	9.89 020	26	0.10 980	9.89 752	9	10	10 9
51	9.78 788	16	9.89 046	26	0.10 954	9.89 742	10	9	6 1.0 0.9
52	9.78 80$\bar{5}$	17	9.89 073	27	0.10 927	9.89 732	10	8	7 1.2 1.1
53	9.78 821	16	9.89 099	26	0.10 901	9.89 722	10	7	8 1.3 1.2
54	9.78 837	16	9.89 12$\bar{5}$	26	0.10 875	9.89 712	10	6	9 1.5 1.4
55	9.78 853	16	9.89 151	26	0.10 849	9.89 702	10	5	10 1.7 1.5
56	9.78 869	16	9.89 177	26	0.10 823	9.89 693	9	4	20 3.3 3.0
57	9.78 886	17	9.89 203	26	0.10 797	9.89 683	10	3	30 5.0 4.5
58	9.78 902	16	9.89 229	26	0.10 771	9.89 673	10	2	40 6.7 6.0
59	9.78 918	16	9.89 25$\bar{5}$	26	0.10 745	9.89 663	10	1	50 8.3 7.5
60	9.78 934	16	9.89 281	26	0.10 719	9.89 653	10	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.76 922		9.86 126		0.13 874	9.90 796		60	
1	9.76 939	17	9.86 153	27	0.13 847	9.90 787	9	59	
2	9.76 957	18	9.86 179	26	0.13 821	9.90 777	10	58	
3	9.76 974	17	9.86 206	27	0.13 794	9.90 768	9	57	27 26
4	9.76 991	17	9.86 232	26	0.13 768	9.90 759	9	56	6 2.7 2.6
5	9.77 009	18	9.86 259	27	0.13 741	9.90 750	9	55	7 3.2 3.0
6	9.77 026	17	9.86 285	26	0.13 715	9.90 741	9	54	8 3.6 3.5
7	9.77 043	17	9.86 312	27	0.13 688	9.90 731	10	53	9 4.1 3.9
8	9.77 061	18	9.86 338	26	0.13 662	9.90 722	9	52	10 4.5 4.3
9	9.77 078	17	9.86 365	27	0.13 635	9.90 713	9	51	20 9.0 8.7
10	9.77 095	17	9.86 392	27	0.13 608	9.90 704	9	50	30 13.5 13.0
11	9.77 112	17	9.86 418	26	0.13 582	9.90 694	10	49	40 18.0 17.3
12	9.77 130	18	9.86 445	27	0.13 555	9.90 685	9	48	50 22.5 21.7
13	9.77 147	17	9.86 471	26	0.13 529	9.90 676	9	47	
14	9.77 164	17	9.86 498	27	0.13 502	9.90 667	9	46	
15	9.77 181	17	9.86 524	26	0.13 476	9.90 657	10	45	18
16	9.77 199	18	9.86 551	27	0.13 449	9.90 648	9	44	6 1.8
17	9.77 216	17	9.86 577	26	0.13 423	9.90 639	9	43	7 2.1
18	9.77 233	17	9.86 603	26	0.13 397	9.90 630	9	42	8 2.4
19	9.77 250	17	9.86 630	27	0.13 370	9.90 620	10	41	9 2.7
20	9.77 268	18	9.86 656	26	0.13 344	9.90 611	9	40	10 3.0
21	9.77 285	17	9.86 683	27	0.13 317	9.90 602	9	39	20 6.0
22	9.77 302	17	9.86 709	26	0.13 291	9.90 592	10	38	30 9.0
23	9.77 319	17	9.86 736	27	0.13 264	9.90 583	9	37	40 12.0
24	9.77 336	17	9.86 762	26	0.13 238	9.90 574	9	36	50 15.0
25	9.77 353	17	9.86 789	27	0.13 211	9.90 565	9	35	
26	9.77 370	17	9.86 815	26	0.13 185	9.90 555	10	34	17
27	9.77 387	17	9.86 842	27	0.13 158	9.90 546	9	33	6 1.7
28	9.77 405	18	9.86 868	26	0.13 132	9.90 537	9	32	7 2.0
29	9.77 422	17	9.86 894	26	0.13 106	9.90 527	10	31	8 2.3
30	9.77 439	17	9.86 921	27	0.13 079	9.90 518	9	30	9 2.6
31	9.77 456	17	9.86 947	26	0.13 053	9.90 509	9	29	10 2.8
32	9.77 473	17	9.86 974	27	0.13 026	9.90 499	10	28	20 5.7
33	9.77 490	17	9.87 000	26	0.13 000	9.90 490	9	27	30 8.5
34	9.77 507	17	9.87 027	27	0.12 973	9.90 480	10	26	40 11.3
35	9.77 524	17	9.87 053	26	0.12 947	9.90 471	9	25	50 14.2
36	9.77 541	17	9.87 079	26	0.12 921	9.90 462	9	24	
37	9.77 558	17	9.87 106	27	0.12 894	9.90 452	10	23	
38	9.77 575	17	9.87 132	26	0.12 868	9.90 443	9	22	16
39	9.77 592	17	9.87 158	26	0.12 842	9.90 434	9	21	6 1.6
40	9.77 609	17	9.87 185	27	0.12 815	9.90 424	10	20	7 1.9
41	9.77 626	17	9.87 211	26	0.12 789	9.90 415	9	19	8 2.1
42	9.77 643	17	9.87 238	27	0.12 762	9.90 405	10	18	9 2.4
43	9.77 660	17	9.87 264	26	0.12 736	9.90 396	9	17	10 2.7
44	9.77 677	17	9.87 290	26	0.12 710	9.90 386	10	16	20 5.3
45	9.77 694	17	9.87 317	27	0.12 683	9.90 377	9	15	30 8.0
46	9.77 711	17	9.87 343	26	0.12 657	9.90 368	9	14	40 10.7
47	9.77 728	17	9.87 369	26	0.12 631	9.90 358	10	13	50 13.3
48	9.77 744	16	9.87 396	27	0.12 604	9.90 349	9	12	
49	9.77 761	17	9.87 422	26	0.12 578	9.90 339	10	11	
50	9.77 778	17	9.87 448	26	0.12 552	9.90 330	9	10	10 9
51	9.77 795	17	9.87 475	27	0.12 525	9.90 320	10	9	6 1.0 0.9
52	9.77 812	17	9.87 501	26	0.12 499	9.90 311	9	8	7 1.2 1.1
53	9.77 829	17	9.87 527	26	0.12 473	9.90 301	10	7	8 1.3 1.2
54	9.77 846	17	9.87 554	27	0.12 446	9.90 292	9	6	9 1.5 1.4
55	9.77 862	16	9.87 580	26	0.12 420	9.90 282	10	5	10 1.7 1.5
56	9.77 879	17	9.87 606	26	0.12 394	9.90 273	9	4	20 3.3 3.0
57	9.77 896	17	9.87 633	27	0.12 367	9.90 263	10	3	30 5.0 4.5
58	9.77 913	17	9.87 659	26	0.12 341	9.90 254	9	2	40 6.7 6.0
59	9.77 930	17	9.87 685	26	0.12 315	9.90 244	10	1	50 8.3 7.5
60	9.77 946	16	9.87 711		0.12 289	9.90 235	9	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.77 946		9.87 711		0.12 289	9.90 235		60	
1	9.77 963	17	9.87 738	27	0.12 262	9.90 225	10	59	
2	9.77 980	17	9.87 764	26	0.12 236	9.90 216	9	58	
3	9.77 997	17	9.87 790	26	0.12 210	9.90 206	10	57	27
4	9.78 013	16	9.87 817	27	0.12 183	9.90 197	9	56	6 2.7
5	9.78 030	17	9.87 843	26	0.12 157	9.90 187	10	55	7 3.2
6	9.78 047	17	9.87 869	26	0.12 131	9.90 178	9	54	8 3.6
7	9.78 063	16	9.87 895	26	0.12 105	9.90 168	10	53	9 4.1
8	9.78 080	17	9.87 922	27	0.12 078	9.90 159	9	52	10 4.5
9	9.78 097	17	9.87 948	26	0.12 052	9.90 149	10	51	20 9.0
10	9.78 113	16	9.87 974	26	0.12 026	9.90 139	10	50	30 13.5
11	9.78 130	17	9.88 000	26	0.12 000	9.90 130	9	49	40 18.0
12	9.78 147	17	9.88 027	27	0.11 973	9.90 120	10	48	50 22.5
13	9.78 163	16	9.88 053	26	0.11 947	9.90 111	9	47	
14	9.78 180	17	9.88 079	26	0.11 921	9.90 101	10	46	
15	9.78 197	17	9.88 105	26	0.11 895	9.90 091	10	45	26
16	9.78 213	16	9.88 131	26	0.11 869	9.90 082	9	44	6 2.6
17	9.78 230	17	9.88 158	27	0.11 842	9.90 072	10	43	7 3.0
18	9.78 246	16	9.88 184	26	0.11 816	9.90 063	9	42	8 3.5
19	9.78 263	17	9.88 210	26	0.11 790	9.90 053	10	41	9 3.9
20	9.78 280	17	9.88 236	26	0.11 764	9.90 043	10	40	10 4.3
21	9.78 296	16	9.88 262	26	0.11 738	9.90 034	9	39	20 8.7
22	9.78 313	17	9.88 289	27	0.11 711	9.90 024	10	38	30 13.0
23	9.78 329	16	9.88 315	26	0.11 685	9.90 014	10	37	40 17.3
24	9.78 346	17	9.88 341	26	0.11 659	9.90 005	9	36	50 21.7
25	9.78 362	16	9.88 367	26	0.11 633	9.89 995	10	35	
26	9.78 379	17	9.88 393	26	0.11 607	9.89 985	10	34	17
27	9.78 395	16	9.88 420	27	0.11 580	9.89 976	9	33	6 1.7
28	9.78 412	17	9.88 446	26	0.11 554	9.89 966	10	32	7 2.0
29	9.78 428	16	9.88 472	26	0.11 528	9.89 956	10	31	8 2.3
30	9.78 445	17	9.88 498	26	0.11 502	9.89 947	9	30	9 2.6
31	9.78 461	16	9.88 524	26	0.11 476	9.89 937	10	29	10 2.8
32	9.78 478	17	9.88 550	26	0.11 450	9.89 927	10	28	20 5.7
33	9.78 494	16	9.88 577	27	0.11 423	9.89 918	9	27	30 8.5
34	9.78 510	16	9.88 603	26	0.11 397	9.89 908	10	26	40 11.3
35	9.78 527	17	9.88 629	26	0.11 371	9.89 898	10	25	50 14.2
36	9.78 543	16	9.88 655	26	0.11 345	9.89 888	10	24	
37	9.78 560	17	9.88 681	26	0.11 319	9.89 879	9	23	
38	9.78 576	16	9.88 707	26	0.11 293	9.89 869	10	22	16
39	9.78 592	16	9.88 733	26	0.11 267	9.89 859	10	21	6 1.6
40	9.78 609	17	9.88 759	26	0.11 241	9.89 849	10	20	7 1.9
41	9.78 625	16	9.88 786	27	0.11 214	9.89 840	9	19	8 2.1
42	9.78 642	17	9.88 812	26	0.11 188	9.89 830	10	18	9 2.4
43	9.78 658	16	9.88 838	26	0.11 162	9.89 820	10	17	10 2.7
44	9.78 674	16	9.88 864	26	0.11 136	9.89 810	10	16	20 5.3
45	9.78 691	17	9.88 890	26	0.11 110	9.89 801	9	15	30 8.0
46	9.78 707	16	9.88 916	26	0.11 084	9.89 791	10	14	40 10.7
47	9.78 723	16	9.88 942	26	0.11 058	9.89 781	10	13	50 13.3
48	9.78 739	16	9.88 968	26	0.11 032	9.89 771	10	12	
49	9.78 756	17	9.88 994	26	0.11 006	9.89 761	10	11	
50	9.78 772	16	9.89 020	26	0.10 980	9.89 752	9	10	10 9
51	9.78 788	16	9.89 046	26	0.10 954	9.89 742	10	9	6 1.0 0.9
52	9.78 805	17	9.89 073	27	0.10 927	9.89 732	10	8	7 1.2 1.1
53	9.78 821	16	9.89 099	26	0.10 901	9.89 722	10	7	8 1.3 1.2
54	9.78 837	16	9.89 125	26	0.10 875	9.89 712	10	6	9 1.5 1.4
55	9.78 853	16	9.89 151	26	0.10 849	9.89 702	10	5	10 1.7 1.5
56	9.78 869	16	9.89 177	26	0.10 823	9.89 693	9	4	20 3.3 3.0
57	9.78 886	17	9.89 203	26	0.10 797	9.89 683	10	3	30 5.0 4.5
58	9.78 902	16	9.89 229	26	0.10 771	9.89 673	10	2	40 6.7 6.0
59	9.78 918	16	9.89 255	26	0.10 745	9.89 663	10	1	50 8.3 7.5
60	9.78 934	16	9.89 281	26	0.10 719	9.89 653	10	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.78 934				0.10 719	9.89 653		60	
		16	9.89 281	26			10		
1	9.78 950		9.89 307	26	0.10 693	9.89 643	10	59	
		17							26 25
2	9.78 967		9.89 333	26	0.10 667	9.89 633	9	58	6 2.6 2.5
		16							7 3.0 2.9
3	9.78 983		9.89 359	26	0.10 641	9.89 624	10	57	8 3.5̄ 3.3
		16							9 3.9 3.8
4	9.78 999		9.89 385	26	0.10 615̄	9.89 614	10	56	10 4.3 4.2
		16							20 8.7 8.3
5	9.79 015̄		9.89 411	26	0.10 589	9.89 604	10	55	30 13.0 12.5
		16							40 17.3 16.7
6	9.79 031		9.89 437	26	0.10 563	9.89 594	10	54	50 21.7 20.8
		16							
7	9.79 047		9.89 463	26	0.10 537	9.89 584	10	53	
		16							
8	9.79 063		9.89 489	26	0.10 511	9.89 574	10	52	
		16							
9	9.79 079		9.89 515	26	0.10 485̄	9.89 564	10	51	
		16							
10	9.79 095		9.89 541	26	0.10 459	9.89 554	10	50	
		16							
11	9.79 111		9.89 567	26	0.10 433	9.89 544	10	49	
		17							
12	9.79 128		9.89 593	26	0.10 407	9.89 534	10	48	
		16							
13	9.79 144		9.89 619	26	0.10 381	9.89 524	10	47	
		16							
14	9.79 160		9.89 645	26	0.10 355̄	9.89 514	10	46	
		16							17
15	9.79 176		9.89 671	26	0.10 329	9.89 504	9	45	6 1.7
		16							7 2.0
16	9.79 192		9.89 697	26	0.10 303	9.89 495̄	10	44	8 2.3
		16							9 2.6
17	9.79 208		9.89 723	26	0.10 277	9.89 485̄	10	43	10 2.8
		16							20 5.7
18	9.79 224		9.89 749	26	0.10 251	9.89 475̄	10	42	30 8.5
		16							40 11.3
19	9.79 240		9.89 775	26	0.10 225̄	9.89 465̄	10	41	50 14.2
		16							
20	9.79 256		9.89 801	26	0.10 199	9.89 455̄	10	40	
		16							
21	9.79 272		9.89 827	26	0.10 173	9.89 445̄	10	39	
		16							
22	9.79 288		9.89 853	26	0.10 147	9.89 435̄	10	38	
		16							
23	9.79 304		9.89 879	26	0.10 121	9.89 425̄	10	37	
		15							
24	9.79 319		9.89 905̄	26	0.10 095	9.89 415̄	10	36	
		16							
25	9.79 335		9.89 931	26	0.10 069	9.89 405̄	10	35	
		16							16 15
26	9.79 351		9.89 957	26	0.10 043	9.89 395̄	10	34	6 1.6 1.5
		16							7 1.9 1.8
27	9.79 367		9.89 983	26	0.10 017	9.89 385̄	10	33	8 2.1 2.0
		16							9 2.4 2.3
28	9.79 383		9.90 009	26	0.09 991	9.89 375̄	10	32	10 2.7 2.5
		16							20 5.3 5.0
29	9.79 399		9.90 035̄	26	0.09 965	9.89 364	11	31	30 8.0 7.5
		16							40 10.7 10.0
30	9.79 415̄		9.90 061	26	0.09 939	9.89 354	10	30	50 13.3 12.5
		16							
31	9.79 431		9.90 086	25	0.09 914	9.89 344	10	29	
		16							
32	9.79 447		9.90 112	26	0.09 888	9.89 334	10	28	
		16							
33	9.79 463		9.90 138	26	0.09 862	9.89 324	10	27	
		15							
34	9.79 478		9.90 164	26	0.09 836	9.89 314	10	26	
		16							
35	9.79 494		9.90 190	26	0.09 810	9.89 304	10	25	
		16							
36	9.79 510		9.90 216	26	0.09 784	9.89 294	10	24	
		16							
37	9.79 526		9.90 242	26	0.09 758	9.89 284	10	23	
		16							
38	9.79 542		9.90 268	26	0.09 732	9.89 274	10	22	
		16							
39	9.79 558		9.90 294	26	0.09 706	9.89 264	10	21	
		15							11
40	9.79 573		9.90 320	26	0.09 680	9.89 254	10	20	6 1.1
		16							7 1.3
41	9.79 589		9.90 346	26	0.09 654	9.89 244	11	19	8 1.5̄
		16							9 1.7
42	9.79 605̄		9.90 371	25	0.09 629	9.89 233	10	18	10 1.8
		16							20 3.7
43	9.79 621		9.90 397	26	0.09 603	9.89 223	10	17	30 5.5
		15							40 7.3
44	9.79 636		9.90 423	26	0.09 577	9.89 213	10	16	50 9.2
		16							
45	9.79 652		9.90 449	26	0.09 551	9.89 203	10	15	
		16							
46	9.79 668		9.90 475̄	26	0.09 525	9.89 193	10	14	
		16							
47	9.79 684		9.90 501	26	0.09 499	9.89 183	10	13	
		15							
48	9.79 699		9.90 527	26	0.09 473	9.89 173	10	12	
		16							
49	9.79 715		9.90 553	26	0.09 447	9.89 162	11	11	
		16							10 9
50	9.79 731		9.90 578	25	0.09 422	9.89 152	10	10	6 1.0 0.9
		15							7 1.2 1.1
51	9.79 746		9.90 604	26	0.09 396	9.89 142	10	9	8 1.3 1.2
		16							9 1.5 1.4
52	9.79 762		9.90 630	26	0.09 370	9.89 132	10	8	10 1.7 1.5
		16							20 3.3 3.0
53	9.79 778		9.90 656	26	0.09 344	9.89 122	10	7	30 5.0 4.5
		15							40 6.7 6.0
54	9.79 793		9.90 682	26	0.09 318	9.89 112	10	6	50 8.3 7.5
		16							
55	9.79 809		9.90 708	26	0.09 292	9.89 101	11	5	
		16							
56	9.79 825̄		9.90 734	26	0.09 266	9.89 091	10	4	
		15							
57	9.79 840		9.90 759	25	0.09 241	9.89 081	10	3	
		16							
58	9.79 856		9.90 785	26	0.09 215̄	9.89 071	10	2	
		16							
59	9.79 872		9.90 811	26	0.09 189	9.89 060	11	1	
		15							
60	9.79 887		9.90 837		0.09 163	9.89 050	10	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.79 887	16	9.90 837	26	0.09 163	9.89 050	10	60	
1	9.79 903	15	9.90 863	26	0.09 137	9.89 040	10	59	
2	9.79 918	16	9.90 889	25	0.09 111	9.89 030	10	58	26
3	9.79 934	16	9.90 914	26	0.09 086	9.89 020	11	57	6 2.6
4	9.79 950	15	9.90 940	26	0.09 060	9.89 009	10	56	7 3.0
5	9.79 965	16	9.90 966	26	0.09 034	9.88 999	10	55	8 3.5
6	9.79 981	15	9.90 992	26	0.09 008	9.88 989	11	54	9 3.9
7	9.79 996	16	9.91 018	25	0.08 982	9.88 978	10	53	10 4.3
8	9.80 012	15	9.91 043	26	0.08 957	9.88 968	10	52	20 8.7
9	9.80 027	16	9.91 069	26	0.08 931	9.88 958	10	51	30 13.0
10	9.80 043	15	9.91 095	26	0.08 905	9.88 948	11	50	40 17.3
11	9.80 058	16	9.91 121	26	0.08 879	9.88 937	10	49	50 21.7
12	9.80 074	15	9.91 147	25	0.08 853	9.88 927	10	48	
13	9.80 089	16	9.91 172	26	0.08 828	9.88 917	11	47	
14	9.80 105	15	9.91 198	26	0.08 802	9.88 906	10	46	25
15	9.80 120	16	9.91 224	26	0.08 776	9.88 896	10	45	6 2.5
16	9.80 136	15	9.91 250	26	0.08 750	9.88 886	11	44	7 2.9
17	9.80 151	15	9.91 276	25	0.08 724	9.88 875	10	43	8 3.3
18	9.80 166	16	9.91 301	26	0.08 699	9.88 865	10	42	9 3.8
19	9.80 182	15	9.91 327	26	0.08 673	9.88 855	11	41	10 4.2
20	9.80 197	16	9.91 353	26	0.08 647	9.88 844	10	40	20 8.3
21	9.80 213	15	9.91 379	25	0.08 621	9.88 834	10	39	30 12.5
22	9.80 228	16	9.91 404	26	0.08 596	9.88 824	11	38	40 16.7
23	9.80 244	15	9.91 430	26	0.08 570	9.88 813	10	37	50 20.8
24	9.80 259	15	9.91 456	26	0.08 544	9.88 803	10	36	
25	9.80 274	16	9.91 482	25	0.08 518	9.88 793	11	35	
26	9.80 290	15	9.91 507	26	0.08 493	9.88 782	10	34	16
27	9.80 305	15	9.91 533	26	0.08 467	9.88 772	11	33	6 1.6
28	9.80 320	16	9.91 559	26	0.08 441	9.88 761	10	32	7 1.9
29	9.80 336	15	9.91 585	26	0.08 415	9.88 751	10	31	8 2.1
30	9.80 351	15	9.91 610	25	0.08 390	9.88 741	11	30	9 2.4
31	9.80 366	16	9.91 636	26	0.08 364	9.88 730	10	29	10 2.7
32	9.80 382	15	9.91 662	26	0.08 338	9.88 720	11	28	20 5.3
33	9.80 397	15	9.91 688	26	0.08 312	9.88 709	10	27	30 8.0
34	9.80 412	16	9.91 713	25	0.08 287	9.88 699	11	26	40 10.7
35	9.80 428	15	9.91 739	26	0.08 261	9.88 688	10	25	50 13.3
36	9.80 443	15	9.91 765	26	0.08 235	9.88 678	10	24	
37	9.80 458	15	9.91 791	26	0.08 209	9.88 668	11	23	
38	9.80 473	16	9.91 816	25	0.08 184	9.88 657	10	22	15
39	9.80 489	15	9.91 842	26	0.08 158	9.88 647	11	21	6 1.5
40	9.80 504	15	9.91 868	26	0.08 132	9.88 636	10	20	7 1.8
41	9.80 519	15	9.91 893	25	0.08 107	9.88 626	11	19	8 2.0
42	9.80 534	15	9.91 919	26	0.08 081	9.88 615	10	18	9 2.3
43	9.80 550	16	9.91 945	26	0.08 055	9.88 605	11	17	10 2.5
44	9.80 565	15	9.91 971	26	0.08 029	9.88 594	10	16	20 5.0
45	9.80 580	15	9.91 996	25	0.08 004	9.88 584	11	15	30 7.5
46	9.80 595	15	9.92 022	26	0.07 978	9.88 573	10	14	40 10.0
47	9.80 610	15	9.92 048	26	0.07 952	9.88 563	10	13	50 12.5
48	9.80 625	15	9.92 073	25	0.07 927	9.88 552	11	12	
49	9.80 641	16	9.92 099	26	0.07 901	9.88 542	10	11	
50	9.80 656	15	9.92 125	26	0.07 875	9.88 531	11	10	11 10
51	9.80 671	15	9.92 150	25	0.07 850	9.88 521	10	9	6 1.1 1.0
52	9.80 686	15	9.92 176	26	0.07 824	9.88 510	11	8	7 1.3 1.2
53	9.80 701	15	9.92 202	26	0.07 798	9.88 499	11	7	8 1.5 1.3
54	9.80 716	15	9.92 227	25	0.07 773	9.88 489	10	6	9 1.7 1.5
55	9.80 731	15	9.92 253	26	0.07 747	9.88 478	11	5	10 1.8 1.7
56	9.80 746	15	9.92 279	26	0.07 721	9.88 468	10	4	20 3.7 3.3
57	9.80 762	16	9.92 304	25	0.07 696	9.88 457	11	3	30 5.5 5.0
58	9.80 777	15	9.92 330	26	0.07 670	9.88 447	10	2	40 7.3 6.7
59	9.80 792	15	9.92 356	26	0.07 644	9.88 436	11	1	50 9.2 8.3
60	9.80 807		9.92 381	25	0.07 619	9.88 425	11	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.80 807	15	9.92 381	26	0.07 619	9.88 425	10	60	
1	9.80 822	15	9.92 407	26	0.07 593	9.88 415	11	59	
2	9.80 837	15	9.92 433	25	0.07 567	9.88 404	10	58	26
3	9.80 852	15	9.92 458	26	0.07 542	9.88 394	11	57	6 2.6
4	9.80 867	15	9.92 484	26	0.07 516	9.88 383	11	56	7 3.0
5	9.80 882	15	9.92 510	25	0.07 490	9.88 372	10	55	8 3.5
6	9.80 897	15	9.92 535	26	0.07 465	9.88 362	11	54	9 3.9
7	9.80 912	15	9.92 561	26	0.07 439	9.88 351	11	53	10 4.3
8	9.80 927	15	9.92 587	25	0.07 413	9.88 340	10	52	20 8.7
9	9.80 942	15	9.92 612	26	0.07 388	9.88 330	11	51	30 13.0
10	9.80 957	15	9.92 638	25	0.07 362	9.88 319	11	50	40 17.3
11	9.80 972	15	9.92 663	26	0.07 337	9.88 308	10	49	50 21.7
12	9.80 987	15	9.92 689	26	0.07 311	9.88 298	11	48	
13	9.81 002	15	9.92 715	25	0.07 285	9.88 287	11	47	
14	9.81 017	15	9.92 740	26	0.07 260	9.88 276	10	46	25
15	9.81 032	15	9.92 766	26	0.07 234	9.88 266	11	45	6 2.5
16	9.81 047	14	9.92 792	25	0.07 208	9.88 255	11	44	7 2.9
17	9.81 061	15	9.92 817	26	0.07 183	9.88 244	10	43	8 3.3
18	9.81 076	15	9.92 843	25	0.07 157	9.88 234	11	42	9 3.8
19	9.81 091	15	9.92 868	26	0.07 132	9.88 223	11	41	10 4.2
20	9.81 106	15	9.92 894	26	0.07 106	9.88 212	11	40	20 8.3
21	9.81 121	15	9.92 920	25	0.07 080	9.88 201	10	39	30 12.5
22	9.81 136	15	9.92 945	26	0.07 055	9.88 191	11	38	40 16.7
23	9.81 151	15	9.92 971	25	0.07 029	9.88 180	11	37	50 20.8
24	9.81 166	14	9.92 996	26	0.07 004	9.88 169	11	36	
25	9.81 180	15	9.93 022	26	0.06 978	9.88 158	10	35	
26	9.81 195	15	9.93 048	25	0.06 952	9.88 148	11	34	15
27	9.81 210	15	9.93 073	26	0.06 927	9.88 137	11	33	6 1.5
28	9.81 225	15	9.93 099	25	0.06 901	9.88 126	11	32	7 1.8
29	9.81 240	14	9.93 124	26	0.06 876	9.88 115	10	31	8 2.0
30	9.81 254	15	9.93 150	25	0.06 850	9.88 105	11	30	9 2.3
31	9.81 269	15	9.93 175	26	0.06 825	9.88 094	11	29	10 2.5
32	9.81 284	15	9.93 201	26	0.06 799	9.88 083	11	28	20 5.0
33	9.81 299	15	9.93 227	25	0.06 773	9.88 072	11	27	30 7.5
34	9.81 314	14	9.93 252	26	0.06 748	9.88 061	10	26	40 10.0
35	9.81 328	15	9.93 278	25	0.06 722	9.88 051	11	25	50 12.5
36	9.81 343	15	9.93 303	26	0.06 697	9.88 040	11	24	
37	9.81 358	15	9.93 329	25	0.06 671	9.88 029	11	23	
38	9.81 372	14	9.93 354	26	0.06 646	9.88 018	11	22	14
39	9.81 387	15	9.93 380	26	0.06 620	9.88 007	11	21	6 1.4
40	9.81 402	15	9.93 406	25	0.06 594	9.87 996	11	20	7 1.6
41	9.81 417	14	9.93 431	26	0.06 569	9.87 985	11	19	8 1.9
42	9.81 431	15	9.93 457	25	0.06 543	9.87 975	10	18	9 2.1
43	9.81 446	15	9.93 482	26	0.06 518	9.87 964	11	17	10 2.3
44	9.81 461	15	9.93 508	26	0.06 492	9.87 953	11	16	20 4.7
45	9.81 475	14	9.93 533	25	0.06 467	9.87 942	11	15	30 7.0
46	9.81 490	15	9.93 559	26	0.06 441	9.87 931	11	14	40 9.3
47	9.81 505	15	9.93 584	25	0.06 416	9.87 920	11	13	50 11.7
48	9.81 519	14	9.93 610	26	0.06 390	9.87 909	11	12	
49	9.81 534	15	9.93 636	26	0.06 364	9.87 898	11	11	
50	9.81 549	15	9.93 661	25	0.06 339	9.87 887	11	10	11 10
51	9.81 563	14	9.93 687	26	0.06 313	9.87 877	10	9	6 1.1 1.0
52	9.81 578	15	9.93 712	25	0.06 288	9.87 866	11	8	7 1.3 1.2
53	9.81 592	14	9.93 738	26	0.06 262	9.87 855	11	7	8 1.5 1.3
54	9.81 607	15	9.93 763	25	0.06 237	9.87 844	11	6	9 1.7 1.5
55	9.81 622	15	9.93 789	26	0.06 211	9.87 833	11	5	10 1.8 1.7
56	9.81 636	14	9.93 814	25	0.06 186	9.87 822	11	4	20 3.7 3.3
57	9.81 651	15	9.93 840	26	0.06 160	9.87 811	11	3	30 5.5 5.0
58	9.81 665	14	9.93 865	25	0.06 135	9.87 800	11	2	40 7.3 6.7
59	9.81 680	15	9.93 891	26	0.06 109	9.87 789	11	1	50 9.2 8.3
60	9.81 694	14	9.93 916	25	0.06 084	9.87 778	11	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.81 694		9.93 916		0.06 084	9.87 778		60	
1	9.81 709	15	9.93 942	26	0.06 058	9.87 767	11	59	
2	9.81 723	14	9.93 967	25	0.06 033	9.87 756	11	58	
3	9.81 738	15	9.93 993	26	0.06 007	9.87 745	11	57	26
4	9.81 752	14	9.94 018	25	0.05 982	9.87 734	11	56	6 | 2.6
5	9.81 767	15	9.94 044	26	0.05 956	9.87 723	11	55	7 | 3.0
6	9.81 781	14	9.94 069	25	0.05 931	9.87 712	11	54	8 | 3.5̄
7	9.81 796	15	9.94 095̄	26	0.05 905	9.87 701	11	53	9 | 3.9
8	9.81 810	14	9.94 120	25	0.05 880	9.87 690	11	52	10 | 4.3
9	9.81 825̄	15	9.94 146	26	0.05 854	9.87 679	11	51	20 | 8.7
10	9.81 839	14	9.94 171	25	0.05 829	9.87 668	11	50	30 | 13.0
11	9.81 854	15	9.94 197	26	0.05 803	9.87 657	11	49	40 | 17.3
12	9.81 868	14	9.94 222	25	0.05 778	9.87 646	11	48	50 | 21.7
13	9.81 882	14	9.94 248	26	0.05 752	9.87 635̄	11	47	
14	9.81 897	15	9.94 273	25	0.05 727	9.87 624	11	46	
15	9.81 911	14	9.94 299	26	0.05 701	9.87 613	11	45	25
16	9.81 926	15	9.94 324	25	0.05 676	9.87 601	12	44	6 | 2.5
17	9.81 940	14	9.94 350	26	0.05 650	9.87 590	11	43	7 | 2.9
18	9.81 955̄	15	9.94 375	25	0.05 625̄	9.87 579	11	42	8 | 3.3
19	9.81 969	14	9.94 401	26	0.05 599	9.87 568	11	41	9 | 3.8
20	9.81 983	14	9.94 426	25	0.05 574	9.87 557	11	40	10 | 4.2
21	9.81 998	15	9.94 452	26	0.05 548	9.87 546	11	39	20 | 8.3
22	9.82 012	14	9.94 477	25	0.05 523	9.87 535̄	11	38	30 | 12.5
23	9.82 026	14	9.94 503	26	0.05 497	9.87 524	11	37	40 | 16.7
24	9.82 041	15	9.94 528	25	0.05 472	9.87 513	11	36	50 | 20.8
25	9.82 055̄	14	9.94 554	26	0.05 446	9.87 501	12	35	
26	9.82 069	14	9.94 579	25	0.05 421	9.87 490	11	34	
27	9.82 084	15	9.94 604	25	0.05 396	9.87 479	11	33	15
28	9.82 098	14	9.94 630	26	0.05 370	9.87 468	11	32	6 | 1.5
29	9.82 112	14	9.94 655	25	0.05 345̄	9.87 457	11	31	7 | 1.8
30	9.82 126	14	9.94 681	26	0.05 319	9.87 446	11	30	8 | 2.0
31	9.82 141	15	9.94 706	25	0.05 294	9.87 434	12	29	9 | 2.3
32	9.82 155̄	14	9.94 732	26	0.05 268	9.87 423	11	28	10 | 2.5
33	9.82 169	14	9.94 757	25	0.05 243	9.87 412	11	27	20 | 5.0
34	9.82 184	15	9.94 783	26	0.05 217	9.87 401	11	26	30 | 7.5
35	9.82 198	14	9.94 808	25	0.05 192	9.87 390	11	25	40 | 10.0
36	9.82 212	14	9.94 834	26	0.05 166	9.87 378	12	24	50 | 12.5
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	0.05 116	9.87 356	11	22	14
39	9.82 255̄	15	9.94 910	26	0.05 090	9.87 345̄	11	21	6 | 1.4
40	9.82 269	14	9.94 935	25	0.05 065̄	9.87 334	11	20	7 | 1.6
41	9.82 283	14	9.94 961	26	0.05 039	9.87 322	12	19	8 | 1.9
42	9.82 297	14	9.94 986	25	0.05 014	9.87 311	11	18	9 | 2.1
43	9.82 311	14	9.95 012	26	0.04 988	9.87 300	11	17	10 | 2.3
44	9.82 326	15	9.95 037	25	0.04 963	9.87 288	12	16	20 | 4.7
45	9.82 340	14	9.95 062	25	0.04 938	9.87 277	11	15	30 | 7.0
46	9.82 354	14	9.95 088	26	0.04 912	9.87 266	11	14	40 | 9.3
47	9.82 368	14	9.95 113	25	0.04 887	9.87 255̄	11	13	50 | 11.7
48	9.82 382	14	9.95 139	26	0.04 861	9.87 243	12	12	
49	9.82 396	14	9.95 164	25	0.04 836	9.87 232	11	11	
50	9.82 410	14	9.95 190	26	0.04 810	9.87 221	11	10	12 | 11
51	9.82 424	14	9.95 215	25	0.04 785̄	9.87 209	12	9	6 | 1.2 | 1.1
52	9.82 439	15	9.95 240	25	0.04 760	9.87 198	11	8	7 | 1.4 | 1.3
53	9.82 453	14	9.95 266	26	0.04 734	9.87 187	11	7	8 | 1.6 | 1.5̄
54	9.82 467	14	9.95 291	25	0.04 709	9.87 175	12	6	9 | 1.8 | 1.7
55	9.82 481	14	9.95 317	26	0.04 683	9.87 164	11	5	10 | 2.0 | 1.8
56	9.82 495̄	14	9.95 342	25	0.04 658	9.87 153	11	4	20 | 4.0 | 3.7
57	9.82 509	14	9.95 368	26	0.04 632	9.87 141	12	3	30 | 6.0 | 5.5
58	9.82 523	14	9.95 393	25	0.04 607	9.87 130	11	2	40 | 8.0 | 7.3
59	9.82 537	14	9.95 418	25	0.04 582	9.87 119	11	1	50 | 10.0 | 9.2
60	9.82 551		9.95 444	26	0.04 556	9.87 107	12	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.82 551	14	9.95 444	25	0.04 556	9.87 107	11	60	
1	9.82 565	14	9.95 469	26	0.04 531	9.87 096	11	59	
2	9.82 579	14	9.95 495	25	0.04 505	9.87 085	12	58	26
3	9.82 593	14	9.95 520	25	0.04 480	9.87 073	11	57	6 2.6
4	9.82 607	14	9.95 545	26	0.04 455	9.87 062	12	56	7 3.0
5	9.82 621	14	9.95 571	25	0.04 429	9.87 050	11	55	8 3.5
6	9.82 635	14	9.95 596	26	0.04 404	9.87 039	11	54	9 3.9
7	9.82 649	14	9.95 622	25	0.04 378	9.87 028	12	53	10 4.3
8	9.82 663	14	9.95 647	25	0.04 353	9.87 016	11	52	20 8.7
9	9.82 677	14	9.95 672	26	0.04 328	9.87 005	12	51	30 13.0
10	9.82 691	14	9.95 698	25	0.04 302	9.86 993	11	50	40 17.3
11	9.82 705	14	9.95 723	25	0.04 277	9.86 982	12	49	50 21.7
12	9.82 719	14	9.95 748	26	0.04 252	9.86 970	11	48	
13	9.82 733	14	9.95 774	25	0.04 226	9.86 959	12	47	
14	9.82 747	14	9.95 799	26	0.04 201	9.86 947	11	46	25
15	9.82 761	14	9.95 825	25	0.04 175	9.86 936	12	45	6 2.5
16	9.82 775	13	9.95 850	25	0.04 150	9.86 924	11	44	7 2.9
17	9.82 788	14	9.95 875	26	0.04 125	9.86 913	11	43	8 3.3
18	9.82 802	14	9.95 901	25	0.04 099	9.86 902	12	42	9 3.8
19	9.82 816	14	9.95 926	26	0.04 074	9.86 890	11	41	10 4.2
20	9.82 830	14	9.95 952	25	0.04 048	9.86 879	12	40	20 8.3
21	9.82 844	14	9.95 977	25	0.04 023	9.86 867	12	39	30 12.5
22	9.82 858	14	9.96 002	26	0.03 998	9.86 855	11	38	40 16.7
23	9.82 872	14	9.96 028	25	0.03 972	9.86 844	12	37	50 20.8
24	9.82 885	13	9.96 053	25	0.03 947	9.86 832	12	36	
25	9.82 899	14	9.96 078	26	0.03 922	9.86 821	11	35	
26	9.82 913	14	9.96 104	25	0.03 896	9.86 809	12	34	14
27	9.82 927	14	9.96 129	26	0.03 871	9.86 798	11	33	6 1.4
28	9.82 941	14	9.96 155	25	0.03 845	9.86 786	12	32	7 1.6
29	9.82 955	14	9.96 180	25	0.03 820	9.86 775	11	31	8 1.9
30	9.82 968	13	9.96 205	25	0.03 795	9.86 763	12	30	9 2.1
31	9.82 982	14	9.96 231	26	0.03 769	9.86 752	11	29	10 2.3
32	9.82 996	14	9.96 256	25	0.03 744	9.86 740	12	28	20 4.7
33	9.83 010	14	9.96 281	25	0.03 719	9.86 728	12	27	30 7.0
34	9.83 023	13	9.96 307	26	0.03 693	9.86 717	11	26	40 9.3
35	9.83 037	14	9.96 332	25	0.03 668	9.86 705	12	25	50 11.7
36	9.83 051	14	9.96 357	25	0.03 643	9.86 694	11	24	
37	9.83 065	14	9.96 383	26	0.03 617	9.86 682	12	23	
38	9.83 078	13	9.96 408	25	0.03 592	9.86 670	12	22	13
39	9.83 092	14	9.96 433	25	0.03 567	9.86 659	11	21	6 1.3
40	9.83 106	14	9.96 459	26	0.03 541	9.86 647	12	20	7 1.5
41	9.83 120	14	9.96 484	25	0.03 516	9.86 635	12	19	8 1.7
42	9.83 133	13	9.96 510	26	0.03 490	9.86 624	11	18	9 2.0
43	9.83 147	14	9.96 535	25	0.03 465	9.86 612	12	17	10 2.2
44	9.83 161	14	9.96 560	25	0.03 440	9.86 600	12	16	20 4.3
45	9.83 174	13	9.96 586	26	0.03 414	9.86 589	11	15	30 6.5
46	9.83 188	14	9.96 611	25	0.03 389	9.86 577	12	14	40 8.7
47	9.83 202	14	9.96 636	25	0.03 364	9.86 565	12	13	50 10.8
48	9.83 215	13	9.96 662	26	0.03 338	9.86 554	11	12	
49	9.83 229	14	9.96 687	25	0.03 313	9.86 542	12	11	
50	9.83 242	13	9.96 712	25	0.03 288	9.86 530	12	10	12 11
51	9.83 256	14	9.96 738	26	0.03 262	9.86 518	12	9	6 1.2 1.1
52	9.83 270	14	9.96 763	25	0.03 237	9.86 507	11	8	7 1.4 1.3
53	9.83 283	13	9.96 788	25	0.03 212	9.86 495	12	7	8 1.6 1.5
54	9.83 297	14	9.96 814	26	0.03 186	9.86 483	12	6	9 1.8 1.7
55	9.83 310	13	9.96 839	25	0.03 161	9.86 472	11	5	10 2.0 1.8
56	9.83 324	14	9.96 864	25	0.03 136	9.86 460	12	4	20 4.0 3.7
57	9.83 338	14	9.96 890	26	0.03 110	9.86 448	12	3	30 6.0 5.5
58	9.83 351	13	9.96 915	25	0.03 085	9.86 436	12	2	40 8.0 7.3
59	9.83 365	14	9.96 940	25	0.03 060	9.86 425	11	1	50 10.0 9.2
60	9.83 378	13	9.96 966	26	0.03 034	9.86 413	12	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.83 378		9.96 966		0.03 034	9.86 413		60	
1	9.83 392	14	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	12	58	
3	9.83 419	14	9.97 042	26	0.02 958	9.86 377	12	57	26
4	9.83 432	13	9.97 067	25	0.02 933	9.86 366	11	56	6 2.6
5	9.83 446	14	9.97 092	25	0.02 908	9.86 354	12	55	7 3.0
6	9.83 459	13	9.97 118	26	0.02 882	9.86 342	12	54	8 3.5
7	9.83 473	14	9.97 143	25	0.02 857	9.86 330	12	53	9 3.9
8	9.83 486	13	9.97 168	25	0.02 832	9.86 318	12	52	10 4.3
9	9.83 500	14	9.97 193	25	0.02 807	9.86 306	12	51	20 8.7
10	9.83 513	13	9.97 219	26	0.02 781	9.86 295	11	50	30 13.0
11	9.83 527	14	9.97 244	25	0.02 756	9.86 283	12	49	40 17.3
12	9.83 540	13	9.97 269	25	0.02 731	9.86 271	12	48	50 21.7
13	9.83 554	14	9.97 295	26	0.02 705	9.86 259	12	47	
14	9.83 567	13	9.97 320	25	0.02 680	9.86 247	12	46	
15	9.83 581	14	9.97 345	25	0.02 655	9.86 235	12	45	25
16	9.83 594	13	9.97 371	26	0.02 629	9.86 223	12	44	6 2.5
17	9.83 608	14	9.97 396	25	0.02 604	9.86 211	12	43	7 2.9
18	9.83 621	13	9.97 421	25	0.02 579	9.86 200	11	42	8 3.3
19	9.83 634	13	9.97 447	26	0.02 553	9.86 188	12	41	9 3.8
20	9.83 648	14	9.97 472	25	0.02 528	9.86 176	12	40	10 4.2
21	9.83 661	13	9.97 497	25	0.02 503	9.86 164	12	39	20 8.3
22	9.83 674	13	9.97 523	26	0.02 477	9.86 152	12	38	30 12.5
23	9.83 688	14	9.97 548	25	0.02 452	9.86 140	12	37	40 16.7
24	9.83 701	13	9.97 573	25	0.02 427	9.86 128	12	36	50 20.8
25	9.83 715	14	9.97 598	25	0.02 402	9.86 116	12	35	
26	9.83 728	13	9.97 624	26	0.02 376	9.86 104	12	34	14
27	9.83 741	13	9.97 649	25	0.02 351	9.86 092	12	33	6 1.4
28	9.83 755	14	9.97 674	25	0.02 326	9.86 080	12	32	7 1.6
29	9.83 768	13	9.97 700	26	0.02 300	9.86 068	12	31	8 1.9
30	9.83 781	13	9.97 725	25	0.02 275	9.86 056	12	30	9 2.1
31	9.83 795	14	9.97 750	25	0.02 250	9.86 044	12	29	10 2.3
32	9.83 808	13	9.97 776	26	0.02 224	9.86 032	12	28	20 4.7
33	9.83 821	13	9.97 801	25	0.02 199	9.86 020	12	27	30 7.0
34	9.83 834	13	9.97 826	25	0.02 174	9.86 008	12	26	40 9.3
35	9.83 848	14	9.97 851	25	0.02 149	9.85 996	12	25	50 11.7
36	9.83 861	13	9.97 877	26	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	0.02 073	9.85 960	12	22	13
39	9.83 901	14	9.97 953	26	0.02 047	9.85 948	12	21	6 1.3
40	9.83 914	13	9.97 978	25	0.02 022	9.85 936	12	20	7 1.5
41	9.83 927	13	9.98 003	25	0.01 997	9.85 924	12	19	8 1.7
42	9.83 940	13	9.98 029	26	0.01 971	9.85 912	12	18	9 2.0
43	9.83 954	14	9.98 054	25	0.01 946	9.85 900	12	17	10 2.2
44	9.83 967	13	9.98 079	25	0.01 921	9.85 888	12	16	20 4.3
45	9.83 980	13	9.98 104	25	0.01 896	9.85 876	12	15	30 6.5
46	9.83 993	13	9.98 130	26	0.01 870	9.85 864	12	14	40 8.7
47	9.84 006	13	9.98 155	25	0.01 845	9.85 851	13	13	50 10.8
48	9.84 020	14	9.98 180	25	0.01 820	9.85 839	12	12	
49	9.84 033	13	9.98 206	26	0.01 794	9.85 827	12	11	
50	9.84 046	13	9.98 231	25	0.01 769	9.85 815	12	10	12 11
51	9.84 059	13	9.98 256	25	0.01 744	9.85 803	12	9	6 1.2 1.1
52	9.84 072	13	9.98 281	25	0.01 719	9.85 791	12	8	7 1.4 1.3
53	9.84 085	13	9.98 307	26	0.01 693	9.85 779	12	7	8 1.6 1.5
54	9.84 098	13	9.98 332	25	0.01 668	9.85 766	13	6	9 1.8 1.7
55	9.84 112	14	9.98 357	25	0.01 643	9.85 754	12	5	10 2.0 1.8
56	9.84 125	13	9.98 383	26	0.01 617	9.85 742	12	4	20 4.0 3.7
57	9.84 138	13	9.98 408	25	0.01 592	9.85 730	12	3	30 6.0 5.5
58	9.84 151	13	9.98 433	25	0.01 567	9.85 718	12	2	40 8.0 7.3
59	9.84 164	13	9.98 458	25	0.01 542	9.85 706	12	1	50 10.0 9.2
60	9.84 177		9.98 484	26	0.01 516	9.85 693	13	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

′	L. Sin.	d.	L. Tang.	c. d.	L. Cotg.	L. Cos.	d.		Prop. Pts.
0	9.84 177		9.98 484		0.01 516	9.85 693		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	0.01 466	9.85 669	12	58	26
3	9.84 216	13	9.98 560	26	0.01 440	9.85 657	12	57	6 2.6
4	9.84 229	13	9.98 585	25	0.01 415	9.85 645	12	56	7 3.0
5	9.84 242	13	9.98 610	25	0.01 390	9.85 632	13	55	8 3.5
6	9.84 255	13	9.98 635	25	0.01 365	9.85 620	12	54	9 3.9
7	9.84 269	14	9.98 661	26	0.01 339	9.85 608	12	53	10 4.3
8	9.84 282	13	9.98 686	25	0.01 314	9.85 596	12	52	20 8.7
9	9.84 295	13	9.98 711	25	0.01 289	9.85 583	13	51	30 13.0
10	9.84 308	13	9.98 737	26	0.01 263	9.85 571	12	50	40 17.3
11	9.84 321	13	9.98 762	25	0.01 238	9.85 559	12	49	50 21.7
12	9.84 334	13	9.98 787	25	0.01 213	9.85 547	12	48	
13	9.84 347	13	9.98 812	25	0.01 188	9.85 534	13	47	
14	9.84 360	13	9.98 838	26	0.01 162	9.85 522	12	46	
15	9.84 373	13	9.98 863	25	0.01 137	9.85 510	12	45	25
16	9.84 385	12	9.98 888	25	0.01 112	9.85 497	13	44	6 2.5
17	9 84 398	13	9.98 913	25	0.01 087	9.85 485	12	43	7 2.9
18	9.84 411	13	9.98 939	26	0.01 061	9.85 473	12	42	8 3.3
19	9 84 424	13	9.98 964	25	0.01 036	9.85 460	13	41	9 3.8
20	9.84 437	13	9.98 989	25	0.01 011	9.85 448	12	40	10 4.2
21	9.84 450	13	9.99 015	26	0.00 985	9.85 436	12	39	20 8.3
22	9.84 463	13	9.99 040	25	0.00 960	9.85 423	13	38	30 12.5
23	9.84 476	13	9.99 065	25	0.00 935	9.85 411	12	37	40 16.7
24	9.84 489	13	9.99 090	25	0.00 910	9.85 399	12	36	50 20.8
25	9.84 502	13	9.99 116	26	0.00 884	9.85 386	13	35	
26	9.84 515	13	9.99 141	25	0.00 859	9.85 374	12	34	14
27	9.84 528	13	9.99 166	25	0.00 834	9.85 361	13	33	6 1.4
28	9.84 540	12	9.99 191	25	0.00 809	9.85 349	12	32	7 1.6
29	9.84 553	13	9.99 217	26	0.00 783	9.85 337	12	31	8 1.9
30	9.84 566	13	9.99 242	25	0.00 758	9.85 324	13	30	9 2.1
31	9.84 579	13	9.99 267	25	0.00 733	9.85 312	12	29	10 2.3
32	9.84 592	13	9.99 293	26	0.00 707	9.85 299	13	28	20 4.7
33	9.84 605	13	9.99 318	25	0.00 682	9.85 287	12	27	30 7.0
34	9.84 618	13	9.99 343	25	0.00 657	9.85 274	13	26	40 9.3
35	9.84 630	12	9.99 368	25	0.00 632	9.85 262	12	25	50 11.7
36	9.84 643	13	9.99 394	26	0.00 606	9.85 250	12	24	
37	9.84 656	13	9.99 419	25	0.00 581	9.85 237	13	23	
38	9.84 669	13	9.99 444	25	0.00 556	9.85 225	12	22	13
39	9.84 682	13	9.99 469	25	0.00 531	9.85 212	13	21	6 1.3
40	9.84 694	12	9.99 495	26	0.00 505	9.85 200	12	20	7 1.5
41	9.84 707	13	9.99 520	25	0.00 480	9.85 187	13	19	8 1.7
42	9.84 720	13	9.99 545	25	0.00 455	9.85 175	12	18	9 2.0
43	9.84 733	13	9.99 570	25	0.00 430	9.85 162	13	17	10 2.2
44	9.84 745	12	9.99 596	26	0.00 404	9.85 150	12	16	20 4.3
45	9.84 758	13	9.99 621	25	0.00 379	9.85 137	13	15	30 6.5
46	9.84 771	13	9.99 646	25	0.00 354	9.85 125	12	14	40 8.7
47	9.84 784	13	9.99 672	26	0.00 328	9.85 112	13	13	50 10.8
48	9.84 796	12	9.99 697	25	0.00 303	9.85 100	12	12	
49	9.84 809	13	9.99 722	25	0.00 278	9.85 087	13	11	
50	9.84 822	13	9.99 747	25	0.00 253	9.85 074	13	10	12
51	9.84 835	13	9.99 773	26	0.00 227	9.85 062	12	9	6 1.2
52	9.84 847	12	9.99 798	25	0.00 202	9.85 049	13	8	7 1.4
53	9.84 860	13	9.99 823	25	0.00 177	9.85 037	12	7	8 1.6
54	9.84 873	13	9.99 848	25	0.00 152	9.85 024	13	6	9 1.8
55	9.84 885	12	9.99 874	26	0.00 126	9.85 012	12	5	10 2.0
56	9.84 898	13	9.99 899	25	0.00 101	9.84 999	13	4	20 4.0
57	9.84 911	13	9.99 924	25	0.00 076	9.84 986	13	3	30 6.0
58	9.84 923	12	9.99 949	25	0.00 051	9.84 974	12	2	40 8.0
59	9.84 936	13	9.99 975	26	0.00 025	9.84 961	13	1	50 10.0
60	9.84 949	13	0.00 000	25	0.00 000	9.84 949	12	0	
	L. Cos.	d.	L. Cotg.	c. d.	L. Tang.	L. Sin.	d.	′	Prop. Pts.

″	′	S	T
0	0	4.68557	4.68557
60	1	.68557	.68557
120	2	.68557	.68557
180	3	.68557	.68557
240	4	.68557	.68558
300	5	4.68557	4.68558
360	6	.68557	.68558
420	7	.68557	.68558
480	8	.68557	.68558
540	9	.68557	.68558
600	10	4.68557	4.68558
660	11	.68557	.68558
720	12	.68557	.68558
780	13	.68557	.68558
840	14	.68557	.68558
900	15	4.68557	4.68558
960	16	.68557	.68558
1020	17	.68557	.68558
1080	18	.68557	.68558
1140	19	.68557	.68558
1200	20	4.68557	4.68558
1260	21	.68557	.68558
1320	22	.68557	.68558
1380	23	.68557	.68558
1440	24	.68557	.68558
1500	25	4.68557	4.68558
1560	26	.68557	.68558
1620	27	.68557	.68558
1680	28	.68557	.68558
1740	29	.68557	.68559
1800	30	4.68557	4.68559
1860	31	.68557	.68559
1920	32	.68557	.68559
1980	33	.68557	.68559
2040	34	.68557	.68559
2100	35	4.68557	4.68559
2160	36	.68557	.68559
2220	37	.68557	.68559
2280	38	.68557	.68559
2340	39	.68557	.68559
2400	40	4.68557	4.68559
2460	41	.68556	.68560
2520	42	.68556	.68560
2580	43	.68556	.68560
2640	44	.68556	.68560
2700	45	4.68556	4.68560
2760	46	.68556	.68560
2820	47	.68556	.68560
2880	48	.68556	.68560
2940	49	.68556	.68560
3000	50	4.68556	4.68561
3060	51	.68556	.68561
3120	52	.68556	.68561
3180	53	.68556	.68561
3240	54	.68556	.68561
3300	55	4.68556	4.68561
3360	56	.68556	.68561
3420	57	.68555	.68561
3480	58	.68555	.68562
3540	59	.68555	.68562
3600	60	4.68555	4.68562

Log sin a = log a'' + S.

″	′	S	T
3600	0	4.68555	4.68562
3660	1	.68555	.68562
3720	2	.68555	.68562
3780	3	.68555	.68562
3840	4	.68555	.68563
3900	5	4.68555	4.68563
3960	6	.68555	.68563
4020	7	.68555	.68563
4080	8	.68555	.68563
4140	9	.68555	.68563
4200	10	4.68554	4.68563
4260	11	.68554	.68564
4320	12	.68554	.68564
4380	13	.68554	.68564
4440	14	.68554	.68564
4500	15	4.68554	4.68564
4560	16	.68554	.68565
4620	17	.68554	.68565
4680	18	.68554	.68565
4740	19	.68554	.68565
4800	20	4.68554	4.68565
4860	21	.68553	.68566
4920	22	.68553	.68566
4980	23	.68553	.68566
5040	24	.68553	.68566
5100	25	4.68553	4.68566
5160	26	.68553	.68567
5220	27	.68553	.68567
5280	28	.68553	.68567
5340	29	.68553	.68567
5400	30	4.68553	4.68567
5460	31	.68552	.68568
5520	32	.68552	.68568
5580	33	.68552	.68568
5640	34	.68552	.68568
5700	35	4.68552	4.68569
5760	36	.68552	.68569
5820	37	.68552	.68569
5880	38	.68552	.68569
5940	39	.68551	.68569
6000	40	4.68551	4.68570
6060	41	.68551	.68570
6120	42	.68551	.68570
6180	43	.68551	.68570
6240	44	.68551	.68571
6300	45	4.68551	4.68571
6360	46	.68551	.68571
6420	47	.68550	.68572
6480	48	.68550	.68572
6540	49	.68550	.68572
6600	50	4.68550	4.68572
6660	51	.68550	.68573
6720	52	.68550	.68573
6780	53	.68550	.68573
6840	54	.68550	.68573
6900	55	4.68549	4.68574
6960	56	.68549	.68574
7020	57	.68549	.68574
7080	58	.68549	.68575
7140	59	.68549	.68575
7200	60	4.68549	4.68575

Log tan a = log a'' + T.

2°

″	′	S	T
7200	0	4.68549	4.68575
7260	1	.68549	.68575
7320	2	.68548	.68576
7380	3	.68548	.68576
7440	4	.68548	.68576
7500	5	4.68548	4.68577
7560	6	.68548	.68577
7620	7	.68548	.68577
7680	8	.68547	.68578
7740	9	.68547	.68578
7800	10	4.68547	4.68578
7860	11	.68547	.68579
7920	12	.68547	.68579
7980	13	.68547	.68579
8040	14	.68546	.68579
8100	15	4.68546	4.68580
8160	16	.68546	.68580
8220	17	.68546	.68580
8280	18	.68546	.68581
8340	19	.68546	.68581
8400	20	4.68545	4.68582
8460	21	.68545	.68582
8520	22	.68545	.68582
8580	23	.68545	.68583
8640	24	.68545	.68583
8700	25	4.68545	4.68583
8760	26	.68544	.68584
8820	27	.68544	.68584
8880	28	.68544	.68584
8940	29	.68544	.68585
9000	30	4.68544	4.68585
9060	31	.68544	.68585
9120	32	.68543	.68586
9180	33	.68543	.68586
9240	34	.68543	.68587
9300	35	4.68543	4.68587
9360	36	.68543	.68587
9420	37	.68542	.68588
9480	38	.68542	.68588
9540	39	.68542	.68588
9600	40	4.68542	4.68589
9660	41	.68542	.68589
9720	42	.68541	.68590
9780	43	.68541	.68590
9840	44	.68541	.68590
9900	45	4.68541	4.68591
9960	46	.68541	.68591
10020	47	.68540	.68592
10080	48	.68540	.68592
10140	49	.68540	.68592
10200	50	4.68540	4.68593
10260	51	.68540	.68593
10320	52	.68539	.68594
10380	53	.68539	.68594
10440	54	.68539	.68595
10500	55	4.68539	4.68595
10560	56	.68539	.68595
10620	57	.68538	.68596
10680	58	.68538	.68596
10740	59	.68538	.68597
10800	60	4.68538	4.68597

Log sin a = log a'' + S.

3°

″	′	S	T
10800	0	4.68538	4.68597
10860	1	.68537	.68598
10920	2	.68537	.68598
10980	3	.68537	.68599
11040	4	.68537	.68599
11100	5	4.68537	4.68599
11160	6	.68536	.68600
11220	7	.68536	.68600
11280	8	.68536	.68601
11340	9	.68536	.68601
11400	10	4.68535	4.68602
11460	11	.68535	.68602
11520	12	.68535	.68603
11580	13	.68535	.68603
11640	14	.68534	.68604
11700	15	4.68534	4.68604
11760	16	.68534	.68605
11820	17	.68534	.68605
11880	18	.68533	.68606
11940	19	.68533	.68606
12000	20	4.68533	4.68607
12060	21	.68533	.68607
12120	22	.68532	.68608
12180	23	.68532	.68608
12240	24	.68532	.68609
12300	25	4.68532	4.68609
12360	26	.68531	.68610
12420	27	.68531	.68610
12480	28	.68531	.68611
12540	29	.68531	.68611
12600	30	4.68530	4.68612
12660	31	.68530	.68612
12720	32	.68530	.68613
12780	33	.68530	.68613
12840	34	.68529	.68614
12900	35	4.68529	4.68614
12960	36	.68529	.68615
13020	37	.68529	.68615
13080	38	.68528	.68616
13140	39	.68528	.68616
13200	40	4.68528	4.68617
13260	41	.68528	.68617
13320	42	.68527	.68618
13380	43	.68527	.68618
13440	44	.68527	.68619
13500	45	4.68526	4.68620
13560	46	.68526	.68620
13620	47	.68526	.68621
13680	48	.68526	.68621
13740	49	.68525	.68622
13800	50	4.68525	4.68622
13860	51	.68525	.68623
13920	52	.68525	.68623
13980	53	.68524	.68624
14040	54	.68524	.68625
14100	55	4.68524	4.68625
14160	56	.68523	.68626
14220	57	.68523	.68626
14280	58	.68523	.68627
14340	59	.68522	.68628
14400	60	4.68522	4.68628

Log tan a = log a'' + T.

TABLE V.

NATURAL

SINES, COSINES, TANGENTS, AND COTANGENTS.

° ′	N. Sin.	N. Tan.	N. Cot.	N. Cos.		° ′	N. Sin.	N. Tan.	N. Cot.	N. Cos.	
0 0	.00 000	.00 000	Infinity.	Unity.	**90** 0	**2** 30	.04 362	.04 366	22.904	.99 90$\bar{5}$	**87** 30
5	145	145	687.5$\bar{5}$	"	55	35	507	512	22.164	898	25
10	291	291	343.77	"	50	40	653	658	21.470	892	20
15	436	436	229.18	.99 999	45	45	798	803	20.819	88$\bar{5}$	15
20	582	582	171.89	998	40	50	.04 943	.04 949	20.206	878	10
25	727	727	137.51	997	35	55	.05 088	.05 09$\bar{5}$	19.627	870	5
30	.00 873	.00 873	114.59	.99 996	30	**3** 0	.05 234	.05 241	19.081	.99 863	**87** 0
35	.01 018	.01 018	98.218	99$\bar{5}$	25	5	379	387	18.564	855	55
40	164	164	85.940	993	20	10	524	533	18.07$\bar{5}$	847	50
45	309	309	76.390	991	15	15	669	678	17.611	839	45
50	454	45$\bar{5}$	68.750	989	10	20	814	824	17.169	831	40
55	600	600	62.499	987	5	25	.05 960	.05 970	16.7$\bar{3}$0	822	35
1 0	.01 745	.01 746	57.290	.99 98$\bar{5}$	**89** 0	30	.06 10$\bar{5}$	.06 116	16.3$\bar{5}$0	.99 813	30
5	.01 891	.01 891	52.882	982	55	35	250	262	15.969	804	25
10	.02 036	.02 036	49.104	979	50	40	395	408	.60$\bar{5}$	795	20
15	181	182	45.829	976	45	45	540	554	15.257	786	15
20	327	328	42.964	973	40	50	685	700	14.924	776	10
25	472	473	40.43$\bar{6}$	969	35	55	831	847	.606	766	5
30	.02 618	.02 619	38.188	.99 966	30	**4** 0	.06 976	.06 993	14.301	.99 756	**86** 0
35	763	764	36.178	962	25	5	.07 121	.07 139	14.008	746	55
40	.02 908	.02 910	34.368	958	20	10	266	285	13.727	736	50
45	.03 054	.03 055	32.730	953	15	15	411	431	.457	725	45
50	199	201	31.242	949	10	20	556	578	13.197	714	40
55	34$\bar{5}$	346	29.882	944	5	25	701	724	12.947	703	35
2 0	.03 490	.03 492	28.636	.99 939	**88** 0	30	.07 846	.07 870	12.706	.99 692	30
5	635	638	27.490	934	55	35	.07 991	.08 017	.474	680	25
10	781	783	26.432	929	50	40	.08 136	163	.251	668	20
15	.03 926	.03 929	25.452	923	45	45	281	309	12.03$\bar{5}$	657	15
20	.04 071	.04 07$\bar{5}$	24.542	917	40	50	426	456	11.826	644	10
25	217	220	23.69$\bar{5}$	911	35	55	571	602	.62$\bar{5}$	632	5
2 30	.04 362	.04 366	22.904	.99 90$\bar{5}$	**87** 30	**5** 0	.08 716	.08 749	11.430	.99 619	**85** 0
	N. Cos.	N. Cot.	N. Tan.	N. Sin.	° ′		N. Cos.	N. Cot.	N. Tan.	N. Sin.	° ′

° ′	N. Sin.	N. Tan.	N. Cot.	N. Cos.		° ′	N. Sin.	N. Tan.	N. Cot.	N. Cos.	
5 0	.08 716	.08 749	11.430	.99 619	85 0	10 0	.17 365	.17 633	5.6713	.98 481	80 0
5	.08 860	.08 895	.242	607	55	5	508	783	.6234	455	55
10	.09 005	.09 042	11.059	594	50	10	651	.17 933	.5764	430	50
15	150	189	10.883	580	45	15	794	.18 083	.5301	404	45
20	295	335	.712	567	40	20	.17 937	233	.4845	378	40
25	440	482	.546	553	35	25	.18 081	384	.4397	352	35
30	.09 585	.09 629	10.385	.99 540	30	30	.18 224	.18 534	5.3955	.98 325	30
35	729	776	.229	526	25	35	367	684	.3521	299	25
40	.09 874	.09 923	10.078	511	20	40	509	835	.3093	272	20
45	.10 019	.10 069	9.9310	497	15	45	652	.18 986	.2672	245	15
50	164	216	.7882	482	10	50	795	.19 136	.2257	218	10
55	308	363	.6493	467	5	55	.18 938	287	.1848	190	5
6 0	.10 453	.10 510	9.5144	.99 452	84 0	11 0	.19 081	.19 438	5.1446	.98 163	79 0
5	597	657	.3831	437	55	5	224	589	.1049	135	55
10	742	805	.2553	421	50	10	366	740	.0658	107	50
15	.10 887	.10 952	.1309	406	45	15	509	.19 891	5.0273	079	45
20	.11 031	.11 099	9.0098	390	40	20	652	.20 042	4.9894	050	40
25	176	246	8.8919	374	35	25	794	194	.9520	.98 021	35
30	.11 320	.11 394	8.7769	.99 357	30	30	.19 937	.20 345	4.9152	.97 992	30
35	465	541	.6648	341	25	35	.20 079	497	.8788	963	25
40	609	688	.5555	324	20	40	222	648	.8430	934	20
45	754	836	.4490	307	15	45	364	800	.8077	905	15
50	.11 898	.11 983	.3450	290	10	50	507	.20 952	.7729	875	10
55	.12 043	.12 131	.2434	272	5	55	649	.21 104	.7385	845	5
7 0	.12 187	.12 278	8.1443	.99 255	83 0	12 0	.20 791	.21 256	4.7046	.97 815	78 0
5	331	426	8.0476	237	55	5	.20 933	408	.6712	784	55
10	476	574	7.9530	219	50	10	.21 076	560	.6382	754	50
15	620	722	.8606	200	45	15	218	712	.6057	723	45
20	764	.12 869	.7704	182	40	20	360	.21 864	.5736	692	40
25	.12 908	.13 017	.6821	163	35	25	502	.22 017	.5420	661	35
30	.13 053	.13 165	7.5958	.99 144	30	30	.21 644	.22 169	4.5107	.97 630	30
35	197	313	.5113	125	25	35	786	322	.4799	598	25
40	341	461	.4287	106	20	40	.21 928	475	.4494	566	20
45	485	609	.3479	087	15	45	.22 070	628	.4194	534	15
50	629	758	.2687	067	10	50	212	781	.3897	502	10
55	773	.13 906	.1912	047	5	55	353	.22 934	.3604	470	5
8 0	.13 917	.14 054	7.1154	.99 027	82 0	13 0	.22 495	.23 087	4.3315	.97 437	77 0
5	.14 061	202	7.0410	.99 006	55	5	637	240	.3029	404	55
10	205	351	6.9682	.98 986	50	10	778	393	.2747	371	50
15	349	499	.8969	965	45	15	.22 920	547	.2468	338	45
20	493	648	.8269	944	40	20	.23 062	700	.2193	304	40
25	637	796	.7584	923	35	25	203	.23 854	.1922	271	35
30	.14 781	.14 945	6.6912	.98 902	30	30	.23 345	.24 008	4.1653	.97 237	30
35	.14 925	.15 094	.6252	880	25	35	486	162	.1388	203	25
40	.15 069	243	.5606	858	20	40	627	316	.1126	169	20
45	212	391	.4971	836	15	45	769	470	.0867	134	15
50	356	540	.4348	814	10	50	.23 910	624	.0611	100	10
55	500	689	.3737	791	5	55	.24 051	778	.0358	065	5
9 0	.15 643	.15 838	6.3138	.98 769	81 0	14 0	.24 192	.24 933	4.0108	.97 030	76 0
5	787	.15 988	.2549	746	55	5	333	.25 087	3.9861	.96 994	55
10	.15 931	.16 137	.1970	723	50	10	474	242	.9617	959	50
15	.16 074	286	.1402	700	45	15	615	397	.9375	923	45
20	218	435	.0844	676	40	20	756	552	.9136	887	40
25	361	585	6.0296	652	35	25	.24 897	707	.8900	851	35
30	.16 505	.16 734	5.9758	.98 629	30	30	.25 038	.25 862	3.8667	.96 815	30
35	648	.16 884	.9228	604	25	35	179	.26 017	.8436	778	25
40	792	.17 033	.8708	580	20	40	320	172	.8208	742	20
45	.16 935	183	.8197	556	15	45	460	328	.7983	705	15
50	.17 078	333	.7694	531	10	50	601	483	.7760	667	10
55	222	483	.7199	506	5	55	741	639	.7539	630	5
10 0	.17 365	.17 633	5.6713	.98 481	80 0	15 0	.25 882	.26 795	3.7321	.96 593	75 0
	N. Cos.	N. Cot.	N. Tan.	N. Sin.	° ′		N. Cos.	N. Cot.	N. Tan.	N. Sin.	° ′

° ′	N. Sin.	N. Tan.	N. Cot.	N. Cos.		° ′	N. Sin.	N. Tan.	N. Cot.	N. Cos.	
15 0	.25 882	.26 795	3.7321	.96 593	75 0	20 0	.34 202	.36 397	2.7475	.93 969	70 0
5	.26 022	.26 951	.7105	555	55	5	339	562	.7351	919	55
10	163	.27 107	.6891	517	50	10	475	727	.7228	869	50
15	303	263	.6680	479	45	15	612	.36 892	.7106	819	45
20	443	419	.6470	440	40	20	748	.37 057	.6985	769	40
25	584	576	.6264	402	35	25	.34 884	223	.6865	718	35
30	.26 724	.27 732	3.6059	.96 363	30	30	.35 021	.37 388	2.6746	.93 667	30
35	.26 864	.27 889	.5856	324	25	35	157	554	.6628	616	25
40	.27 004	.28 046	.5656	285	20	40	293	720	.6511	565	20
45	144	203	.5457	246	15	45	429	.37 887	.6395	514	15
50	284	360	.5261	206	10	50	565	.38 053	.6279	462	10
55	424	517	.5067	166	5	55	701	220	.6165	410	5
16 0	.27 564	.28 675	3.4874	.96 126	74 0	21 0	.35 837	.38 386	2.6051	.93 358	69 0
5	704	832	.4684	086	55	5	.35 973	553	.5938	306	55
10	843	.28 990	.4495	046	50	10	.36 108	721	.5826	253	50
15	.27 983	.29 147	.4308	.96 005	45	15	244	.38 888	.5715	201	45
20	.28 123	305	.4124	.95 964	40	20	379	.39 055	.5605	148	40
25	262	463	.3941	923	35	25	515	223	.5495	095	35
30	.28 402	.29 621	3.3759	.95 882	30	30	.36 650	.39 391	2.5386	.93 042	30
35	541	780	.3580	841	25	35	785	559	.5279	.92 988	25
40	680	.29 938	.3402	799	20	40	.36 921	727	.5172	935	20
45	820	.30 097	.3226	757	15	45	.37 056	.39 896	.5065	881	15
50	.28 959	255	.3052	715	10	50	191	.40 065	.4960	827	10
55	.29 098	414	.2879	673	5	55	326	234	.4855	773	5
17 0	.29 237	.30 573	3.2709	.95 630	73 0	22 0	.37 461	.40 403	2.4751	.92 718	68 0
5	376	732	.2539	588	55	5	595	572	.4648	664	55
10	515	.30 891	.2371	545	50	10	730	741	.4545	609	50
15	654	.31 051	.2205	502	45	15	865	.40 911	.4443	554	45
20	793	210	.2041	459	40	20	.37 999	.41 081	.4342	499	40
25	.29 932	370	.1878	415	35	25	.38 134	251	.4242	444	35
30	.30 071	.31 530	3.1716	.95 372	30	30	.38 268	.41 421	2.4142	.92 388	30
35	209	690	.1556	328	25	35	403	592	.4043	332	25
40	348	.31 850	.1397	284	20	40	537	763	.3945	276	20
45	486	.32 010	.1240	240	15	45	671	.41 933	.3847	220	15
50	625	171	.1084	195	10	50	805	.42 105	.3750	164	10
55	763	331	.0930	150	5	55	.38 939	276	.3654	107	5
18 0	.30 902	.32 492	3.0777	.95 106	72 0	23 0	.39 073	.42 447	2.3559	.92 050	67 0
5	.31 040	653	.0625	061	55	5	207	619	.3464	.91 994	55
10	178	814	.0475	.95 015	50	10	341	791	.3369	936	50
15	316	.32 975	.0326	.94 970	45	15	474	.42 963	.3276	879	45
20	454	.33 136	.0178	924	40	20	608	.43 136	.3183	822	40
25	593	298	3.0032	878	35	25	741	308	.3090	764	35
30	.31 730	.33 460	2.9887	.94 832	30	30	.39 875	.43 481	2.2998	.91 706	30
35	.31 868	621	.9743	786	25	35	.40 008	654	.2907	648	25
40	.32 006	783	.9600	740	20	40	141	.43 828	.2817	590	20
45	144	.33 945	.9459	693	15	45	275	.44 001	.2727	531	15
50	282	.34 108	.9319	646	10	50	408	175	.2637	472	10
55	419	270	.9180	599	5	55	541	349	.2549	414	5
19 0	.32 557	.34 433	2.9042	.94 552	71 0	24 0	.40 674	.44 523	2.2460	.91 355	66 0
5	694	596	.8905	504	55	5	806	697	.2373	295	55
10	832	758	.8770	457	50	10	.40 939	.44 872	.2286	236	50
15	.32 969	.34 922	.8636	409	45	15	.41 072	.45 047	.2199	176	45
20	.33 106	.35 085	.8502	361	40	20	204	222	.2113	116	40
25	244	248	.8370	313	35	25	337	397	.2028	.91 056	35
30	.33 381	.35 412	2.8239	.94 264	30	30	.41 469	.45 573	2.1943	.90 996	30
35	518	576	.8109	215	25	35	602	748	.1859	936	25
40	655	740	.7980	167	20	40	734	.45 924	.1775	875	20
45	792	.35 904	.7852	118	15	45	866	.46 101	.1692	814	15
50	.33 929	.36 068	.7725	068	10	50	.41 998	277	.1609	753	10
55	.34 065	232	.7600	.94 019	5	55	.42 130	454	.1527	692	5
20 0	.34 202	.36 397	2.7475	.93 969	70 0	25 0	.42 262	.46 631	2.1445	.90 631	65 0
	N. Cos.	N. Cot.	N. Tan.	N. Sin.	° ′		N. Cos.	N. Cot.	N. Tan.	N. Sin.	° ′

° ′	N. Sin.	N. Tan.	N. Cot.	N. Cos.	
25 0	.42 262	.46 631	2.1445	.90 631	65 0
5	394	808	.1364	569	55
10	525	.46 985	.1283	507	50
15	657	.47 163	.1203	446	45
20	788	341	.1123	383	40
25	.42 920	519	.1044	321	35
30	.43 051	.47 698	2.0965	.90 259	30
35	182	.47 876	.0887	196	25
40	313	.48 055	.0809	133	20
45	445	234	.0732	070	15
50	575	414	.0655	.90 007	10
55	706	593	.0579	.89 943	5
26 0	.43 837	.48 773	2.0503	.89 879	64 0
5	.43 968	.48 953	.0428	816	55
10	.44 098	.49 134	.0353	752	50
15	229	315	.0278	687	45
20	359	495	.0204	623	40
25	490	677	.0130	558	35
30	.44 620	.49 858	2.0057	.89 493	30
35	750	.50 040	1.9984	428	25
40	.44 880	222	.9912	363	20
45	.45 010	404	.9840	298	15
50	140	587	.9768	232	10
55	269	769	.9697	167	5
27 0	.45 399	.50 953	1.9626	.89 101	63 0
5	529	.51 136	.9556	.89 035	55
10	658	319	.9486	.88 968	50
15	787	503	.9416	902	45
20	.45 917	688	.9347	835	40
25	.46 046	.51 872	.9278	768	35
30	.46 175	.52 057	1.9210	.88 701	30
35	304	242	.9142	634	25
40	433	427	.9074	566	20
45	561	613	.9007	499	15
50	690	798	.8940	431	10
55	819	.52 985	.8873	363	5
28 0	.46 947	.53 171	1.8807	.88 295	62 0
5	.47 076	358	.8741	226	55
10	204	545	.8676	158	50
15	332	732	.8611	089	45
20	460	.53 920	.8546	.88 020	40
25	588	.54 107	.8482	.87 951	35
30	.47 716	.54 296	1.8418	.87 882	30
35	844	484	.8354	812	25
40	.47 971	673	.8291	743	20
45	.48 099	.54 862	.8228	673	15
50	226	.55 051	.8165	603	10
55	354	241	.8103	532	5
29 0	.48 481	.55 431	1.8040	.87 462	61 0
5	608	621	.7979	391	55
10	735	.55 812	.7917	321	50
15	862	.56 003	.7856	250	45
20	.48 989	194	.7796	178	40
25	.49 116	385	.7735	107	35
30	.49 242	.56 577	1.7675	.87 036	30
35	369	769	.7615	.86 964	25
40	495	.56 962	.7556	892	20
45	622	.57 155	.7496	820	15
50	748	348	.7437	748	10
55	.49 874	541	.7379	675	5
30 0	.50 000	.57 735	1.7321	.86 603	60 0
	N. Cos.	N. Cot.	N. Tan.	N. Sin.	° ′

° ′	N. Sin.	N. Tan.	N. Cot.	N. Cos.	
30 0	.50 000	.57 735	1.7321	.86 603	60 0
5	126	.57 929	.7262	530	55
10	252	.58 124	.7205	457	50
15	377	318	.7147	384	45
20	503	513	.7090	310	40
25	628	709	.7033	237	35
30	754	.58 905	1.6977	.86 163	30
35	.50 879	.59 101	.6920	089	25
40	.51 004	297	.6864	.86 015	20
45	129	494	.6808	.85 941	15
50	254	691	.6753	866	10
55	379	.59 888	.6698	792	5
31 0	.51 504	.60 086	1.6643	.85 717	59 0
5	628	284	.6588	642	55
10	753	483	.6534	567	50
15	.51 877	681	.6479	491	45
20	.52 002	.60 881	.6426	416	40
25	126	.61 080	.6372	340	35
30	.52 250	.61 280	1.6319	.85 264	30
35	374	480	.6265	188	25
40	498	681	.6212	112	20
45	621	.61 882	.6160	.85 035	15
50	745	.62 083	.6107	.84 959	10
55	869	285	.6055	882	5
32 0	.52 992	.62 487	1.6003	.84 805	58 0
5	.53 115	689	.5952	728	55
10	238	.62 892	.5900	650	50
15	361	.63 095	.5849	573	45
20	484	299	.5798	495	40
25	607	503	.5747	417	35
30	.53 730	.63 707	1.5697	.84 339	30
35	853	.63 912	.5647	261	25
40	.53 975	.64 117	.5597	182	20
45	.54 097	322	.5547	104	15
50	220	528	.5497	.84 025	10
55	342	734	.5448	.83 946	5
33 0	.54 464	.64 941	1.5399	.83 867	57 0
5	586	.65 148	.5350	788	55
10	708	355	.5301	708	50
15	829	563	.5253	629	45
20	.54 951	771	.5204	549	40
25	.55 072	.65 980	.5156	469	35
30	.55 194	.66 189	1.5108	.83 389	30
35	315	398	.5061	308	25
40	436	608	.5013	228	20
45	557	.66 818	.4966	147	15
50	678	.67 028	.4919	.83 066	10
55	799	239	.4872	.82 985	5
34 0	.55 919	.67 451	1.4826	.82 904	56 0
5	.56 040	663	.4779	822	55
10	160	.67 875	.4733	741	50
15	280	.68 088	.4687	659	45
20	401	301	.4641	577	40
25	521	514	.4596	495	35
30	641	.68 728	1.4550	.82 413	30
35	760	.68 942	.4505	330	25
40	.56 880	.69 157	.4460	248	20
45	.57 000	372	.4415	165	15
50	119	588	.4370	.82 082	10
55	238	.69 804	.4326	.81 999	5
35 0	.57 358	.70 021	1.4281	.81 915	55 0
	N. Cos.	N. Cot.	N. Tan.	N. Sin.	° ′

° ′	N. Sin.	N. Tan.	N. Cot.	N. Cos.	
35 0	.57 358	.70 021	1.4281	.81 915	55 0
5	477	238	.4237	832	55
10	596	455	.4193	748	50
15	715	673	.4150	664	45
20	833	.70 891	.4106	580	40
25	.57 952	.71 110	.4063	496	35
30	.58 070	.71 329	1.4019	.81 412	30
35	189	549	.3976	327	25
40	307	769	.3934	242	20
45	425	71 990	.3891	157	15
50	543	.72 211	.3848	.81 072	10
55	661	432	.3806	.80 987	5
36 0	.58 779	.72 654	1.3764	.80 902	54 0
5	.58 896	.72 877	.3722	816	55
10	.59 014	.73 100	.3680	730	50
15	131	323	.3638	644	45
20	248	547	.3597	558	40
25	365	771	.3555	472	35
30	.59 482	.73 996	1.3514	.80 386	30
35	599	.74 221	.3473	299	25
40	716	447	.3432	212	20
45	832	674	.3392	125	15
50	.59 949	.74 900	.3351	.80 038	10
55	.60 065	.75 128	.3311	.79 951	5
37 0	.60 182	.75 355	1.3270	.79 864	53 0
5	298	584	.3230	776	55
10	414	.75 812	.3190	688	50
15	529	.76 042	.3151	600	45
20	645	272	.3111	512	40
25	761	502	.3072	424	35
30	876	.76 733	1.3032	.79 335	30
35	.60 991	.76 964	.2993	247	25
40	.61 107	.77 196	.2954	158	20
45	222	428	.2915	.79 069	15
50	337	661	.2876	.78 980	10
55	451	.77 895	.2838	891	5
38 0	.61 566	.78 129	1.2799	.78 801	52 0
5	681	363	.2761	711	55
10	795	598	.2723	622	50
15	.61 909	.78 834	.2685	532	45
20	.62 024	.79 070	.2647	442	40
25	138	306	.2609	351	35
30	.62 251	.79 544	1.2572	.78 261	30
35	365	.79 781	.2534	170	25
40	479	.80 020	.2497	.78 079	20
45	592	258	.2460	.77 988	15
50	706	498	.2423	897	10
55	819	738	.2386	806	5
39 0	.62 932	.80 978	1.2349	.77 715	51 0
5	.63 045	.81 220	.2312	623	55
10	158	461	.2276	531	50
15	271	703	.2239	439	45
20	383	.81 946	.2203	347	40
25	496	.82 190	.2167	255	35
30	.63 608	.82 434	1.2131	.77 162	30
35	720	678	.2095	.77 070	25
40	832	.82 923	.2059	.76 977	20
45	.63 944	.83 169	.2024	884	15
50	.64 056	415	.1988	791	10
55	167	662	.1953	698	5
40 0	.64 279	.83 910	1.1918	.76 604	50 0
	N. Cos.	N. Cot	N. Tan.	N. Sin.	° ′

° ′	N. Sin.	N. Tan.	N. Cot.	N. Cos.	
40 0	.64 279	.83 910	1.1918	.76 604	50 0
5	390	.84 158	.1882	511	55
10	501	407	.1847	417	50
15	612	656	.1812	323	45
20	723	.84 906	.1778	229	40
25	834	.85 157	.1743	135	35
30	.64 945	.85 408	1.1708	.76 041	30
35	.65 055	660	.1674	.75 946	25
40	166	.85 912	.1640	851	20
45	276	.86 166	.1606	756	15
50	386	419	.1571	661	10
55	496	674	.1538	566	5
41 0	.65 606	.86 929	1.1504	.75 471	49 0
5	716	.87 184	.1470	375	55
10	825	441	.1436	280	50
15	.65 935	698	.1403	184	45
20	.66 044	.87 955	.1369	.75 088	40
25	153	.88 214	.1336	.74 992	35
30	.66 262	.88 473	1.1303	.74 896	30
35	371	732	.1270	799	25
40	480	.88 992	.1237	703	20
45	588	.89 253	.1204	606	15
50	697	515	.1171	509	10
55	805	.89 777	.1139	412	5
42 0	.66 913	.90 040	1.1106	.74 314	48 0
5	.67 021	304	.1074	217	55
10	129	569	.1041	120	50
15	237	.90 834	.1009	.74 022	45
20	344	.91 099	.0977	.73 924	40
25	452	366	.0945	826	35
30	.67 559	.91 633	1.0913	.73 728	30
35	666	.91 901	.0881	629	25
40	773	.92 170	.0850	531	20
45	880	439	.0818	432	15
50	.67 987	709	.0786	333	10
55	.68 093	.92 980	.0755	234	5
43 0	.68 200	.93 252	1.0724	.73 135	47 0
5	306	524	.0692	.73 036	55
10	412	.93 797	.0661	.72 937	50
15	518	.94 071	.0630	837	45
20	624	345	.0599	737	40
25	730	620	.0569	637	35
30	.68 835	.94 896	1.0538	.72 537	30
35	.68 941	.95 173	.0507	437	25
40	.69 046	451	.0477	337	20
45	151	.95 729	.0446	236	15
50	256	.96 008	.0416	136	10
55	361	288	.0385	.72 035	5
44 0	.69 466	.96 569	1.0355	.71 934	46 0
5	570	.96 850	.0325	833	55
10	675	.97 133	.0295	732	50
15	779	416	.0265	630	45
20	883	700	.0235	529	40
25	.69 987	.97 984	.0206	427	35
30	.70 091	.98 270	1.0176	.71 325	30
35	195	556	.0147	223	25
40	298	.98 843	.0117	121	20
45	401	.99 131	.0088	.71 019	15
50	503	420	.0058	.70 916	10
55	608	.99 710	.0029	813	5
45 0	.70 711	1.00 000	1.0000	.70 711	45 0
	N. Cos.	N. Cot.	N. Tan.	N. Sin.	° ′

DEGREES.						MINUTES.		SECONDS.	
0°	0.00000 00	60°	1.04719 76	120°	2.09439 51	0′	0.00000 00	0″	0.00000 00
1	0.01745 33	61	1.06465 08	121	2.11184 84	1	0.00029 09	1	0.00000 48
2	0.03490 66	62	1.08210 41	122	2.12930 17	2	0.00058 18	2	0.00000 97
3	0.05235 99	63	1.09955 74	123	2.14675 $\bar{5}0$	3	0.00087 27	3	0.00001 45
4	0.06981 32	64	1.11701 07	124	2.16420 83	4	0.00116 36	4	0.00001 94
5	0.08726 $6\bar{5}$	65	1.13446 40	125	2.18166 16	5	0.00145 44	5	0.00002 42
6	0.10471 98	66	1.15191 73	126	2.19911 49	6	0.00174 53	6	0.00002 91
7	0.12217 30	67	1.16937 06	127	2.21656 82	7	0.00203 62	7	0.00003 39
8	0.13962 63	68	1.18682 39	128	2.23402 14	8	0.00232 71	8	0.00003 88
9	0.15707 96	69	1.20427 72	129	2.25147 47	9	0.00261 80	9	0.00004 36
10	0.17453 29	70	1.22173 $0\bar{5}$	130	2.26892 80	10	0.00290 89	10	0.00004 $8\bar{5}$
11	0.19198 62	71	1.23918 38	131	2.28638 13	11	0.00319 98	11	0.00005 33
12	0.20943 95	72	1.25663 71	132	2.30383 46	12	0.00349 07	12	0.00005 82
13	0.22689 28	73	1.27409 04	133	2.32128 79	13	0.00378 15	13	0.00006 30
14	0.24434 61	74	1.29154 36	134	2.33874 12	14	0.00407 24	14	0.00006 79
15	0.26179 94	75	1.30899 69	135	2.35619 $4\bar{5}$	15	0.00436 33	15	0.00007 27
16	0.27925 27	76	1.32645 02	136	2.37364 78	16	0.00465 42	16	0.00007 76
17	0.29670 60	77	1.34390 35	137	2.39110 11	17	0.00494 51	17	0.00008 24
18	0.31415 93	78	1.36135 68	138	2.40855 44	18	0.00523 60	18	0.00008 73
19	0.33161 26	79	1.37881 01	139	2.42600 77	19	0.00552 69	19	0.00009 21
20	0.34906 59	80	1.39626 34	140	2.44346 10	20	0.00581 78	20	0.00009 70
21	0.36651 91	81	1.41371 67	141	2.46091 42	21	0.00610 87	21	0.00010 18
22	0.38397 24	82	1.43117 00	142	2.47836 75	22	0.00639 95	22	0.00010 67
23	0.40142 57	83	1.44862 33	143	2.49582 08	23	0.00669 04	23	0.00011 15
24	0.41887 90	84	1.46607 66	144	2.51327 41	24	0.00698 13	24	0.00011 64
25	0.43633 23	85	1.48352 99	145	2.53072 74	25	0.00727 22	25	0.00012 12
26	0.45378 56	86	1.50098 32	146	2.54818 07	26	0.00756 31	26	0.00012 61
27	0.47123 89	87	1.51843 64	147	2.56563 40	27	0.00785 40	27	0.00013 09
28	0.48869 22	88	1.53588 97	148	2.58308 73	28	0.00814 49	28	0.00013 57
29	0.50614 $5\bar{5}$	89	1.55334 30	149	2.60054 06	29	0.00843 58	29	0.00014 06
30	0.52359 88	90	1.57079 63	150	2.61799 39	30	0.00872 66	30	0.00014 54
31	0.54105 21	91	1.58824 96	151	2.63544 72	31	0.00901 75	31	0.00015 03
32	0.55850 54	92	1.60570 29	152	2.65290 $0\bar{5}$	32	0.00930 84	32	0.00015 51
33	0.57595 87	93	1.62315 62	153	2.67035 38	33	0.00959 93	33	0.00016 00
34	0.59341 19	94	1.64060 $9\bar{5}$	154	2.68780 70	34	0.00989 02	34	0.00016 48
35	0.61086 52	95	1.65806 28	155	2.70526 03	35	0.01018 11	35	0.00016 97
36	0.62831 85	96	1.67551 61	156	2.72271 36	36	0.01047 20	36	0.00017 45
37	0.64577 18	97	1.69296 94	157	2.74016 69	37	0.01076 29	37	0.00017 94
38	0.66322 51	98	1.71042 27	158	2.75762 02	38	0.01105 38	38	0.00018 42
39	0.68067 84	99	1.72787 60	159	2.77507 35	39	0.01134 46	39	0.00018 91
40	0.69813 17	100	1.74532 93	160	2.79252 68	40	0.01163 55	40	0.00019 39
41	0.71558 $5\bar{0}$	101	1.76278 25	161	2.80998 01	41	0.01192 64	41	0.00019 88
42	0.73303 83	102	1.78023 58	162	2.82743 34	42	0.01221 73	42	0.00020 36
43	0.75049 16	103	1.79768 91	163	2.84488 67	43	0.01250 82	43	0.00020 $8\bar{5}$
44	0.76794 49	104	1.81514 24	164	2.86234 00	44	0.01279 91	44	0.00021 33
45	0.78539 82	105	1.83259 57	165	2.87979 33	45	0.01309 00	45	0.00021 82
46	0.80285 $1\bar{5}$	106	1.85004 90	166	2.89724 66	46	0.01338 09	46	0.00022 30
47	0.82030 47	107	1.86750 23	167	2.91469 99	47	0.01367 17	47	0.00022 79
48	0.83775 80	108	1.88495 56	168	2.93215 31	48	0.01396 26	48	0.00023 27
49	0.85521 13	109	1.90240 89	169	2.94960 64	49	0.01425 35	49	0.00023 76
50	0.87266 46	110	1.91986 22	170	2.96705 97	50	0.01454 44	50	0.00024 24
51	0.89011 79	111	1.93731 $5\bar{5}$	171	2.98451 30	51	0.01483 53	51	0.00024 73
52	0.90757 12	112	1.95476 88	172	3.00196 63	52	0.01512 62	52	0.00025 21
53	0.92502 45	113	1.97222 21	173	3.01941 96	53	0.01541 71	53	0.00025 70
54	0.94247 78	114	1.98967 53	174	3.03687 29	54	0.01570 80	54	0.00026 18
55	0.95993 11	115	2.00712 86	175	3.05432 62	55	0.01599 89	55	0.00026 66
56	0.97738 44	116	2.02458 19	176	3.07177 $9\bar{5}$	56	0.01628 97	56	0.00027 $1\bar{5}$
57	0.99483 77	117	2.04203 52	177	3.08923 28	57	0.01658 06	57	0.00027 63
58	1.01229 10	118	2.05948 85	178	3.10668 61	58	0.01687 15	58	0.00028 12
59	1.02974 43	119	2.07694 18	179	3.12413 94	59	0.01716 24	59	0.00028 60
60	1.04719 76	120	2.09439 51	180	3.14159 27	60	0.01745 33	60	0.00029 09

TABLE VII.

Napierian Logarithms of Numbers.

N.	Log.	N.	Log.	N.	Log.	N.	Log.	N.	Log.
1	0.00000	21	3.04452	41	3.71357	61	4.11087	81	4.39445̄
2	0.69315̄	22	3.09104	42	3.73767	62	4.12713	82	4.40672
3	1.09861	23	3.13549	43	3.76120	63	4.14313	83	4.41884
4	1.38629	24	3.17805	44	3.78419	64	4.15888	84	4.43082
5	1.60944	25	3.21888	45	3.80666	65	4.17439	85	4.44265
6	1.79176	26	3.25810	46	3.82864	66	4.18965	86	4.45435̄
7	1.94591	27	3.29584	47	3.85015̄	67	4.20469	87	4.46591
8	2.07944	28	3.33220	48	3.87120	68	4.21951	88	4.47734
9	2.19722	29	3.36730	49	3.89182	69	4.23411	89	4.48864
10	2.30259	30	3.40120	50	3.91202	70	4.24850̄	90	4.49981
11	2.39790	31	3.43399	51	3.93183	71	4.26268	91	4.51086
12	2.48491	32	3.46574	52	3.95124	72	4.27667	92	4.52179
13	2.56495̄	33	3.49651	53	3.97029	73	4.29046	93	4.53260
14	2.63906	34	3.52636	54	3.98898	74	4.30407	94	4.54329
15	2.70805	35	3.55535̄	55	4.00733	75	4.31749	95	4.55388
16	2.77259	36	3.58352	56	4.02535	76	4.33073	96	4.56435̄
17	2.83321	37	3.61092	57	4.04305	77	4.34381	97	4.57471
18	2.89037	38	3.63759	58	4.06044	78	4.35671	98	4.58497
19	2.94444	39	3.66356	59	4.07754	79	4.36945̄	99	4.59512
20	2.99573	40	3.68888	60	4.09434	80	4.38203	100	4.60517

N.	0	1	2	3	4	5	6	7	8	9
10	4.6 0517	1512	2497	3473	4439	5396	6344	7283	8213	9135̄
11	4.7 0048	0953	1850̄	2739	3620	4493	5359	6217	7068	7912
12	8749	9579	*0402	*1218	*2028	*2831	*3628	*4419	*5203	*5981
13	4.8 6753	7520	8280	9035̄	9784	*0527	*1265	*1998	*2725	*3447
14	4.9 4164	4876	5583	6284	6981	7673	8361	9043	9721	*0395̄
15	5.0 1064	1728	2388	3044	3695	4343	4986	5625̄	6260	6890
16	7517	8140	8760	9375	9987	*0595̄	*1199	*1799	*2396	*2990
17	5.1 3580	4166	4749	5329	5906	6479	7048	7615̄	8178	8739
18	9296	9850̄	*0401	*0949	*1494	*2036	*2575̄	*3111	*3644	*4175̄
19	5.2 4702	5227	5750̄	6269	6786	7300	7811	8320	8827	9330
20	5.3 9832	*0330	*0827	*1321	*1812	*2301	*2788	*3272	*3754	*4233
21	5.3 4711	5186	5659	6129	6598	7064	7528	7990	8450̄	8907
22	9363	9816	*0268	*0717	*1165̄	*1610	*2053	*2495	*2935̄	*3372
23	5.4 3808	4242	4674	5104	5532	5959	6383	6806	7227	7646
24	8064	8480	8894	9306	9717	*0126	*0533	*0939	*1343	*1745
25	5.5 2146	2545	2943	3339	3733	4126	4518	4908	5296	5683
26	6068	6452	6834	7215	7595̄	7973	8350̄	8725̄	9099	9471
27	9842	*0212	*0580	*0947	*1313	*1677	*2040	*2402	*2762	*3121
28	5.6 3479	3835	4191	4545̄	4897	5249	5599	5948	6296	6643
29	6988	7332	7675	8017	8358	8698	9036	9373	9709	*0044
30	5.7 0378	0711	1043	1373	1703	2031	2359	2685̄	3010	3334
31	3657	3979	4300	4620	4939	5257	5574	5890	6205	6519
32	6832	7144	7455	7765	8074	8383	8690	8996	9301	9606
33	9909	*0212	*0513	*0814	*1114	*1413	*1711	*2008	*2305̄	*2600
34	5.8 2895̄	3188	3481	3773	4064	4354	4644	4932	5220	5507
35	5.8 5793	6079	6363	6647	6930	7212	7493	7774	8053	8332
36	8610	8888	9164	9440	9715	9990	*0263	*0536	*0808	*1080
37	5.9 1350	1620	1889	2158	2426	2693	2959	3225̄	3489	3754
38	4017	4280	4542	4803	5064	5324	5584	5842	6101	6358
39	6615̄	6871	7126	7381	7635	7889	8141	8394	8645	8896
40	5.9 9146	9396	9645	9894	*0141	*0389	*0635	*0881	*1127	*1372
N.	0	1	2	3	4	5	6	7	8	9

N.	0	1	2	3	4	5	6	7	8	9
40	5.9 9146	9396	9645	9894	*0141	*0389	*0635	*0881	*1127	*1372
41	6.0 1616	1859	2102	2345	2587	2828	3069	3309	3548	3787
42	4025	4263	4501	4737	4973	5209	5444	5678	5912	6146
43	6379	6611	6843	7074	7304	7535	7764	7993	8222	8450
44	8677	8904	9131	9357	9582	9807	*0032	*0256	*0479	*0702
45	6.1 0925	1147	1368	1589	1810	2030	2249	2468	2687	2905
46	3123	3340	3556	3773	3988	4204	4419	4633	4847	5060
47	5273	5486	5698	5910	6121	6331	6542	6752	6961	7170
48	7379	7587	7794	8002	8208	8415	8621	8826	9032	9236
49	9441	9644	9848	*0051	*0254	*0456	*0658	*0859	*1060	*1261
50	6.2 1461	1661	1860	2059	2258	2456	2654	2851	3048	3245
51	3441	3637	3832	4028	4222	4417	4611	4804	4998	5190
52	5383	5575	5767	5958	6149	6340	6530	6720	6910	7099
53	7288	7476	7664	7852	8040	8227	8413	8600	8786	8972
54	9157	9342	9527	9711	9895	*0079	*0262	*0445	*0628	*0810
55	6.3 0992	1173	1355	1536	1716	1897	2077	2257	2436	2615
56	2794	2972	3150	3328	3505	3683	3859	4036	4212	4388
57	4564	4739	4914	5089	5263	5437	5611	5784	5957	6130
58	6303	6475	6647	6819	6990	7161	7332	7502	7673	7843
59	8012	8182	8351	8519	8688	8856	9024	9192	9359	9526
60	6.3 9693	9859	*0026	*0192	*0357	*0523	*0688	*0853	*1017	*1182
61	6.4 1346	1510	1673	1836	1999	2162	2325	2487	2649	2811
62	2972	3133	3294	3455	3615	3775	3935	4095	4254	4413
63	4572	4731	4889	5047	5205	5362	5520	5677	5834	5990
64	6147	6303	6459	6614	6770	6925	7080	7235	7389	7543
65	6.4 7697	7851	8004	8158	8311	8464	8616	8768	8920	9072
66	9224	9375	9527	9677	9828	9979	*0129	*0279	*0429	*0578
67	6.5 0728	0877	1026	1175	1323	1471	1619	1767	1915	2062
68	2209	2356	2503	2649	2796	2942	3088	3233	3379	3524
69	3669	3814	3959	4103	4247	4391	4535	4679	4822	4965
70	6.5 5108	5251	5393	5536	5678	5820	5962	6103	6244	6386
71	6526	6667	6808	6948	7088	7228	7368	7508	7647	7786
72	7925	8064	8203	8341	8479	8617	8755	8893	9030	9167
73	9304	9441	9578	9715	9851	9987	*0123	*0259	*0394	*0530
74	6.6 0665	0800	0935	1070	1204	1338	1473	1607	1740	1874
75	6.6 2007	2141	2274	2407	2539	2672	2804	2936	3068	3200
76	3332	3463	3595	3726	3857	3988	4118	4249	4379	4509
77	4639	4769	4898	5028	5157	5286	5415	5544	5673	5801
78	5929	6058	6185	6313	6441	6568	6696	6823	6950	7077
79	7203	7330	7456	7582	7708	7834	7960	8085	8211	8336
80	6.6 8461	8586	8711	8835	8960	9084	9208	9332	9456	9580
81	9703	9827	9950	*0073	*0196	*0319	*0441	*0564	*0686	*0808
82	6.7 0930	1052	1174	1296	1417	1538	1659	1780	1901	2022
83	2143	2263	2383	2503	2623	2743	2863	2982	3102	3221
84	3340	3459	3578	3697	3815	3934	4052	4170	4288	4406
85	6.7 4524	4641	4759	4876	4993	5110	5227	5344	5460	5577
86	5693	5809	5926	6041	6157	6273	6388	6504	6619	6734
87	6849	6964	7079	7194	7308	7422	7537	7651	7765	7878
88	7992	8106	8219	8333	8446	8559	8672	8784	8897	9010
89	9122	9234	9347	9459	9571	9682	9794	9906	*0017	*0128
90	6.8 0239	0351	0461	0572	0683	0793	0904	1014	1124	1235
91	1344	1454	1564	1674	1783	1892	2002	2111	2220	2329
92	2437	2546	2655	2763	2871	2979	3087	3195	3303	3411
93	3518	3626	3733	3841	3948	4055	4162	4268	4375	4482
94	4588	4694	4801	4907	5013	5118	5224	5330	5435	5541
95	6.8 5646	5751	5857	5961	6066	6171	6276	6380	6485	6589
96	6693	6797	6901	7005	7109	7213	7316	7420	7523	7626
97	7730	7833	7936	8038	8141	8244	8346	8449	8551	8653
98	8755	8857	8959	9061	9163	9264	9366	9467	9568	9669
99	9770	9871	9972	*0073	*0174	*0274	*0375	*0475	*0575	*0675
100	6.9 0776	0875	0975	1075	1175	1274	1374	1473	1572	1672
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