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FORMULAS AND TABLES FOR THE COMPUTATION OF GEODETIC POSITIONS ON THE INTERNATIONAL ELLIPSOID

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FORMULAS AND TABLES FOR THE COMPUTATION OF GEODETIC POSITIONS ON THE INTERNATIONAL ELLIPSOID

INTRODUCTION

Although the United States Coast and Geodetic Survey is using, and expects to use, the Clarke Spheroid of 1866 for geographic purposes, it has felt the need of tables adapted to the formulas familiar to its personnel but based on the International Ellipsoid of Reference. This ellipsoid will be used by the Survey for experimental and scientific purposes and it is believed that other geodetic organizations and individual geodesists will also find use for these tables. Excellent fundamental tables for the computation of geodetic positions on the International Ellipsoid have already appeared.[1] These are calculated to a great number of decimals and served as the basis for the present tables. The present publication includes a brief account of the International Ellipsoid followed by a number of pages explaining the uses of the tables. These pages, apart from changes obviously necessitated by the change from the Clarke Spheroid, are reproduced almost verbatim from Special Publication No. 8 of this Survey, *Formulas and Tables for the Computation of Geodetic Positions*, seventh edition, 1929.

The explanations thus reproduced refer to the current practice of the Survey in using logarithms to seven decimal places. The tables in this publication are to eight decimal places in the main; nevertheless, the earlier text has been retained unchanged in this respect. It is easy to reduce the number of figures to seven and the eighth figure may be needed on occasions. It may well be that to secure the full benefit of the eighth figure it will be necessary to include smaller terms in the formulas, or otherwise to make them more nearly rigorous. The approach to rigor will doubtless require a greater definiteness in specifying the exact nature of the lines forming the geodetic triangles, whether vertical sections, geodetic lines, or lines of some other sort. These refinements, of which mention is made in the text reproduced from Special Publication No. 8 (see p. 3 of this publication), are left for future consideration. The illustrative examples, however, are computed with the eight decimals of the tables.

A collection of numerical data and formulas based on the International Ellipsoid forms part of the present collection of tables.

The proofs of the formulas given at the end of the seventh edition of Special Publication No. 8 have been omitted. These proofs were based on the conception of substituting a certain sphere for the ellipsoid, not the auxiliary sphere in the usual theory of the geodesic line on an ellipsoid (for the rigorous theory see F. R. Helmert, *Die mathe-*

[1] Tables de L'Ellipsoide de Référence International adopté par l'Assemblée Générale de Madrid le 7 octobre 1924, dans le Système de la Division sexagésimale de la Circonférence, calculées sous la direction du Général G. Perrier . . . par E. Hasse . . . Special Publication No. 2 of the Section (now Association) of Geodesy of the International Union of Geodesy and Geophysics, Paris, 1928.

matischen und physikalischen Theorieen der höheren Geodäsie, vol. 1, p. 218, or A. R. Clarke, *Geodesy*, pp. 114 and 127), but a sphere having as its radius the great normal of the initial point. This method of proof, which goes back at least to Puissant, and which is given in Special Publication No. 8, is lacking in rigor, as it does not make clear the nature of the line on the ellipsoid connecting the initial and terminal points of the computation.

The seventh edition of Special Publication No. 8 contained the formulas, lacking in early editions, for the inverse problem, the determination of the length of a line and of the azimuths at its ends, given the geographic coordinates of the ends. An illustrative numerical example of the inverse computation was given but no proof of the formulas used. The present publication gives proof of a sort. The proof again depends on the conception of the substitution of a certain sphere for the ellipsoid and is equally lacking in rigor.

THE INTERNATIONAL ELLIPSOID OF REFERENCE

This ellipsoid was adopted in 1924 at the Madrid meeting of the Section (now Association) of Geodesy of the International Union of Geodesy and Geophysics. The executive committee of the Section of Geodesy made a report on the International Ellipsoid, from which the following is translated.

"It is not in any way a question of forcing upon nations that have their triangulations either long completed or well advanced a new ellipsoid upon which they must recalculate their triangulation. If they are in a position to do so, so much the better, but obviously they cannot be compelled to do this and any ruling of this sort would be idle.

"The International Ellipsoid should be used in preference to any other:

(1) In regions recently opened to geodetic work, for triangulations very recently undertaken or scarcely begun, the calculation of which could be easily recommenced, and for triangulations to be undertaken in the future.

(2) In regions already covered by geodetic operations, when for any reason the work is to be revised.

(3) Whenever for purposes of higher geodesy the deflections of the vertical are to be calculated with reference to a definite ellipsoid.

"It is thus to be hoped that the triangulation of the vast territories still to be won over to geodesy will all be calculated on the same ellipsoid and that some countries will make over their triangulation on the same system. Even though the homogeneity cannot be complete, at least a long step will have been taken toward that unification of systems so much desired by geodesists, a fact which will make it easier to discuss and to solve a large number of important problems."

The fundamental defining parameters of the International Ellipsoid of Reference are:

$$\text{Semimajor axis} = a = \mathbf{6{,}378{,}388\ meters},$$

$$\text{Flattening (ellipticity)} = \frac{a-b}{a} = f = \frac{1}{297}.$$

From these are derived:

$$\text{Semiminor axis} = b = 6{,}356{,}911.946 \text{ meters},$$

$$\text{Square of eccentricity} = e^2 = \frac{a^2 - b^2}{a^2} = 0.006722670022.$$

The International Ellipsoid was based on the work of J. F. Hayford.[2] Hayford gives for the semiminor axis 6,356,909 meters, but if strict internal consistency of all sets of parameters connected with the ellipsoid is desired, only two parameters can be selected arbitrarily; the remaining values must be deduced from these two. Hayford's figures are not strictly self-consistent and since a and f were chosen as the defining parameters, b must be deduced from them, with the result to three decimals of a meter as given above. Other derived parameters and data are given on pages 25–30.

Recent progress in the invention and improvement of calculating machines brings up a question as to the possibility of arranging these tables for machine computing instead of preserving the previous form for logarithmic work. Where the number of factors in a product is more than two, the only mechanical device in use at present that compares in speed with the use of logarithms is the slide rule. The best forms of this instrument in present use are limited to numbers of 4 or 5 figures, while the work for which these tables are designed generally calls for 7 figures. So it again appears that modern progress has not yet reached a point where a change is required.

SOLUTION OF TRIANGLES

The triangle on the ellipsoid is solved by the application of Legendre's theorem. That is, one third of the spherical excess is subtracted from each angle of the ellipsoidal triangle, the resulting angles being the angles of a plane triangle whose sides are approximately equal in length to the sides of the triangle on the ellipsoid.

The angle at each vertex of the ellipsoidal triangle is the angle between the two vertical planes at that vertex passed respectively through the sea-level projection of each of the other two vertices. Reduction is thus made for elevation above the *geoid* and not above the *ellipsoid*, for object sighted upon. We reduce to the geoid rather than to the ellipsoid chiefly because, in the first approximation, we do not know the elevation above the ellipsoid. Horizontal angles and directions are not reduced for local deflection of the vertical, for horizontal refraction, or for difference of direction between vertical section and geodesic (shortest) line. Nor are bases reduced for difference of elevation between geoid and ellipsoid. These refinements of computation, amounting generally to less than the uncertainties of errors of observation, remain to be applied at some future time as a second approximation to the first-order triangulation in the United States.

For two points, A_1 and B_1 on the ellipsoid, the plane which contains the normal at A_1 and passes through B_1 intersects the ellipsoid in a plane curve, which may be called the vertical section from A_1 to

[2] Supplementary Investigation in 1909 of the Figure of the Earth and Isostasy, U. S. Coast and Geodetic Survey, 1910, p. 39.

B_1. The vertical section from B_1 to A_1 is determined by the plane which contains the normal at B_1 and passes through A_1. These two vertical sections do not coincide, except in particular cases, so it is not strictly accurate to say that a triangle is formed on the ellipsoid by the vertical sections joining three points. There are eight triangles actually formed, the sides and angles of any one differing extremely little from the corresponding sides and angles of any other, for triangles that actually enter into geodetic work—that is, for triangles whose vertices are intervisible. This ambiguity is entirley independent of that arising from extending the lines completely around the earth. The latter ambiguity does not occur in practical application to intervisible points. The fact that horizontal directions are not reduced to the direction of the geodesic lines is the source of the above difficulty, but the effect on the resulting lengths is small, being well within the uncertainty due to errors of observation. The error in length due to this cause cannot accumulate, since the lengths of the controlling bases do not require a corresponding correction. The effect on the azimuth is small and also well within the uncertainties arising from errors of observation.

SPHERICAL EXCESS

The spherical excess is computed by the formula:

$$\epsilon=\frac{a_1 b_1 \sin C_1(1-e^2 \sin^2 \phi)^2}{2a^2(1-e^2) \sin 1''}=a_1 b_1 \sin C_1 \times m.$$

In this formula ϵ is the spherical excess; a_1, b_1 and C_1 are two sides and the included angle, respectively, of the corresponding triangle; e^2 is the square of the eccentricity, and a the major semiaxis of the ellipsoid of reference; and ϕ is the mean geodetic latitude of the three vertices of the triangle. That part of the above expression which depends only on the latitude and the dimensions of the ellipsoid may be designated by a single letter m. This variable m must not be confounded with the constant parameter $m=\frac{e^2}{2-e^2}$ of the International Ellipsoid given on page 25.

In Table I, page 18, the logarithms of m are given with the latitude as an argument.

The above formula gives the spherical excess too small by one one-hundredth of a second for an equilateral triangle with 200-kilometer sides, or for a nonequilateral triangle of the same area. For an equilateral triangle of 100-kilometer sides, or an equivalent nonequilateral triangle, the excess as given by this formula is too small by less than one one-thousandth of a second.

In cases where a more accurate value of the spherical excess is required the formulas given on page 51 of Special Publication No. 4, *The Transcontinental Triangulation*, may be used. A very full discussion of Legendre's theorem and the computation and use of the spherical excess will be found in F. R. Helmert's, *Die mathematischen und physikalischen Theorieen der höheren Geodäsie*, volume 1, pages 88–102. The subject is also treated in some detail by A. R. Clarke in his *Geodesy*, pages 46–49, 103–134.

These formulas give a slightly unequal distribution of the spherical excess among the three angles of the triangle.

NUMBER OF DECIMAL PLACES IN ANGLES AND LENGTHS

According to present practice in the Coast and Geodetic Survey, directions, angles, and azimuths are computed to the hundredth of the sexagesimal second for first-order triangulation and to the tenth for second and third-order triangulation. This gives from 1 to 2 uncertain figures in the corresponding values—the uncertainties due to errors of observation—and appears to be as much as can reasonably be required of the computation at the present time.

The logarithms of the lengths, expressed in meters, are given to 7 decimal places for the first-order lines and to 6 places for second- and third-order lines. The lengths being computed from the angles, it is best to use 7 decimal places in the lengths with hundredths of seconds in the angles and 6 places with tenths of seconds. In reasonably well-shaped triangles this secures against the introduction of accumulated error in the last decimal place of the logarithms of the lengths due to those small accumulations in the last decimal place of the angles which arise from rounding off to the last place used. In other words, no uncertainty is introduced into the last figure of the lengths by the computing except the unavoidable accumulation due to rounding off.

An uncertainty of a unit in the fifth decimal place of the logarithm is equivalent to an uncertainty of 1 part in 43,000, while one in the sixth place corresponds to 1 part in 434,000. The base lines are scarcely more accurate than the latter ratio; so it follows at once that even for the most accurate first-order triangulation the logarithms of the lengths are surely uncertain in the sixth and seventh places, and in some cases the fifth place may be uncertain by as much as a unit. Therefore it may be said that in the use of seven decimals in the logarithms for the first-order lines from 2 to 3 of the last figures are uncertain, and with the use of six decimals, for second- and third-order lines, the last 2 figures are uncertain.

In passing from the logarithm to the corresponding number the uncertainty in the logarithm is, in general, reproduced by the same amount in the corresponding figure of the number. For example, an uncertainty of one in the sixth decimal of the logarithm gives rise to an uncertainty of one in the sixth figure of the number. The counting is from the left to the right in the number, beginning with the first significant figure. This correspondence for figures in the same place in the logarithm and in the number is exact for numbers whose first figures are 434. . . . For all numbers from 100 . . . to 434 . . . the uncertainty in the derived numbers is less than the uncertainty in the corresponding figure of the logarithm, being only about one fourth as much for the former numbers. From 434 . . . to 999 . . . the uncertainty in the derived numbers is greater than the uncertainty in the corresponding figure of the logarithm, being about two and one half times as great in the latter numbers. On the whole, then, the numbers should be written out to as many significant figures as there are decimal places in the logarithms from which they are derived, and the uncertainties will be about the same for corresponding figures. If this rule were followed out, it could always be said that there were two uncertain figures in the given lengths. The length of the lines varies between such wide limits, however, that the application of such a rule would give a nonuniform appearance to the results, so the practice in the Coast and Geodetic Survey is to give

the lengths to two decimal places (centimeters) for the first-order lines and to one decimal place for the second- and third-order lines.

COMPUTATION OF DIFFERENCES OF LATITUDE, LONGITUDE, AND AZIMUTH

The problem is, given the latitude and longitude of a point A_1 and the azimuth and distance from A_1 to B_1, to determine the latitude and longitude of B_1 and the azimuth from B_1 to A_1. The distance here used is the side of a triangle, computed as explained above, and the azimuth is the angle the vertical section makes with the meridian, measured clockwise from the south up to 360°. The meridian referred to is not the directly observed meridian, but is one carried to the point in question through the triangulation and is, in general, based on many directly observed astronomic azimuths. It is customary in the Coast and Geodetic Survey to speak of this azimuth as the geodetic azimuth, meaning the azimuth of the vertical section as carried through the triangulation and having no reference to the azimuth of the geodesic (shortest) line. The formulas used in the solution of the above problem are as follows:

$$-\Delta\phi = s\cos\alpha.B + s^2\sin^2\alpha.C + (\delta\phi)^2 D - hs^2\sin^2\alpha.E - \tfrac{1}{2}s^2 kE + \tfrac{3}{2}s^2\cos^2\alpha.kE + \tfrac{1}{2}s^2\cos^2\alpha\sec^2\phi.A'^2 k\sin^2 1''. \quad (1)$$

$$\text{Sin}\,\Delta\lambda = \sin\frac{s}{N'}\sec\phi'\sin\alpha; \quad (2)$$

or

$$\log\Delta\lambda = \log s + c(\log\Delta\lambda) - c(\log s) + \log\sin\alpha + \log A' + \log\sec\phi'. \quad (3)$$

In (3) $c\,(\log\Delta\lambda)$ and $c\,(\log s)$ are the arc-sine corrections of Table III, the arguments $\log\Delta\lambda$ and $\log s$ of that table being indicated in parentheses.

$$-\tan\tfrac{1}{2}(\Delta\alpha) = \tan\tfrac{1}{2}(\Delta\lambda)\frac{\sin\tfrac{1}{2}(\phi'+\phi)}{\cos\tfrac{1}{2}(\phi'-\phi)}; \quad (4)$$

or

$$-\Delta\alpha = \Delta\lambda\sin\tfrac{1}{2}(\phi'+\phi)\sec\tfrac{1}{2}(\Delta\phi) + (\Delta\lambda)^3 F.$$

In (1) the following abbreviations are made:

$$h = s\cos\alpha.B;$$
$$-\delta\phi = s\cos\alpha.B + s^2\sin^2\alpha.C - hs^2\sin^2\alpha.E;$$
$$k = s^2\sin^2\alpha.C.$$

The symbols in the above expressions are as follows: ϕ and λ are the given latitude and longitude, respectively, of the point A_1; ϕ' and λ' represent the required latitude and longitude, respectively, of the point B_1; s is the distance from A_1 to B_1; α is the azimuth of the vertical section from A_1 to B_1, and α' is the azimuth of the vertical section from B_1 to A_1; N' is the length of the radius of curvature in the prime vertical at the point B_1. The differences of latitude, longitude, and azimuth are represented, respectively, by $\Delta\phi$, $\Delta\lambda$, and $\Delta\alpha$, and—

$$\phi' = \phi + \Delta\phi;$$
$$\lambda' = \lambda + \Delta\lambda;$$
$$\alpha' = \alpha + \Delta\alpha + 180°;$$

A', B, C, D, E, and F are factors depending on the dimensions of the reference ellipsoid and the latitude. The forms of these factors are shown on page 30, and their logarithms are given with the latitude as an argument in Table VII.

COMPUTATION OF GEODETIC POSITIONS

Equation (1) gives the difference of latitude in the form of a power series of the distance. Although terms of the sixth order appear in this expression, it cannot be said to be correct up to terms of the fourth order. This formula is limited in application both by latitude and by length of line. Latitudes near 90° are excluded, since the tangent of the latitude enters into some of the coefficients. For a required degree of accuracy in $\Delta\phi$—for example, that the third decimal place of the seconds shall be correct, according to usage in the Coast and Geodetic Survey—the length of line to which (1) is applicable is limited accordingly. In Appendix No. 7, Coast and Geodetic Survey Report for 1896, page 303, it is stated that (1) and (3) should not be applied to lines of greater length than 75 kilometers if the results are required to be correct to 0″.001. When this statement was made the terms of the fourth order were not included in (1), and the statement seems to have allowed considerable margin for safety.

Equation (2) gives $\Delta\lambda$ by the solution of a spherical triangle. In passing to form (3), which is more convenient for computing, corrections are given for the second term in the reduction from the logarithm of the sine to the logarithm of the arc. The form of this correction for $\Delta\lambda$ is approximately $\frac{M}{6}\sin^2 1''\ (\Delta\lambda)^2$, in which M is the modulus of the common system of logarithms, and $\Delta\lambda$ is expressed in seconds; the form for s is $\frac{M}{6}s^2A'^2\sin^2 1''$, in which s is in meters and A' is the factor given in (3). This factor is written with the prime accent to emphasize the fact that in the use of (3) it is to be taken from the tables for the latitude ϕ' and not ϕ. In Table II the exact correction to the logarithm of $\Delta\lambda$ is placed in the middle, while just opposite on the right is the corresponding logarithm of $\Delta\lambda$ to four decimal places for values of c less than 4000 and to five decimal places for values of c equal to and greater than 4000, and opposite on the left is the corresponding logarithm of s to four places. The correction for log $\Delta\lambda$ is always positive and that for log s is always negative. In tabulating the correction for log s an average value (8.5090–10) was taken for log A'. The correction can not be in error on this account as much as one in the seventh place for any latitude from 0° to 72°, so long as the line does not exceed 100 kilometers in length. In forming length equations in triangulation adjustment the correction for reduction from arc to sine is taken from Table II for log s and is, of course, always negative in this case.

Formulas (1), (2), and (3) do not give results correct to 0″.001 in $\Delta\phi$ and $\Delta\lambda$ for lines approaching 100 kilometers in length or greater. Nevertheless the error is not more than two or three in the third decimal of the seconds for lines up to about 120 kilometers, and in general the errors due to the limitations of the formulas are not greater

for these lengths than the uncertainty arising from the use of only seven decimal places in the computations.

Formula (4) is the application of Dalby's theorem. See Helmert's *Die mathematischen und physikalischen Theorieen der höheren Geodäsie*, volume 1, page 150. There can be no question of the accuracy of the second decimal place of the seconds in $\Delta\alpha$, derived by the use of this formula, for any length of line for which (1), (2), and (3) give results approximately correct to 0''.001. In passing to the second form of (4) account is taken of the second term in the expansion of tan $\frac{1}{2}\Delta\alpha$ and tan $\frac{1}{2}\Delta\lambda$, and an approximate value of the ratio of $\Delta\alpha$ to $\Delta\lambda$ is taken to derive the form of the factor F.

Examples are given on pages 15 and 16 of the computation of first- and third-order positions, respectively. These examples are photographic reproductions of transcribed computations. The differences of latitude, longitude, and azimuth are computed for the two sides of a triangle, the base points of which are already known in latitude, longitude, distance, and mutual azimuths. The solution is also shown of the triangles upon which the examples are based. The practice is to write the name of the new point first in the form for the computation of triangles, the known base points following in clockwise order. The two position computations from the two known extremities of the base to the as yet unknown position of the vertex of the triangle are made on the left- and right-hand halves of the page, respectively. The angle opposite the second name in the triangle computation is always entered on the left half of the page and is added to get the resulting azimuth from that point to the vertex. The third angle is placed on the right half of the page and always subtracted to get the resulting azimuth from the other base point. This rule of always writing the names and angles of the triangle in clockwise order and entering the angles and adding and subtracting in a specified way on the position computation forms is mechanical, but is conducive to accuracy and speed in computing. The latitude and longitude of the vertex of the triangle both appear on each half of the page, and an immediate check is furnished, while the two azimuths from the vertex back to the base points are checked if the azimuth on the right half of the page is equal to the sum of the azimuth on the left half of the page and the first angle of the triangle.

No printed form is used for computing spherical excess, as it is a simple matter to add the logarithm from Table I to the three logarithms in the triangle computation, a preliminary computation of the triangle being sufficiently accurate for this purpose.

To apply these tables to the computation of positions south of the Equator it is only necessary to bear in mind in using the formulas that all south latitudes are negative. Wherever $\Delta\phi$, as computed in these formulas, is negative, it indicates a numerical increase in the latitude. In using the formulas for $\Delta\alpha$ it should be noted that for the Southern Hemisphere the term sin $\frac{1}{2}(\phi+\phi')$ is always negative, and therefore $\Delta\alpha$ and $\Delta\lambda$ always have the same sign in the Southern Hemisphere, whereas they have opposite signs in the Northern Hemisphere.

To apply these tables to the computation of positions in east longitude it is only necessary to consider that all east longtiudes are negative.

INVERSE POSITION COMPUTATION

Let $P\,A\,B$ be the ellipsoidal triangle formed by the pole P and the points A and B, whose geographic latitudes (ϕ_1 and ϕ_2) and whose difference of longitude ($\Delta\lambda$) are given. It is required to find the linear distance $AB=s$ and the azimuth (α) of AB at A and the back azimuth (α') of BA at B. Replace this ellipsoidal triangle by a spherical triangle on a sphere having for its radius the great normal (N_m) for the mean latitude $\phi_m=\frac{1}{2}(\phi_1+\phi_2)$. In this spherical triangle $PA'B'$, ϕ_1' and ϕ_2' being the latitudes of the points corresponding to A and B, let $\Delta\lambda$ remain unchanged, also $\phi_m=\frac{1}{2}(\phi_1+\phi_2)=\frac{1}{2}(\phi_1'+\phi_2')$. ϕ_1' and ϕ_2', however, are not equal to ϕ_1 and ϕ_2, but the arc between the parallels of ϕ_1 and ϕ_2 on the sphere is taken equal to the arc between the parallels of ϕ_1 and ϕ_2 on the ellipsoid, that is:

$$N_m(\phi_2'-\phi_1')=R_m(\phi_2-\phi_1)=R_m\Delta\phi \tag{5}$$

where $\Delta\phi=\phi_2-\phi_1$.

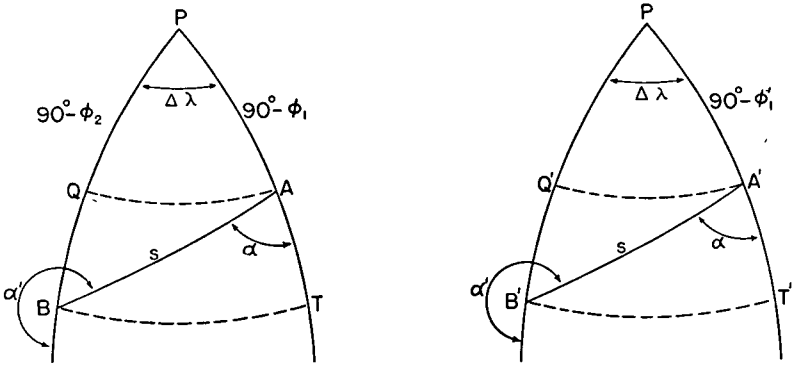

FIGURE 1.—Spheroidal and ellipsoidal triangles involved in inverse position computation.

The left-hand side represents exactly the meridional arc represented on the sphere; the right-hand side is an approximation, valid for moderate values of $\phi_2-\phi_1$ only.

It is assumed by this substitution that the distance $AB=A'B'$, $\angle A=\angle A'$ and $\angle B=\angle B'$, all with sufficient accuracy for the purpose in hand. This would be true if the triangles were in a plane, for then they would be identical right triangles. It is nearly true because the sides of the triangles are small in comparison with the dimensions of the sphere and ellipsoid and because, furthermore, the curvatures of the two surfaces are nearly equal. It would be possible to consider elaborately the orders of magnitudes of the errors involved, but this discussion does not pretend to mathematical rigor. Apply two of Gauss' (Delambre's) equations to $PA'B'$; these are

$$\left.\begin{aligned}\sin\frac{c}{2}\cos\frac{1}{2}(A-B)&=\sin\frac{1}{2}(a+b)\sin\frac{1}{2}C\\ \sin\frac{c}{2}\sin\frac{1}{2}(A-B)&=\sin\frac{1}{2}(a-b)\cos\frac{1}{2}C\end{aligned}\right\}\tag{6}$$

If we take the points A and B in the general formula above as corresponding to A' and B', it is easy to see that C represents $\Delta\lambda$ and that if we reckon azimuths from the south, we have $A=180°-\alpha$, $B=\alpha'-180°$; also $b=90°-\phi_1'$, and $a=90°-\phi_2'$. $c=A'B'$ in angle. Let this be denoted by σ, corresponding to linear distance s. Gauss' equations (6) then become

$$\left.\begin{aligned}\sin\tfrac{1}{2}\sigma\cos\tfrac{1}{2}(360°-\alpha-\alpha')&=\cos\phi_m\sin\tfrac{1}{2}\Delta\lambda\\ \sin\tfrac{1}{2}\sigma\sin\tfrac{1}{2}(360°-\alpha-\alpha')&=\sin\tfrac{1}{2}(\phi_1'-\phi_2')\cos\tfrac{1}{2}\Delta\lambda\end{aligned}\right\}(7)$$

Let us replace the small sines of the small arcs $\frac{1}{2}\sigma$, $\frac{1}{2}\Delta\lambda$, and $\frac{1}{2}(\phi_1'-\phi_2')$ by the arcs themselves in radians, merely noting in the equations the necessity of a small correction due to this replacement. Since $\sigma=\frac{s}{N_m}$ and $\phi_1'-\phi_2'=-\frac{R_m}{N_m}\Delta\phi$ we have

$$\left.\begin{aligned}\frac{s}{2N_m}\sin\left(\alpha+\frac{\Delta\alpha}{2}\right)&=\cos\phi_m\frac{\Delta\lambda}{2}+\text{arc-sin corrections}\\ \frac{s}{2N_m}\cos\left(\alpha+\frac{\Delta\alpha}{2}\right)&=-\frac{R_m}{2N_m}\Delta\phi\cos\tfrac{1}{2}\Delta\lambda+\text{ arc-sin corrections}\end{aligned}\right\}(8)$$

where we write $\alpha'=180°+\alpha+\Delta\alpha$.

Or since $A_m=\frac{1}{N_m\sin 1''}$, $B_m=\frac{1}{R_m\sin 1''}$, where A_m and B_m are taken from Table VII with the argument ϕ_m, we have when the small angles are expressed in seconds of arc instead of radians

$$\left.\begin{aligned}s\sin\left(\alpha+\frac{\Delta\alpha}{2}\right)&=\frac{\Delta\lambda\cos\phi_m}{A_m}+\text{arc-sin corrections}\\ s\cos\left(\alpha+\frac{\Delta\alpha}{2}\right)&=-\frac{\Delta\phi\cos\frac{1}{2}\Delta\lambda}{B_m}+\text{arc-sin corrections}\end{aligned}\right\}(9)$$

The method of computing from these equations can be seen by examining the example on page 17. The first member of the pair is divided by the second to obtain $\tan\left(\alpha+\frac{\Delta\alpha}{2}\right)$. The proper quadrant for $\alpha+\frac{\Delta\alpha}{2}$ is deduced from the fact that s is always positive, also $\cos\frac{\Delta\lambda}{2}$, $\cos\phi_m$, A_m and B_m, so that $\alpha+\frac{\Delta\alpha}{2}$ must be in a quadrant where its sine has the same algebraic sign as $\Delta\lambda$ and its cosine the same algebraic sign as $-\Delta\phi$. When $\alpha+\frac{\Delta\alpha}{2}$ is known, the value of s is found from either member of the pair of equations (9), or preferably from both as a check.

The notation of Form 662, p. 17, for taking care of the arc-sine corrections needs a little explanation. $\Delta\lambda_1$ and $\Delta\phi_1$ are the values of $\Delta\lambda$ and $\Delta\phi$ *after* the arc-sine correction has been applied. s_1 is the value of s *before* the arc-sine correction for s has been applied.

The equations are then as printed at the top of the form (with a slightly different notation)

$$\left.\begin{aligned} s_1 \sin\left(\alpha+\frac{\Delta\alpha}{2}\right)&=\frac{\Delta\lambda_1 \cos\phi_m}{A_m} \\ s_1 \cos\left(\alpha+\frac{\Delta\alpha}{2}\right)&=-\frac{\Delta\phi_1 \cos\frac{1}{2}\Delta\lambda}{B_m} \end{aligned}\right\} \quad (10)$$

The value of $\log s_1$ is first deduced, as previously explained, then the arc-sine correction is applied, giving $\log s$ in meters.

The other pair of Gauss' equations could be made to give a value of $\Delta\alpha$, but it is simpler to transform the result into the same form as that used in the direct problem

$$-\Delta\alpha=\Delta\lambda \sin\phi_m \sec\frac{\Delta\phi}{2}+F(\Delta\lambda)^3 \quad (11)$$

where $\log F$ comes from Table VII.

With the values of $\alpha+\frac{\Delta\alpha}{2}$ and $\Delta\alpha$ we readily find α and $\alpha'=\alpha+180°+\Delta\alpha$, the azimuth of AB at A and the back azimuth of BA at B, respectively. In Form 662, ϕ is written for ϕ_1 and ϕ' for ϕ_2. This is convenient enough in stating the final result, but not in deriving it, as the primes are needed for another purpose.

More accurate formulas for solving the inverse problem are given without proof in Theodor Albrecht's *Formeln und Hilfstafeln für geographische Ortsbestimmungen*, 4th ed., p. 137. It is not difficult to see that the method just given is a simpler and somewhat less approximate form of the method given by Albrecht and attributed by him to Gauss and Helmert jointly. Special tables are needed. The principal terms are given in such a form that by a slight modification of the form of statement the present tables could be used for them. The smaller terms involve quantities not immediately deducible from the present tables. Albrecht's tables are for the Bessel spheroid, but the small terms are so small that Albrecht's tables for them could be used in connection with the International Ellipsoid without serious error.

ARC-SINE CORRECTION

The sines of small angles are nearly equal to the angles themselves expressed in radians. If an equation involves the ratios of the sines of small angles, the sines may be replaced by the ratios of the angles or the ratios of the corresponding arcs expressed in any convenient unit; the resulting approximation may be rendered exact by applying a small correction. Since the formulas are for logarithmic computation, the problem to be considered is that of the logarithm of the ratio $\frac{\sin x}{x}$; since this is nearly unity its logarithm is a small quantity. Common logarithms are meant throughout. This requires the presence of the modulus $M=0.434295\ldots$ in the formulas.

First method.—We have the well-known series

$$\log \sin x = \log x - M\left(\frac{1}{6}x^2 + \frac{1}{180}x^4 + \ldots\right), \tag{12}$$

x being in radians, or if we call c the *correction* $\log x - \log \sin x$

$$c = \frac{M}{6}\left(x^2 + \frac{1}{30}x^4 + \ldots\right). \tag{13}$$

Reverting to the series in order to express x^2 in terms of c, we have to two terms

$$x^2 = \frac{6c}{M}\left[1 - \frac{1}{5}\frac{c}{M}\right]. \tag{14}$$

or taking common logarithms and carrying the logarithm of the factor in square brackets to one term only, we get

$$\log x = \frac{1}{2}\log c + \frac{1}{2}\log\left(\frac{6}{M}\right) - \frac{1}{10}c. \tag{15}$$

To reduce x to seconds of arc, indicated by x'' we add $\log \frac{1}{\text{arc } 1''} = 5.314425$. With this and the value of $\log \frac{6}{M}$ we find

$$\log x'' = 5.884609 + \frac{1}{2}\log c - \frac{1}{10}c. \tag{16}$$

By this means for each value of c the corresponding value of $\log x''$ in seconds may be found. The value of the small correction term is nearly always negligible.

Second method.—Many tables of logarithms of numbers or of trigonometric functions give the values of $S = \log \sin x - \log x''$. It is merely a matter of interpolation and of looking up the logarithms to tabulate the correction in the form here given. The first method is, however, much more rapid and the second method is useful chiefly as an occasional check. The second method is best explained by a numerical example, which will be computed by the first method also.

Example, first method.—Let $c = 12{,}000$ units of the eighth place $= 0.00012000$

$$\log x = 6.079181 - 10$$

$$\begin{aligned} \tfrac{1}{2}\log x &= 8.039591 - 10 \\ \text{constant} &= 5.884609 \\ -\tfrac{1}{10}c &= \underline{0.000012} \\ \log x'' &= \overline{3.924188} \end{aligned}$$

Same example, second method.—For a very small angle the value of S, which may be denoted by S_0, is 4.68557487. From this subtract the value of c to obtain a new value of S and see to what angle this new value corresponds. This second method applies best to the larger values of c, for which S changes rather rapidly.

$$\begin{aligned} S_0 &= 4.68557487 \\ -c &= \underline{0.00012000} \\ S &= \overline{4.68545487} \end{aligned}$$

In Bauschinger and Peters, *Logarithmic-Trigonometrical Tables with Eight Decimal Places*, there is found at the foot of page 331 of the logarithms of numbers

	°	′	″	S
8390=	2	19	50	4.68545510
8400=	2	20	00	4.68545482

By interpolation, the value of S found above corresponds to $8390+10\times\frac{23}{28}=8398.21$ with some uncertainty in the final figure. Log x''=log 8398.21=3.924187, in substantial agreement with the value found by the first method.

The value of log x'' thus found is tabulated under the heading "Log $\Delta\lambda$ (correction positive)" in Table II. This table can be considered rigorous for log $\Delta\lambda$.

As is stated on page 18 of Special Publication No. 8 the relation between log $\Delta\lambda$ and the corresponding log s for a common value of the arc-sine correction is log $\Delta\lambda$—log s=8.5090–10, the right-hand side being a mean value of log A' in Table VII. If greater precision is wanted, the actual value of log A', which ranges from 8.50971–10 at the Equator to 8.50875–10 at the Pole, should be used. For the purpose of making the correction the above equation may be written

$$\log s=\log \Delta\lambda+1.4910, \tag{17}$$

or if greater exactness is sought

$$\log s=\log \Delta\lambda+\operatorname{colog} A'. \tag{18}$$

The general region of the table where interpolation is to be made is easily determined with the mean value 1.4910. Then the exact value of colog A' is used to recompute a line or two, it being remembered that the table is accurate for $\Delta\lambda$ regardless of the value of A', and the more accurate value of the arc-sine correction for log s is found by interpolation.

For lines of ordinary length this is a superfluous refinement.

ARC-SINE CORRECTION FOR INVERSE PROBLEM

The relation between Tables II and III is very simple. In the inverse problem the half differences of latitude and longitude and the half of the angular distance between the two points is involved. Table III for the inverse problem is derived by adding log 2=0.30103 to the values of log x'' derived for Table II and calling the results "Log $\Delta\phi$ or log $\Delta\lambda$" in Table III, the values of the arc-sine correction remaining unchanged.

The value found under the heading Log s_1 in Table III, is found, as before, by adding 1.4910 to log $\Delta\phi$ or log $\Delta\lambda$. Because we are dealing with smaller arc-sine corrections in the inverse problem it will very seldom be necessary to use the actual value of colog A_m instead of the assumed value, 1.4910.

The example used to illustrate the inverse problem involves the same points as the direct problem. The azimuths agree within 0″.01 but the logarithm of the distance in the inverse problem comes out

5.37615071 as against 5.37615050. This is a difference of 21 units of the eighth place but only 2 units of the seventh. Seven places are all that are ordinarily used and the agreement would then be considered satisfactory. It must be remembered that this line is exceptionally long. For lines of the length ordinarily used the discrepancies between the direct and the inverse solution would come chiefly from rounding off to three decimals the difference of latitude and longitude.

EXAMPLES OF COMPUTATION

Computation of triangles

FIRST-ORDER TRIANGULATION

Stations	Observed angle	Correction	Spherical angle	Spherical excess	Plane angle	Logarithm
	° ′		″	″	″	
2-3						5.21551659
1 Wheeler Peak	43 40		37.34	24.58	12.76	0.16083227
2 Mount Nebo	48 04		05.50	24.58	40.92	9.87149183
3 Tushar	88 16		30.91	24.59	06.32	9.99980164
1-3			73.75			5.24784069
1-2						5.37615050

THIRD-ORDER TRIANGULATION

2-3						3.662881
1 Parson	103 12		18.8		18.8	0.011638
2 Outer	23 51		16.1		16.1	9.606827
3 Hard	52 56		25.1		25.1	9.902007
1-3			00.0			3.281346
1-2						3.576526

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U. S. COAST AND GEODETIC SURVEY
Form 526—Rev. Apr. 11, 1930

POSITION COMPUTATION, FIRST-ORDER TRIANGULATION

		°	′	″
α	2 Mt. Nebo to 3 Tushar	20	05	36.08
2d∠	Tushar & Wheeler Peak	+48	04	05.50
α	2 Mt. Nebo to 1 Wheeler Peak	68	09	41.58
Δα		−1	37	01.37
		180	00	00.00
α′	1 Wheeler Peak to 2 Mt. Nebo	246	32	40.21
	First Angle of Triangle	43	40	37.34

	°	′	″			°	′	″
φ	39	48	38.316	2 Mt. Nebo	λ	111	45	56.235
Δφ	−	49	29.158		Δλ	+ 2	32	50.612
φ′	38	59	09.158	1 Wheeler Peak	λ′	114	18	46.847

	Logarithms		″		Logs
a	5.37615050	(1)	+2867.6669	½	9.699
cos α	9.57053225	(2)	+ 103.0436	s²	10.752
B	8.51084596	Sum	+2970.7105	K	2.013
(1)−h	3.45752871	(3)	+ 0.2125	E	6.100
s²	10.732301	(4)	− 1.7599	(5)	8.564
sin² α	9.935317	(5)	− 0.0366	3	0.477
C	1.325403	(6)	+ 0.0152	cos² α	9.141
(2)−K	2.013021	(7)	+ 0.0167	(6)	8.182
(½Δφ)²	6.94521	−Δφ	+2969.1584	(colog) E/3	3.900
D	2.38221	Δφ/2	−1484.58	A²sin²1″/3	5.912
(3)	9.32742			sec² φ	0.223
−h	3.45753			(7)	8.223
s² sin² α	10.68762				
E	6.10035	Arc−sin corr.			
(4)	0.24550	for s	−1002.5	(Δλ)²	11.8872
		for Δλ	+143.09	F	7.8682
		Total	+4284	(8)	9.7564

	°	′	″
½(φ+φ′)	39	23	53.74
Logarithms			
s	5.37615050		
sin α	9.99765860		
A′	8.50913564		
sec φ′	0.10941074		
Sum	3.96235548		
Arc−sin corr.	+		4284
Δλ	3.96239832		
sin½(φ+φ′)	9.80257333		
sec Δφ/2	0.00001125		
(approx.) −Δα	3.76498290		
do	+5820.803		
(8)	+ 0.571		
−Δα	+5821.37		
Δλ	+9170.6120		

	Logarithms		″		Logs
a	5.24784069	(1)	−2094.7865	½	9.699
cos α	9.56234873	(2)	+ 54.6469	s²	10.496
B	8.51095035	Sum	−2040.1396	K	1.737
(1)−h	3.32113977	(3)	+ 0.0993	E	6.072
s²	10.495681	(4)	+ 0.6706	(5)	8.004
sin² α	9.937889	(5)	− 0.0101	3	0.477
C	1.303995	(6)	+ 0.0040	cos² α	9.125
(2)−K	1.737565	(7)	+ 0.0046	(6)	7.606
(½Δφ)²	6.61903	−Δφ	−2039.3712	(colog) E/3	3.928
D	2.37775	Δφ/2	+1019.69	A²sin²1″/3	5.912
(3)	8.99678			sec² φ	0.212
−h	3.32114			(7)	7.658
s² sin² α	10.43357				
E	6.07177	Arc−sin corr.			
(4)	9.82648	for s	−655.2	(Δλ)²	11.5061
		for Δλ	+797.1	F	7.8734
		Total	+241.9	(8)	9.3795

	°	′	″
½(φ+φ′)	38	42	09.47
Logarithms			
s	5.24784069		
sin α	9.96894460		
A′	8.50913564		
sec φ′	0.10941074		
Sum	3.88533167		
Arc−sin corr.	+		2419
Δλ	3.88535586		
sin½(φ+φ′)	9.79607349		
sec Δφ/2	0.00000531		
(approx.) −Δα	3.63143466		
do	+4279.910		
(8)	+ .240		
−Δα	+4280.150		
Δλ	+6846.7227		

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FIGURE 2.—Example of first-order position computation.

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U. S. COAST AND GEODETIC SURVEY
Form 27
Ed. April, 1929

POSITION COMPUTATION, THIRD-ORDER TRIANGULATION

			°	′	″
α	2 Outer	to 3 Hard	144	43	42.5
2d ∠	Hard	& Parson	+23	51	16.1
α	2 Outer	to 1 Parson	168	34	58.6
Δα			−		20.7
			180	*00*	*00.0*
α′	1 Parson	to 2 Outer	348	34	37.9
		First Angle of Triangle	103	12	18.8

	°	′	″			°	′	″
φ	40	35	18.742	2 Outer	λ	73	36	33.964
Δφ	+	1	59.847		Δλ	+		31.763
φ′	40	37	18.589	1 Parson	λ′	73	37	05.727

	Logarithms	Values in seconds	
s	3.576526		
Cos α	9.991320		
B	8.510787		
h	2.078633	1st term	−119.8486″
s²	7.15305		
Sin² α	8.59311		
C	1.33728		
	7.08344	2d term	+.0012
h²	4.1573		
D	2.3842		
	6.5415	3d term	+.0003
		−Δφ	−119.847

	° ′ ″	
½(φ+φ′)	40 36 18.7	
	Logarithms	**Values in seconds**
s	3.576526	
Sin α	9.296554 −2	
A′	8.509094 5	
Sec φ′	0.119745 2	
Δλ	1.501919	+31.763″
Sin ½(φ+φ′)	9.813476	
−Δα	1.315395	+20.67

			°	′	″
α	3 Hard	to 2 Outer	324	42	28.9
3d ∠	Parson	& Outer	−52	56	25.1
α	3 Hard	to 1 Parson	271	46	03.8
Δα			+		52.9
			180	*00*	*00.0*
α′	1 Parson	to 3 Hard	91	46	56.7

	°	′	″			°	′	″
φ	40	37	20.508	3 Hard	λ	73	38	27.006
Δφ			1.919		Δλ		1	21.279
φ′	40	37	18.589	1 Parson	λ′	73	37	05.727

	Logarithms	Values in seconds	
s	3.281346		
Cos α	8.489222		
B	8.510785		
h	0.281353	1st term	+1.9114″
s²	6.56269		
Sin² α	9.99959		
C	1.33780		
	7.90008	2d term	+0.0079
h²	0.5627		
D	2.3843		
	2.9470	3d term	+ --
		−Δφ	+1.919

	° ′ ″	
½(φ+φ′)	40 37 19.5	
	Logarithms	**Values in seconds**
s	3.281346	
Sin α	9.999793 3	
A′	8.509094 5	
Sec φ′	0.119745 2	
Δλ	1.909979	−81.279″
Sin ½(φ+φ′)	9.813626	
−Δα	1.723605	−52.92

11—6362

FIGURE 3.—Example of third-order position computation.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
Form 668
Rev. April, 1931

INVERSE POSITION COMPUTATION

$$s_1 \sin\left(\alpha+\frac{\Delta\alpha}{2}\right)=\frac{\Delta\lambda_1 \cos\phi_m}{A_m}$$

$$s_1 \cos\left(\alpha+\frac{\Delta\alpha}{2}\right)=\frac{-\Delta\phi_1 \cos\frac{\Delta\lambda}{2}}{B_m}$$

$$-\Delta\alpha=\Delta\lambda \sin\phi_m \sec\frac{\Delta\phi}{2}+F(\Delta\lambda)^3$$

in which $\log \Delta\lambda_1 = \log(\lambda'-\lambda)$ − correction for arc to sin″; $\log \Delta\phi_1 = \log(\phi'-\phi)$ − correction for arc to sin″; and $\log s = \log s_1$ + correction for arc to sin″.

NAME OF STATION

1. ϕ	39°	48′	38.316″	Mt. Nebo	λ	111°	45′	56.235″
2. ϕ'	38	59	09.158	Wheeler Peak	λ'	114	18	46.847
$\Delta\phi\ (=\phi'-\phi)$		−49	29.158		$\Delta\lambda\ (=\lambda'-\lambda)$	+2	32	50.612
$\frac{\Delta\phi}{2}$		−24	44.579		$\frac{\Delta\lambda}{2}$	+1	16	25.306
$\phi_m\left(=\phi+\frac{\Delta\phi}{2}\right)$	39	23	53.737					
$\Delta\phi$ (secs.)			−2969.158		$\Delta\lambda$ (secs.)			+9170.612

$\log \Delta\phi$	3.47263330			$\log \Delta\lambda$	3.96239832
cor. arc−sin	− 375			cor. arc−sin	− 3577
$\log \Delta\phi_1$	3.47262955			$\log \Delta\lambda_1$	3.96236255
$\log \cos \frac{\Delta\lambda}{2}$	9.99989268			$\log \cos \phi_m$	9.88804061
$\operatorname{colog} B_m$	1.48912298			$\operatorname{colog} A_m$	1.49087469
$\log\{s_1 \cos(\alpha+\frac{\Delta\alpha}{2})\}$	4.96164521		(opposite in sign to $\Delta\phi$)	$\log\{s_1 \sin(\alpha+\frac{\Delta\alpha}{2})\}$	5.34127785
				$\log\{s_1 \cos(\alpha+\frac{\Delta\alpha}{2})\}$	4.96164521
$\log \Delta\lambda$	3.96239832	3 log $\Delta\lambda$	11.8872	$\log \tan(\alpha+\frac{\Delta\alpha}{2})$	0.37963264
$\log \sin \phi_m$	9.80257333	log F	7.8206	$\alpha+\frac{\Delta\alpha}{2}$	67° 21′ 10.88″
$\log \sec \frac{\Delta\phi}{2}$	0.00001125	log b	9.7578	$\log \sin(\alpha+\frac{\Delta\alpha}{2})$	9.96515220
				$\log \cos(\alpha+\frac{\Delta\alpha}{2})$	9.58551956
$\log a$	3.76498290			$\log s_1$	5.37612565
a	+5820.803			cor. arc−sin	+ 2506
b	+ 0.573			$\log s$	5.37615071
$-\Delta\alpha$ (secs.)	+5821.376				
$\frac{\Delta\alpha}{2}$	+2910.69″				
		48′	30.69″		
$\alpha+\frac{\Delta\alpha}{2}$		67° 21′	10.88″		
α (1 to 2)		68° 09′	41.57″		
$\Delta\alpha$		− 1 37	01.37		
		180			
α' (2 to 1)		246° 32′	40.20″		

*Use the table on the back of this form for correction of arc to sin.

NOTE.—For log s up to 4.52 and for $\Delta\phi$ or $\Delta\lambda$ (or both) up to 10′, omit all terms below the heavy line except those printed (in whole or in part) in heavy type or those underscored, if using logarithms to 6 decimal places.

U. S. GOVERNMENT PRINTING OFFICE: 1931

FIGURE 4.—Example of inverse position computation.

TABLE I.—*Log m—Factor for spherical excess*

[m is a factor used in computing spherical excess; see formula, p. 4. This m is not to be confounded with the parameter $\left(m=\frac{e^2}{2-e^2}\right)$ of the International Ellipsoid on p. 25]

Lat.	log m	Lat.	log m	Lat.	log m	Lat.	log m	Lat.	log m
° ′		° ′		° ′		° ′		° ′	
0 00	1.406903	10 00	1.406727	20 00	1.406219	30 00	1.405442	40 00	1.404487
10	903	10	721	10	209	10	427	10	470
20	903	20	715	20	197	20	412	20	453
30	902	30	709	30	186	30	397	30	436
40	902	40	703	40	175	40	382	40	420
50	902	50	696	50	164	50	367	50	403
1 00	901	11 00	690	21 00	153	31 00	352	41 00	386
10	900	10	684	10	141	10	337	10	369
20	900	20	677	20	130	20	322	20	352
30	899	30	671	30	118	30	307	30	335
40	898	40	664	40	106	40	292	40	318
50	897	50	657	50	095	50	277	50	301
2 00	896	12 00	650	22 00	083	32 00	262	42 00	284
10	894	10	643	10	071	10	246	10	267
20	893	20	636	20	059	20	231	20	251
30	892	30	629	30	047	30	215	30	234
40	890	40	622	40	035	40	200	40	217
50	889	50	615	50	023	50	184	50	200
3 00	887	13 00	607	23 00	1.406011	33 00	169	43 00	183
10	885	10	600	10	1.405999	10	153	10	165
20	883	20	592	20	986	20	138	20	148
30	881	30	585	30	974	30	122	30	131
40	879	40	577	40	961	40	106	40	114
50	877	50	569	50	949	50	091	50	097
4 00	874	14 00	561	24 00	936	34 00	075	44 00	080
10	872	10	553	10	924	10	059	10	063
20	869	20	545	20	911	20	043	20	046
30	867	30	537	30	898	30	027	30	029
40	864	40	528	40	885	40	1.405012	40	1.404012
50	861	50	520	50	872	50	1.404996	50	1.403995
5 00	858	15 00	512	25 00	859	35 00	980	45 00	978
10	855	10	503	10	846	10	964	10	961
20	852	20	494	20	833	20	948	20	944
30	849	30	486	30	820	30	931	30	927
40	846	40	477	40	807	40	915	40	910
50	843	50	468	50	793	50	899	50	893
6 00	839	16 00	459	26 00	780	36 00	883	46 00	876
10	835	10	450	10	767	10	867	10	859
20	832	20	441	20	753	20	851	20	842
30	828	30	432	30	739	30	834	30	825
40	824	40	422	40	726	40	818	40	808
50	820	50	413	50	712	50	802	50	791
7 00	816	17 00	404	27 00	698	37 00	785	47 00	774
10	812	10	394	10	685	10	769	10	757
20	808	20	384	20	671	20	753	20	740
30	803	30	375	30	657	30	736	30	723
40	799	40	365	40	643	40	720	40	706
50	794	50	355	50	629	50	703	50	689
8 00	790	18 00	345	28 00	615	38 00	687	48 00	672
10	785	10	335	10	601	10	670	10	655
20	780	20	325	20	587	20	654	20	638
30	775	30	315	30	572	30	637	30	621
40	770	40	304	40	558	40	620	40	604
50	765	50	294	50	544	50	604	50	587
9 00	760	19 00	284	29 00	529	39 00	587	49 00	570
10	755	10	273	10	515	10	570	10	554
20	749	20	262	20	500	20	554	20	537
30	744	30	252	30	486	30	537	30	520
40	738	40	241	40	471	40	520	40	503
50	732	50	230	50	456	50	504	50	486
10 00	1.406727	20 00	1.406219	30 00	1.405442	40 00	1.404487	50 00	1.403469

TABLE I.—*Log m—Factor for spherical excess*—Continued

[m is a factor used in computing spherical excess; see formula, p. 4. This m is not to be confounded with the parameter $\left(m=\frac{e^2}{2-e^2}\right)$ of the International Ellipsoid on p. 25]

Lat.	log m	Lat.	log m	Lat.	log m	Lat.	log m
° ′		° ′		° ′		° ′	
50 00	1.403469	60 00	1.402512	70 00	1.401731	80 00	1.401221
10	453	10	498	10	720	10	215
20	436	20	483	20	709	20	210
30	419	30	468	30	699	30	204
40	402	40	454	40	688	40	198
50	386	50	439	50	677	50	193
51 00	369	61 00	424	71 00	667	81 00	188
10	352	10	410	10	656	10	182
20	336	20	396	20	646	20	177
30	319	30	381	30	636	30	172
40	302	40	367	40	625	40	167
50	286	50	353	50	615	50	162
52 00	269	62 00	339	72 00	605	82 00	158
10	253	10	324	10	595	10	153
20	236	20	310	20	585	20	148
30	220	30	296	30	575	30	144
40	203	40	282	40	565	40	140
50	187	50	269	50	556	50	135
53 00	170	63 00	255	73 00	546	83 00	131
10	154	10	241	10	537	10	127
20	138	20	227	20	527	20	123
30	121	30	213	30	518	30	119
40	105	40	200	40	509	40	115
50	089	50	186	50	499	50	112
54 00	073	64 00	173	74 00	490	84 00	108
10	056	10	159	10	481	10	105
20	040	20	146	20	472	20	101
30	024	30	133	30	464	30	098
40	1.403008	40	119	40	455	40	095
50	1.402992	50	106	50	446	50	092
55 00	976	65 00	093	75 00	438	85 00	089
10	960	10	080	10	429	10	086
20	944	20	067	20	421	20	083
30	928	30	054	30	412	30	080
40	912	40	041	40	404	40	077
50	896	50	028	50	396	50	075
56 00	880	66 00	016	76 00	388	86 00	072
10	864	10	1.402003	10	380	10	070
20	849	20	1.401991	20	372	20	068
30	833	30	978	30	364	30	066
40	817	40	966	40	356	40	064
50	802	50	953	50	349	50	062
57 00	786	67 00	941	77 00	341	87 00	060
10	770	10	929	10	334	10	058
20	755	20	916	20	326	20	057
30	739	30	904	30	319	30	055
40	724	40	892	40	312	40	054
50	708	50	880	50	305	50	052
58 00	693	68 00	868	78 00	298	88 00	051
10	678	10	857	10	291	10	050
20	663	20	845	20	284	20	049
30	647	30	833	30	277	30	048
40	632	40	822	40	271	40	047
50	617	50	810	50	264	50	046
59 00	602	69 00	799	79 00	258	89 00	046
10	587	10	787	10	251	10	045
20	572	20	776	20	245	20	045
30	557	30	765	30	239	30	044
40	542	40	753	40	233	40	044
50	527	50	742	50	227	50	044
60 00	1.402512	70 00	1.401731	80 00	1.401221	90 00	1.401044

TABLE II.—*Correction to log s and log Δλ for difference in arc and sine—Direct problem*

[Corrections in units of the eighth decimal place of logarithms]

Log s (correction negative)	Arc-sine correction	Log Δλ (correction positive)	Log s (correction negative)	Arc-sine correction	Log Δλ (correction positive)	Log s (correction negative)	Arc-sine correction	Log Δλ (correction positive)	Log s (correction negative)	Arc-sine correction	Log Δλ (correction positive)
3.3756	1	1.8846	4.4708	155	2.9798	4.8575	920	3.3665	5.24970	5600	3.75870
3.5261	2	2.0351	4.4777	160	2.9867	4.8622	940	3.3712	5.25354	5700	3.76254
3.6142	3	2.1232	4.4844	165	2.9934	4.8667	960	3.3757	5.25732	5800	3.76632
3.6766	4	2.1856	4.4908	170	2.9998	4.8712	980	3.3802	5.26103	5900	3.77003
3.7251	5	2.2341	4.4971	175	3.0061	4.8756	1000	3.3846	5.26468	6000	3.77368
3.7647	6	2.2737	4.5032	180	3.0122	4.8862	1050	3.3952	5.26827	6100	3.77727
3.7982	7	2.3072	4.5092	185	3.0182	4.8963	1100	3.4053	5.27180	6200	3.78080
3.8272	8	2.3362	4.5150	190	3.0240	4.9060	1150	3.4150	5.27527	6300	3.78427
3.8527	9	2.3617	4.5206	195	3.0296	4.9152	1200	3.4242	5.27869	6400	3.78769
3.8756	10	2.3846	4.5261	200	3.0351	4.9241	1250	3.4331	5.28206	6500	3.79106
3.8963	11	2.4053	4.5315	205	3.0405	4.9326	1300	3.4416	5.28537	6600	3.79437
3.9152	12	2.4242	4.5367	210	3.0457	4.9408	1350	3.4498	5.28864	6700	3.79764
3.9326	13	2.4416	4.5418	215	3.0508	4.9487	1400	3.4577	5.29186	6800	3.80086
3.9487	14	2.4577	4.5468	220	3.0558	4.9563	1450	3.4653	5.29503	6900	3.80403
3.9637	15	2.4727	4.5517	225	3.0607	4.9637	1500	3.4727	5.29815	7000	3.80715
3.9777	16	2.4867	4.5565	230	3.0655	4.9708	1550	3.4798	5.30123	7100	3.81023
3.9908	17	2.4998	4.5611	235	3.0701	4.9777	1600	3.4867	5.30427	7200	3.81327
4.0032	18	2.5122	4.5657	240	3.0747	4.9844	1650	3.4934	5.30726	7300	3.81626
4.0150	19	2.5240	4.5702	245	3.0792	4.9908	1700	3.4998	5.31022	7400	3.81922
4.0261	20	2.5351	4.5746	250	3.0836	4.9971	1750	3.5061	5.31313	7500	3.82213
4.0468	22	2.5558	4.5789	255	3.0879	5.0032	1800	3.5122	5.31601	7600	3.82501
4.0657	24	2.5747	4.5831	260	3.0921	5.0092	1850	3.5182	5.31885	7700	3.82785
4.0831	26	2.5921	4.5872	265	3.0962	5.0150	1900	3.5240	5.32165	7800	3.83065
4.0992	28	2.6082	4.5913	270	3.1003	5.0206	1950	3.5296	5.32441	7900	3.83341
4.1142	30	2.6232	4.5953	275	3.1043	5.0261	2000	3.5351	5.32715	8000	3.83615
4.1282	32	2.6372	4.5992	280	3.1082	5.0315	2050	3.5405	5.32984	8100	3.83884
4.1413	34	2.6503	4.6030	285	3.1020	5.0367	2100	3.5457	5.33251	8200	3.84151
4.1538	36	2.6628	4.6068	290	3.1158	5.0418	2150	3.5508	5.33514	8300	3.84414
4.1655	38	2.6745	4.6105	295	3.1195	5.0468	2200	3.5558	5.33774	8400	3.84674
4.1766	40	2.6856	4.6142	300	3.1232	5.0517	2250	3.5607	5.34031	8500	3.84931
4.1872	42	2.6962	4.6213	310	3.1303	5.0565	2300	3.5655	5.34285	8600	3.85185
4.1973	44	2.7063	4.6282	320	3.1372	5.0611	2350	3.5701	5.34536	8700	3.85436
4.2070	46	2.7160	4.6349	330	3.1439	5.0657	2400	3.5747	5.34784	8800	3.85684
4.2162	48	2.7252	4.6413	340	3.1503	5.0702	2450	3.5792	5.35029	8900	3.85929
4.2251	50	2.7341	4.6476	350	3.1566	5.0746	2500	3.5836	5.35272	9000	3.86172
4.2336	52	2.7426	4.6538	360	3.1628	5.0789	2550	3.5879	5.35512	9100	3.86412
4.2418	54	2.7508	4.6597	370	3.1687	5.0831	2600	3.5921	5.35749	9200	3.86649
4.2497	56	2.7587	4.6655	380	3.1745	5.0872	2650	3.5962	5.35984	9300	3.86884
4.2573	58	2.7663	4.6711	390	3.1801	5.0913	2700	3.6003	5.36216	9400	3.87116
4.2647	60	2.7737	4.6766	400	3.1856	5.0953	2750	3.6043	5.36446	9500	3.87346
4.2718	62	2.7808	4.6820	410	3.1910	5.0992	2800	3.6082	5.36673	9600	3.87573
4.2787	64	2.7877	4.6872	420	3.1962	5.1030	2850	3.6120	5.36898	9700	3.87798
4.2854	66	2.7944	4.6923	430	3.2013	5.1068	2900	3.6158	5.37121	9800	3.88021
4.2919	68	2.8009	4.6973	440	3.2063	5.1105	2950	3.6195	5.37342	9900	3.88242
4.2982	70	2.8072	4.7022	450	3.2112	5.1142	3000	3.6232	5.37560	10000	3.88460
4.3043	72	2.8133	4.7070	460	3.2160	5.1213	3100	3.6303	5.37776	10100	3.88676
4.3102	74	2.8192	4.7117	470	3.2207	5.1282	3200	3.6372	5.37990	10200	3.88890
4.3160	76	2.8250	4.7162	480	3.2252	5.1349	3300	3.6439	5.38202	10300	3.89102
4.3217	78	2.8307	4.7207	490	3.2297	5.1413	3400	3.6503	5.38411	10400	3.89311
4.3272	80	2.8362	4.7251	500	3.2341	5.1476	3500	3.6566	5.38619	10500	3.89519
4.3325	82	2.8415	4.7336	520	3.2426	5.1538	3600	3.6628	5.38825	10600	3.89725
4.3377	84	2.8467	4.7418	540	3.2508	5.1597	3700	3.6687	5.39029	10700	3.89929
4.3429	86	2.8519	4.7497	560	3.2587	5.1655	3800	3.6745	5.39231	10800	3.90131
4.3479	88	2.8569	4.7573	580	3.2663	5.1711	3900	3.6801	5.39431	10900	3.90331
4.3527	90	2.8617	4.7647	600	3.2737	5.17664	4000	3.68564	5.39629	11000	3.90529
4.3575	92	2.8665	4.7718	620	3.2808	5.18200	4100	3.69100	5.39826	11100	3.90726
4.3622	94	2.8712	4.7787	640	3.2877	5.18723	4200	3.69623	5.40021	11200	3.90921
4.3667	96	2.8757	4.7854	660	3.2944	5.19234	4300	3.70134	5.40214	11300	3.91114
4.3712	98	2.8802	4.7919	680	3.3009	5.19733	4400	3.70633	5.40405	11400	3.91305
4.3756	100	2.8846	4.7982	700	3.3072	5.20221	4500	3.71121	5.40595	11500	3.91495
4.3862	105	2.8952	4.8043	720	3.3133	5.20698	4600	3.71598	5.40783	11600	3.91683
4.3963	110	2.9053	4.8102	740	3.3192	5.21165	4700	3.72065	5.40969	11700	3.91869
4.4060	115	2.9150	4.8160	760	3.3250	5.21622	4800	3.72522	5.41154	11800	3.92054
4.4152	120	2.9242	4.8217	780	3.3307	5.22070	4900	3.72970	5.41337	11900	3.92237
4.4241	125	2.9331	4.8272	800	3.3362	5.22509	5000	3.73409	5.41519	12000	3.92419
4.4326	130	2.9416	4.8325	820	3.3415	5.22939	5100	3.73839	5.41699	12100	3.92599
4.4408	135	2.9498	4.8377	840	3.3467	5.23361	5200	3.74261	5.41878	12200	3.92778
4.4487	140	2.9577	4.8429	860	3.3519	5.23774	5300	3.74674	5.42055	12300	3.92955
4.4563	145	2.9653	4.8479	880	3.3569	5.24180	5400	3.75080	5.42231	12400	3.93131
4.4637	150	2.9727	4.8527	900	3.3617	5.24578	5500	3.75478	5.42405	12500	3.93305

TABLE II.—*Correction to log s and log Δλ for difference in arc and sine—Direct problem*—Continued

[Corrections in units of the eighth decimal place of logarithms]

Log s (correction negative)	Arc-sine correction	Log Δλ (correction positive)	Log s (correction negative)	Arc-sine correction	Log Δλ (correction positive)	Log s (correction negative)	Arc-sine correction	Log Δλ (correction positive)	Log s (correction negative)	Arc-sine correction	Log Δλ (correction positive)
5.42578	12600	3.93478	5.44236	13600	3.95136	5.45777	14600	3.96677			
5.42750	12700	3.93650	5.44396	13700	3.95296	5.45925	14700	3.96825			
5.42920	12800	3.93820	5.44553	13800	3.95453	5.46072	14800	3.96972			
5.43089	12900	3.93989	5.44710	13900	3.95610	5.46219	14900	3.97119			
5.43257	13000	3.94157	5.44866	14000	3.95766	5.46364	15000	3.97264			
5.43423	13100	3.94323	5.45020	14100	3.95920						
5.43588	13200	3.94488	5.45174	14200	3.96074						
5.43752	13300	3.94652	5.45326	14300	3.96226						
5.43915	13400	3.94815	5.45478	14400	3.96378						
5.44076	13500	3.94976	5.45628	14500	3.96528						

TABLE III.—*Correction to log s and log Δφ or log Δλ for difference in arc and sine—Inverse problem*

[Corrections in units of the eighth decimal place of logarithms]

Log s_1	Arc-sin correction	Log Δφ or log Δλ	Log s_1	Arc-sin correction	Log Δφ or log Δλ	Log s_1	Arc-sin correction	Log Δφ or log Δλ	Log s_1	Arc-sin correction	Log Δφ or log Δλ
3.6766	1	2.1856	4.6053	72	3.1143	4.8799	255	3.3889	5.1335	820	3.6425
3.8271	2	2.3361	4.6112	74	3.1202	4.8841	260	3.3931	5.1387	840	3.6477
3.9152	3	2.4242	4.6170	76	3.1260	4.8882	265	3.3972	5.1439	860	3.6529
3.9776	4	2.4866	4.6227	78	3.1317	4.8923	270	3.4013	5.1489	880	3.6579
4.0261	5	2.5351	4.6282	80	3.1372	4.8963	275	3.4053	5.1537	900	3.6627
4.0657	6	2.5747	4.6335	82	3.1425	4.9002	280	3.4092	5.1585	920	3.6675
4.0992	7	2.6082	4.6387	84	3.1477	4.9040	285	3.4130	5.1632	940	3.6722
4.1282	8	2.6372	4.6439	86	3.1529	4.9078	290	3.4168	5.1677	960	3.6767
4.1537	9	2.6627	4.6489	88	3.1579	4.9115	295	3.4205	5.1722	980	3.6812
4.1766	10	2.6856	4.6537	90	3.1627	4.9152	300	3.4242	5.1766	1000	3.6856
4.1973	11	2.7063	4.6585	92	3.1675	4.9223	310	3.4313	5.1872	1050	3.6962
4.2162	12	2.7252	4.6632	94	3.1722	4.9292	320	3.4382	5.1973	1100	3.7063
4.2336	13	2.7426	4.6677	96	3.1767	4.9359	330	3.4449	5.2070	1150	3.7160
4.2497	14	2.7587	4.6722	98	3.1812	4.9423	340	3.4513	5.2162	1200	3.7252
4.2647	15	2.7737	4.6766	100	3.1856	4.9486	350	3.4576	5.2251	1250	3.7341
4.2787	16	2.7877	4.6872	105	3.1962	4.9548	360	3.4638	5.2336	1300	3.7426
4.2918	17	2.8008	4.6973	110	3.2063	4.9607	370	3.4697	5.2418	1350	3.7508
4.3042	18	2.8132	4.7070	115	3.2160	4.9665	380	3.4755	5.2497	1400	3.7587
4.3160	19	2.8250	4.7162	120	3.2252	4.9721	390	3.4811	5.2573	1450	3.7663
4.3271	20	2.8361	4.7251	125	3.2341	4.9776	400	3.4866	5.2647	1500	3.7737
4.3478	22	2.8568	4.7336	130	3.2426	4.9830	410	3.4920	5.2718	1550	3.7808
4.3667	24	2.8757	4.7418	135	3.2508	4.9882	420	3.4972	5.2787	1600	3.7877
4.3841	26	2.8931	4.7497	140	3.2587	4.9933	430	3.5023	5.2854	1650	3.7944
4.4002	28	2.9092	4.7573	145	3.2663	4.9983	440	3.5073	5.2918	1700	3.8008
4.4152	30	2.9242	4.7647	150	3.2737	5.0032	450	3.5122	5.2981	1750	3.8071
4.4292	32	2.9382	4.7718	155	3.2808	5.0080	460	3.5170	5.3042	1800	3.8132
4.4423	34	2.9513	4.7787	160	3.2877	5.0127	470	3.5217	5.3102	1850	3.8192
4.4548	36	2.9638	4.7854	165	3.2944	5.0172	480	3.5262	5.3160	1900	3.8250
4.4665	38	2.9755	4.7918	170	3.3008	5.0217	490	3.5307	5.3216	1950	3.8306
4.4776	40	2.9866	4.7981	175	3.3071	5.0261	500	3.5351	5.3271	2000	3.8361
4.4882	42	2.9972	4.8042	180	3.3132	5.0346	520	3.5436	5.3325	2050	3.8415
4.4983	44	3.0073	4.8102	185	3.3192	5.0428	540	3.5518	5.3377	2100	3.8467
4.5080	46	3.0170	4.8160	190	3.3250	5.0507	560	3.5597	5.3428	2150	3.8518
4.5172	48	3.0262	4.8216	195	3.3306	5.0583	580	3.5673	5.3478	2200	3.8568
4.5261	50	3.0351	4.8271	200	3.3361	5.0657	600	3.5747	5.3527	2250	3.8617
4.5346	52	3.0436	4.8325	205	3.3415	5.0728	620	3.5818	5.3575	2300	3.8665
4.5428	54	3.0518	4.8377	210	3.3467	5.0797	640	3.5887	5.3621	2350	3.8711
4.5507	56	3.0597	4.8428	215	3.3518	5.0864	660	3.5954	5.3667	2400	3.8757
4.5583	58	3.0673	4.8478	220	3.3568	5.0929	680	3.6019	5.3712	2450	3.8802
4.5657	60	3.0747	4.8527	225	3.3617	5.0992	700	3.6082	5.3756	2500	3.8846
4.5728	62	3.0818	4.8575	230	3.3665	5.1053	720	3.6143	5.3799	2550	3.8889
4.5797	64	3.0887	4.8621	235	3.3711	5.1112	740	3.6202	5.3841	2600	3.8931
4.5864	66	3.0954	4.8667	240	3.3757	5.1170	760	3.6260	5.3882	2650	3.8972
4.5929	68	3.1019	4.8712	245	3.3802	5.1227	780	3.6317	5.3923	2700	3.9013
4.5992	70	3.1082	4.8756	250	3.3846	5.1282	800	3.6372	5.3963	2750	3.9053

TABLE IV.—*Log sec ½ Δφ*

Δφ	log sec ½ Δφ	Δφ	log sec ½ Δφ	Δφ	log sec ½ Δφ	Δφ	log sec ½ Δφ
° ′ ″		° ′ ″		° ′ ″		° ′ ″	
0 00 00	0.00000000	0 10 00	0.00000046	0 20 00	00.00000184	0 30 00	0.00000413
10	0	10	47	10	187	10	418
20	0	20	49	20	190	20	423
30	0	30	51	30	193	30	427
40	0	40	52	40	196	40	432
50	0	50	54	50	199	50	437
0 01 00	0	0 11 00	56	0 21 00	203	0 31 00	441
10	1	10	57	10	206	10	446
20	1	20	59	20	209	20	451
30	1	30	61	30	212	30	456
40	1	40	63	40	216	40	461
50	2	50	64	50	219	50	465
0 02 00	2	0 12 00	66	0 22 00	222	0 32 00	470
10	2	10	68	10	226	10	475
20	3	20	70	20	229	20	480
30	3	30	72	30	233	30	485
40	3	40	74	40	236	40	490
50	4	50	76	50	239	50	495
0 03 00	4	0 13 00	78	0 23 00	243	0 33 00	500
10	5	10	80	10	247	10	505
20	5	20	82	20	250	20	510
30	6	30	84	30	254	30	516
40	6	40	86	40	257	40	521
50	7	50	88	50	261	50	526
0 04 00	7	0 14 00	90	0 24 00	265	0 34 00	531
10	8	10	92	10	268	10	536
20	9	20	94	20	272	20	541
30	0.00000009	30	97	30	276	30	547
40	0.00000010	40	0.00000099	40	279	40	552
50	11	50	0.00000101	50	283	50	557
0 05 00	11	0 15 00	103	0 25 00	287	0 35 00	563
10	12	10	106	10	291	10	568
20	13	20	108	20	295	20	573
30	14	30	110	30	299	30	579
40	15	40	113	40	303	40	584
50	16	50	115	50	307	50	590
0 06 00	17	0 16 00	118	0 26 00	311	0 36 00	595
10	17	10	120	10	315	10	601
20	18	20	123	20	319	20	606
30	19	30	125	30	323	30	612
40	20	40	128	40	327	40	618
50	21	50	130	50	331	50	623
0 07 00	23	0 17 00	133	0 27 00	335	0 37 00	629
10	24	10	135	10	339	10	635
20	25	20	138	20	343	20	640
30	26	30	141	30	347	30	646
40	27	40	143	40	352	40	652
50	28	50	146	50	356	50	658
0 08 00	29	0 18 00	149	0 28 00	360	0 38 00	663
10	31	10	152	10	364	10	669
20	32	20	154	20	369	20	675
30	33	30	157	30	373	30	681
40	35	40	160	40	377	40	687
50	36	50	163	50	382	50	693
0 09 00	37	0 19 00	166	0 29 00	386	0 39 00	699
10	39	10	169	10	391	10	705
20	40	20	172	20	395	20	711
30	41	30	175	30	400	30	717
40	43	40	178	40	404	40	723
50	44	50	181	50	409	50	729
0 10 00	0.00000046	0 20 00	0.00000184	0 30 00	0.00000413	0 40 00	0.00000735

TABLE IV.—*Log sec* ½△ø—Continued

Δφ	log sec ½Δφ	Δφ	log sec ½Δφ	Δφ	log sec ½Δφ	Δφ	log sec ½Δφ
° ′ ″		° ′ ″		° ′ ″		° ′ ″	
0 40 00	0.00000735	0 50 00	0.00001148	1 00 00	0.00001654	1 10 00	0.00002251
10	741	10	1156	10	1663	10	2262
20	747	20	1164	20	1672	20	2272
30	753	30	1171	30	1681	30	2283
40	760	40	1179	40	1691	40	2294
50	766	50	1187	50	1700	50	2305
0 41 00	772	0 51 00	1195	1 01 00	1709	1 11 00	2316
10	778	10	1203	10	1719	10	2327
20	785	20	1210	20	1728	20	2337
30	791	30	1218	30	1737	30	2348
40	797	40	1226	40	1747	40	2359
50	804	50	1234	50	1756	50	2370
0 42 00	810	0 52 00	1242	1 02 00	1766	1 12 00	2381
10	817	10	1250	10	1775	10	2392
20	823	20	1258	20	1785	20	2403
30	830	30	1266	30	1794	30	2415
40	836	40	1274	40	1804	40	2426
50	843	50	1282	50	1814	50	2437
0 43 00	849	0 53 00	1290	1 03 00	1823	1 13 00	2448
10	856	10	1298	10	1833	10	2459
20	863	20	1307	20	1843	20	2470
30	869	30	1315	30	1852	30	2482
40	876	40	1323	40	1862	40	2493
50	883	50	1331	50	1872	50	2504
0 44 00	889	0 54 00	1339	1 04 00	1882	1 14 00	2515
10	896	10	1348	10	1891	10	2527
20	903	20	1356	20	1901	20	2538
30	910	30	1364	30	1911	30	2550
40	916	40	1373	40	1921	40	2561
50	923	50	1381	50	1931	50	2572
0 45 00	930	0 55 00	1390	1 05 00	1941	1 15 00	2584
10	937	10	1398	10	1951	10	2595
20	944	20	1406	20	1961	20	2607
30	951	30	1415	30	1971	30	2618
40	958	40	1423	40	1981	40	2630
50	965	50	1432	50	1991	50	2642
0 46 00	972	0 56 00	1441	1 06 00	2001	1 16 00	2653
10	979	10	1449	10	2011	10	2665
20	986	20	1458	20	2021	20	2677
30	0.00000993	30	1466	30	2031	30	2688
40	0.00001000	40	1475	40	2042	40	2700
50	1008	50	1484	50	2052	50	2712
0 47 00	1015	0 57 00	1492	1 07 00	2062	1 17 00	2724
10	1022	10	1501	10	2072	10	2735
20	1029	20	1510	20	2083	20	2747
30	1036	30	1519	30	2093	30	2759
40	1044	40	1528	40	2103	40	2771
50	1051	50	1536	50	2114	50	2783
0 48 00	1058	0 58 00	1545	1 08 00	2124	1 18 00	2795
10	1066	10	1554	10	2135	10	2807
20	1073	20	1563	20	2145	20	2819
30	1081	30	1572	30	2155	30	2831
40	1088	40	1581	40	2166	40	2843
50	1095	50	1590	50	2176	50	2855
0 49 00	1103	0 59 00	1599	1 09 00	2187	1 19 00	2867
10	1110	10	1608	10	2198	10	2879
20	1118	20	1617	20	2208	20	2891
30	1126	30	1626	30	2219	30	2903
40	1133	40	1635	40	2229	40	2915
50	1141	50	1645	50	2240	50	2928
0 50 00	0.00001148	1 00 00	0.00001654	1 10 00	0.00002251	1 20 00	0.00002940

TABLE IV.—*Log sec* ½ Δφ—Continued

Δφ	log sec ½Δφ	Δφ	log sec ½Δφ	Δφ	log sec ½Δφ	Δφ	log sec ½Δφ
° ′ ″		° ′ ″		° ′ ″		° ′ ″	
1 20 00	0.00002940	1 30 00	0.00003721	1 40 00	0.00004594	1 50 00	0.00005558
10	2952	10	3735	10	4609	10	5575
20	2964	20	3748	20	4624	20	5592
30	2977	30	3762	30	4640	30	5609
40	2989	40	3776	40	4655	40	5626
50	3001	50	3790	50	4671	50	5643
1 21 00	3014	1 31 00	3804	1 41 00	4686	1 51 00	5660
10	3026	10	3818	10	4702	10	5677
20	3039	20	3832	20	4717	20	5694
30	3051	30	3846	30	4733	30	5711
40	3064	40	3860	40	4748	40	5728
50	3076	50	3874	50	4764	50	5745
1 22 00	3089	1 32 00	3888	1 42 00	4779	1 52 00	5762
10	3101	10	3902	10	4795	10	5780
20	3114	20	3916	20	4811	20	5797
30	3127	30	3930	30	4826	30	5814
40	3139	40	3945	40	4842	40	5831
50	3152	50	3959	50	4858	50	5848
1 23 00	3165	1 33 00	3973	1 43 00	4873	1 53 00	5866
10	3177	10	3987	10	4889	10	5883
20	3190	20	4002	20	4905	20	5900
30	3203	30	4016	30	4921	30	5918
40	3216	40	4030	40	4937	40	5935
50	3228	50	4045	50	4953	50	5953
1 24 00	3241	1 34 00	4059	1 44 00	4969	1 54 00	5970
10	3254	10	4073	10	4984	10	5987
20	3267	20	4088	20	5000	20	6005
30	3280	30	4102	30	5016	30	6023
40	3293	40	4117	40	5032	40	6040
50	3306	50	4131	50	5048	50	6058
1 25 00	3319	1 35 00	4146	1 45 00	5065	1 55 00	6075
10	3332	10	4160	10	5081	10	6093
20	3345	20	4175	20	5097	20	6110
30	3358	30	4190	30	5113	30	6128
40	3371	40	4204	40	5129	40	6146
50	3384	50	4219	50	5145	50	6164
1 26 00	3397	1 36 00	4234	1 46 00	5161	1 56 00	6181
10	3411	10	4248	10	5178	10	6199
20	3424	20	4263	20	5194	20	6217
30	3437	30	4278	30	5210	30	6235
40	3450	40	4293	40	5227	40	6253
50	3464	50	4307	50	5243	50	6270
1 27 00	3477	1 37 00	4322	1 47 00	5259	1 57 00	6288
10	3490	10	4337	10	5276	10	6306
20	3504	20	4352	20	5292	20	6324
30	3517	30	4367	30	5309	30	6342
40	3530	40	4382	40	5325	40	6360
50	3544	50	4397	50	5342	50	6378
1 28 00	3557	1 38 00	4412	1 48 00	5358	1 58 00	6396
10	3571	10	4427	10	5375	10	6414
20	3584	20	4442	20	5391	20	6433
30	3598	30	4457	30	5408	30	6451
40	3611	40	4472	40	5424	40	6469
50	3625	50	4487	50	5441	50	6487
1 29 00	3639	1 39 00	4502	1 49 00	5458	1 59 00	6505
10	3652	10	4517	10	5475	10	6523
20	3666	20	4533	20	5491	20	6542
30	3680	30	4548	30	5508	30	6560
40	3693	40	4563	40	5525	40	6578
50	3707	50	4578	50	5542	1 59 50	6597
1 30 00	0.00003721	1 40 00	0.00004594	1 50 00	0.00005558	2 00 00	6615

TABLE V.—*Conversion table*

Meters to feet			Feet to meters		
Meters	Feet	Logarithm of feet	Feet	Meters	Logarithm of meters
1	3. 28083333	0. 51598417	1	0. 30480061	9. 48401583
2	6. 56166667	0. 81701416	2	0. 60960122	9. 78504583
3	9. 84250000	0. 99310542	3	0. 91440183	9. 96113709
4	13. 12333333	1. 11804416	4	1. 21920244	0. 08607582
5	16. 40416667	1. 21495417	5	1. 52400305	0. 18298584
6	19. 68500000	1. 29413542	6	1. 82880366	0. 26216708
7	22. 96583333	1. 36108221	7	2. 13360427	0. 32911387
8	26. 24666667	1. 41907416	8	2. 43840488	0. 38710582
9	29. 52750000	1. 47022668	9	2. 74320549	0. 43825834

Kilometers to statute miles			Statute miles to kilometers		
Kilometers	Miles	Logarithm of miles	Miles	Kilometers	Logarithm of kilometers
1	0. 62136995	9. 79335025	1	1. 60934722	0. 20664975
2	1. 24273990	0. 09438024	2	3. 21869444	0. 50767975
3	1. 86410985	0. 27047150	3	4. 82804166	0. 68377101
4	2. 48547980	0. 39541024	4	6. 43738887	0. 80870975
5	3. 10684975	0. 49232025	5	8. 04673609	0. 90561976
6	3. 72821970	0. 57150150	6	9. 65608331	0. 98480100
7	4. 34958965	0. 63844829	7	11. 26543053	1. 05174779
8	4. 97095960	0. 69644023	8	12. 87477775	1. 10973974
9	5. 59232955	0. 74759276	9	14. 48412497	1. 16089226

TABLE VI.—*Dimensions of International Ellipsoid and miscellaneous derived data*

	Numerical values	Logarithms
Semimajor axis=a	6, 378, 388 meters	6. 80471 09340
	3, 963. 338629 miles	3. 59806 11802
Semiminor axis=b	6, 356, 911. 946 meters	6. 80324 61958
	3, 949. 994055 miles	3. 59659 64420
Rectifying radius[1]=r	6, 367, 654. 497 meters	6. 80397 94910
	3, 956. 669153 miles	3. 59732 97372
Mean radius=$\frac{2a+b}{3}$	6, 371, 229. 315 meters	6. 80422 32366
	3, 958. 890438 miles	3. 59757 34828
Radius of sphere of same area	6, 371, 227. 709 meters	6. 80422 31271
	3, 958. 889440 miles	3. 59757 29341
Radius of sphere of same volume	6, 371, 221. 266 meters	6. 80422 26879
	3, 958, 885. 436 miles	3. 59757 29341
Length of meridian quadrant	10, 002, 288. 299 meters	7. 00009 93682
	6, 215. 121375 miles	3. 79344 96144
Length of equatorial quadrant	10, 019, 148. 4 meters	7. 00083 08093
	6, 225. 597735 miles	3. 79418 10555
Area of ellipsoid	510, 100, 934 square kilometers	8. 70765 61187
	196, 950, 283. 9 square miles	8. 29435 66111
Volume of ellipsoid	1,083, 319. 78×10^6 cubic kilometers	12. 03475 66729
	259, 900. 677×10^6 cubic miles	11. 41480 74115
Flattening=$f=\frac{1}{297}$	0. 00336 70034 67	7. 52724 35506–10
(Eccentricity)$^2=e^2=\frac{a^2-b^2}{a^2}$	0. 00672 26700 22	7. 82754 17947–10
$e'^2=\frac{a^2-b^2}{b^2}$	0. 00676 81701 97	7. 83047 12712–10
$\frac{1}{a \sin 1''}$ (a in meters)		8. 50971 41992–10
$\frac{1}{a(1-e^2)\sin 1''}$ (a in meters)		8. 51264 36757–10
$\frac{1}{2a^2(1-e^2)\sin 1''}$ (a in meters)		1. 40690 27460–10
$\frac{3}{2} e^2 \sin 1''$		2. 68920 79206–10
$\frac{1}{6a^2}$ (a in meters)		5. 61242 68816–20
$\frac{1}{12} \sin^2 1''$		8. 29196 84876–20
$m=\frac{e^2}{2-e^2}$	0. 00337 26716 91	7. 52797 40673–10
$n=\frac{1-(1-e^2)^{1/2}}{1+(1-e^2)^{1/2}}$	0. 00168 63406 41	7. 22694 53067–10

In the above table where the values are expressed in miles, statute miles are meant.

[1] See Latitude Developments, United States Coast and Geodetic Survey Special Publication No. 67, pp. 125 and 128, for definition, use, and formula.

FORMULAS FOR CONVERTING GEODETIC LATITUDE INTO OTHER KINDS OF LATITUDE AND VICE VERSA [1]

Numerical values of coefficients depend on data of the International Ellipsoid found in Table VI.

1. (*a*) Geodetic latitude ϕ to geocentric latitude ψ.

$$\phi-\psi=\left(m \sin 2\phi-\frac{m^2}{2}\sin 4\phi+\frac{m^3}{3}\sin 6\phi-\cdots\right)\div \text{arc } 1'' \tag{19}$$

With numerical coefficients:

$$\begin{aligned}\phi-\psi=&695''.6635 \sin 2\phi-1''.1731 \sin 4\phi\\&+0''.0026 \sin 6\phi-\cdots\end{aligned} \tag{20}$$

With the coefficients expressed as logarithms:

$$\begin{aligned}\phi-\psi=&[2.84239920] \sin 2\phi-[0.069343] \sin 4\phi\\&+[7.421-10] \sin 6\phi-\cdots\end{aligned} \tag{21}$$

(*b*) Geocentric latitude ψ to geodetic latitude ϕ.

$$\phi-\psi=\left(m \sin 2\psi+\frac{m^2}{2}\sin 4\psi+\frac{m^3}{3}\sin 6\psi+\cdots\right)\div \text{arc } 1'' \tag{22}$$

With numerical coefficients:

$$\phi-\psi=695''.6635 \sin 2\psi+1''.1731 \sin 4\psi+0''.0026 \sin 6\psi+\cdots \tag{23}$$

With the coefficients expressed as logarithms:

$$\phi-\psi=[2.84239920] \sin 2\psi+[0.069343] \sin 4\psi+[7.421-10] \sin 6\psi \tag{24}$$

2. (*a*) Geodetic latitude ϕ to parametric latitude θ.

$$\phi-\theta=\left(n \sin 2\phi-\frac{n^2}{2}\sin 4\phi+\frac{n^3}{3}\sin 6\phi-\cdots\right)\div \text{arc } 1'' \tag{25}$$

With numerical coefficients:

$$\phi-\theta=347''.8327 \sin 2\phi-0''.2933 \sin 4\phi+0''.0003 \sin 6\phi-\cdots \tag{26}$$

With the coefficients expressed as logarithms:

$$\begin{aligned}\phi-\theta=&[2.54137044] \sin 2\phi-[9.46729-10] \sin 4\phi\\&+[6.518-10] \sin 6\phi-\cdots\end{aligned} \tag{27}$$

(*b*) Parametric latitude θ to geodetic latitude ϕ.

$$\phi-\theta=\left(n \sin 2\theta+\frac{n^2}{2}\sin 4\theta+\frac{n^3}{3}\sin 6\theta+\cdots\right)\div \text{arc } 1'' \tag{28}$$

With numerical coefficients:

$$\phi-\theta=347''.8327 \sin 2\theta+0''.2933 \sin 4\theta+0''.0003 \sin 6\theta+\cdots \tag{29}$$

With coefficients expressed as logarithms:

$$\begin{aligned}\phi-\theta=&[2.54137044] \sin 2\theta+[9.46729-10] \sin 4\theta\\&+[6.518-10] \sin 6\theta+\cdots\end{aligned} \tag{30}$$

[1] See Latitude Developments, United States Coast and Geodetic Survey Special Publication No. 67, pp. 12, 84, 85, 127, and 128.

3. (*a*) Geodetic latitude ϕ to isometric latitude χ.

$$\phi-\chi=\left[\left(\frac{e^2}{2}+\frac{5e^4}{24}+\frac{3e^6}{32}+\frac{281e^8}{5760}+\cdots\right)\sin 2\phi-\left(\frac{5e^4}{48}+\frac{7e^6}{80}+\frac{697e^8}{11520}+\cdots\right)\sin 4\phi+\left(\frac{13e^6}{480}+\frac{461e^8}{13440}+\cdots\right)\sin 6\phi-\left(\frac{1237e^8}{161280}+\cdots\right)\sin 8\phi+\cdots\right]\div\text{arc } 1'' \tag{31}$$

With numerical coefficients:

$$\phi-\chi=695''.2731\sin 2\phi-0''.9765\sin 4\phi+0''.0017\sin 6\phi+\cdots \tag{32}$$

With the coefficients expressed as logarithms:

$$\phi-\chi=[2.84215543]\sin 2\phi-[9.98969-10]\sin 4\phi+[7.233-10]\sin 6\phi\cdots \tag{33}$$

(*b*) Isometric latitude χ to geodetic latitude ϕ.

$$\phi-\chi=\left[\left(\frac{e^2}{2}+\frac{5e^4}{24}+\frac{e^6}{12}+\frac{13e^8}{360}+\cdots\right)\sin 2\chi+\left(\frac{7e^4}{48}+\frac{29e^6}{240}+\frac{811e^8}{11520}+\cdots\right)\sin 4\chi+\left(\frac{7e^6}{120}+\frac{81e^8}{1120}+\cdots\right)\sin 6\chi+\left(\frac{4279e^8}{161280}+\cdots\right)\sin 8\chi+\cdots\right]\div\text{arc } 1'' \tag{34}$$

With numerical coefficients:

$$\phi-\chi=695''.2724\sin 2\chi+1''.3671\sin 4\chi+0''.0037\sin 6\chi+\cdots \tag{35}$$

With the coefficients expressed as logarithms:

$$\phi-\chi=[2.84215501]\sin 2\chi+[0.135787]\sin 4\chi+[7.567-10]\sin 6\chi+\cdots \tag{36}$$

4. (*a*) Geodetic latitude ϕ to authalic latitude β.

$$\phi-\beta=\left[\left(\frac{e^2}{3}+\frac{31e^4}{180}+\frac{59e^6}{560}+\cdots\right)\sin 2\phi-\left(\frac{17e^4}{360}+\frac{61e^6}{1260}+\cdots\right)\sin 4\phi+\left(\frac{383e^6}{45360}+\cdots\right)\sin 6\phi-\cdots\right]\div\text{arc } 1'' \tag{37}$$

With numerical coefficients:

$$\phi-\beta=+463''.8288\sin 2\phi-0''.4432\sin 4\phi+0''.0005\sin 6\phi-\cdots \tag{38}$$

With the coefficients expressed as logarithms:

$$\phi-\beta=[2.66635771]\sin 2\phi-[9.64664-10]\sin 4\phi+[6.724-10]\sin 6\phi-\cdots \tag{39}$$

(*b*) Authalic latitude β to geodetic latitude ϕ.

$$\phi-\beta=\left[\left(\frac{e^2}{3}+\frac{31e^4}{180}+\frac{517e^6}{5040}+\cdots\right)\sin 2\beta+\left(\frac{23e^4}{360}+\frac{251e^6}{3780}+\cdots\right)\sin 4\beta\right.$$
$$\left.+\left(\frac{761e^6}{45360}+\cdots\right)\sin 6\beta+\cdots\right]\div\text{arc } 1'' \qquad (40)$$

With numerical coefficients:

$$\phi-\beta=463''.8286\sin 2\beta+0''.5997\sin 4\beta+0''.0011\sin 6\beta+\ldots \qquad (41)$$

With the coefficients expressed as logarithms:

$$\phi-\beta=[2.66635755]\sin 2\beta+[9.77796-10]\sin 4\beta$$
$$+[7.022-10]\sin 6\beta+\ldots \qquad (42)$$

5. (*a*) Geodetic latitude ϕ to rectifying latitude ω.

$$\phi-\omega=\left[\left(\frac{3n}{2}-\frac{9n^3}{16}\cdots\right)\sin 2\phi-\left(\frac{15n^2}{16}-\frac{15n^4}{32}\cdots\right)\sin 4\phi\right.$$
$$\left.+\left(\frac{35n^3}{48}\cdots\right)\sin 6\phi-\left(\frac{315n^4}{512}\cdots\right)\sin 8\phi+\cdots\right]\div\text{arc } 1'' \qquad (43)$$

With numerical coefficients:

$$\phi-\omega=521''.7485\sin 2\phi-0''.5499\sin 4\phi+0''.0007\sin 6\phi-\ldots \qquad (44)$$

With the coefficients expressed as logarithms:

$$\phi-\omega=[2.71746124]\sin 2\phi-[9.74029-10]\sin 4\phi$$
$$+[6.858-10]\sin 6\phi-\ldots \qquad (45)$$

(*b*) Rectifying latitude ω to geodetic latitude ϕ.

$$\phi-\omega=\left[\left(\frac{3n}{2}-\frac{27n^3}{32}\cdots\right)\sin 2\omega+\left(\frac{21n^2}{16}-\frac{55n^4}{32}\cdots\right)\sin 4\omega\right.$$
$$\left.+\left(\frac{151n^3}{96}\cdots\right)\sin 6\omega+\left(\frac{1097n^4}{512}\cdots\right)\sin 8\omega+\cdots\right]\div\text{arc } 1'' \qquad (46)$$

With numerical coefficients:

$$\phi-\omega=521''.7482\sin 2\omega+0''.7699\sin 4\omega+0''.0016\sin 6\omega+\ldots \qquad (47)$$

With the coefficients expressed as logarithms:

$$\phi-\omega=[2.71714610]\sin 2\omega+[9.88641-10]\sin 4\omega$$
$$+[7.192-10]\sin 6\omega+\ldots \qquad (48)$$

For rectifying radius see p. 25.

FORMULAS FOR VARIOUS RADII OF THE ELLIPSOID

[The values below are based on the meter as unit.]

1. Formula for N, the radius of curvature in the prime vertical, or the distance of the point to the polar axis.

$$\text{Log } N=\log a\ (1+n)-Mn\cos 2\phi+\frac{1}{2}Mn^2\cos 4\phi \qquad (49)$$
$$-\frac{1}{3}Mn^3\cos 6\phi+\ \ldots$$

With numerical coefficients:

$$\begin{aligned}\text{Log } N=6.805\ 442\ 6856&-0.000\ 732\ 3684\cos 2\phi \\ &+0.000\ 000\ 6175\cos 4\phi \\ &-0.000\ 000\ 0007\cos 6\phi+\ \ldots\end{aligned} \qquad (50)$$

With coefficients expressed as logarithms:

$$\begin{aligned}\text{Log } N=6.805\ 442\ 6856&-[6.864\ 729\ 62-10]\cos 2\phi \\ &+[3.790\ 64-10]\cos 4\phi \\ &-[0.841-10]\cos 6\phi+\ \ldots\end{aligned} \qquad (51)$$

2. Formula for R, the radius of curvature in the meridian.

$$\text{Log } R=\log a\ (1+n)(1-n)^2-3Mn\cos 2\phi+\frac{3}{2}Mn^2\cos 4\phi \qquad (52)$$
$$-Mn^3\cos 6\phi+\ \ldots$$

With numerical coefficients:

$$\begin{aligned}\text{Log } R=6.803\ 976\ 7124&-0.002\ 197\ 1053\cos 2\phi \\ &+0.000\ 001\ 8525\cos 4\phi \\ &-0.000\ 000\ 0021\cos 6\phi+\ \ldots\end{aligned} \qquad (53)$$

With coefficients expressed as logarithms:

$$\begin{aligned}\text{Log } R=6.803\ 976\ 7124&-[7.341\ 850\ 873-10]\cos 2\phi \\ &+[4.267\ 766-10]\cos 4\phi \\ &-[1.319-10]\cos 6\phi+\ \ldots\end{aligned} \qquad (54)$$

3. Formula for R_α, the radius of curvature in azimuth α.

$$\text{Log } R_\alpha=\text{Log } N-Me'^2\cos^2\phi\cos^2\alpha+\frac{1}{2}Me'^4\cos^4\phi\cos^4\alpha \qquad (55)$$
$$-\frac{1}{3}Me'^6\cos^6\phi\cos^6\alpha+\ \ldots$$

With numerical coefficients:

$$\begin{aligned}\text{Log } R_\alpha=\text{Log } N&-0.002\ 939\ 3790\cos^2\phi\cos^2\alpha \\ &+0.000\ 009\ 9471\cos^4\phi\cos^4\alpha \\ &-0.000\ 000\ 0449\cos^6\phi\cos^6\alpha+\ \ldots\end{aligned} \qquad (56)$$

With the coefficients expressed as logarithms:

$$\begin{aligned}\text{Log } R_\alpha=\text{Log } N&-[7.468\ 255\ 583-10]\cos^2\phi\cos^2\alpha \\ &+[4.997\ 697-10]\cos^4\phi\cos^4\alpha \\ &-[2.652\ 1-10]\cos^6\phi\cos^6\alpha+\ \ldots\end{aligned} \qquad (57)$$

4. Formula for radius vector ρ.

$$\text{Log } \rho = \log\left(a\frac{1+n^2}{1+n}\right) + M(m-n)\cos 2\phi - \frac{1}{2}M(m^2-n^2)\cos 4\phi + \frac{1}{3}M(m^3-n^3)\cos 6\phi + \ldots \quad (58)$$

With numerical coefficients:

$$\begin{aligned}\text{Log } \rho = 6.803\ 980\ 4174 &+ 0.000\ 732\ 3643 \cos 2\phi \\ &- 0.000\ 001\ 8525 \cos 4\phi \\ &+ 0.000\ 000\ 0049 \cos 6\phi + \ldots\end{aligned} \quad (59)$$

With the coefficients expressed as logarithms:

$$\begin{aligned}\text{Log } \rho = 6.803\ 980\ 4174 &+ [6.864\ 727\ 15-10] \cos 2\phi \\ &- [4.267\ 763-10] \cos 4\phi \\ &+ [1.687-10] \cos 6\phi + \ldots\end{aligned} \quad (60)$$

By means of the formula

$$\rho = a\sqrt{\frac{\cos\phi}{\cos\psi\cos(\phi-\psi)}}$$

(Chauvenet, *Spherical and Practical Astronomy*, vol. 1, p. 101) in connection with the formulas (19), (20), (21) for converting geodetic latitude into geocentric latitude, any value of ρ obtained by the formulas (58), (59), (60) may be easily verified.

In formulas (49), (52), (55), and (58), $M = \log_{10} e$, the modulus of the common logarithms.

TABLE VII.—*Logarithms of the factors A', B, C, D, E, and F based on the International Ellipsoid*

[Unit, the meter]

$$A' = \frac{(1-e^2\sin^2\phi')^{1/2}}{a \text{ arc } 1''}$$

$$B = \frac{(1-e^2\sin^2\phi)^{3/2}}{a(1-e^2) \text{ arc } 1''}$$

$$C = \frac{(1-e^2\sin^2\phi)^2 \tan\phi}{2a^2(1-e^2) \text{ arc } 1''}$$

$$D = \frac{\frac{3}{2}e^2 \sin\phi\cos\phi \text{ arc } 1''}{1-e^2\sin^2\phi}$$

$$E = \frac{(1+3\tan^2\phi)(1-e^2\sin^2\phi)}{6a^2}$$

$$F = \frac{1}{12} \text{ arc } \phi \cos^2\phi \text{ arc}^2 1''$$

LATITUDE 0°-1°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
0 00	8. 50971420	8. 51264368			5. 61243		0. 000
1	420	4368	7. 870629	9. 15293	43	4. 7557	1, 842. 925
2	420	4367	8. 171659	9. 45396	43	5. 0567	3, 685. 849
3	420	4367	8. 347751	9. 63006	43	. 2328	5, 528. 774
4	420	4367	8. 472689	9. 75499	43	. 3578	7, 371. 698
05	420	4367	8. 569599	9. 85190	43	. 4547	9, 214. 623
6	419	4366	8. 648781	9. 93108	43	. 5338	11, 057. 548
7	419	4366	8. 715728	9. 99803	43	. 6008	12, 900. 473
8	419	4365	8. 773720	0. 05602	43	. 6588	14, 743. 397
9	419	4365	8. 824873	0. 10718	44	. 7099	16, 586. 322
10	8. 50971419	8. 51264364	8. 870630	0. 15293	5. 61244	5. 7557	18, 429. 247
11	418	4363	8. 912023	0. 19432	44	. 7971	20, 272. 172
12	418	4362	8. 949812	0. 23211	44	. 8349	22, 115. 096
13	418	4361	8. 984575	0. 26687	45	. 8696	23, 958. 021
14	418	4360	9. 016760	0. 29906	45	. 9018	25, 800. 946
15	417	4359	9. 046723	0. 32902	45	. 9318	27, 643. 871
16	417	4358	9. 074752	0. 35705	46	. 9598	29, 486. 796
17	416	4357	9. 101082	0. 38338	46	5. 9861	31, 329. 721
18	416	4356	9. 125906	0. 40820	46	6. 0110	33, 172. 646
19	415	4354	9. 149387	0. 43168	47	. 0344	35, 015. 572
20	8. 50971415	8. 51264353	9. 171664	0. 45395	5. 61247	6. 0567	36, 858. 497
21	414	4351	9. 192854	0. 47514	48	. 0779	38, 701. 422
22	414	4350	9. 213058	0. 49534	48	. 0981	40, 544. 347
23	413	4348	9. 232363	0. 51465	48	. 1174	42, 387. 273
24	413	4346	9. 250847	0. 53313	49	. 1359	44, 230. 198
25	412	4344	9. 268576	0. 55086	50	. 1536	46, 073. 124
26	412	4343	9. 285610	0. 56789	50	. 1706	47, 916. 050
27	411	4341	9. 302001	0. 58428	51	. 1870	49, 758. 975
28	410	4339	9. 317796	0. 60007	51	. 2028	51, 601. 901
29	410	4336	9. 333036	0. 61531	52	. 2181	53, 444. 827
30	8. 50971409	8. 51264334	9. 347760	0. 63003	5. 61253	6. 2328	55, 287. 753
31	408	4332	9. 362002	0. 64427	53	. 2470	57, 130. 679
32	407	4330	9. 375791	0. 65806	54	. 2608	58, 973. 605
33	406	4327	9. 389155	0. 67142	55	. 2742	60, 816. 532
34	406	4325	9. 402121	0. 68438	55	. 2871	62, 659. 458
35	405	4322	9. 414711	0. 69697	56	. 2997	64, 502. 384
36	404	4320	9. 426946	0. 70920	57	. 3119	66, 345. 311
37	403	4317	9. 438847	0. 72110	58	. 3238	68, 188. 238
38	402	4314	9. 450429	0. 73268	59	. 3354	70, 031. 165
39	401	4311	9. 461711	0. 74396	60	. 3467	71, 874. 092
40	8. 50971400	8. 51264308	9. 472708	0. 75496	5. 61260	6. 3577	73, 717. 019
41	399	4305	9. 483433	0. 76568	61	. 3684	75, 559. 946
42	398	4302	9. 493899	0. 77614	62	. 3789	77, 402. 873
43	397	4299	9. 504119	0. 78636	63	. 3891	79, 245. 801
44	396	4296	9. 514105	0. 79634	64	. 3991	81, 088. 728
45	395	4293	9. 523865	0. 80610	65	. 4088	82, 931. 656
46	394	4289	9. 533412	0. 81564	66	. 4184	84, 774. 584
47	393	4286	9. 542753	0. 82498	67	. 4277	86, 617. 512
48	391	4282	9. 551898	0. 83412	68	. 4368	88, 460. 440
49	390	4279	9. 560854	0. 84307	69	. 4458	90, 303. 369
50	8. 50971389	8. 51264275	9. 569629	0. 85184	5. 61270	6. 4546	92, 146. 297
51	388	4271	9. 578230	0. 86044	71	. 4632	93, 989. 226
52	387	4267	9. 586664	0. 86887	72	. 4716	95, 832. 154
53	385	4263	9. 594937	0. 87714	74	. 4798	97, 675. 083
54	384	4260	9. 603057	0. 88526	75	. 4880	99, 518. 012
55	383	4255	9. 611027	0. 89322	76	. 4959	101, 360. 942
56	381	4251	9. 618854	0. 90105	77	. 5038	103, 203. 871
57	380	4247	9. 626542	0. 90873	78	. 5114	105, 046. 801
58	378	4243	9. 634096	0. 91628	80	. 5190	106, 889. 731
59	377	4239	9. 641522	0. 92370	81	. 5264	108, 732. 661
1 00	8. 50971375	8. 51264234	9. 648823	0. 93100	5. 61282	6. 5337	110, 575. 591

The characteristics of log A′, and log B have been increased by 10. The characteristics of log C, log E, and log F have been increased by 20. The characteristics of log D for latitude 0′ to 7′, inclusive, have been increased by 20; for greater values of latitude they have been increased by 10.

LATITUDE 1°-2°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
1 00	8. 50971375	8. 51264234	9. 648823	0. 93100	5. 61282	6. 5337	110, 575. 591
1	374	4230	56003	3817	84	409	112, 418. 521
2	372	4225	63066	4523	85	479	114, 261. 452
3	371	4221	70016	5218	86	549	116, 104. 383
4	369	4216	76857	5902	88	617	117, 947. 314
05	368	4211	83592	6574	89	684	119, 790. 245
6	366	4206	90224	7237	91	750	121, 633. 176
7	364	4201	9. 696757	7890	92	816	123, 476. 108
8	363	4196	9. 703193	8533	94	880	125, 319. 040
9	361	4191	09534	9167	95	6. 5943	127, 161. 972
10	8. 50971359	8. 51264186	9. 715784	0. 99791	5. 61297	6. 6006	129, 004. 904
11	358	4181	21946	1. 00407	5. 61298	067	130, 847. 836
12	356	4175	28022	1014	5. 61300	128	132, 690. 769
13	354	4170	34014	1613	01	188	134, 533. 702
14	352	4165	39925	2203	03	247	136, 376. 635
15	350	4159	45756	2786	05	305	138, 219. 568
16	349	4154	51510	3361	06	363	140, 062. 502
17	347	4148	57190	3928	08	419	141, 905. 436
18	345	4142	62795	4488	10	475	143, 748. 370
19	343	4136	68330	5041	11	531	145, 591. 304
20	8. 50971341	8. 51264130	9. 773794	1. 05607	5. 61313	6. 6585	147, 434. 239
21	339	4124	79192	6126	15	639	149, 277. 174
22	337	4118	84521	6658	17	692	151, 120. 109
23	335	4112	89788	7184	18	745	152, 963. 044
24	333	4106	9. 794991	7704	20	797	154, 805. 980
25	331	4100	9. 800133	8218	22	848	156, 648. 916
26	329	4094	05214	8725	24	899	158, 491. 852
27	326	4087	10237	9227	26	949	160, 334. 788
28	324	4081	15203	1. 09723	28	6. 6998	162, 177. 725
29	322	4074	20112	1. 10213	30	6. 7048	164, 020. 662
30	8. 50971320	8. 51264067	9. 824967	1. 10698	5. 61332	6. 7096	165, 863. 599
31	318	4061	29768	1178	34	144	167, 706. 536
32	315	4054	34517	1652	36	191	169, 549. 474
33	313	4047	39214	2121	38	238	171, 392. 412
34	311	4040	43860	2585	40	284	173, 235. 350
35	308	4033	48458	3044	42	330	175, 078. 289
36	306	4026	53008	3498	44	376	176, 921. 228
37	304	4019	57511	3948	46	421	178, 764. 167
38	301	4012	61968	4393	48	465	180, 607. 107
39	299	4004	66379	4833	50	509	182, 450. 047
40	8. 50971296	8. 51263997	9. 870747	1. 15269	5. 61353	6. 7553	184, 292. 987
41	294	3990	75070	5701	55	596	186, 135. 928
42	291	3982	79352	6128	57	638	187, 978. 869
43	289	3975	83591	6551	59	681	189, 821. 810
44	286	3967	87789	6970	62	723	191, 664. 751
45	284	3959	91947	7386	64	764	193, 507. 693
46	281	3951	9. 896067	7797	66	805	195, 350. 635
47	279	3943	9. 900147	8204	68	846	197, 193. 577
48	276	3935	04190	8608	71	886	199, 036. 520
49	273	3927	08195	9007	73	926	200, 879. 463
50	8. 50971271	8. 51263919	9. 912164	1. 19403	5. 61376	6. 7966	202, 722. 407
51	268	3911	16097	1. 19796	78	6. 8005	204, 565. 351
52	265	3903	19995	1. 20185	81	044	206, 408. 295
53	262	3895	23857	0570	83	082	208, 251. 239
54	259	3886	27686	0952	86	120	210, 094. 184
55	257	3878	31482	1331	88	158	211, 937. 130
56	254	3869	35245	1706	91	196	213, 780. 075
57	251	3860	38976	2079	93	233	215, 623. 021
58	248	3852	42675	2448	96	270	217, 465. 968
59	245	3843	46343	2814	5. 61398	306	219, 308. 914
2 00	8. 50971242	8. 51263834	9. 949980	1. 23177	5. 61401	6. 8343	221, 151. 861

The characteristics of log A′, log B, and log D have been increased by 10. The characteristics of log C, log E, and log F have been increased by 20.

LATITUDE 2°–3°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
2 00	8.50971242	8.51263834	9.949980	1.23177	5.61401	6.8343	221,151.861
1	239	3825	53587	3536	04	378	222,994.809
2	236	3816	57163	3893	06	414	224,837.757
3	233	3807	60712	4247	09	450	226,680.705
4	230	3798	64231	4598	12	484	228,523.653
05	227	3789	67723	4946	14	519	230,366.602
6	224	3780	71186	5292	17	554	232,209.552
7	221	3770	74623	5635	20	588	234,052.502
8	218	3761	78032	5975	23	622	235,895.452
9	214	3751	81415	6312	26	656	237,738.403
10	8.50971211	8.51263742	9.984771	1.26647	5.61428	6.8689	239,581.354
11	208	3732	88102	6979	31	722	241,424.305
12	205	3722	91408	7308	34	755	243,267.257
13	202	3712	94688	7636	37	788	245,110.209
14	198	3703	9.997945	7960	40	820	246,953.161
15	195	3693	10.001177	8283	43	852	248,796.114
16	192	3683	04386	8602	46	884	250,639.068
17	188	3672	07571	8920	49	916	252,482.022
18	185	3662	10732	9235	52	948	254,324.976
19	181	3652	13871	9548	55	6.8979	256,167.931
20	8.50971178	8.51263642	10.016987	1.29859	5.61458	6.9010	258,010.886
21	174	3631	20082	1.30167	61	041	259,853.842
22	171	3621	23155	0473	64	071	261,696.798
23	167	3610	26206	0777	67	102	263,539.754
24	164	3600	29236	1079	70	132	265,382.711
25	160	3589	32244	1379	74	162	267,225.669
26	157	3578	35232	1677	77	191	269,068.627
27	153	3567	38200	1973	80	221	270,911.585
28	150	3556	41148	2266	83	250	272,754.544
29	146	3545	44076	2558	87	279	274,597.503
30	8.50971142	8.51263534	10.046985	1.32848	5.61490	6.9308	276,440.463
31	138	3523	49874	3136	93	337	278,283.423
32	135	3512	52744	3422	5.61496	366	280,126.384
33	131	3501	55595	3706	5.61500	394	281,969.345
34	127	3489	58429	3988	03	422	283,812.307
35	123	3478	61243	4268	06	450	285,655.269
36	120	3466	64040	4547	10	478	287,498.232
37	116	3455	66819	4824	13	505	289,341.195
38	112	3443	69579	5098	17	533	291,184.158
39	108	3431	72323	5372	20	560	293,027.122
40	8.50971104	8.51263420	10.075050	1.35643	5.61524	6.9587	294,870.087
41	100	3408	77760	5913	27	614	296,713.052
42	096	3396	80453	6181	31	641	298,556.018
43	092	3384	83129	6448	34	667	300,398.984
44	088	3372	85790	6713	38	694	302,241.951
45	084	3359	88433	6976	42	720	304,084.918
46	080	3347	91061	7237	45	746	305,927.885
47	076	3335	93673	7497	49	772	307,770.853
48	072	3322	96270	7756	52	798	309,613.822
49	067	3310	10.098852	8013	56	824	311,456.792
50	8.50971063	8.51263297	10.101418	1.38268	5.61560	6.9849	313,299.762
51	059	3285	03969	8522	64	874	315,142.732
52	055	3272	06505	8774	68	900	316,985.703
53	051	3259	09027	9025	71	925	318,828.674
54	046	3247	11534	9275	75	950	320,671.646
55	042	3234	14028	9523	79	974	322,514.618
56	038	3221	16506	1.39770	83	6.9999	324,357.591
57	033	3208	18970	1.40015	86	7.0023	326,200.565
58	029	3194	21421	0259	90	048	328,043.539
59	024	3181	23859	0501	94	072	329,886.514
3 00	8.50971020	8.51263168	10.126283	1.40742	5.61598	7.0096	331,729.489

The characteristics of log A′, log B, and log D have been increased by 10. The characteristics of log C, log E, and log F have been increased by 20.

LATITUDE 3°–4°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
3 00	8. 50971020	8. 51263168	0. 126283	1. 40742	5. 61598	7. 0096	331, 729. 489
1	016	3155	28693	0982	5. 61602	120	333, 572. 465
2	011	3141	31090	1220	06	144	335, 415. 441
3	007	3128	33474	1457	10	167	337, 258. 418
4	8. 50971002	3114	35845	1693	14	191	339, 101. 396
05	8. 50970998	3101	38203	1928	18	214	340, 944. 374
6	993	3087	40549	2161	22	237	342, 787. 353
7	988	3073	42882	2393	26	260	344, 630. 332
8	984	3059	45202	2624	30	283	346, 473. 312
9	979	3045	47511	2853	35	306	348, 316. 292
10	8. 50970974	8. 51263031	0. 149807	1. 43081	5. 61639	7. 0329	350, 159. 273
11	970	3017	52092	3308	43	352	352, 002. 255
12	965	3003	54364	3534	47	374	353, 845. 237
13	960	2989	56624	3759	51	397	355, 688. 220
14	956	2974	58873	3982	56	419	357, 531. 203
15	951	2960	61111	4205	60	441	359, 374. 187
16	946	2946	63337	4426	64	463	361, 217. 172
17	941	2931	65552	4646	68	485	363, 060. 157
18	936	2916	67755	4865	73	507	364, 903. 143
19	931	2902	69948	5083	77	528	366, 746. 130
20	8. 50970926	8. 51262887	0. 172129	1. 45299	5. 61681	7. 0550	368, 589. 117
21	921	2872	74301	5515	86	572	370, 432. 105
22	916	2857	76461	5730	90	593	372, 275. 093
23	911	2842	78609	5943	95	614	374, 118. 082
24	906	2827	80748	6155	5. 61699	635	375, 961. 072
25	901	2812	82877	6367	5. 61704	656	377. 804. 062
26	896	2797	84996	6577	08	677	379, 647. 053
27	891	2782	87104	6786	13	698	381, 490. 045
28	886	2766	89201	6995	17	719	383, 333. 037
29	881	2751	91289	7202	22	740	385, 176. 030
30	8. 50970876	8. 51262735	0. 193367	1. 47408	5. 61726	7. 0760	387, 019. 024
31	871	2720	95435	7614	31	781	388, 862. 018
32	865	2704	97494	7818	36	801	390, 705. 013
33	860	2688	0. 199542	8021	40	821	392, 548. 008
34	855	2673	0. 201581	8224	45	842	394, 391. 004
35	850	2657	03611	8425	50	862	396, 234. 001
36	844	2641	05632	8626	54	882	398, 076. 999
37	839	2625	07643	8825	59	901	399, 919. 997
38	834	2609	09644	9024	64	921	401, 762. 996
39	828	2593	11637	9222	68	941	403, 605. 996
40	8. 50970823	8. 51262576	0. 213621	1. 49418	5. 61773	7. 0960	405, 448. 996
41	817	2560	15596	9614	78	980	407, 291. 997
42	812	2544	17561	1. 49809	83	7. 0999	409, 134. 998
43	806	2527	19519	1. 50003	88	7. 1019	410, 978. 001
44	801	2511	21467	0196	93	038	412, 821. 004
45	795	2494	23407	0389	5. 61798	057	414, 664. 008
46	790	2478	25339	0580	5. 61802	076	416, 507. 012
47	784	2461	27261	0771	07	095	418, 350. 017
48	779	2444	29175	0961	12	114	420, 193. 023
49	773	2427	31082	1150	17	133	422, 036. 030
50	8. 50970767	8. 51262410	0. 232980	1. 51338	5. 61822	7. 1152	423, 879. 037
51	762	2393	34868	1525	28	170	425, 722. 045
52	756	2376	36750	1712	32	189	427, 565. 054
53	750	2359	38624	1897	38	207	429, 408. 064
54	745	2342	40489	2082	43	226	431, 251. 074
55	739	2324	42347	2266	48	244	433, 094. 085
56	733	2307	44196	2450	53	262	434, 937. 097
57	727	2289	46038	2632	58	280	436, 780. 109
58	721	2272	47873	2814	63	298	438, 623. 122
59	715	2254	49699	2995	68	316	440, 466. 136
4 00	8. 50970710	8. 51262237	0. 251518	1. 53175	5. 61874	7. 1334	442, 309. 151

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 4°–5°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
4 00	8.50970710	8.51262237	0.251518	1.53175	5.61874	7.1334	442,309.151
1	704	2219	53329	3354	79	352	444,152.166
2	698	2201	55134	3533	84	370	445,995.182
3	692	2183	56931	3711	90	388	447,838.199
4	686	2165	58719	3888	95	405	449,681.217
05	680	2147	60501	4064	5.61900	423	451,524.236
6	674	2129	62276	4240	06	440	453,367.255
7	668	2111	64044	4415	11	458	455,210.275
8	662	2092	65804	4589	16	475	457,053.296
9	655	2074	67558	4763	22	492	458,896.317
10	8.50970649	8.51262056	0.269305	1.54936	5.61927	7.1510	460,739.340
11	643	2037	71044	5108	33	527	462,582.363
12	637	2018	72777	5279	38	544	464,425.387
13	631	2000	74503	5450	44	561	466,268.412
14	624	1981	76222	5620	49	578	468,111.437
15	618	1962	77935	5790	55	594	469,954.463
16	612	1943	79640	5958	60	611	471,797.490
17	606	1925	81339	6126	66	628	473,640.518
18	599	1905	83032	6294	72	645	475,483.547
19	593	1886	84719	6461	77	661	477,326.577
20	8.50970586	8.51261867	0.286398	1.56627	5.61983	7.1678	479,169.607
21	580	1848	88071	6792	88	694	481,012.638
22	574	1829	89738	6957	5,61994	710	482,855.670
23	567	1809	91399	7121	5.62000	727	484,698.703
24	561	1790	93053	7285	06	743	486,541.736
25	554	1770	94701	7448	11	759	488,384.771
26	548	1751	96344	7610	17	775	490,227.806
27	541	1731	97980	7772	23	792	492,070.842
28	534	1711	0.299609	7933	29	808	493,913.879
29	528	1692	0.301233	8093	35	823	495,756.917
30	8.50970521	8.51261672	0.302851	1.58253	5.62040	7.1839	497,599.956
31	515	1652	04463	8412	46	855	499,442.995
32	508	1632	06069	8571	52	871	501,286.035
33	501	1612	07669	8729	58	887	503,129.076
34	494	1591	09264	8886	64	902	504,972.118
35	488	1571	10853	9043	70	918	506,815.161
36	481	1551	12435	9199	76	933	508,658.205
37	474	1530	14012	9355	82	949	510,501.250
38	467	1510	15584	9510	88	964	512,344.295
39	460	1489	17149	9665	94	980	514,187.342
40	8.50970454	8.51261469	0.318710	1.59819	5.62100	7.1995	516,030.389
41	447	1448	20265	1.59972	06	7.2010	517,873.437
42	440	1427	21815	1.60125	12	025	519,716.486
43	433	1406	23358	0278	19	040	521,559.535
44	426	1385	24897	0430	25	056	523,402.586
45	419	1364	26431	0581	31	070	525,245.638
46	412	1343	27958	0731	37	086	527,088.690
47	405	1322	29481	0882	44	100	528,931.744
48	398	1301	30998	1031	50	115	530,774.798
49	391	1280	32511	1180	56	130	532,617.853
50	8.50970384	8.51261258	0.334017	1.61329	5.62162	7.2145	534,460.910
51	376	1237	35519	1477	69	160	536,303.967
52	369	1215	37016	1625	75	174	538,147.024
53	362	1194	38507	1772	81	189	539,990.083
54	355	1172	39994	1918	88	203	541,833.143
55	348	1151	41476	2064	5.62194	218	543,676.204
56	340	1129	42953	2210	5.62200	232	545,519.265
57	333	1107	44424	2355	07	247	547,362.328
58	326	1085	45891	2500	14	261	549,205.391
59	318	1063	47353	2644	20	275	551,048.456
5 00	8.50970311	8.51261041	0.348810	1.62787	5.62226	7.2290	552,891.521

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 5°–6°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
5 00	8. 50970311	8. 51261041	0. 348810	1. 62787	5. 62226	7. 2290	552, 891. 521
1	304	1019	50262	2930	33	304	554, 734. 587
2	296	0996	51710	3073	40	318	556, 577. 654
3	289	0974	53153	3215	46	332	558, 420. 723
4	281	0952	54591	3356	53	346	560, 263. 792
05	274	0929	56025	3498	59	360	562, 106. 862
6	266	0907	57454	3638	66	374	563, 949. 933
7	259	0884	58877	3778	73	388	565, 793. 005
8	251	0862	60297	3918	79	402	567, 636. 078
9	244	0839	61712	4058	86	416	569, 479. 152
10	8. 50970236	8. 51260816	0. 363122	1. 64196	5. 62293	7. 2429	571, 322. 227
11	228	0793	64529	4335	5. 62299	443	573, 165. 303
12	221	0770	65930	4472	5. 62306	457	575, 008. 379
13	213	0747	67328	4610	13	470	576, 851. 457
14	205	0724	68720	4747	20	484	578, 694. 536
15	198	0701	70108	4884	27	498	580, 537. 616
16	190	0678	71493	5020	33	511	582, 380. 696
17	182	0654	72872	5155	40	524	584, 223. 778
18	174	0631	74247	5291	47	538	586, 066. 861
19	166	0607	75619	5425	54	551	587, 909. 945
20	8. 50970159	8. 51260584	0. 376985	1. 65560	5. 62361	7. 2564	589, 753. 029
21	151	0560	78348	5694	68	578	591, 590. 115
22	143	0536	79707	5827	75	591	593, 439. 202
23	135	0513	81060	5960	82	604	595, 282. 289
24	127	0489	82411	6093	89	617	597, 125. 378
25	119	0465	83757	6225	5. 62396	630	598, 968. 468
26	111	0441	85098	6357	5. 62403	644	600, 811. 558
27	103	0417	86436	6488	10	656	602, 654. 650
28	095	0393	87771	6620	17	670	604, 497. 743
29	087	0369	89100	6750	24	682	606, 340. 837
30	8. 50970079	8. 51260344	0. 390426	1. 66880	5. 62432	7. 2695	608, 183. 932
31	071	0320	91748	7010	39	708	610, 027. 028
32	063	0296	93066	7140	46	721	611, 870. 125
33	054	0271	94380	7268	53	734	613, 713. 222
34	046	0247	95690	7397	60	746	615, 556. 321
35	038	0222	96997	7525	68	759	617, 399. 421
36	030	0197	98298	7653	75	772	619, 242. 523
37	022	0172	0. 399597	7781	82	784	621, 085. 625
38	013	0148	0. 400892	7908	89	797	622, 928. 728
39	8. 50970005	0123	02183	8034	5. 62497	810	624, 771. 832
40	8. 50969997	8. 51260098	0. 403470	1. 68160	5. 62504	7. 2822	626, 614. 938
41	988	0073	04754	8286	11	835	628, 458. 044
42	980	0047	06033	8412	19	847	630, 301. 151
43	971	8. 51260022	07310	8537	26	859	632, 144. 260
44	963	8. 51259997	08583	8662	34	872	633, 987. 369
45	955	9972	09851	8786	41	884	635, 830. 480
46	946	9946	11116	8910	49	896	637, 673. 592
47	938	9921	12378	9034	56	909	639, 516. 705
48	929	9895	13635	9157	64	921	641, 359. 819
49	920	9869	14890	9280	71	933	643, 202. 934
50	8. 50969912	8. 51259844	0. 416141	1. 69403	5. 62579	7. 2945	645, 046. 050
51	903	9818	17388	9525	86	957	646, 889. 167
52	895	9792	18632	9647	5. 62594	969	648, 732. 285
53	886	9766	19872	9768	5. 62601	981	650, 575. 404
54	877	9740	21109	1. 69889	09	7. 2993	652, 418. 525
55	869	9714	22343	1. 70010	17	7. 3005	654, 261. 646
56	860	9688	23572	0131	24	017	656, 104. 769
57	851	9661	24799	0251	32	029	657, 947. 893
58	842	9635	26023	0370	40	041	659, 791. 018
59	834	9609	27242	0490	48	053	661, 634. 144
6 00	8. 50969825	8. 51259582	0. 428459	1. 70609	5. 62655	7. 3064	663, 477. 271

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 6°-7°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
6 00	8.50969825	8.51259582	0.428459	1.70609	5.62655	7.3064	663,477.271
1	816	9556	29673	0728	63	076	665,320.399
2	807	9529	30882	0846	71	088	667,163.529
3	798	9503	32089	0964	79	099	669,006.659
4	789	9476	33293	1082	87	111	670,849.791
05	780	9449	34492	1199	5.62695	123	672,692.923
6	771	9422	35689	1316	5.62702	134	674,536.057
7	762	9395	36882	1433	10	146	676,379.193
8	753	9368	38073	1549	18	157	678,222.329
9	744	9341	0.439261	1665	26	169	680,065.466
10	8.50969735	8.51259314	0.440444	1.71781	5.62734	7.3180	681,908.605
11	726	9287	41626	1896	42	192	683,751.744
12	717	9259	42804	2012	50	203	685,594.885
13	708	9232	43978	2126	58	214	687,438.027
14	699	9204	45150	2241	66	226	689,281.170
15	690	9177	46319	2355	74	237	691,124.314
16	680	9149	47484	2469	83	248	692,967.460
17	671	9122	48646	2582	91	259	694,810.607
18	662	9094	49805	2696	5.62799	270	696,653.755
19	653	9066	50962	2808	5.62807	282	698,496.904
20	8.50969643	8.51259038	0.452116	1.72921	5.62815	7.3293	700,340.054
21	634	9010	53265	3033	23	304	702,183.205
22	625	8982	54413	3145	32	315	704,026.358
23	615	8954	55558	3257	40	326	705,869.511
24	606	8926	56699	3368	48	337	707,712.666
25	597	8898	57838	3479	56	348	709,555.823
26	587	8869	58973	3590	65	359	711,398.980
27	578	8841	60106	3701	73	370	713,242.139
28	568	8812	61236	3811	81	381	715,085.298
29	559	8784	62363	1.73921	90	392	716,928.459
30	8.50969549	8.51258755	0.463488	1.74030	5.62898	7.3402	718,771.622
31	540	8726	64609	4140	5.62906	413	720,614.785
32	530	8698	65727	4249	15	424	722,457.950
33	520	8669	66843	4357	24	434	724,301.116
34	511	8640	67956	4466	32	445	726,144.283
35	501	8611	69066	4574	40	456	727,987.451
36	491	8582	70174	4682	49	466	729,830.620
37	482	8553	71278	4790	58	477	731,673.791
38	472	8524	72381	4897	66	488	733,516.963
39	462	8494	73479	5004	75	498	735,360.137
40	8.50969452	8.51258465	0.474576	1.75111	5.62983	7.3509	737,203.311
41	443	8435	75670	5217	5.62992	519	739,046.487
42	433	8406	76761	5323	5.63000	530	740,889.664
43	423	8376	77850	5429	09	540	742,732.842
44	413	8347	78936	5535	18	551	744,576.021
45	403	8317	80019	5640	26	561	746,419.202
46	393	8287	81100	5746	35	571	748,262.384
47	383	8257	82177	5850	44	582	750,105.568
48	373	8228	83253	5955	53	592	751,948.752
49	363	8198	84326	6059	62	602	753,791.938
50	8.50969353	8.51258167	0.485396	1.76163	5.63070	7.3613	755,635.125
51	343	8137	86464	6267	79	623	757,478.314
52	333	8107	87529	6371	88	633	759,321.503
53	323	8077	88592	6474	5.63097	643	761,164.694
54	313	8046	89652	6577	5.63106	653	763,007.886
55	303	8016	90709	6680	15	663	764,851.080
56	293	7986	91765	6782	24	674	766,694.275
57	282	7955	92817	6884	33	684	768,537.471
58	272	7924	93867	6986	42	694	770,380.668
59	262	7894	94914	7088	51	704	772,223.867
7 00	8.50969252	8.51257863	0.495960	1.77190	5.63160	7.3714	774,067.067

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 7°–8°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
7 00	8.50969252	8.51257863	0.495960	1.77190	5.63160	7.3714	774,067.067
1	241	7832	7003	291	69	724	775,910.268
2	231	7801	8043	392	78	734	777,753.471
3	221	7770	0.499081	493	87	744	779,596.675
4	210	7739	0.500116	593	5.63196	753	781,439.880
05	200	7708	1150	693	5.63205	763	783,283.087
6	190	7677	2181	793	14	773	785,126.295
7	179	7645	3209	893	23	783	786,969.504
8	169	7614	4235	1.77993	32	793	788,812.715
9	158	7583	5258	1.78092	42	802	790,655.927
10	8.50969148	8.51257551	0.506280	1.78191	5.63251	7.3812	792,499.140
11	137	7519	7298	290	60	822	794,342.354
12	127	7488	8315	388	69	832	796,185.570
13	116	7456	0.509330	486	78	841	798,028.787
14	106	7424	0.510342	585	88	851	799,872.006
15	095	7392	1352	682	5.63297	860	801,715.226
16	084	7360	2359	780	5.63306	870	803,558.447
17	074	7328	3365	877	16	880	805,401.670
18	063	7296	4368	1.78974	25	889	807,244.894
19	052	7264	5368	1.79071	34	899	809,088.120
20	8.50969041	8.51257232	0.516367	1.79168	5.63344	7.3908	810,931.347
21	031	7200	7363	265	53	918	812,774.575
22	020	7167	8358	361	63	927	814,617.804
23	8.50969009	7135	0.519349	457	72	937	816,461.035
24	8.50968998	7102	0.520339	552	82	946	818,304.267
25	987	7070	1326	648	5.63391	956	820,147.501
26	976	7037	2312	743	5.63401	965	821,990.736
27	966	7004	3296	838	10	974	823,833.972
28	955	6972	4276	1.79933	20	984	825,677.210
29	944	6939	5256	1.80028	30	7.3993	827,520.449
30	8.50968933	8.51256906	0.526232	1.80122	5.63439	7.4002	829,363.690
31	922	6873	7207	217	49	011	831,206.932
32	911	6840	8179	311	58	020	833,050.175
33	900	6807	0.529150	404	68	030	834,893.420
34	889	6773	0.530119	498	78	039	836,736.666
35	877	6740	1085	591	88	048	838,579.914
36	866	6707	2050	684	5.63497	057	840,423.163
37	855	6673	3011	777	5.63507	066	842,266.413
38	844	6640	3972	870	17	075	844,109.665
39	833	6606	4929	1.80962	27	084	845,952.919
40	8.50968822	8.51256573	0.535886	1.81055	5.63536	7.4094	847,796.173
41	810	6539	6839	147	46	103	849,639.429
42	799	6505	7792	239	56	112	851,482.687
43	788	6471	8742	330	66	121	853,325.946
44	776	6437	0.539690	422	76	130	855,169.206
45	765	6403	0.540636	513	86	138	857,012.468
46	754	6369	1580	604	5.63596	148	858,855.732
47	742	6335	2522	695	5.63606	156	860,698.997
48	731	6301	3461	786	16	165	862,542.263
49	720	6266	4400	876	26	174	864,385.531
50	8.50968708	8.51256232	0.545336	1.81966	5.63636	7.4183	866,228.800
51	697	6198	6270	1.82056	46	192	868,072.071
52	685	6163	7202	146	56	201	869,915.343
53	674	6129	8133	236	66	209	871,758.616
54	662	6094	9061	325	76	218	873,601.891
55	650	6059	0.549988	414	86	227	875,445.167
56	639	6024	0.550913	503	5.63696	236	877,288.445
57	627	5989	1835	592	5.63706	244	879,131.725
58	616	5955	2757	681	17	253	880,975.006
59	604	5920	3675	769	27	262	882,818.288
8 00	8.50968592	8.51255884	0.554592	1.82857	5.63737	7.4270	884,661.572

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 8°-9°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
8 00	8.50968592	8.51255884	0.554592	1.82857	5.63737	7.4270	884,661.572
1	580	5849	5507	1.82945	47	279	886,504.858
2	569	5814	6421	1.83033	58	288	888,348.145
3	557	5779	7332	121	68	296	890,191.433
4	545	5743	8242	208	78	305	892,034.723
05	533	5708	0.559150	296	88	313	893,878.014
6	522	5672	0.560056	383	5.63799	322	895,721.307
7	510	5637	0960	470	5.63809	330	897,564.601
8	498	5601	1863	556	20	339	899,407.897
9	486	5565	2763	643	30	347	901,251.195
10	8.50968474	8.51255530	0.563662	1.83729	5.63840	7.4356	903,094.494
11	462	5494	4559	815	51	364	904,937.794
12	450	5458	5455	901	61	372	906,781.096
13	438	5422	6349	1.83987	72	381	908,624.400
14	426	5386	7240	1.84073	82	389	910,467.705
15	414	5350	8130	158	5.63893	398	912,311.011
16	402	5313	9018	243	5.63903	406	914,154.319
17	390	5277	0.569905	328	14	414	915,997.629
18	378	5241	0.570789	413	24	423	917,840.940
19	366	5204	1673	498	35	431	919,684.253
20	8.50968353	8.51255168	0.572554	1.84582	5.63946	7.4439	921,527.567
21	341	5131	3434	667	56	447	923,370.883
22	329	5095	4311	751	67	456	925,214.200
23	317	5058	5188	835	78	464	927,057.519
24	304	5021	6062	1.84919	88	472	928,900.840
25	292	4984	6935	1.85002	5.63999	480	930,744.162
26	280	4947	7806	086	5.64010	488	932,587.486
27	267	4910	8676	169	21	496	934,430.811
28	255	4873	0.579543	252	31	505	936,274.138
29	243	4836	0.580410	335	42	513	938,117.466
30	8.50968230	8.51254799	0.581274	1.85418	5.64053	7.4521	939,960.796
31	218	4762	2137	500	64	529	941,804.128
32	205	4724	2998	583	75	537	943,647.461
33	193	4687	3858	665	86	545	945,490.795
34	180	4649	4715	747	5.64096	553	947,334.131
35	168	4612	5572	829	5.64107	561	949,177.469
36	155	4574	6427	911	18	569	951,020.809
37	143	4536	7280	1.85992	29	577	952,864.150
38	130	4499	8131	1.86074	40	585	954,707.493
39	118	4461	8982	155	51	593	956,550.837
40	8.50968105	8.51254423	0.589830	1.86236	5.64162	7.4601	958,394.183
41	092	4385	0.590677	317	73	609	960,237.530
42	080	4347	1521	398	84	616	962,080.879
43	067	4309	2366	478	5.64196	624	963,924.230
44	054	4270	3207	558	5.64207	632	965,767.582
45	041	4232	4048	639	18	640	967,610.936
46	029	4194	4887	719	29	648	969,454.292
47	016	4155	5725	799	40	656	971,297.649
48	8.50968003	4117	6560	878	51	663	973,141.008
49	8.50967990	4078	7395	1.86958	62	671	974,984.369
50	8.50967977	8.51254040	0.598227	1.87038	5.64274	7.4679	976,827.731
51	964	4001	9059	117	85	687	978,671.095
52	951	3962	0.599888	196	5.64296	694	980,514.460
53	939	3923	0.600717	275	5.64307	702	982,357.827
54	926	3884	1543	354	19	710	984,201.196
55	913	3845	2369	432	30	717	986,044.566
56	900	3806	3192	511	41	725	987,887.938
57	886	3767	4014	589	53	733	989,731.312
58	873	3728	4835	667	64	740	991,574.687
59	860	3689	5654	745	75	748	993,418.064
9 00	8.50967847	8.51253649	0.606472	1.87823	5.64387	7.4755	995,261.443

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 9°-10°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
9 00	8. 50967847	8. 51253649	0. 606472	1. 87823	5. 64387	7. 4755	995, 261. 443
1	834	3610	7288	901	5. 64398	763	997, 104. 823
2	821	3571	8104	1. 87978	5. 64410	770	998, 948. 205
3	808	3531	8917	1. 88056	21	778	1, 000, 791. 589
4	795	3491	0. 609729	133	32	786	002, 634. 974
05	781	3452	0. 610539	210	44	793	004, 478. 361
6	768	3412	1349	287	56	801	006, 321. 750
7	755	3372	2156	364	67	808	008, 165. 141
8	741	3332	2963	441	79	816	010, 008. 533
9	728	3292	3768	517	5. 64490	823	011, 851. 927
10	8. 50967715	8. 51253252	0. 614571	1. 88593	5. 64502	7. 4830	1, 013, 695. 322
11	701	3212	5373	670	14	838	015, 538. 719
12	688	3172	6174	746	25	845	017, 382. 118
13	675	3132	6973	822	37	853	019, 225. 519
14	661	3091	7770	897	49	860	021, 068. 921
15	648	3051	8567	1. 88973	60	867	022, 912. 325
16	634	3010	0. 619362	1. 89048	72	875	024, 755. 731
17	621	2970	0. 620156	124	84	882	026, 599. 139
18	607	2929	0948	199	5. 64596	889	028, 442. 548
19	594	2889	1739	274	5. 64607	897	030, 285. 959
20	8. 50967580	8. 51252848	0. 622529	1. 89349	5. 64619	7. 4904	1, 032, 129. 372
21	566	2807	3317	424	31	911	033, 972. 786
22	553	2766	4104	498	43	918	035, 816. 202
23	539	2725	4890	573	54	926	037, 659. 620
24	525	2684	5673	647	66	933	039, 503. 039
25	512	2643	6456	721	78	940	041, 346. 461
26	498	2602	7238	795	5. 64690	947	043, 189. 884
27	484	2561	8017	869	5. 64702	954	045, 033. 309
28	471	2519	8797	1. 89943	14	962	046, 876. 735
29	457	2478	0. 629574	1. 90016	26	969	048, 720. 164
30	8. 50967443	8. 51252437	0. 630350	1. 90090	5. 64738	7. 4976	1, 050, 563. 594
31	429	2395	1125	163	50	983	052, 407. 026
32	415	2354	1899	236	62	990	054, 250. 459
33	401	2312	2671	310	74	7. 4997	056, 093. 894
34	387	2270	3441	382	87	7. 5004	057, 937. 331
35	374	2228	4212	455	5. 64798	011	059, 780. 770
36	360	2186	4980	528	5. 64810	018	061, 624. 211
37	346	2145	5747	600	23	025	063, 467. 654
38	332	2102	6513	673	35	032	065, 311. 098
39	318	2060	7278	745	47	039	067, 154. 544
40	8. 50967303	8. 51252018	0. 638040	1. 90817	5. 64859	7. 5046	1, 068, 997. 992
41	289	1976	8803	889	71	053	070, 841. 442
42	275	1934	0. 639563	1. 90961	84	060	072, 684. 893
43	261	1891	0. 640322	1. 91033	5. 64896	067	074, 528. 346
44	247	1849	1081	104	5. 64908	074	076, 371. 801
45	233	1806	1838	176	20	081	078, 215. 258
46	219	1764	2594	247	33	088	080, 058. 717
47	204	1721	3348	318	45	095	081, 902. 178
48	190	1679	4102	389	57	102	083, 745. 640
49	176	1636	4853	460	70	109	085, 589. 104
50	8. 50967162	8. 51251593	0. 645604	1. 91531	5. 64982	7. 5116	1, 087, 432. 570
51	147	1550	6354	602	5. 64994	122	089, 276. 038
52	133	1507	7102	672	5. 65007	129	091, 119. 507
53	119	1464	7849	742	19	136	092, 962. 978
54	104	1421	8595	813	32	143	094, 806. 451
55	090	1378	0. 649340	883	44	150	096, 649. 926
56	076	1334	0. 650083	1. 91953	57	156	098, 493. 403
57	061	1291	0825	1. 92023	69	163	100, 336. 882
58	047	1248	1567	093	82	170	102, 180. 363
59	032	1204	2306	162	5. 65094	177	104, 023. 845
10 00	8. 50967018	8. 51251161	0. 653046	1. 92232	5. 65107	7. 5183	1, 105, 867. 329

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 10°–11°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
10 00	8. 50967018	8. 51251161	0. 653046	1. 92232	5. 65107	7. 5183	1, 105, 867. 329
1	8. 50967003	1117	3783	301	119	190	107, 710. 815
2	8. 50966989	1073	4520	370	132	197	109, 554. 303
3	974	1030	5255	440	145	204	111, 397. 793
4	959	0986	5988	508	157	210	113, 241. 285
05	945	0942	6722	578	170	217	115, 084. 778
6	930	0898	7453	646	183	224	116, 928. 273
7	915	0854	8184	715	195	230	118, 771. 771
8	901	0810	8913	783	208	237	120, 615. 270
9	886	0766	0. 659641	852	221	243	122, 458. 771
10	8. 50966871	8. 51250721	0. 660369	1. 92920	5. 65234	7. 5250	1, 124, 302. 274
11	856	0677	1094	1. 92988	246	257	126, 145. 778
12	842	0633	1820	1. 93056	259	263	127, 989. 285
13	827	0588	2543	124	272	270	129, 832. 794
14	812	0544	3265	192	285	276	131, 676. 304
15	797	0499	3987	260	298	283	133, 519. 816
16	782	0454	4707	327	310	289	135, 363. 330
17	767	0410	5427	394	323	296	137, 206. 846
18	752	0365	6144	462	336	302	139, 050. 364
19	737	0320	6861	529	349	309	140, 893. 884
20	8. 50966722	8. 51250275	0. 667577	1. 93596	5. 65362	7. 5315	1, 142, 737. 406
21	707	0230	8292	663	375	322	144, 580. 930
22	692	0185	9006	730	388	328	146, 424. 456
23	677	0140	0. 669718	797	401	335	148, 267. 983
24	662	0095	0. 670429	863	414	341	150, 111. 512
25	647	0049	1140	930	427	348	151, 955. 044
26	632	8. 51250004	1849	1. 93996	440	354	153, 798. 577
27	617	8. 51249959	2558	1. 94062	453	360	155, 642. 112
28	602	9913	3265	128	466	367	157, 485. 649
29	587	9868	3970	194	479	373	159, 329. 188
30	8. 50966571	8. 51249822	0. 674676	1. 94260	5. 65493	7. 5379	1, 161, 172. 729
31	556	9776	5379	326	506	386	163, 016. 272
32	541	9730	6083	392	519	392	164, 859. 817
33	526	9685	6784	458	532	398	166. 703. 364
34	510	9639	7485	523	545	405	168, 546. 913
35	495	9593	8185	588	559	411	170, 390. 463
36	480	9547	8883	654	572	417	172, 234. 016
37	464	9501	0. 679581	719	585	424	174, 077. 571
38	449	9454	0. 680277	784	598	430	175, 921. 128
39	433	9408	0972	848	612	436	177, 764. 686
40	8. 50966418	8. 51249362	0. 681667	1. 94913	5. 65625	7. 5442	1, 179, 608. 247
41	403	9315	2360	1. 94978	638	448	181, 451. 809
42	387	9269	3052	1. 95042	652	455	183, 295. 373
43	372	9222	3744	107	665	461	185, 138. 940
44	356	9176	4434	171	678	467	186, 982. 508
45	340	9129	5124	236	692	473	188, 826. 079
46	325	9082	5812	300	705	479	190, 669. 651
47	309	9036	6499	364	719	486	192, 513. 225
48	294	8989	7186	428	732	492	194, 356. 802
49	278	8942	7871	491	746	498	196, 200. 380
50	8. 50966262	8. 51248895	0. 688554	1. 95555	5. 65759	7. 5504	1, 198, 043. 961
51	247	8848	9238	618	773	510	199, 887. 543
52	231	8801	0. 689920	682	786	516	201, 731. 127
53	215	8753	0. 690602	745	800	522	203, 574. 713
54	199	8706	1282	809	814	528	205, 418. 302
55	184	8659	1961	872	827	534	207, 261. 892
56	168	8611	2640	935	841	540	209, 105. 484
57	152	8564	3316	1. 95998	854	546	210, 949. 079
58	136	8516	3992	1. 96061	868	553	212, 792. 675
59	120	8469	4668	123	882	559	214, 636. 274
11 00	8. 50966104	8. 51248421	0. 695342	1. 96186	5. 65895	7. 5565	1, 216, 479. 874

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 11°–12°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
11 00	8. 50966104	8. 51248421	0. 695342	1. 96186	5. 65895	7. 5565	1, 216, 479. 874
1	088	8373	6016	248	909	571	218, 323. 477
2	073	8325	6688	311	923	577	220, 167. 081
3	057	8277	7359	373	936	583	222, 010. 687
4	041	8229	8030	435	950	589	223, 854. 296
05	025	8181	8700	°498	964	594	225, 697. 907
6	8. 50966008	8133	0. 699368	560	978	600	227, 541. 519
7	8. 50965992	8085	0. 700036	622	5. 65992	606	229, 385. 134
8	976	8037	0702	683	5. 66006	612	231, 228. 751
9	960	7989	1368	745	019	618	233, 072. 370
10	8. 50965944	8. 51247940	0. 702033	1. 96806	5. 66033	7. 5624	1, 234, 915. 990
11	928	7892	2696	868	047	630	236, 759. 613
12	912	7843	3359	929	061	636	238, 603. 238
13	896	7795	4022	1. 96991	075	642	240, 446. 865
14	879	7746	4682	1. 97052	089	648	242, 290. 494
15	863	7697	5343	113	103	654	244, 134. 125
16	847	7648	6002	174	117	659	245, 977. 759
17	831	7600	6659	235	131	665	247, 821. 394
18	814	7551	7317	296	145	671	249, 665. 031
19	798	7502	7973	356	159	677	251, 508. 671
20	8. 50965782	8. 51247453	0. 708628	1. 97417	5. 66173	7. 5683	1, 253, 352. 312
21	765	7403	9284	477	187	688	255, 195. 956
22	749	7354	0. 709937	538	201	694	257, 039. 602
23	732	7305	0. 710589	598	215	700	258, 883. 249
24	716	7256	1242	658	229	706	260, 726. 899
25	699	7206	1892	718	244	712	262, 570. 551
26	683	7157	2542	778	258	717	264, 414. 205
27	666	7107	3192	838	272	723	266, 257. 861
28	650	7058	3840	898	286	729	268, 101. 520
29	633	7008	4487	1. 97958	300	734	269, 945. 180
30	8. 50965617	8. 51246958	0. 715134	1. 98017	5. 66315	7. 5740	1, 271, 788. 843
31	600	6908	5779	077	329	746	273, 632. 507
32	584	6858	6423	136	343	752	275, 476. 174
33	567	6808	7067	195	358	757	277, 319. 843
34	550	6758	7710	255	372	763	279, 163. 514
35	533	6708	8352	314	386	768	281, 007. 187
36	517	6658	8994	373	400	774	282, 850. 862
37	500	6608	0. 719634	432	415	780	284, 694. 539
38	483	6558	0. 720273	491	429	785	286, 538. 219
39	466	6507	0912	549	444	791	288, 381. 901
40	8. 50965450	8. 51246457	0. 721549	1. 98608	5. 66458	7. 5797	1, 290, 225. 584
41	433	6406	2186	667	472	802	292, 069. 270
42	416	6356	2822	725	487	808	293, 912. 958
43	399	6305	3457	783	502	813	295, 756. 648
44	382	6254	4091	842	516	819	297, 600. 341
45	365	6204	4725	900	530	824	299, 444. 035
46	348	6153	5357	1. 98958	545	830	301, 287. 732
47	331	6102	5989	1. 99016	560	836	303, 131. 431
48	314	6051	6620	074	574	841	304, 975. 132
49	297	6000	7250	132	589	846	306, 818. 835
50	8. 50965280	8. 51245949	0. 727879	1. 99190	5. 66603	7. 5852	1, 308, 662. 540
51	263	5897	8508	247	618	858	310, 506. 248
52	246	5846	9135	305	633	863	312, 349. 957
53	229	5795	0. 729761	362	647	868	314, 193. 669
54	212	5744	0. 730387	419	662	874	316, 037. 383
55	195	5692	1012	477	677	879	317, 881. 099
56	178	5641	1636	534	691	885	319, 724. 818
57	160	5589	2259	591	706	890	321, 568. 538
58	143	5537	2882	648	721	896	323, 412. 261
59	126	5486	3504	705	736	901	325, 255. 986
12 00	8. 50965109	8. 51245434	0. 734124	1. 99762	5. 66750	7. 5907	1, 327, 099. 713

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 12°–13°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
12 00	8. 50965109	8. 51245434	0. 734124	1. 99762	5. 66750	7. 5907	1, 327, 099. 713
1	091	5382	4745	818	765	12	328, 943. 443
2	074	5330	5364	875	780	17	330, 787. 174
3	057	5278	5982	932	795	23	332, 630. 908
4	039	5226	6601	1. 99988	810	28	334, 474. 644
05	022	5174	7217	2. 00045	824	34	336, 318. 382
6	8. 50965005	5122	7833	101	840	39	338, 162. 122
7	8. 50964987	5069	8448	157	854	44	340, 005. 865
8	970	5017	9063	213	869	50	341, 849. 610
9	952	4965	0. 739677	269	884	55	343, 693. 357
10	8. 50964935	8. 51244912	0. 740289	2. 00325	5. 66899	7. 5960	1, 345, 537. 107
11	917	4860	0902	381	914	66	347, 380. 858
12	900	4807	1513	437	929	71	349, 224. 612
13	882	4754	2123	492	944	76	351, 068. 368
14	865	4701	2734	548	959	81	352, 912. 126
15	847	4649	3342	604	974	87	354, 755. 886
16	829	4596	3950	659	5. 66989	92	356, 599. 649
17	812	4543	4557	714	5. 67004	7. 5997	358, 443. 414
18	794	4490	5165	770	020	7. 6002	360, 287. 181
19	776	4437	5770	825	035	08	362, 130. 951
20	8. 50964759	8. 51244384	0. 746375	2. 00880	5. 67050	7. 6013	1, 363, 974. 723
21	741	4330	6980	935	065	18	365, 818. 497
22	723	4277	7583	2. 00990	080	23	367, 662. 273
23	705	4224	8186	2. 01045	095	28	369, 506. 051
24	688	4170	8789	100	110	34	371, 349. 832
25	670	4117	9390	154	126	39	373, 193. 615
26	652	4063	0. 749990	209	141	44	375, 037. 400
27	634	4010	0. 750589	263	156	49	376, 881. 188
28	616	3956	1189	318	172	54	378, 724. 978
•29	598	3902	1787	372	187	60	380, 568. 770
30	8. 50964580	8. 51243848	0. 752384	2. 01426	5. 67202	7. 6065	1, 382, 412. 564
31	562	3795	2981	480	218	70	384, 256. 361
32	544	3741	3577	535	233	75	386, 100. 160
33	526	3687	4172	589	248	80	387, 943. 961
34	508	3632	4767	642	264	85	389, 787. 765
35	490	3578	5361	696	279	90	391, 631. 571
36	472	3524	5954	750	294	7. 6095	393, 475. 379
37	454	3470	6546	804	310	7. 6100	395, 319. 189
38	436	3415	7137	858	325	06	397, 163. 002
39	418	3361	7729	911	341	11	399, 006. 817
40	8. 50964400	8. 51243307	0. 758319	2. 01964	5. 67356	7. 6116	1, 400, 850. 635
41	381	3252	8908	2. 02018	372	21	402, 694. 454
42	363	3197	0. 759497	071	388	26	404, 538. 276
43	345	3143	0. 760085	124	403	31	406, 382. 101
44	327	3088	0672	177	418	36	408, 225. 927
45	308	3033	1258	230	434	41	410, 069. 756
46	290	2978	1845	284	450	46	411, 913. 588
47	272	2923	2430	336	465	51	413, 757. 422
48	253	2868	3014	389	481	56	415, 601. 258
49	235	2813	3597	442	497	61	417, 445. 096
50	8. 50964217	8. 51242758	0. 764181	2. 02494	5. 67512	7. 6166	1, 419, 288. 937
51	198	2703	4763	547	528	71	421, 132. 780
52	180	2647	5344	600	544	76	422, 976. 625
53	161	2592	5925	652	559	81	424, 820. 473
54	143	2537	6506	704	575	86	426, 664. 323
55	124	2481	7085	757	591	90	428, 508. 175
56	106	2426	7663	809	607	7. 6195	430, 352. 030
57	087	2370	8241	861	622	7. 6200	432, 195. 887
58	069	2314	8819	913	638	05	434, 039. 747
59	050	2258	9395	2. 02965	654	10	435, 883. 609
13 00	8. 50964032	8. 51242203	0. 769971	2. 03017	5. 67670	7. 6215	1, 437, 727. 473

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 13°-14°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
13 00	8.50964032	8.51242203	0.769971	2.03017	5.67670	7.6215	1,437,727.473
1	8.50964013	2147	0.770547	069	686	20	439,571.340
2	8.50963994	2091	1122	120	702	25	441,415.209
3	976	2035	1695	172	718	30	443,259.080
4	957	1979	2268	224	734	34	445,102.954
05	938	1922	2841	275	749	39	446,946.830
6	919	1866	3413	326	765	44	448,790.708
7	901	1810	3984	378	781	49	450,634.589
8	882	1754	4554	429	797	54	452,478.472
9	863	1697	5125	480	813	59	454,322.358
10	8.50963844	8.51241641	0.775694	2.03531	5.67829	7.6264	1,456,166.246
11	825	1584	6262	582	845	68	458,010.137
12	807	1527	6830	633	862	73	459,854.030
13	788	1471	7397	684	878	78	461,697.925
14	769	1414	7964	735	894	83	463,541.823
15	750	1357	8529	786	910	88	465,385.723
16	731	1300	9094	837	926	92	467,229.625
17	712	1243	0.779658	887	942	7.6297	469,073.530
18	693	1186	0.780223	938	958	7.6302	470,917.438
19	674	1129	0786	2.03988	974	06	472,761.348
20	8.50963655	8.51241072	0.781348	2.04038	5.67990	7.6311	1,474,605.260
21	636	1015	1910	089	5.68007	16	476,449.175
22	617	0957	2472	139	023	21	478,293.092
23	597	0900	3032	189	039	25	480,137.011
24	578	0843	3592	239	056	30	481,980.933
25	559	0785	4151	289	072	35	483,824.857
26	540	0728	4710	339	088	40	485,668.784
27	521	0670	5268	389	104	44	487,512.713
28	502	0612	5825	439	121	49	489,356.645
29	482	0555	6382	489	137	54	491,200.579
30	8.50963463	8.51240497	0.786939	2.04538	5.68153	7.6358	1,493,044.516
31	444	0439	7494	588	170	63	494,888.455
32	424	0381	8049	638	186	68	496,732.397
33	405	0323	8602	687	203	72	498,576.341
34	386	0265	9156	736	219	77	500,420.287
35	366	0207	0.789709	786	236	81	502,264.236
36	347	0148	0.790262	835	252	86	504,108.188
37	327	0090	0813	884	268	91	505,952.142
38	308	8.51240032	1364	933	285	7.6395	507,796.098
39	289	8.51239973	1915	2.04982	301	7.6400	509,640.057
40	8.50963269	8.51239915	0.792465	2.05031	5.68318	7.6404	1,511,484.018
41	250	9856	3014	080	334	09	513,327.982
42	230	9798	3562	129	351	14	515,171.948
43	210	9739	4110	178	368	18	517,015.917
44	191	9680	4658	226	384	23	518,859.888
45	171	9621	5204	275	401	27	520,703.862
46	152	9563	5750	323	418	32	522,547.838
47	132	9504	6295	372	434	36	524,391.817
48	112	9445	6840	420	451	41	526,235.798
49	093	9386	7385	469	467	45	528,079.782
50	8.50963073	8.51239326	0.797929	2.05517	5.68484	7.6450	1,529,923.769
51	053	9267	8471	565	501	54	531,767.758
52	033	9208	9014	613	518	59	533,611.749
53	8.50963014	9149	0.799556	661	534	63	535,455.743
54	8.50962994	9089	0.800097	709	551	68	537,299.739
55	974	9030	0638	757	568	72	539,143.738
56	954	8970	1178	805	585	77	540,987.739
57	934	8911	1717	853	602	81	542,831.743
58	914	8851	2257	901	618	86	544,675.750
59	894	8791	2795	948	635	90	546,519.759
14 00	8.50962875	8.51238731	0.803332	2.05996	5.68652	7.6494	1,548,363.770

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 14°–15°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
14 00	8. 50962875	8. 51238731	0. 803332	2. 05996	5. 68652	7. 6494	1, 548, 363. 770
1	855	8672	3869	2. 06043	669	7. 6499	550, 207. 784
2	835	8612	4405	091	686	7. 6503	552, 051. 801
3	815	8552	4942	138	703	08	553, 895. 820
4	795	8492	5477	186	720	12	555, 739. 842
05	775	8431	6012	233	737	17	557, 583, 866
6	754	8371	6546	280	754	21	559, 427. 893
7	734	8311	7079	327	771	25	561, 271. 922
8	714	8251	7613	374	788	30	563, 115. 954
9	694	8190	8145	421	805	34	564, 959. 989
10	8. 50962674	8. 51238130	0. 808677	2. 06468	5. 68822	7. 6539	1, 566, 804. 026
11	654	8069	9208	516	839	43	568, 648. 066
12	634	8009	0. 809738	562	856	47	570, 492. 108
13	613	7948	0. 810269	608	873	52	572, 336. 152
14	593	7887	0799	655	890	56	574, 180. 200
15	573	7827	1327	702	907	60	576, 024. 250
16	553	7766	1856	748	924	65	577, 868. 302
17	532	7705	2383	795	942	69	579, 712. 357
18	512	7644	2910	841	959	73	581, 556. 415
19	492	7583	3438	888	976	78	583, 400. 476
20	8. 50962471	8. 51237522	0. 813964	2. 06934	5. 68993	7. 6582	1, 585, 244. 539
21	451	7461	4489	2. 06980	5. 69010	86	587, 088. 604
22	430	7399	5014	2. 07026	028	90	588, 932. 672
23	410	7338	5538	072	045	95	590, 776. 743
24	390	7277	6063	118	062	7. 6599	592, 620. 816
25	369	7215	6586	164	079	7. 6603	594, 464. 892
26	349	7154	7109	210	097	08	596, 308. 970
27	328	7092	7631	256	114	12	598, 153. 051
28	308	7031	8153	302	131	16	599, 997. 135
29	287	6969	8674	348	149	20	601, 841. 222
30	8. 50962266	8. 51236907	0. 819195	2. 07393	5. 69166	7. 6624	1, 603, 685. 311
31	246	6845	0. 819715	439	183	29	605, 529. 402
32	225	6783	0. 820234	484	201	33	607, 373. 496
33	205	6721	0753	530	218	37	609, 217. 593
34	184	6659	1271	575	236	41	611, 061. 693
35	163	6597	1790	620	253	46	612, 905. 795
36	142	6535	2307	666	270	50	614, 749. 900
37	122	6473	2824	711	288	54	616, 594. 007
38	101	6411	3340	756	306	58	618, 438. 117
39	080	6348	3855	801	323	62	620, 282. 230
40	8. 50962059	8. 51236286	0. 824370	2. 07846	5. 69341	7. 6666	1, 622, 126. 345
41	039	6224	4886	891	358	71	623, 970. 463
42	8. 50962018	6161	5400	936	376	75	625, 814. 584
43	8. 50961997	6098	5913	2. 07981	393	79	627, 658. 707
44	976	6036	6426	2. 08026	411	83	629, 502. 833
45	955	5973	6939	071	428	87	631, 346. 962
46	934	5910	7451	115	446	91	633, 191. 093
47	913	5847	7963	160	464	7. 6696	635, 035. 227
48	892	5784	8474	204	481	7. 6700	636, 879. 363
49	871	5721	8984	249	499	04	638, 723. 503
50	8. 50961850	8. 51235658	0. 829494	2. 08293	5. 69517	7. 6708	1, 640, 567. 645
51	829	5595	0. 830003	338	534	12	642, 411. 789
52	808	5532	0512	382	552	16	644, 255. 937
53	787	5469	1020	426	570	20	646, 100. 087
54	766	5406	1528	470	588	24	647, 944. 239
55	745	5342	2035	515	606	28	649, 788. 395
56	724	5279	2542	559	623	32	651, 632. 553
57	702	5215	3048	603	641	36	653, 476. 714
58	681	5152	3554	647	659	40	655, 320. 877
59	660	5088	4059	690	677	44	657, 165. 043
15 00	8. 50961639	8. 51235024	0. 834564	2. 08734	5. 69695	7. 6748	1, 659, 009. 212

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 15°-16°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
15 00	8.50961639	8.51235024	0.834564	2.08734	5.69695	7.6748	1,659,009.212
1	618	4961	5069	778	713	53	660,853.384
2	596	4897	5572	822	730	57	662,697.558
3	575	4833	6075	866	748	61	664,541.735
4	554	4769	6578	909	766	65	666,385.915
05	532	4705	7080	953	784	69	668,230.097
6	511	4641	7581	2.08996	802	73	670,074.282
7	490	4577	8083	2.09040	820	77	671,918.470
8	468	4512	8584	083	838	81	673,762.661
9	447	4448	9084	126	856	85	675,606.854
10	8.50961425	8.51234384	0.839583	2.09170	5.69874	7.6789	1,677,451.050
11	404	4320	0.840082	213	892	93	679,295.249
12	382	4255	0581	256	910	7.6796	681,139.451
13	361	4191	1079	299	928	7.6800	682,983.655
14	339	4126	1578	342	946	04	684,827.862
15	318	4061	2075	385	964	08	686,672.072
16	296	3997	2571	428	5.69983	12	688,516.284
17	275	3932	3067	471	5.70001	16	690,360.499
18	253	3867	3563	513	019	20	692,204.717
19	231	3802	4058	556	037	24	694,048.938
20	8.50961210	8.51233737	0.844553	2.09599	5.70055	7.6828	1,695,893.162
21	188	3672	5048	642	074	32	697,737.388
22	166	3607	5541	684	092	36	699,581.617
23	145	3542	6035	727	110	40	701,425.849
24	123	3476	6527	769	128	44	703,270.083
25	101	3411	7020	811	146	48	705,114.320
26	079	3346	7511	854	165	51	706,958.560
27	058	3280	8002	896	183	55	708,802.803
28	036	3215	8493	938	201	59	710,647.049
29	8.50961014	3149	8985	2.09980	220	63	712,491.298
30	8.50960992	8.51233084	0.849474	2.10023	5.70238	7.6867	1,714,335.549
31	970	3018	0.849964	065	256	71	716,179.803
32	948	2952	0.850452	107	275	75	718,024.060
33	926	2887	0941	149	293	78	719,868.320
34	904	2821	1429	190	312	82	721,712.582
35	882	2755	1916	232	330	86	723,556.847
36	860	2689	2403	274	348	90	725,401.115
37	838	2623	2891	316	367	94	727,245.386
38	816	2557	3377	358	385	7.6898	729,089.660
39	794	2490	3862	399	404	7.6901	730,933.936
40	8.50960772	8.51232424	0.854347	2.10441	5.70422	7.6905	1,732,778.215
41	750	2358	4832	482	441	09	734,622.497
42	728	2291	5316	524	459	13	736,466.782
43	706	2225	5800	565	478	16	738,311.070
44	684	2159	6283	606	496	20	740,155.360
45	661	2092	6766	648	515	24	741,999.653
46	639	2025	7249	689	534	28	743,843.950
47	617	1959	7731	730	552	32	745,688.249
48	595	1892	8213	772	571	35	747,532.551
49	572	1825	8694	812	590	39	749,376.855
50	8.50960550	8.51231758	0.859174	2.10854	5.70608	7.6943	1,751,221.163
51	528	1691	0.859654	894	627	47	753,065.473
52	505	1624	0.860134	935	646	50	754,909.786
53	483	1557	0613	2.10976	664	54	756,754.102
54	461	1490	1092	2.11017	683	58	758,598.421
55	438	1423	1571	058	702	61	760,442.743
56	416	1356	2049	099	720	65	762,287.068
57	393	1288	2526	139	739	69	764,131.395
58	371	1221	3003	180	758	72	765,975.725
59	349	1153	3479	220	777	76	767,820.058
16 00	8.50960326	8.51231086	0.863955	2.11261	5.70796	7.6980	1,769,664.394

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 16°–17°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
16 00	8. 50960326	8. 51231086	0. 863955	2. 11261	5. 70796	7. 6980	1, 769, 664. 394
1	304	1018	4431	301	814	84	771, 508. 733
2	281	0951	4906	342	833	87	773, 353. 075
3	258	0883	5381	382	852	91	775, 197. 420
4	236	0815	5855	422	871	95	777, 041. 768
05	213	0747	6330	463	890	7. 6998	778, 886. 118
6	191	0680	6803	503	909	7. 7002	780, 730. 471
7	168	0612	7276	543	928	06	782, 574. 827
8	145	0544	7749	583	947	09	784, 419. 186
9	123	0476	8221	623	966	13	786, 263. 548
10	8. 50960100	8. 51230407	0. 868692	2. 11663	5. 70985	7. 7016	1, 788, 107. 913
11	077	0339	9163	703	5. 71004	20	789, 952. 281
12	054	0271	0. 869634	743	023	24	791, 796. 652
13	032	0203	0. 870105	783	042	27	793, 641. 025
14	8. 50960009	0134	0574	823	061	31	795, 485. 401
15	8. 50959986	8. 51230066	1044	862	080	34	797, 329. 781
16	963	8. 51229997	1514	902	099	38	799, 174. 163
17	940	9929	1983	942	118	42	801, 018. 548
18	917	9860	2451	2. 11981	137	45	802, 862. 936
19	894	9791	2918	2. 12021	156	49	804, 707. 327
20	8. 50959872	8. 51229723	0. 873386	2. 12060	5. 71175	7. 7052	1, 806, 551. 721
21	849	9654	3853	100	194	56	808, 396. 118
22	826	9585	4319	139	214	60	810, 240. 518
23	803	9516	4785	178	233	63	812, 084. 921
24	780	9447	5251	218	252	67	813, 929. 326
25	757	9378	5716	257	271	70	815, 773. 734
26	734	9309	6181	296	290	74	817, 618. 146
27	711	9239	6645	335	310	77	819, 462. 561
28	687	9170	7109	374	329	81	821, 306. 978
29	664	9101	7574	413	348	84	823, 151. 398
30	8. 50959641	8. 51229031	0. 878037	2. 12452	5. 71367	7. 7088	1, 824, 995. 822
31	618	8962	8499	491	387	91	826, 840. 248
32	595	8892	8962	530	406	95	828, 684. 677
33	572	8823	9424	569	425	7. 7098	830, 529. 109
34	548	8753	0. 879885	608	445	7. 7102	832, 373. 544
35	525	8684	0. 880346	646	464	05	834, 217. 982
36	502	8614	0807	685	483	09	836, 062. 423
37	479	8544	1267	724	503	12	837, 906. 867
38	455	8474	1727	762	522	16	839, 751. 314
39	432	8404	2186	801	541	19	841, 595. 764
40	8. 50959409	8. 51228334	0. 882645	2. 12839	5. 71561	7. 7123	1, 843, 440. 217
41	385	8264	3104	878	580	26	845, 284. 673
42	362	8194	3562	916	600	30	847, 129. 131
43	339	8124	4021	954	619	33	848, 973. 593
44	315	8053	4478	2. 12993	639	37	850, 818. 058
45	292	7983	4935	2. 13031	658	40	852, 662. 526
46	268	7913	5392	069	678	43	854, 506. 996
47	245	7842	5848	107	697	47	856, 351. 470
48	221	7772	6304	145	717	50	858, 195. 947
49	198	7701	6759	184	736	54	860, 040. 427
50	8. 50959174	8. 51227631	0. 887214	2. 13222	5. 71756	7. 7157	1, 861, 884. 909
51	151	7560	7669	259	776	60	863, 729. 395
52	127	7489	8123	297	795	64	865, 573. 884
53	104	7418	8577	335	815	67	867, 418. 375
54	080	7347	9030	373	834	71	869, 262. 870
55	056	7277	9483	411	854	74	871, 107. 368
56	033	7206	0. 889936	449	874	78	872, 951. 869
57	8. 50959009	7134	0. 890388	486	894	81	874, 796. 372
58	8. 50958985	7063	0840	524	913	84	876, 640. 879
59	961	6992	1291	561	933	88	878, 485. 389
17 00	8. 50958938	8. 51226921	0. 891743	2. 13599	5. 71953	7. 7191	1, 880, 329. 902

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 17°-18°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
17 00	8. 50958938	8. 51226921	0. 891743	2. 13599	5. 71953	7. 7191	1, 880, 329. 902
1	914	6850	2194	636	972	94	882, 174. 418
2	890	6778	2644	674	5. 71992	7. 7198	884, 018. 937
3	866	6707	3094	711	5. 72012	7. 7201	885, 863. 459
4	842	6635	3543	749	032	04	887, 707. 984
05	819	6564	3992	786	052	08	889, 552. 512
6	795	6492	4441	823	071	11	891, 397. 043
7	771	6420	4889	860	091	14	893, 241. 577
8	747	6349	5337	897	111	18	895, 086. 114
9	723	6277	5785	935	131	21	896, 930. 654
10	8. 50958699	8. 51226205	0. 896232	2. 13972	5. 72151	7. 7224	1, 898, 775. 198
11	675	6133	6679	2. 14009	171	28	900, 619. 744
12	651	6061	7125	046	191	31	902, 464. 293
13	627	5989	7571	083	211	34	904, 308. 845
14	603	5917	8017	119	231	38	906, 153. 401
15	579	5845	8462	156	251	41	907, 997. 959
16	555	5773	8907	193	271	44	909, 842. 521
17	531	5700	9352	230	290	47	911, 687. 086
18	507	5628	0. 899796	266	311	51	913, 531. 654
19	483	5556	0. 900239	303	330	54	915, 376. 224
20	8. 50958458	8. 51225483	0. 900683	2. 14340	5. 72351	7. 7257	1, 917, 220. 798
21	434	5411	1126	376	371	60	919, 065. 375
22	410	5338	1568	413	391	64	920, 909. 955
23	386	5265	2011	449	411	67	922, 754. 538
24	362	5193	2453	486	431	70	924, 599. 124
25	337	5120	0. 902894	522	451	73	926, 443. 714
26	313	5047	3336	558	471	77	928, 288. 306
27	289	4974	3777	595	491	80	930, 132. 902
28	264	4901	4218	631	511	83	931, 977. 501
29	240	4828	4658	667	532	86	933, 822. 102
30	8. 50958216	8. 51224755	0. 905097	2. 14703	5. 72552	7. 7290	1, 935, 666. 707
31	191	4682	5537	740	572	93	937, 511. 315
32	167	4609	5976	776	592	96	939, 355. 926
33	143	4535	6414	812	612	7. 7299	941, 200. 540
34	118	4462	6852	848	633	7. 7302	943, 045. 157
35	094	4389	7290	884	653	06	944, 889. 777
36	069	4315	7728	919	673	09	946, 734. 401
37	045	4242	8165	955	693	12	948, 579. 028
38	8. 50958020	4168	8602	2. 14991	714	15	950, 423. 658
39	8. 50957996	4095	9038	2. 15027	734	18	952, 268. 290
40	8. 50957971	8. 51224021	0. 909474	2. 15062	5. 72754	7. 7321	1, 954, 112. 926
41	946	3947	0. 909910	098	775	24	955, 957. 565
42	922	3873	0. 910345	134	795	28	957, 802. 207
43	897	3799	0780	169	816	31	959, 646. 853
44	873	3725	1215	205	836	34	961, 491. 501
45	848	3651	1649	240	856	37	963, 336. 153
46	823	3577	2083	276	877	40	965, 180. 808
47	798	3503	2517	311	897	43	967, 025. 466
48	774	3429	2950	347	918	46	968, 870. 127
49	749	3355	3383	382	938	50	970, 714. 791
50	8. 50957724	8. 51223281	0. 913815	2. 15417	5. 72958	7. 7353	1, 972, 559. 459
51	699	3206	4247	452	5. 72979	56	974, 404. 129
52	675	3132	4679	488	5. 73000	59	976, 248. 803
53	650	3057	5111	523	020	62	978, 093. 480
54	625	2983	5542	558	041	65	979, 938. 160
55	600	2908	5972	593	061	68	981, 782. 843
56	575	2834	6403	628	082	71	983, 627. 529
57	550	2759	6833	663	102	74	985, 472. 219
58	525	2684	7263	698	123	78	987, 316. 912
59	500	2609	7692	733	144	81	989, 161. 608
18 00	8. 50957476	8. 51222534	0. 918121	2. 15768	5. 73164	7. 7384	1, 991, 006. 307

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 18°-19°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
18 00	8. 50957476	8. 51222534	0. 918121	2. 15768	5. 73164	7. 7384	1, 991, 006. 307
1	451	2459	8550	802	185	87	992, 851. 009
2	426	2384	8978	837	205	90	994, 695. 714
3	400	2309	9406	872	226	93	996, 540, 423
4	375	2234	0. 919834	906	247	96	1, 998, 385. 135
05	350	2159	0. 920261	941	267	7. 7399	2, 000, 229. 850
6	325	2084	0688	2. 15976	288	7. 7402	002, 074. 568
7	300	2008	1115	2. 16010	309	05	003, 919. 289
8	275	1933	1541	045	330	08	005, 764. 014
9	250	1858	1967	079	350	11	007, 608. 742
10	8. 50957225	8. 51221782	0. 922393	2. 16114	5. 73371	7. 7414	2, 009, 453. 473
11	200	1706	2818	148	392	17	011, 298. 207
12	174	1631	3243	182	413	20	013, 142. 944
13	149	1555	3667	217	434	23	014, 987. 685
14	124	1479	4092	251	454	26	016, 832. 429
15	099	1404	4516	285	475	29	018, 677. 176
16	073	1328	4939	319	496	32	020, 521. 926
17	048	1252	5362	354	517	35	022, 366. 680
18	8. 50957023	1176	5785	388	538	38	024, 211. 437
19	8. 50956997	1100	6208	422	559	41	026, 056. 197
20	8. 50956972	8. 51221024	0. 926630	2. 16456	5. 73580	7. 7444	2, 027, 900. 960
21	947	0948	7052	490	601	47	029, 745. 726
22	921	0871	7474	524	622	50	031, 590. 496
23	896	0795	7895	557	642	53	033, 435. 269
24	870	0719	8316	591	663	56	035, 280. 045
25	845	0642	8737	625	684	59	037, 124. 824
26	819	0566	9157	659	705	62	038, 969. 607
27	794	0489	9577	693	726	65	040, 814. 393
28	768	0413	0. 929997	726	747	68	042, 659. 182
29	743	0336	0. 930416	760	768	71	044, 503. 975
30	8. 50956717	8. 51220260	0. 930835	2. 16794	5. 73789	7. 7474	2, 046, 348. 771
31	692	0183	1254	827	810	76	048, 193. 570
32	666	0106	1672	861	832	79	050, 038. 372
33	640	8. 51220029	2090	894	853	82	051, 883. 177
34	615	8. 51219952	2508	928	874	85	053, 727. 986
35	589	9875	2925	961	895	88	055, 572. 798
36	563	9798	3342	2. 16994	916	91	057, 417. 613
37	538	9721	3759	2. 17028	937	94	059, 262. 432
38	512	9644	4174	061	958	7. 7597	061, 107. 254
39	486	9567	4590	094	5. 73980	7. 7500	062, 952. 079
40	8. 50956461	8. 51219489	0. 935006	2. 17127	5. 74001	7. 7503	2, 064, 796. 907
41	435	9412	5422	160	022	06	066, 641. 739
42	409	9335	5837	194	043	08	068, 486. 574
43	383	9257	6251	227	064	11	070, 331. 412
44	357	9180	6666	260	086	14	072, 176. 253
45	331	9102	7080	293	107	17	074, 021. 098
46	306	9025	7494	326	128	20	075, 865. 946
47	280	8947	7908	359	150	23	077. 710. 797
48	254	8869	8321	391	171	26	079, 555. 652
49	228	8791	8734	424	192	28	081, 400. 510
50	8. 50956202	8. 51218713	0. 939147	2. 17457	5. 74214	7. 7531	2, 083, 245. 372
51	176	8635	9559	490	235	34	085, 090. 237
52	150	8557	0. 939971	522	256	37	086, 935. 104
53	124	8479	0. 940383	555	278	40	088, 779. 975
54	098	8401	0794	588	299	43	090, 624. 850
55	072	8323	1205	620	320	46	092, 469. 728
56	046	8245	1616	653	342	48	094, 314. 609
57	8. 50956020	8167	2026	686	363	51	096, 159. 494
58	8. 50955993	8088	2436	718	385	54	098, 004. 382
59	967	8010	2846	750	406	57	099, 849. 273
19 00	8. 50955941	8. 51217931	0. 943256	2. 17783	5. 74428	7. 7560	2, 101, 694. 167

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 19°-20°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
19 00	8.50955941	8.51217931	0.943256	2.17783	5.74428	7.7560	2,101,694.167
1	915	7853	3665	815	449	62	103,539.065
2	889	7774	4074	848	470	65	105,383.966
3	863	7696	4483	880	492	68	107,228.871
4	836	7617	4890	912	514	71	109,073.779
05	810	7538	5298	944	535	74	110,918.690
6	784	7459	5706	2.17977	557	76	112,763.605
7	758	7381	6113	2.18009	578	79	114,608.523
8	731	7302	6520	041	600	82	116,453.444
9	705	7223	6927	073	622	84	118,298.369
10	8.50955679	8.51217144	0.947334	2.18105	5.74643	7.7587	2,120,143.297
11	652	7065	7740	137	665	90	121,988.228
12	626	6985	8146	169	686	93	123,833.163
13	599	6906	8551	201	708	96	125,678.101
14	573	6827	8957	233	730	7.7598	127,523.042
15	547	6748	9362	264	752	7.7601	129,367.987
16	520	6668	0.949766	296	773	04	131,212.935
17	494	6589	0.950171	328	795	06	133,057.887
18	467	6509	0575	360	816	09	134,902.842
19	441	6430	0979	392	838	12	136,747.800
20	8.50955414	8.51216350	0.951381	2.18423	5.74860	7.7615	2,138,592.762
21	388	6270	1785	455	882	17	140,437.727
22	361	6191	2188	486	904	20	142,282.695
23	334	6111	2590	518	925	23	144,127.667
24	308	6031	2993	549	947	26	145,972.642
25	281	5951	3395	581	969	28	147,817.621
26	254	5871	3796	612	5.74991	31	149,662.603
27	228	5791	4198	644	5.75013	34	151,507.588
28	201	5711	4599	675	035	36	153,352.577
29	174	5631	5000	706	056	39	155,197.569
30	8.50955148	8.51215551	0.955401	2.18738	5.75078	7.7642	2,157,042.565
31	121	5470	5801	769	100	44	158,887.564
32	094	5390	6201	800	122	47	160,732.566
33	067	5310	6601	831	144	50	162,577.572
34	040	5229	7000	862	166	52	164,422.581
35	8.50955014	5149	7399	893	188	55	166,267.594
36	8.50954987	5068	7797	924	210	58	168,112.610
37	960	4988	8196	955	232	60	169,957.630
38	933	4907	8594	2.18986	254	63	171,802.653
39	906	4826	8992	2.19017	276	66	173,647.679
40	8.50954879	8.51214745	0.959390	2.19048	5.75298	7.7668	2,175,492.709
41	852	4665	0.959788	079	320	71	177,337.742
42	825	4584	0.960185	110	342	73	179,182.779
43	798	4503	0582	141	364	76	181,027.819
44	771	4422	0979	172	386	79	182,872.863
45	744	4341	1375	202	408	81	184,717.910
46	717	4260	1771	233	430	84	186,562.960
47	690	4178	2167	264	452	86	188,408.014
48	663	4097	2562	294	475	89	190,253.071
49	636	14016	2957	325	497	92	192,098.132
50	8.50954609	8.51213934	0.963351	2.19355	5.75519	7.7694	2,193,943.196
51	582	3853	3746	386	541	97	195,788.264
52	555	3772	4140	416	563	7.7699	197,633.335
53	527	3690	4535	447	586	7.7702	199,478.410
54	500	3609	4928	477	608	05	201,323.488
55	473	3527	5322	508	630	07	203,168.570
56	446	3445	5715	538	652	10	205,013.655
57	419	3363	6108	568	674	12	206,858.743
58	391	3282	6501	598	697	15	208,703.835
59	364	3200	6894	628	719	17	210,548.931
20 00	8.50954337	8.51213118	0.967285	2.19659	5.75741	7.7720	2,212,394.030

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 20°-21°

Lat.		log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
°	′							*Meters*
20	00	8. 50954337	8. 51213118	0. 967285	2. 19659	5. 75741	7. 7720	2, 212, 394. 030
	1	309	3036	7677	689	764	22	214, 239. 132
	2	282	2954	8069	719	786	25	216, 084. 238
	3	255	2872	8460	749	808	28	217, 929. 347
	4	227	2790	8851	779	831	30	219, 774. 460
	05	200	2707	9242	809	853	33	221, 619. 577
	6	172	2625	0. 969632	839	875	35	223, 464. 697
	7	145	2543	0. 970023	869	898	38	225, 309. 820
	8	118	2460	0413	899	920	40	227, 154. 947
	9	090	2378	0802	929	943	43	229, 000. 077
	10	8. 50954063	8. 51212295	0. 971192	2. 19959	5. 75965	7. 7745	2, 230, 845. 211
	11	035	2213	1580	2. 19988	5. 75987	48	232, 690. 349
	12	8. 50954008	2130	1969	2. 20018	5. 76010	50	234, 535. 490
	13	8. 50953980	2048	2358	048	032	53	236, 380. 634
	14	952	1965	2746	078	055	55	238, 225. 782
	15	925	1882	3135	107	077	58	240, 070. 933
	16	897	1799	3522	137	100	60	241, 916. 088
	17	870	1716	3910	166	122	63	243, 761. 247
	18	842	1634	4298	196	145	65	245, 606. 409
	19	814	1551	4685	226	168	68	247, 451. 574
	20	8. 50953787	8. 51211467	0. 975071	2. 20255	5. 76190	7. 7770	2, 249, 296. 743
	21	759	1384	5457	284	213	73	251, 141. 916
	22	731	1301	5843	314	235	75	252, 987. 092
	23	703	1218	6230	343	258	78	254, 832. 272
	24	676	1135	6615	373	280	80	256, 677. 455
	25	648	1051	7001	402	303	82	258, 522. 642
	26	620	0968	7386	431	326	85	260, 367. 832
	27	592	0885	7771	460	348	87	262, 213. 026
	28	564	0801	8156	490	371	90	264, 058. 223
	29	537	0717	8539	519	394	92	265, 903. 424
	30	8. 50953509	8. 51210634	0. 978924	2. 20548	5. 76416	7. 7795	2, 267, 748. 628
	31	481	0550	9308	577	439	7. 7797	269, 593. 836
	32	453	0466	0. 979691	606	462	7. 7800	271, 439. 048
	33	425	0383	0. 980075	635	485	02	273, 284. 263
	34	397	0299	0458	664	507	04	275, 129. 482
	35	369	0215	0841	693	530	07	276, 974. 704
	36	341	0131	1224	722	553	09	278, 819. 930
	37	313	8. 51210047	1606	751	576	12	280, 665. 159
	38	285	8. 51209963	1987	780	598	14	282, 510. 392
	39	257	9879	2369	809	621	16	284, 355. 629
	40	8. 50953229	8. 51209795	0. 982751	2. 20837	5. 76644	7. 7819	2, 286, 200. 869
	41	201	9710	3132	866	667	21	288, 046. 112
	42	173	9626	3514	895	690	24	289, 891. 359
	43	145	9542	3895	924	713	26	291, 736. 610
	44	116	9457	4275	952	736	28	293, 581. 865
	45	088	9373	4656	2. 20981	758	31	295, 427. 123
	46	060	9288	5035	2. 21010	781	33	297, 272. 385
	47	032	9204	5415	038	804	36	299, 117. 650
	48	8. 50953004	9119	5795	067	827	38	300, 962. 919
	49	8. 50952976	9034	6174	095	850	40	302, 808. 191
	50	8. 50952947	8. 51208950	0. 986553	2. 21124	5. 76873	7. 7843	2, 304, 653. 467
	51	919	8865	6932	152	896	45	306, 498. 746
	52	891	8780	7311	180	919	47	308, 344. 029
	53	862	8695	7689	209	942	50	310, 189. 316
	54	834	8610	8066	237	965	52	312, 034. 607
	55	806	8525	8444	265	5. 76988	54	313, 879. 901
	56	777	8440	8822	294	5. 77011	57	315, 725. 198
	57	749	8355	9200	322	034	59	317, 570. 499
	58	721	8270	9577	350	057	61	319, 415. 804
	59	692	8185	9954	378	080	64	321, 261. 113
21	00	8. 50952664	8. 51208099	0. 990330	2. 21406	5. 77103	7. 7866	2, 323, 106. 425

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 21°-22°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
21 00	8. 50952664	8. 51208099	0. 990330	2. 21406	5. 77103	7. 7866	2, 323, 106. 425
1	635	8014	0706	434	126	68	324, 951. 741
2	607	7929	1082	463	150	71	326, 797. 060
3	578	7843	1458	491	173	73	328, 642. 383
4	550	7758	1834	519	196	75	330, 487. 710
05	521	7672	2209	547	219	78	332, 333. 040
6	493	7586	2585	575	242	80	334, 178. 374
7	464	7501	2960	602	265	82	336, 023. 712
8	436	7415	3333	630	288	84	337, 869. 053
9	407	7329	3708	658	312	87	339, 714. 398
10	8. 50952379	8. 51207243	0. 994082	2. 21686	5. 77335	7. 7889	2, 341, 559. 746
11	350	7158	4456	714	358	91	343, 405. 098
12	321	7072	4830	742	381	94	345, 250. 454
13	293	6986	5204	769	405	96	347, 095. 813
14	264	6900	5577	797	428	7. 7898	348, 941. 176
15	235	6813	5949	824	451	7. 7900	350, 786. 543
16	206	6727	6322	852	475	03	352, 631. 913
17	178	6641	6695	880	498	05	354, 477. 287
18	149	6555	7067	907	521	07	356, 322. 665
19	120	6468	7439	935	544	10	358, 168. 047
20	8. 50952091	8. 51206382	0. 997811	2. 21962	5. 77568	7. 7912	2, 360, 013. 432
21	063	6296	8183	2. 21990	591	14	361, 858. 821
22	034	6209	8553	2. 22017	614	16	363, 704. 213
23	8. 50952005	6123	8924	044	638	18	365, 549. 609
24	8. 50951976	6036	9295	072	661	21	367, 395. 009
25	947	5949	0. 999666	099	685	23	369, 240. 412
26	918	5863	1. 000037	126	708	25	371, 085. 819
27	889	5776	0407	154	732	27	372, 931. 230
28	860	5689	0776	181	755	30	374, 776. 644
29	831	5602	1146	208	778	32	376, 622. 062
30	8. 50951802	8. 51205515	1. 001516	2. 22235	5. 77802	7. 7934	2, 378, 467. 484
31	773	5428	1885	262	825	36	380, 312. 910
32	744	5341	2254	290	849	38	382, 158. 339
33	715	5254	2623	317	872	41	384, 003. 772
34	686	5167	2991	344	896	43	385, 849. 209
35	657	5080	3359	371	920	45	387, 694. 649
36	628	4992	3727	398	943	47	389, 540. 093
37	599	4905	4095	425	967	49	391, 385. 541
38	570	4818	4463	452	5. 77990	52	393, 230. 993
39	541	4730	4830	478	5. 78014	54	395, 076. 448
40	8. 50951512	8. 51204643	1. 005197	2. 22505	5. 78037	7. 7956	2, 396, 921. 907
41	482	4555	5564	532	061	58	398, 767. 370
42	453	4468	5931	559	085	60	400, 612. 836
43	424	4380	6297	586	108	62	402, 458. 306
44	395	4292	6664	612	132	65	404, 303. 780
45	366	4205	7030	639	156	67	406, 149. 257
46	336	4117	7395	666	179	69	407, 994. 738
47	307	4029	7760	692	203	71	409, 840. 223
48	278	3941	8126	719	226	73	411, 685. 712
49	248	3853	8491	746	250	75	413, 531. 205
50	8. 50951219	8. 51203765	1. 008856	2. 22772	5. 78274	7. 7978	2, 415, 376. 701
51	190	3677	9221	799	298	80	417, 222. 201
52	160	3589	9585	825	322	83	419, 067. 705
53	131	3501	1. 009949	852	345	84	420, 913. 212
54	102	3413	1. 010313	878	369	86	422, 758. 723
55	072	3324	0677	904	393	88	424, 604. 238
56	043	3236	1041	931	416	90	426, 449. 757
57	8. 50951013	3148	1404	957	440	92	428, 295. 279
58	8. 50950984	3059	1767	2. 22983	464	95	430, 140. 805
59	954	2971	2130	2. 23010	488	97	431, 986. 335
22 00	8. 50950925	8. 51202882	1. 012493	2. 23036	5. 78512	7. 7999	2, 433, 831. 869

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 22°–23°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
22 00	8.50950925	8.51202882	1.012493	2.23036	5.78512	7.7999	2,433,831.869
1	895	2793	2855	062	536	7.8001	435,677.407
2	866	2705	3218	088	560	03	437,522.948
3	836	2616	3579	114	584	05	439,368.493
4	806	2527	3941	140	607	07	441,214.042
05	777	2438	4302	167	631	09	443,059.595
6	747	2350	4664	193	655	11	444,905.151
7	718	2261	5025	219	679	13	446,750.711
8	688	2172	5386	245	703	16	448,596.275
9	658	2083	5746	271	727	18	450,441.843
10	8.50950629	8.51201994	1.016107	2.23297	5.78751	7.8020	2,452,287.414
11	599	1904	6467	322	775	22	454,132.989
12	569	1815	6828	348	799	24	455,978.568
13	539	1726	7188	374	823	26	457,824.151
14	510	1637	7546	400	847	28	459,669.738
15	480	1547	7906	426	871	30	461,515.328
16	450	1458	8265	452	895	32	463,360.922
17	420	1368	8625	477	919	34	465,206.520
18	390	1279	8983	503	943	36	467,052.122
19	361	1189	9341	529	967	38	468,897.728
20	8.50950331	8.51201100	1.019700	2.23554	5.78992	7.8040	2,470,743.338
21	301	1010	1.020058	580	5.79016	42	472,588.951
22	271	0920	0416	606	040	44	474,434.568
23	241	0831	0774	631	064	46	476,280.189
24	211	0741	1131	657	088	48	478,125.813
25	181	0651	1488	682	112	50	479,971.442
26	151	0561	1845	708	136	52	481,817.074
27	121	0471	2202	733	160	54	483,662.710
28	091	0381	2559	758	185	56	485,508.350
29	061	0291	2915	784	209	58	487,353.994
30	8.50950031	8.51200201	1.023271	2.23809	5.79233	7.8060	2,489,199.642
31	8.50950001	0111	3628	834	257	62	491,045.293
32	8.50949971	8.51200020	3983	860	282	64	492,890.949
33	941	8.51199930	4339	885	306	66	494,736.608
34	911	9840	4694	910	330	68	496,582.271
35	880	9749	5049	935	354	70	498,427.938
36	850	9659	5404	960	379	72	500,273.608
37	820	9568	5759	2.23986	403	74	502,119.283
38	790	9478	6114	2.24011	427	76	503,964.961
39	760	9387	6468	036	452	78	505,810.643
40	8.50949730	8.51199296	1.026822	2.24061	5.79476	7.8080	2,507,656.329
41	699	9206	7176	086	500	82	509,502.019
42	669	9115	7530	111	525	84	511,347.713
43	639	9024	7884	136	549	86	513,193.411
44	608	8933	8237	161	574	88	515,039.112
45	578	8842	8590	186	598	90	516,884.817
46	548	8751	8943	210	622	92	518,730.527
47	517	8660	9296	235	647	94	520,576.240
48	487	8569	1.029648	260	671	96	522,421.957
49	457	8478	1.030000	285	696	7.8098	524,267.678
50	8.50949426	8.51198387	1.030353	2.24310	5.79720	7.8100	2,526,113.402
51	396	8296	0705	334	745	02	527,959.131
52	366	8204	1057	359	769	04	529,804.863
53	335	8113	1407	384	794	06	531,650.600
54	305	8022	1759	408	818	08	533,496.340
55	274	7930	2110	433	842	09	535,342.084
56	244	7839	2461	458	867	11	537,187.832
57	213	7747	2812	482	892	13	539,033.584
58	183	7656	3162	507	916	15	540,879.340
59	152	7564	3513	531	941	17	542,725.099
23 00	8.50949121	8.51197472	1.033863	2.24556	5.79965	7.8119	2,544,570.863

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 23°-24°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
23 00	8. 50949121	8. 51197472	1. 033863	2. 24556	5. 79965	7. 8119	2, 544, 570. 863
1	091	7380	4213	580	5. 79990	21	546, 416. 631
2	060	7289	4562	605	5. 80015	23	548, 262. 402
3	8. 50949030	7197	4912	629	039	25	550, 108. 177
4	8. 50948999	7105	5261	653	064	27	551, 953. 956
05	968	7013	5611	678	088	28	553, 799. 739
6	938	6921	5959	702	113	30	555, 645. 526
7	907	6829	6308	726	138	32	557, 491. 317
8	876	6737	6657	751	162	34	559, 337. 112
9	846	6644	7005	775	187	36	561, 182. 911
10	8. 50948815	8. 51196552	1. 037353	2. 24799	5. 80212	7. 8138	2, 563, 028. 714
11	784	6460	7701	823	236	40	564, 874. 520
12	753	6368	8049	847	261	42	566, 720. 331
13	722	6275	8397	871	286	44	568, 566. 145
14	692	6183	8744	896	311	45	570, 411. 963
15	661	6090	1. 039090	920	336	47	572, 257. 786
16	630	5998	9438	944	360	49	574, 103. 612
17	599	5905	1. 039785	968	385	51	575, 949. 442
18	568	5813	1. 040132	2. 24992	410	53	577, 795. 276
19	537	5720	0477	2. 25016	435	55	579, 641. 114
20	8. 50948506	8. 51195627	1. 040824	2. 25039	5. 80460	7. 8156	2, 581, 486. 956
21	476	5534	1170	063	484	58	583, 332. 802
22	445	5442	1516	087	509	60	585, 178. 652
23	414	5349	1862	111	534	62	587, 024. 505
24	383	5256	2207	135	559	64	588, 870. 363
25	352	5163	2552	158	584	66	590, 716. 225
26	321	5070	2897	182	609	67	592, 562. 091
27	290	4977	3243	206	634	69	594, 407, 960
28	259	4884	3587	230	658	71	596, 253. 834
29	228	4790	3931	253	684	73	598, 099. 711
30	8. 50948196	8. 51194697	1. 044276	2. 25277	5. 80708	7. 8175	2, 599, 945. 593
31	165	4604	4620	301	733	76	601, 791, 478
32	134	4510	4963	324	758	78	603, 637. 368
33	103	4417	5308	348	783	80	605, 483. 261
34	072	4324	5651	371	808	82	607, 329. 158
35	041	4230	5995	395	833	84	609, 175. 060
36	8. 50948010	4137	6337	418	858	85	611, 020. 965
37	8. 50947978	4043	6681	442	883	87	612, 866. 874
38	947	3949	7024	465	908	89	614, 712. 788
39	916	3856	7367	488	933	91	616, 558. 705
40	8. 50947885	8. 51193762	1. 047708	2. 25512	5. 80958	7. 8193	2, 618, 404. 626
41	853	3668	8051	535	5. 80983	94	620, 250. 551
42	822	3574	8393	558	5. 81008	96	622, 096. 480
43	791	3480	8735	582	034	7. 8198	623, 942. 414
44	760	3386	9076	605	059	7. 8200	625, 788. 351
45	728	3292	9418	628	084	01	627, 634. 292
46	697	3198	1. 049760	651	109	03	629, 480. 237
47	665	3104	1. 050101	675	134	05	631, 326. 186
48	634	3010	0441	698	159	07	633, 172. 139
49	603	2916	0782	721	184	08	635, 018. 097
50	8. 50947571	8. 51192822	1. 051123	2. 25744	5. 81210	7. 8210	2, 636, 864. 058
51	540	2727	1464	767	235	12	638, 710. 023
52	508	2633	1804	790	260	14	640, 555. 992
53	477	2539	2144	813	285	15	642, 401, 965
54	445	2444	2484	836	310	17	644, 247. 943
55	414	2350	2824	859	336	19	646, 093. 924
56	382	2255	3163	882	361	21	647, 939. 909
57	351	2160	3502	905	386	22	649, 785. 898
58	319	2066	3842	928	411	24	651, 631. 892
59	288	1971	4181	951	436	26	653, 477. 889
24 00	8. 50947256	8. 51191876	1. 054519	2. 25974	5. 81462	7. 8227	2, 655, 323. 890

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 24°–25°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
24 00	8. 50947256	8. 51191876	1. 054519	2. 25974	5. 81462	7. 8227	2, 655, 323. 890
1	225	1782	4858	2. 25996	487	29	657, 169. 896
2	193	1687	5197	2. 26019	512	31	659, 015. 905
3	161	1592	5534	042	538	33	660, 861. 918
4	130	1497	5873	064	563	34	662, 707. 936
05	098	1402	6211	087	589	36	664, 553. 957
6	066	1307	6549	110	614	38	666, 399. 983
7	035	1212	6886	132	639	39	668, 246. 013
8	8. 50947003	1117	7223	155	665	41	670, 092. 046
9	8. 50946971	1021	7561	178	690	43	671, 938. 084
10	8. 50946939	8. 51190926	1. 057898	2. 26200	5. 81715	7. 8244	2, 673, 784. 126
11	908	0831	8234	223	741	46	675, 630. 171
12	876	0735	8571	245	766	48	677, 476. 221
13	844	0640	8908	268	792	49	679, 322. 275
14	812	0545	9244	290	817	51	681, 168. 333
15	780	0449	9580	313	843	53	683, 014. 395
16	749	0354	1. 059916	335	868	54	684, 860. 461
17	717	0258	1. 060253	358	894	56	686, 706. 531
18	685	0162	0587	380	919	58	688, 552. 605
19	653	8. 51190067	0923	402	945	59	690, 398. 684
20	8. 50946621	8. 51189971	1. 061259	2. 26424	5. 81970	7. 8261	2, 692, 244. 766
21	589	9875	1594	447	5. 81996	63	694, 090. 852
22	557	9779	1928	469	5. 82021	64	695, 936. 943
23	525	9683	2263	491	047	66	697, 783. 037
24	493	9587	2598	513	072	68	699, 629. 136
25	461	9491	2932	536	098	69	701, 475. 239
26	429	9395	3267	558	123	71	703, 321. 346
27	397	9299	3601	580	149	73	705, 167. 457
28	365	9203	3935	602	175	74	707, 013. 572
29	333	9107	4268	624	200	76	708, 859. 691
30	8. 50946301	8. 51189011	1. 064602	2. 26646	5. 82226	7. 8277	2, 710, 705. 814
31	269	8914	4936	668	252	79	712, 551. 941
32	237	8818	5268	690	277	81	714, 398. 072
33	205	8722	5602	712	303	82	716, 244. 207
34	173	8625	5935	734	328	84	718, 090. 347
35	140	8529	6268	756	354	86	719, 936. 490
36	108	8432	6600	778	380	87	721, 782. 638
37	076	8336	6932	800	406	89	723, 628. 790
38	044	8239	7265	822	431	90	725, 474. 946
39	8. 50946012	8142	7596	843	457	92	727, 321. 106
40	8. 50945979	8. 51188046	1. 067928	2. 26865	5. 82483	7. 8294	2, 729, 167. 270
41	947	7949	8260	887	509	95	731, 013. 438
42	915	7852	8592	908	534	97	732, 859. 611
43	883	7755	8923	930	560	7. 8298	734, 705. 787
44	850	7658	9254	952	586	7. 8301	736, 551. 968
45	818	7561	9586	974	612	01	738, 398. 152
46	786	7464	1. 069916	2. 26995	638	03	740, 244. 341
47	753	7367	1. 070247	2. 27017	663	04	742, 090. 534
48	721	7270	0578	038	689	06	743, 936. 731
49	688	7173	0909	060	715	08	745, 782. 933
50	8. 50945656	8. 51187076	1. 071238	2. 27081	5. 82741	7. 8309	2, 747, 629. 138
51	624	6979	1569	103	767	11	749, 475. 347
52	591	6881	1899	124	793	12	751, 321. 561
53	559	6784	2228	146	819	14	753, 167. 779
54	526	6687	2558	167	844	16	755, 014. 001
55	494	6589	2887	189	870	17	756, 860. 227
56	461	6492	3216	210	896	18	758, 706. 457
57	429	6394	3545	232	922	20	760, 552. 691
58	396	6297	3875	253	948	22	762, 398. 930
59	364	6199	4204	274	5. 82974	23	764, 245. 172
25 00	8. 50945331	8. 51186101	1. 074531	2. 27295	5. 83000	7. 8325	2, 766, 091. 419

The characteristics of log A′, log B, log C, and log D, have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 25°–26°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
25 00	8. 50945331	8. 51186101	1. 074531	2. 27295	5. 83000	7. 8325	2, 766, 091. 419
1	299	6004	4860	317	026	26	767, 937. 670
2	266	5906	5189	338	052	28	769. 783. 925
3	233	5808	5516	359	078	29	771, 630. 184
4	201	5710	5845	380	104	31	773, 476. 448
05	168	5612	6173	401	130	32	775, 322. 715
6	135	5514	6500	423	156	34	777, 168. 987
7	103	5416	6827	444	182	35	779, 015. 263
8	070	5318	7155	465	208	37	780, 861. 543
9	037	5220	7481	486	234	38	782, 707. 827
10	8. 50945005	8. 51185122	1. 077809	2. 27507	5. 83260	7. 8340	2, 784, 554. 116
11	8. 50944972	5024	8136	528	287	41	786, 400. 408
12	939	4925	8463	549	313	43	788, 246. 705
13	906	4827	8789	570	339	44	790, 093. 006
14	874	4729	9115	591	365	46	791, 939. 311
15	841	4630	9442	612	391	47	793, 785. 620
16	808	4532	1. 079767	632	417	49	795, 631. 934
17	775	4433	1. 080094	653	443	50	797, 478. 251
18	742	4335	0420	674	470	52	799, 324. 573
19	709	4236	0744	695	496	53	801, 170. 899
20	8. 50944677	8. 51184138	1. 081070	2. 27716	5. 83522	7. 8355	2, 803, 017. 230
21	644	4039	1396	736	548	56	804, 863. 564
22	611	3940	1720	757	574	58	806, 709. 903
23	578	3841	2045	778	600	59	808, 556. 245
24	545	3743	2371	799	627	61	810, 402. 592
25	512	3644	2695	819	653	62	812, 248. 944
26	479	3545	3019	840	679	64	814, 095. 299
27	446	3446	3344	860	706	65	815, 941. 659
28	413	3347	3669	881	732	66	817, 788. 023
29	380	3248	3992	902	758	68	819, 634. 391
30	8. 50944347	8. 51183149	1. 084316	2. 27922	5. 83785	7. 8369	2, 821, 480. 763
31	314	3050	4640	943	811	71	823, 327. 139
32	281	2950	4963	963	837	72	825, 173. 520
33	248	2851	5287	2. 27984	864	74	827, 019. 905
34	215	2752	5610	2. 28004	890	75	828, 866. 294
35	182	2653	5933	025	916	76	830, 712. 687
36	148	2553	6256	045	943	78	832, 559. 085
37	115	2454	6579	065	969	79	834, 405. 487
38	082	2354	6901	086	5. 83995	81	836, 251. 893
39	049	2255	7224	106	5. 84022	82	838, 098. 303
40	8. 50944016	8. 51182155	1. 087547	2. 28126	5. 84048	7. 8384	2, 839, 944. 718
41	8. 50943983	2056	7868	146	074	85	841, 791. 136
42	949	1956	8190	167	101	86	843, 637. 559
43	916	1856	8513	187	128	88	845, 483. 987
44	883	1756	8834	207	154	89	847, 330. 418
45	850	1657	9156	227	180	91	849, 176. 854
46	816	1557	9477	248	207	92	851, 023. 294
47	783	1457	1. 089798	268	233	93	852, 869. 738
48	750	1357	1. 090120	288	260	95	854, 716. 186
49	716	1257	0441	308	286	96	856, 562. 639
50	8. 50943683	8. 51181157	1. 090761	2. 28328	5. 84313	7. 8398	2, 858, 409. 096
51	650	1057	1082	348	340	7. 8399	860, 255. 557
52	616	0957	1403	368	366	7. 8400	862, 102. 022
53	583	0857	1723	388	392	02	863, 948. 492
54	549	0756	2043	408	419	03	865, 794. 966
55	516	0656	2364	428	446	04	867, 641. 444
56	483	0556	2683	448	472	06	869, 487. 927
57	449	0455	3003	468	499	07	871, 334. 414
58	416	0355	3323	488	526	09	873, 180. 905
59	382	0255	3642	507	552	10	875, 027. 400
26 00	8. 50943349	8. 51180154	1. 093962	2. 28527	5. 84579	7. 8411	2, 876, 873. 899

The characteristics of log A′, log B, log C and log D, have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 26°–27°

Lat.		log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
°	′							*Meters*
26	00	8. 50943349	8. 51180154	1. 093962	2. 28527	5. 84579	7. 8411	2, 876, 873. 899
	1	315	8. 51180053	4281	547	605	13	878, 720. 403
	2	282	8. 51179953	4600	567	632	14	880, 566. 911
	3	248	9852	4919	586	659	15	882, 413. 423
	4	215	9752	5238	606	685	17	884, 259. 940
	05	181	9651	5556	626	712	18	886, 106. 461
	6	147	9550	5875	646	739	19	887, 952. 986
	7	114	9449	6194	665	766	21	889, 799. 516
	8	080	9348	6511	685	792	22	891, 646. 050
	9	047	9248	6830	704	819	23	893, 492. 588
	10	8. 50943013	8. 51179147	1. 097148	2. 28724	5. 84846	7. 8425	2, 895, 339. 130
	11	8. 50942979	9046	7465	744	872	26	897, 185. 677
	12	946	8945	7783	763	899	27	899, 032. 228
	13	912	8843	8100	783	926	29	900, 878. 783
	14	878	8742	8417	802	953	30	902, 725. 343
	15	844	8641	8735	822	5. 84980	31	904, 571. 907
	16	811	8540	9051	841	5. 85006	33	906, 418. 475
	17	777	8439	9369	860	033	34	908, 265. 047
	18	743	8337	1. 099686	880	060	35	910, 111. 624
	19	709	8236	1. 100002	899	087	37	911, 958. 205
	20	8. 50942676	8. 51178135	1. 100319	2. 28919	5. 85114	7. 8438	2, 913, 804. 790
	21	642	8033	0635	938	140	39	915, 651. 380
	22	608	7932	0951	957	167	40	917, 497. 974
	23	574	7830	1267	976	194	42	919, 344. 572
	24	540	7728	1584	2. 28996	221	43	921, 191. 175
	25	506	7627	1899	2. 29015	248	44	923, 037. 782
	26	472	7525	2215	034	275	46	924, 884. 393
	27	439	7423	2530	053	302	47	926, 731. 009
	28	405	7322	2845	072	329	48	928, 577. 629
	29	371	7220	3161	092	356	50	930, 424. 253
	30	8. 50942337	8. 51177118	1. 103475	2. 29111	5. 85383	7. 8451	2, 932, 270. 882
	31	303	7016	3791	130	410	52	934, 117. 515
	32	269	6914	4106	149	437	53	935, 964. 152
	33	235	6812	4420	168	464	55	937, 810. 794
	34	201	6710	4735	187	491	56	939, 657. 440
	35	167	6608	5049	206	518	57	941, 504. 090
	36	133	6506	5363	225	545	58	943, 350. 745
	37	099	6404	5677	244	572	60	945, 197. 404
	38	065	6302	5992	263	599	61	947, 044. 067
	39	8. 50942031	6199	6305	282	626	62	948, 890. 735
	40	8. 50941996	8. 51176097	1. 106619	2. 29301	5. 85653	7. 8463	2, 950, 737. 407
	41	962	5995	6932	320	680	65	952, 584. 083
	42	928	5892	7246	338	707	66	954, 430. 764
	43	894	5790	7559	357	734	67	956, 277. 449
	44	860	5687	7872	376	761	68	958, 124. 138
	45	826	5585	8185	395	788	70	959, 970. 832
	46	792	5482	8498	414	815	71	961, 817. 530
	47	757	5380	8811	432	843	72	963, 664. 233
	48	723	5277	9124	451	870	73	965, 510. 940
	49	689	5174	9436	470	897	74	967, 357. 651
	50	8. 50941655	8. 51175072	1. 109748	2. 29488	5. 85924	7. 8476	2, 969, 204. 367
	51	620	4969	1. 110061	507	951	77	971, 051. 087
	52	586	4866	0372	526	5. 85978	78	972, 897. 811
	53	552	4763	0684	544	5. 86006	79	974, 744. 540
	54	517	4660	0997	563	033	81	976, 591. 273
	55	483	4557	1308	581	060	82	978, 438. 010
	56	449	4454	1620	600	087	83	980, 284. 752
	57	414	4351	1931	618	115	84	982, 131. 498
	58	380	4248	2242	637	142	85	983, 978. 249
	59	346	4145	2554	655	169	87	985, 825. 004
27	00	8. 50941311	8. 51174042	1. 112864	2. 29674	5. 86196	7. 8488	2, 987, 671. 763

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 27°–28°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
27 00	8.50941311	8.51174042	1.112864	2.29674	5.86196	7.8488	2,987,671.763
1	277	3939	3175	692	224	89	989,518.527
2	242	3835	3486	711	251	90	991,365.295
3	208	3732	3796	729	278	91	993,212.068
4	174	3629	4107	747	306	92	995,058.845
05	139	3525	4418	766	333	94	996,905.626
6	105	3422	4727	784	360	95	2,998,752.412
7	070	3318	5038	802	388	96	3,000,599.202
8	036	3215	5347	820	415	97	002,445.997
9	8.50941001	3111	5657	839	442	7.8498	004,292.796
10	8.50940967	8.51173008	1.115967	2.29857	5.86470	7.8500	3,006,139.599
11	932	2904	6276	875	497	01	007,986.407
12	897	2800	6586	893	524	02	009,833.219
13	863	2696	6896	911	552	03	011,680.036
14	828	2593	7204	930	579	04	013,526.857
15	794	2489	7514	948	607	05	015,373.682
16	759	2385	7822	966	634	06	017,220.512
17	724	2281	8131	2.29984	662	08	019,067.346
18	690	2177	8440	2.30002	689	09	020,914.185
19	655	2073	8748	020	717	10	022,761.028
20	8.50940620	8.51171969	1.119057	2.30038	5.86744	7.8511	3,024,607.875
21	586	1865	9365	056	772	12	026,454.727
22	551	1761	9673	074	799	13	028,301.583
23	516	1656	1.119981	092	827	14	030,148.444
24	481	1552	1.120289	110	854	16	031,995.309
25	447	1448	0597	127	882	17	033,842.179
26	412	1344	0904	145	909	18	035,689.053
27	377	1239	1212	163	937	19	037,535.932
28	342	1135	1520	181	964	20	039,382.815
29	308	1031	1826	199	5.86992	21	041,229.702
30	8.50940273	8.51170926	1.122134	2.30216	5.87020	7.8522	3,043,076.594
31	238	0822	2441	234	047	23	044,923.490
32	203	0717	2747	252	075	25	046,770.391
33	168	0612	3054	270	102	26	048,617.296
34	133	0508	3360	287	130	27	050,464.206
35	098	0403	3667	305	158	28	052,311.120
36	063	0298	3974	323	185	29	054,158.039
37	8.50940029	0193	4280	340	213	30	056,004.962
38	8.50939994	8.51170089	4586	358	240	31	057,851.889
39	959	8.51169984	4892	376	268	32	059,698.821
40	8.50939924	8.51169879	1.125198	2.30393	5.87296	7.8533	3,061,545.758
41	889	9774	5504	411	324	34	063,392.699
42	854	9669	5809	428	351	36	065,239.644
43	819	9564	6115	446	379	37	067,086.594
44	784	9459	6420	463	407	38	068,933.548
45	749	9354	6725	481	434	39	070,780.507
46	714	9249	7031	498	462	40	072,627.470
47	678	9143	7335	515	490	41	074,474.437
48	643	9038	7640	533	518	42	076,321.409
49	608	8933	7945	550	546	43	078,168.386
50	8.50939573	8.51168827	1.128250	2.30567	5.87573	7.8544	3,080,015.367
51	538	8722	8555	585	601	45	081,862.353
52	503	8617	8858	602	629	46	083,709.343
53	468	8511	9163	619	657	47	085,556.337
54	433	8406	9467	637	685	48	087,403.336
55	397	8300	1.129771	654	712	49	089,250.340
56	362	8195	1.130074	671	740	50	091,097.348
57	327	8089	0379	688	768	51	092,944.360
58	292	7983	0683	705	796	52	094,791.377
59	257	7878	0986	722	824	54	096,638.399
28 00	8.50939221	8.51167772	1.131289	2.30740	5.87852	7.8554	3,098,485.425

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 28°–29°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
28 00	8. 50939221	8. 51167772	1. 131289	2. 30740	5. 87852	7. 8554	3, 098, 485. 425
1	186	7666	1592	757	880	56	100, 332. 455
2	151	7560	1896	774	908	57	102, 179. 490
3	116	7454	2199	791	936	58	104, 026. 530
4	080	7348	2501	808	964	59	105, 873. 574
05	045	7242	2805	825	5. 87992	60	107, 720. 622
6	8. 50939010	7136	3107	842	5. 88020	61	109, 567. 675
7	8. 50938974	7030	3410	859	047	62	111, 414. 733
8	939	6924	3713	876	075	63	113, 261. 795
9	903	6818	4014	893	103	64	115, 108. 861
10	8. 50938868	8. 51166712	1. 134317	2. 30910	5. 88131	7. 8565	3, 116, 955. 932
11	833	6606	4619	927	159	66	118, 803. 008
12	797	6500	4921	943	188	67	120, 650. 088
13	762	6393	5222	960	216	68	122, 497. 173
14	726	6287	5525	977	244	69	124, 344. 262
15	691	6181	5826	2. 30994	272	70	126, 191. 355
16	655	6074	6127	2. 31011	300	71	128, 038. 453
17	620	5968	6429	028	328	72	129, 885. 556
18	584	5861	6730	044	356	73	131, 732. 663
19	549	5755	7032	061	384	74	133, 579. 775
20	8. 50938513	8. 51165648	1. 137333	2. 31078	5. 88412	7. 8575	3, 135, 426. 891
21	478	5542	7633	094	440	76	137, 274. 012
22	442	5435	7935	111	468	77	139, 121. 137
23	407	5328	8235	128	496	78	140, 968. 267
24	371	5221	8536	144	524	78	142, 815. 402
25	336	5115	8836	161	553	80	144, 662. 541
26	300	5008	9136	177	581	80	146, 509. 684
27	264	4901	9437	194	609	81	148, 356. 832
28	229	4794	1. 139737	210	637	82	150, 203. 985
29	193	4687	1. 140037	227	665	83	152, 051. 142
30	8. 50938157	8. 51164580	1. 140336	2. 31243	5. 88694	7. 8584	3, 153, 898. 304
31	122	4473	0637	260	722	85	155, 745. 470
32	086	4366	0936	276	750	86	157, 592. 641
33	050	4259	1236	293	778	87	159, 439. 816
34	8. 50938015	4152	1535	309	806	88	161, 286. 996
35	8. 50937979	4045	1834	326	835	89	163, 134. 180
36	943	3937	2134	342	863	90	164, 981. 369
37	907	3830	2432	358	891	91	166, 828. 563
38	872	3723	2732	375	920	92	168, 675. 761
39	836	3615	3030	391	948	93	170, 522. 964
40	8. 50937800	8. 51163508	1. 143329	2. 31407	5. 88976	7. 8594	3, 172, 370. 171
41	764	3401	3629	424	5. 89004	95	174, 217. 383
42	728	3293	3926	440	033	96	176, 064. 599
43	693	3186	4225	456	061	96	177, 911. 820
44	657	3078	4523	472	089	97	179, 759. 046
45	621	2971	4822	488	118	98	181, 606. 276
46	585	2863	5119	504	146	7. 8599	183, 453. 511
47	549	2755	5418	521	175	7. 8600	185, 300. 750
48	513	2648	5716	537	203	01	187, 147. 994
49	477	2540	6013	553	231	02	188, 995. 243
50	8. 50937441	8. 51162432	1. 146311	2. 31569	5. 89260	7. 8603	3, 190, 842. 496
51	405	2324	6608	585	288	04	192, 689. 753
52	370	2216	6906	601	316	05	194, 537. 015
53	334	2108	7203	617	345	06	196, 384. 282
54	298	2000	7500	633	374	06	198, 231. 554
55	262	1892	7797	649	402	07	200, 078. 830
56	226	1784	8094	665	430	08	201, 926. 110
57	190	1676	8392	681	459	09	203, 773. 395
58	153	1568	8688	697	487	10	205, 620. 685
59	117	1460	8985	713	516	11	207, 467. 980
29 00	8. 50937081	8. 51161352	1. 149281	2. 31728	5. 89544	7. 8612	3, 209, 315. 279

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 29°-30°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
29 00	8. 50937081	8. 51161352	1. 149281	2. 31728	5. 89544	7. 8612	3, 209, 315. 279
1	045	1244	9578	744	573	13	211, 162. 582
2	8. 50937009	1135	1. 149874	760	601	14	213, 009. 890
3	8. 50936973	1027	1. 150170	776	630	14	214, 857. 203
4	937	0919	0466	792	658	15	216, 704. 520
05	901	0810	0762	808	687	16	218, 551. 842
6	865	0702	1059	823	716	17	220, 399. 169
7	829	0594	1354	839	744	18	222, 246. 500
8	792	0485	1650	855	773	19	224, 093. 836
9	756	0376	1945	870	801	20	225, 941. 177
10	8. 50936720	8. 51160268	1. 152241	2. 31886	5. 89830	7. 8620	3, 227, 788. 522
11	684	0159	2536	902	858	21	229, 635. 872
12	648	8. 51160051	2831	917	887	22	231, 483. 226
13	611	8. 51159942	3126	933	916	23	233, 330. 585
14	575	9833	3421	949	944	24	235, 177. 949
15	539	9724	3717	964	5. 89973	25	237, 025. 317
16	503	9616	4011	980	5. 90002	26	238, 872. 690
17	466	9507	4306	2. 31995	030	26	240, 720. 067
18	430	9398	4600	2. 32011	059	27	242, 567. 449
19	394	9289	4895	026	088	28	244, 414. 836
20	8. 50936357	8. 51159180	1. 155189	2. 32042	5. 90116	7. 8629	3, 246, 262. 227
21	321	9071	5484	057	145	30	248, 109. 623
22	285	8962	5778	073	174	30	249, 957. 024
23	248	8853	6072	088	203	31	251, 804. 429
24	212	8744	6366	103	231	32	253, 651. 839
25	176	8635	6660	119	260	33	255, 499. 253
26	139	8525	6954	134	289	34	257, 346. 672
27	103	8416	7247	149	318	35	259, 194. 096
28	066	8307	7541	165	346	35	261, 041. 525
29	8. 50936030	8197	7834	180	375	36	262, 888. 958
30	8. 50935993	8. 51158088	1. 158128	2. 32195	5. 90404	7. 8637	3, 264, 736. 396
31	957	7979	8421	210	433	38	266, 583. 838
32	920	7869	8714	226	462	39	268, 431. 285
33	884	7760	9007	241	490	39	270, 278. 737
34	848	7650	9300	256	519	40	272, 126. 193
35	811	7541	9593	271	548	41	273, 973. 654
36	774	7431	1. 159886	286	577	42	275, 821. 120
37	738	7322	1. 160179	302	606	43	277, 668. 591
38	701	7212	0471	317	635	43	279, 516. 066
39	665	7102	0764	332	664	44	281, 363. 546
40	8. 50935628	8. 51156992	1. 161056	2. 32347	5. 90693	7. 8645	3, 283, 211. 030
41	592	6883	1348	362	721	46	285, 058. 519
42	555	6773	1640	377	750	46	286, 906. 013
43	518	6663	1932	392	779	47	288, 753. 511
44	482	6553	2224	407	808	48	290, 601. 014
45	445	6443	2516	422	837	49	292, 448. 522
46	408	6333	2807	437	866	50	294, 296. 034
47	372	6223	3099	452	895	50	296, 143. 551
48	335	6113	3390	467	924	51	297, 991. 073
49	298	6003	3682	481	953	52	299, 838. 600
50	8. 50935262	8. 51155893	1. 163973	2. 32496	5. 90982	7. 8653	3, 301, 686. 131
51	225	5783	4265	511	5. 91011	53	303, 533. 667
52	188	5673	4556	526	040	54	305, 381. 207
53	152	5562	4847	541	069	55	307, 228. 752
54	115	5452	5138	556	098	56	309, 076. 302
55	078	5342	5428	570	127	56	310, 923. 857
56	041	5232	5720	585	156	57	312, 771. 416
57	8. 50935004	5121	6010	600	185	58	314, 618. 980
58	8. 50934968	5011	6301	614	214	58	316, 466. 549
59	931	4900	6591	629	244	59	318, 314. 122
30 00	8. 50934894	8. 51154790	1. 166881	2. 32644	5. 91273	7. 8660	3, 320, 161. 700

The characteristics of log A′, log B, log C, and log D have b en increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 30°-31°

Lat.		log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
°	′							*Meters*
30	00	8.50934894	8.51154790	1.166881	2.32644	5.91273	7.8660	3,320,161.700
	1	857	4679	7171	658	302	61	322,009.283
	2	820	4569	7462	673	331	62	323,856.871
	3	783	4458	7751	688	360	62	325,704.463
	4	747	4347	8042	702	389	63	327,552.060
	05	710	4237	8331	717	418	64	329,399.661
	6	673	4126	8621	732	447	64	331,247.267
	7	636	4015	8910	746	476	65	333,094.878
	8	599	3904	9200	760	506	66	334,942.494
	9	562	3794	9489	775	535	66	336,790.115
	10	8.50934525	8.51153683	1.169779	2.32790	5.91564	7.8667	3,338,637.740
	11	488	3572	1.170069	804	593	68	340,485.370
	12	451	3461	0357	818	623	69	342,333.005
	13	414	3350	0647	833	652	69	344,180.644
	14	377	3239	0935	847	681	70	346,028.288
	15	340	3128	1225	862	710	71	347,875.937
	16	303	3017	1513	876	740	71	349,723.590
	17	266	2906	1802	890	769	72	351,571.248
	18	229	2795	2090	905	798	73	353,418.911
	19	192	2683	2379	919	827	73	355,266.579
	20	8.50934155	8.51152572	1.172667	2.32933	5.91857	7.8674	3,357,114.251
	21	118	2461	2956	948	886	75	358,961.928
	22	081	2350	3243	962	915	76	360,809.610
	23	043	2238	3532	976	944	76	362,657.297
	24	8.50934006	2127	3820	2.32990	5.91974	77	364,504.988
	25	8.50933969	2015	4108	2.33004	5.92003	78	366,352.684
	26	932	1904	4395	019	033	78	368,200.385
	27	895	1792	4683	033	062	79	370,048.091
	28	858	1681	4970	047	091	80	371,895.801
	29	821	1569	5259	061	121	80	373,743.516
	30	8.50933783	8.51151458	1.175545	2.33075	5.92150	7.8681	3,375,591.236
	31	746	1346	5833	089	180	82	377,438.961
	32	709	1235	6120	103	209	82	379,286.690
	33	672	1123	6408	117	238	83	381,134.424
	34	634	1011	6694	131	268	83	382,982.163
	35	597	0899	6982	145	297	84	384,829.906
	36	560	0788	7268	159	327	85	386,677.654
	37	523	0676	7555	173	356	85	388,525.407
	38	485	0564	7842	187	386	86	390,373.165
	39	448	0452	8129	201	415	87	392,220.928
	40	8.50933411	8.51150340	1.178415	2.33215	5.92444	7.8687	3,394,068.695
	41	373	0228	8702	229	474	88	395,916.467
	42	336	0116	8987	243	504	88	397,764.244
	43	299	8.51150004	9274	256	533	89	399,612.026
	44	261	8.51149892	9560	270	563	90	401,459.813
	45	224	9780	1.179846	284	592	90	403,307.604
	46	187	9667	1.180132	298	622	91	405,155.400
	47	149	9555	0418	312	651	92	407,003.201
	48	112	9443	0703	325	681	92	408,851.006
	49	074	9331	0990	339	710	93	410,698.816
	50	8.50933037	8.51149218	1.181275	2.33353	5.92740	7.8693	3,412,546.631
	51	8.50932999	9106	1561	366	770	94	414,394.451
	52	962	8994	1846	380	799	95	416,242.276
	53	924	8881	2131	394	829	95	418,090.105
	54	887	8769	2416	408	858	96	419,937.939
	55	849	8656	2702	421	888	96	421,785.778
	56	812	8544	2986	435	918	97	423,633.622
	57	774	8431	3272	448	947	98	425,481.471
	58	737	8319	3556	462	5.92977	98	427,329.324
	59	699	8206	3842	475	5.93007	99	429,177.182
31	00	8.50932662	8.51148093	1.184126	2.33489	5.93036	7.8699	3,431,025.045

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 31°-32°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
31 00	8.50932662	8.51148093	1.184126	2.33489	5.93036	7.8699	3,431,025.045
1	624	7981	4411	502	066	7.8700	432,872.913
2	587	7868	4695	516	096	01	434,720.785
3	549	7755	4980	529	125	01	436,568.663
4	512	7642	5264	543	155	02	438,416.545
05	474	7529	5548	556	185	02	440,264.432
6	436	7417	5832	570	214	03	442,112.323
7	399	7304	6117	583	244	03	443,960.220
8	361	7191	6400	596	274	04	445,808.121
9	323	7078	6685	610	304	05	447,656.027
10	8.50932286	8.51146965	1.186968	2.33623	5.93334	7.8705	3,449,503.938
11	248	6852	7252	636	363	06	451,351.854
12	210	6739	7535	650	393	06	453,199.775
13	173	6626	7819	663	423	07	455,047.700
14	135	6512	8102	676	453	07	456,895.630
15	097	6399	8386	689	483	08	458,743.565
16	059	6286	8669	702	512	08	460,591.505
17	8.50932022	6173	8953	716	542	09	462,439.450
18	8.50931984	6059	9235	729	572	10	464,287.399
19	946	5946	9519	742	602	10	466,135.353
20	8.50931908	8.51145833	1.189801	2.33755	5.93632	7.8711	3,467,983.312
21	870	5719	1.190085	768	662	11	469,831.296
22	833	5606	0367	782	692	12	471,679.245
23	795	5492	0650	795	721	12	473,527.219
24	757	5379	0932	808	751	13	475,375.197
25	719	5265	1215	821	781	13	477,223.180
26	681	5152	1497	834	811	14	479,071.168
27	643	5038	1780	847	841	14	480,919.161
28	606	4925	2062	860	871	15	482,767.159
29	568	4811	2345	873	901	15	484,615.162
30	8.50931530	8.51144697	1.192626	2.33886	5.93931	7.8716	3,486,463.169
31	492	4584	2909	899	961	16	488,311.181
32	454	4470	3190	912	5.93991	17	490,159.198
33	416	4356	3473	924	5.94021	17	492,007.220
34	378	4242	3754	937	051	18	493,855.247
35	340	4128	4036	950	081	18	495,703.279
36	302	4014	4317	963	111	19	497,551.315
37	264	3900	4599	976	141	19	499,399.357
38	226	3786	4880	2.33989	171	20	501,247.403
39	188	3672	5162	2.34002	201	20	503,095.454
40	8.50931150	8.51143558	1.195443	2.34014	5.94231	7.8721	3,504,943.510
41	112	3444	5724	027	261	21	506,791.570
42	074	3330	6005	040	291	22	508,639.636
43	8.50931036	3216	6286	052	321	22	510,487.706
44	8.50930998	3102	6567	065	352	23	512,335.782
45	960	2988	6848	078	382	23	514,183.862
46	922	2873	7129	090	412	24	516,031.947
47	884	2759	7409	103	442	24	517,880.037
48	846	2645	7690	116	472	25	519,728.131
49	808	2531	7970	128	502	25	521,576.231
50	8.50930769	8.51142416	1.198251	2.34141	5.94532	7.8726	3,523,424.336
51	731	2302	8531	154	562	26	525,272.445
52	693	2187	8812	166	592	27	527,120.559
53	655	2073	9092	179	623	27	528,968.678
54	617	1958	9372	191	653	28	530,816.802
55	579	1844	9652	204	683	28	532,664.931
56	540	1729	1.199932	216	713	28	534,513.065
57	502	1615	1.200212	229	744	29	536,361.203
58	464	1500	0492	241	774	29	538,209.347
59	426	1385	0771	254	804	30	540,057.495
32 00	8.50930388	8.51141271	1.201051	2.34266	5.94834	7.8730	3,541,905.648

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 32°–33°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
32 00	8. 50930388	8. 51141271	1. 201051	2. 34266	5. 94834	7. 8730	3, 541, 905. 648
1	349	1156	1330	278	865	31	543. 753. 806
2	311	1041	1609	291	895	31	545, 601. 969
3	273	0926	1889	303	925	32	547, 450. 137
4	235	0812	2168	315	955	32	549, 298. 310
05	196	0697	2448	328	5. 94986	32	551, 146. 488
6	158	0582	2727	340	5. 95016	33	552, 994. 670
7	120	0467	3006	352	046	33	554, 842. 858
8	081	0352	3285	364	077	34	556, 691. 050
9	043	0237	3564	377	107	34	558, 539. 247
10	8. 50930005	8. 51140122	1. 203842	2. 34389	5. 95137	7. 8734	3, 560, 387. 449
11	8. 50929966	8. 51140007	4122	401	168	35	562, 235. 656
12	928	8. 51139892	4400	413	198	35	564, 083. 868
13	890	9777	4679	426	228	36	565, 932. 084
14	851	9661	4957	438	259	36	567, 780. 306
15	813	9546	5236	450	289	37	569, 628. 533
16	774	9431	5514	462	320	37	571, 476. 764
17	736	9316	5792	474	350	37	573, 325. 001
18	698	9201	6070	486	380	38	575, 173. 242
19	659	9085	6348	498	411	38	577, 021. 488
20	8. 50929621	8. 51138970	1. 206627	2. 34510	5. 95441	7. 8739	3, 578, 869. 739
21	582	8854	6904	522	472	39	580, 717. 995
22	544	8739	7183	534	502	39	582, 566. 256
23	505	8624	7460	546	533	40	584, 414. 522
24	467	8508	7738	558	563	40	586, 262. 793
25	428	8393	8015	570	594	41	588, 111. 069
26	390	8277	8294	582	624	41	589, 959. 349
27	351	8162	8571	594	655	41	591, 807. 635
28	313	8046	8849	606	685	42	593, 655. 925
29	274	7930	9125	618	716	42	595, 504. 221
30	8. 50929236	8. 51137815	1. 209402	2. 34630	5. 95746	7. 8742	3, 597, 352. 521
31	197	7699	9680	642	777	43	599, 200. 826
32	158	7583	1. 209957	653	807	43	601, 049. 136
33	120	7467	1. 210234	665	838	44	602, 897. 451
34	081	7352	0511	677	868	44	604, 745. 771
35	043	7236	0788	689	899	44	606, 594. 096
36	8. 50929004	7120	1065	700	930	45	608. 442. 426
37	8. 50928965	7004	1342	712	960	45	610, 290. 760
38	927	6888	1618	724	5. 95991	45	612, 139. 100
39	888	6772	1895	736	5. 96021	46	613, 987. 445
40	8. 50928849	8. 51136656	1. 212171	2. 34747	5. 96052	7. 8746	3, 615, 835. 794
41	811	6540	2447	759	083	46	617, 684. 149
42	772	6424	2724	771	113	47	619, 532. 508
43	733	6308	3000	782	144	47	621, 380. 872
44	695	6192	3277	794	174	47	623, 229. 242
45	656	6076	3553	806	205	48	625, 077. 616
46	617	5960	3829	817	236	48	626, 925. 995
47	579	5844	4105	829	267	48	628, 774. 379
48	540	5727	4381	840	297	49	630, 622. 768
49	501	5611	4657	852	328	49	632, 471. 162
50	8. 50928462	8. 51135495	1. 214932	2. 34863	5. 96359	7. 8750	3, 634, 319. 561
51	424	5378	5208	875	390	50	636, 167. 965
52	385	5262	5483	886	420	50	638, 016. 374
53	346	5146	5760	898	451	50	639, 864. 788
54	307	5029	6035	909	482	51	641, 713. 207
55	268	4913	6311	921	512	51	643, 561. 631
56	230	4796	6585	932	543	51	645, 410. 059
57	191	4680	6861	944	574	52	647, 258. 493
58	152	4563	7136	955	605	52	649, 106. 932
59	113	4447	7412	966	636	52	650, 955. 376
33 00	8. 50928074	8. 51134330	1. 217686	2. 34978	5. 96666	7. 8753	3, 652, 803. 824

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 33°-34°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
33 00	8. 50928074	8. 51134330	1. 217686	2. 34978	5. 96666	7. 8753	3, 652, 803. 824
1	8. 50928035	4214	7961	2. 34989	697	53	654, 652. 277
2	8. 50927996	4097	8236	2. 35000	728	53	656, 500. 736
3	957	3980	8511	011	759	54	658, 349. 199
4	919	3863	8786	023	790	54	660, 197. 668
05	880	3747	9060	034	821	54	662, 046. 141
6	841	3630	9336	045	852	54	663, 894. 619
7	802	3513	9610	056	882	55	665, 743. 103
8	763	3396	1. 219885	068	913	55	667, 591. 591
9	724	3279	1. 220159	079	944	55	669, 440. 084
10	8. 50927685	8. 51133163	1. 220433	2. 35090	5. 96975	7. 8756	3, 671, 288. 583
11	646	3046	0707	101	5. 97006	56	673, 137. 086
12	607	2929	0981	112	037	56	674, 985. 594
13	568	2812	1256	123	068	56	676, 834. 107
14	529	2695	1529	134	099	57	678, 682. 625
15	490	2578	1804	146	130	57	680, 531. 148
16	451	2461	2078	156	161	57	682, 379. 676
17	412	2343	2351	168	192	58	684, 228. 210
18	373	2226	2625	179	223	58	686, 076. 748
19	334	2109	2899	190	254	58	687, 925. 291
20	8. 50927295	8. 51131992	1. 223173	2. 35201	5. 97285	7. 8758	3, 689, 773. 839
21	256	1875	3446	212	316	58	691, 622. 392
22	217	1757	3720	222	347	59	693, 470. 950
23	177	1640	3993	233	378	59	695, 319. 513
24	138	1523	4267	244	409	59	697, 168. 081
25	099	1405	4540	255	440	60	699, 016. 654
26	060	1288	4812	266	471	60	700. 865. 232
27	8. 50927021	1171	5086	277	502	60	702, 713. 815
28	8. 50926982	1053	5359	288	533	60	704, 562. 403
29	943	0936	5632	299	564	60	706, 410. 996
30	8. 50926904	8. 51130818	1. 225905	2. 35309	5. 97595	7. 8761	3, 708, 259. 594
31	864	0701	6178	320	626	61	710, 108. 197
32	825	0583	6451	331	657	61	711, 956. 805
33	786	0466	6723	342	688	61	713, 805. 418
34	747	0348	6996	352	720	62	715, 654. 036
35	708	0230	7268	363	751	62	717, 502. 659
36	668	8. 51130113	7542	374	782	62	719, 351. 287
37	629	8. 51129995	7814	385	813	62	721, 199. 920
38	590	9877	8087	395	844	62	723, 048. 558
39	551	9760	8358	406	876	63	724, 897. 201
40	8. 50926511	8. 51129642	1. 228630	2. 35417	5. 97907	7. 8763	3, 726, 745. 849
41	472	9524	8903	427	938	63	728, 594. 502
42	433	9406	9175	438	5. 97969	63	730, 443. 161
43	393	9288	9448	448	5. 98000	64	732, 291. 824
44	354	9170	9719	459	032	64	734, 140. 492
45	315	9052	1. 229992	2. 35470	063	64	735, 989. 165
46	276	8935	1. 230263	480	094	64	737, 837. 843
47	236	8817	0534	491	125	64	739, 686. 526
48	197	8699	0807	501	156	65	741, 535. 215
49	158	8580	1078	512	188	65	743, 383. 908
50	8. 50926118	8. 51128462	1, 231350	2. 35522	5. 98219	7. 8765	3, 745, 232. 606
51	079	8344	1621	532	250	65	747, 081. 309
52	039	8226	1893	543	282	65	748, 930. 018
53	8. 50926000	8108	2164	553	313	66	750, 778. 731
54	8. 50925961	7990	2435	564	344	66	752, 627. 449
55	921	7872	2707	574	376	66	754, 476. 173
56	882	7753	2978	584	407	66	756, 324. 901
57	842	7635	3250	595	438	66	758, 173. 635
58	803	7517	3520	605	470	66	760, 022. 373
59	764	7399	3792	616	501	67	761, 871. 117
34 00	8. 50925724	8. 51127280	1. 234062	2. 35626	5. 98532	7. 8767	3, 763, 719. 866

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 34°-35°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
34 00	8.50925724	8.51127280	1.234062	2.35626	5.98532	7.8767	3,763,719.866
1	685	7162	4333	636	564	67	765,568.619
2	645	7043	4604	646	595	67	767,417.378
3	606	6925	4875	656	626	67	769,266.142
4	566	6806	5146	667	658	68	771,114.910
05	527	6688	5416	677	689	68	772,963.684
6	487	6569	5686	687	721	68	774,812.463
7	448	6451	5957	697	752	68	776,661.247
8	408	6332	6227	708	784	68	778,510.036
9	369	6214	6498	718	815	68	780,358.830
10	8.50925329	8.51126095	1.236768	2.35728	5.98846	7.8768	3,782,207.629
11	290	5976	7039	738	878	68	784,056.433
12	250	5858	7309	748	910	69	785,905.242
13	210	5739	7579	758	941	69	787,754.056
14	171	5620	7849	768	5.98972	69	789,602.875
15	131	5502	8119	778	5.99004	69	791,451.700
16	092	5383	8389	788	036	69	793,300.529
17	052	5264	8659	798	067	69	795,149.363
18	8.50925012	5145	8928	808	099	70	796,998.203
19	8.50924973	5026	9199	818	130	70	798,847.048
20	8.50924933	8.51124907	1.239468	2.35828	5.99162	7.8770	3,800,695.897
21	894	4788	1.239738	838	193	70	802,544.752
22	854	4669	1.240007	848	225	70	804,393.611
23	814	4550	0277	858	256	70	806,242.476
24	775	4431	0546	868	288	70	808,091.346
25	735	4312	0815	878	320	70	809,940.221
26	695	4193	1085	887	351	70	811,789.101
27	655	4074	1354	897	383	70	813,637.986
28	616	3955	1624	907	414	71	815,486.876
29	576	3836	1893	917	446	71	817,335.771
30	8.50924536	8.51123717	1.242161	2.35927	5.99478	7.8771	3,819,184.672
31	497	3598	2431	936	510	71	821,033.577
32	457	3478	2700	946	541	71	822,882.487
33	417	3359	2969	956	573	71	824,731.403
34	377	3240	3237	966	604	71	826,580.324
35	338	3121	3507	976	636	71	828,429.249
36	298	3001	3775	985	668	71	830,278.180
37	258	2882	4043	2.35995	700	72	832,127.116
38	218	2762	4313	2.36004	731	72	833,976.057
39	178	2643	4581	014	763	72	835,825.003
40	8.50924139	8.51122524	1.244850	2.36024	5.99795	7.8772	3,837,673.954
41	099	2404	5118	033	827	72	839,522.910
42	059	2285	5386	043	858	72	841,371.871
43	8.50924019	2165	5655	052	890	72	843,220.837
44	8.50923979	2046	5922	062	922	72	845,069.809
45	939	1926	6191	072	954	72	846,918.785
46	900	1806	6459	081	5.99986	72	848,767.767
47	860	1687	6726	090	6.00017	72	850,616.754
48	820	1567	6995	100	049	72	852,465.745
49	780	1447	7263	110	081	72	854,314.742
50	8.50923740	8.51121328	1.247531	2.36119	6.00113	7.8772	3,856,163.744
51	700	1208	7799	128	145	72	858,012.751
52	660	1088	8066	138	176	73	859,861.763
53	620	0968	8334	147	208	73	861,710.781
54	580	0849	8601	157	240	73	863,559.803
55	540	0729	8870	166	272	73	865,408.830
56	500	0609	9137	175	304	73	867,257.863
57	460	0489	9404	185	336	73	869,106.901
58	420	0369	9672	194	368	73	870,955.944
59	380	0249	1.249939	203	400	73	872,804.992
35 00	8.50923340	8.51120129	1.250207	2.36213	6.00432	7.8773	3,874,654.045

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 35°–36°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
35 00	8. 50923340	8. 51120129	1. 250207	2. 36213	6. 00432	7. 8773	3, 874, 654. 045
1	300	8. 51120009	0474	222	464	73	876, 503. 103
2	260	8. 51119889	0740	231	496	73	878, 352. 166
3	220	9769	1008	240	527	73	880, 201. 234
4	180	9649	1275	250	559	73	882, 050. 307
05	140	9529	1542	259	591	73	883, 899. 386
6	100	9409	1808	268	623	73	885, 748. 470
7	060	9289	2076	277	655	73	887, 597. 559
8	8. 50923020	9169	2343	286	687	73	889, 446. 653
9	8. 50922980	9048	2609	295	719	73	891, 295. 752
10	8. 50922940	8. 51118928	1. 252877	2. 36304	6. 00751	7. 8773	3, 893, 144. 856
11	900	8808	3143	314	783	73	894, 993. 965
12	860	8688	3409	323	815	73	896, 843. 079
13	820	8567	3676	332	847	73	898, 692. 199
14	780	8447	3943	341	880	73	900, 541. 323
15	740	8327	4209	350	912	73	902, 390. 453
16	700	8206	4476	359	944	73	904, 239. 588
17	659	8086	4742	368	6. 00976	73	906, 088. 728
18	619	7966	5009	377	6. 01008	73	907, 937. 873
19	579	7845	5274	386	040	73	909, 787. 023
20	8. 50922539	8. 51117725	1. 255541	2. 36395	6. 01072	7. 8773	3, 911, 636. 178
21	499	7604	5807	404	104	73	913, 485. 339
22	459	7484	6072	413	136	73	915, 334. 504
23	418	7363	6339	422	168	73	917, 183. 675
24	378	7243	6605	430	201	73	919, 032. 851
25	338	7122	6871	439	233	73	920, 882. 032
26	298	7001	7137	448	265	73	922, 731. 218
27	258	6881	7402	457	297	73	924, 580. 410
28	217	6760	7669	466	329	73	926, 429. 606
29	177	6639	7934	475	361	73	928, 278. 808
30	8. 50922137	8. 51116519	1. 258199	2. 36483	6. 01394	7. 8773	3, 930, 128. 015
31	097	6398	8465	492	426	73	931, 977. 226
32	056	6277	8730	501	458	73	933, 826. 443
33	8. 50922016	6156	8996	510	490	73	935, 675. 665
34	8. 50921976	6036	9261	518	523	73	937, 524. 893
35	936	5915	9526	527	555	73	939, 374. 125
36	895	5794	1. 259792	536	587	73	941, 223. 363
37	855	5673	1. 260057	544	619	73	943, 072. 605
38	815	5552	0323	553	652	73	944, 921. 853
39	774	5431	0588	562	684	73	946, 771. 106
40	8. 50921734	8. 51115310	1. 260853	2. 36570	6. 01716	7. 8772	3, 948, 620. 365
41	694	5189	1118	579	748	72	950, 469. 628
42	653	5068	1383	588	781	72	952, 318. 896
43	613	4947	1648	596	813	72	954, 168. 170
44	573	4826	1913	605	846	72	956, 017. 449
45	532	4705	2177	613	878	72	957, 866. 733
46	492	4584	2443	622	910	72	959, 716. 022
47	452	4463	2707	630	943	72	961, 565. 316
48	411	4342	2971	639	6. 01975	72	963, 414. 615
49	371	4220	3237	647	6. 02007	72	965, 263. 920
50	8. 50921330	8. 51114099	1. 263501	2. 36656	6. 02040	7. 8772	3, 967, 113. 230
51	290	3978	3766	664	072	72	968, 962. 544
52	250	3857	4029	672	104	72	970, 811. 864
53	209	3736	4294	681	137	72	972, 661. 190
54	169	3614	4559	689	169	72	974, 510. 520
55	128	3493	4823	698	202	72	976, 359. 855
56	088	3372	5088	706	234	71	978, 209. 196
57	047	3250	5352	714	267	71	980, 058. 542
58	8. 50921007	3129	5616	723	299	71	981, 907. 893
59	8. 50920967	3008	5880	731	332	71	983, 757. 249
36 00	8. 50920926	8. 51112886	1. 266144	2. 36739	6. 02364	7. 8771	3, 985, 606. 611

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 36°–37°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
36 00	8. 50920926	8. 51112886	1. 266144	2. 36739	6. 02364	7. 8771	3, 985, 606. 611
1	886	2765	6408	748	397	71	987, 455. 977
2	845	2643	6672	756	429	71	989, 305. 349
3	805	2522	6936	764	462	71	991, 154. 726
4	764	2400	7200	772	494	71	993, 004. 108
05	724	2279	7464	781	527	70	994, 853. 495
6	683	2157	7727	789	559	70	996, 702. 887
7	643	2035	7992	797	592	70	3, 998, 552. 285
8	602	1914	8255	805	624	70	4, 000, 401. 688
9	561	1792	8518	813	657	70	002, 251. 096
10	8. 50920521	8. 51111671	1. 268782	2. 36822	6. 02689	7. 8770	4, 004, 100. 509
11	480	1549	9045	830	722	70	005, 949. 927
12	440	1427	9309	838	754	70	007, 799. 351
13	399	1305	9572	846	787	70	009, 648. 780
14	359	1184	1. 269836	854	820	70	011, 498. 214
15	318	1062	1. 270099	862	852	69	013, 347. 653
16	277	0940	0362	870	885	69	015, 197. 097
17	237	0818	0625	878	918	69	017, 046. 546
18	196	0696	0889	886	950	69	018, 896. 001
19	156	0575	1152	894	6. 02983	69	020, 745. 461
20	8. 50920115	8. 51110453	1. 271415	2. 36902	6. 03016	7. 8769	4, 022, 594. 926
21	074	0331	1678	910	048	68	024, 444. 396
22	8. 50920034	0209	1941	918	081	68	026, 293. 871
23	8. 50919993	8. 51110087	2204	926	114	68	028, 143. 352
24	952	8. 51109965	2467	934	146	68	029, 992. 837
25	912	9843	2729	942	179	68	031, 842. 328
26	871	9721	2993	950	212	68	033, 691. 824
27	830	9599	3255	957	245	68	035, 541. 326
28	790	9477	3518	965	277	68	037, 390. 832
29	749	9355	3781	973	310	67	039, 240. 344
30	8. 50919708	8. 51109233	1. 274043	2. 36981	6. 03343	7. 8767	4, 041, 089. 861
31	668	9111	4306	989	376	67	042, 939, 383
32	627	8988	4568	2. 36996	408	67	044, 788. 910
33	586	8866	4830	2. 37004	441	67	046, 638. 443
34	545	8744	5093	012	474	66	048, 487. 981
35	505	8622	5355	020	507	66	050, 337. 524
36	464	8500	5618	027	540	66	052, 187. 072
37	423	8377	5880	035	572	66	054, 036. 625
38	382	8255	6142	043	605	66	055, 886. 184
39	342	8133	6405	050	638	66	057, 735. 748
40	8. 50919301	8. 51108010	1. 276667	2. 37058	6. 03671	7. 8765	4, 059, 585. 317
41	260	7888	6928	066	704	65	061, 434. 891
42	219	7766	7191	073	737	65	063, 284. 470
43	178	7643	7453	081	770	65	065, 134. 055
44	138	7521	7715	089	802	65	066, 983. 645
45	097	7398	7977	096	835	64	068, 833. 240
46	056	7276	8238	104	868	64	070, 682. 840
47	8. 50919015	7154	8501	111	901	64	072, 532. 445
48	8. 50918974	7031	8762	119	934	64	074, 382. 056
49	934	6909	9023	126	967	64	076, 231. 672
50	8. 50918893	8. 51106786	1. 279286	2. 37134	6. 04000	7. 8764	4, 078, 081. 293
51	852	6663	9547	141	033	63	079, 930. 920
52	811	6541	1. 279808	149	066	63	081, 780. 551
53	770	6418	1. 280070	156	099	63	083, 630. 188
54	729	6296	0331	164	132	63	085, 479. 830
55	688	6173	0594	171	165	62	087, 329. 477
56	648	6050	0855	178	198	62	089, 179. 130
57	607	5928	1116	186	231	62	091, 028. 787
58	566	5805	1378	193	264	62	092, 878. 450
59	525	5682	1639	200	297	62	094, 728. 118
37 00	8. 50918484	8. 51105559	1. 281899	2. 37208	6. 04330	7. 8761	4, 096, 577. 792

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 37°–38°

Lat.		log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
°	′							*Meters*
37	00	8.50918484	8.51105559	1.281899	2.37208	6.04330	7.8761	4,096,577.792
	1	443	5437	2161	215	363	61	098,427.470
	2	402	5314	2422	222	396	61	100,277.154
	3	361	5191	2683	230	429	61	102,126.843
	4	320	5068	2944	237	462	60	103,976.537
	05	279	4945	3205	244	495	60	105,826.237
	6	238	4823	3467	252	528	60	107,675.942
	7	197	4700	3727	259	562	60	109,525.652
	8	156	4577	3988	266	595	59	111,375.367
	9	115	4454	4249	273	628	59	113,225.087
	10	8.50918074	8.51104331	1.284510	2.37280	6.04661	7.8759	4,115,074.813
	11	8.50918033	4208	4770	288	694	59	116,924.544
	12	8.50917992	4085	5031	295	727	58	118,774.280
	13	951	3962	5292	302	760	58	120,624.021
	14	910	3839	5552	309	794	58	122,473.768
	15	869	3716	5813	316	827	58	124,323.520
	16	828	3593	6073	323	860	57	126,173.277
	17	787	3470	6333	330	893	57	128,023.039
	18	746	3347	6595	337	926	57	129,872.807
	19	705	3223	6855	344	960	57	131,722.580
	20	8.50917664	8.51103100	1.287116	2.37351	6.04993	7.8756	4,133,572.358
	21	623	2977	7376	358	6.05026	56	135,422.141
	22	582	2854	7636	365	059	56	137,271.930
	23	541	2731	7896	372	092	56	139,121.724
	24	500	2607	8156	379	126	55	140,971.523
	25	459	2484	8416	386	159	55	142,821.327
	26	418	2361	8677	393	192	55	144,671.137
	27	377	2238	8937	400	226	54	146,520.952
	28	336	2114	9196	407	259	54	148,370.772
	29	294	1991	9457	414	292	54	150,220,597
	30	8.50917253	8.51101868	1.289716	2.37420	6.05326	7.8754	4,152,070.428
	31	212	1744	1.289976	427	359	53	153,920.264
	32	171	1621	1.290237	434	392	53	155,770.105
	33	130	1497	0496	441	425	53	157,619.951
	34	089	1374	0756	448	459	52	159,469.803
	35	048	1251	1016	454	492	52	161,319.660
	36	8.50917006	1127	1275	461	526	52	163,169.522
	37	8.50916965	1004	1535	468	559	51	165,019.389
	38	924	0880	1795	475	592	51	166,869.262
	39	883	0757	2054	482	626	51	168,719.140
	40	8.50916842	8.51100633	1.292314	2.37488	6.05659	7.8750	4,170,569.023
	41	801	0510	2573	495	692	50	172,418,911
	42	759	0386	2832	502	726	50	174,268,805
	43	718	0262	3093	508	759	50	176,118.704
	44	677	0139	3352	515	793	49	177,968.608
	45	636	8.51100015	3611	522	826	49	179,818.518
	46	595	8.51099891	3870	528	860	49	181,668.432
	47	553	9768	4129	535	893	48	183,518.352
	48	512	9644	4388	541	927	48	185,368.277
	49	471	9520	4648	548	960	48	187,218.208
	50	8.50916430	8.51099397	1.294907	2.37554	6.05994	7.8747	4,189,068.144
	51	388	9273	5167	561	6.06027	47	190,918.085
	52	347	9149	5425	567	061	47	192,768.031
	53	306	9025	5684	574	094	46	194,617.983
	54	265	8902	5944	580	128	46	196,467.940
	55	223	8778	6202	587	161	46	198,317.902
	56	182	8654	6461	593	195	45	200,167.870
	57	141	8530	6720	600	228	45	202,017.843
	58	099	8406	6979	606	262	44	203,867.821
	59	058	8282	7237	613	296	44	205,717.804
38	00	8.50916017	8.51098158	1.297497	2.37619	6.06329	7.8744	4,207,567.792

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 38°–39°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
38 00	8. 50916017	8. 51098158	1. 297497	2. 37619	6. 06329	7. 8744	4, 207, 567. 792
1	8. 50915976	8034	7755	625	363	43	209, 417. 786
2	934	7910	8014	632	396	43	211, 267. 785
3	893	7786	8273	638	430	43	213, 117. 790
4	852	7662	8531	644	464	42	214, 967. 800
05	810	7538	8790	651	498	42	216, 817. 815
6	769	7414	9049	657	531	42	218, 667. 835
7	728	7290	9307	663	565	41	220, 517. 860
8	686	7166	9565	670	598	41	222, 367. 891
9	645	7042	1. 299824	676	632	40	224, 217, 927
10	8. 50915603	8. 51096918	1. 300082	2. 37682	6. 06666	7. 8740	4, 226, 067. 969
11	562	6794	0340	688	700	40	227, 918. 015
12	521	6670	0599	694	733	39	229, 768. 067
13	479	6546	0857	701	767	39	231, 618. 124
14	438	6422	1116	707	801	39	233, 468. 187
15	397	6297	1374	713	834	38	235, 318. 255
16	355	6173	1631	719	868	38	237, 168. 328
17	314	6049	1890	725	902	37	239, 018. 406
18	272	5925	2148	731	936	37	240, 868. 490
19	231	5800	2406	738	6. 06969	37	242, 718. 579
20	8. 50915189	8. 51095676	1. 302664	2. 37744	6. 07003	7. 8736	4, 244, 568. 673
21	148	5552	2922	750	037	36	246, 418. 773
22	107	5428	3180	756	071	35	248, 268. 878
23	065	5303	3438	762	105	35	250, 118. 988
24	8. 50915024	5179	3696	768	138	35	251, 969. 104
25	8. 50914982	5055	3953	774	172	34	253, 819. 225
26	941	4930	4212	780	206	34	255, 669. 351
27	899	4806	4469	786	240	33	257, 519. 482
28	858	4681	4726	792	274	33	259, 369. 619
29	816	4557	4985	798	308	32	261, 219. 761
30	8. 50914775	8. 51094433	1. 305242	2. 37804	6. 07342	7. 8732	4, 263, 069. 908
31	733	4308	5499	809	375	32	264, 920. 061
32	692	4184	5758	815	409	31	266, 770. 219
33	650	4059	6015	821	443	31	268, 620. 382
34	609	3935	6272	827	477	30	270, 470. 550
35	567	3810	6530	833	511	30	272, 320. 724
36	526	3686	6787	839	545	30	274, 170. 903
37	484	3561	7045	844	579	29	276, 021. 087
38	443	3436	7303	850	613	29	277, 871. 277
39	401	3312	7560	856	647	28	279, 721. 472
40	8. 50914360	8. 51093187	1. 307817	2. 37862	6. 07681	7. 8728	4, 281, 571. 672
41	318	3063	8075	868	715	27	283, 421. 878
42	277	2938	8331	873	749	27	285, 272. 089
43	235	2813	8588	879	783	26	287, 122. 305
44	194	2689	8846	885	817	26	288, 972. 527
45	152	2564	9103	890	851	26	290, 822. 754
46	110	2439	9360	896	885	25	292, 672. 986
47	069	2314	9617	902	919	25	294, 523. 224
48	8. 50914027	2190	1. 309874	908	953	24	296, 373. 467
49	8. 50913986	2065	1. 310131	913	6. 07987	24	298, 223. 715
50	8. 50913944	8. 51091940	1. 310388	2. 37919	6. 08021	7. 8723	4, 300, 073. 968
51	903	1815	0645	924	055	23	301, 924. 227
52	861	1691	0902	930	089	22	303, 774. 491
53	819	1566	1159	936	123	22	305, 624. 760
54	778	1441	1416	941	158	21	307, 475. 035
55	736	1316	1672	947	192	21	309, 325. 315
56	694	1191	1930	952	226	20	311, 175. 600
57	653	1066	2186	958	260	20	313. 025. 891
58	611	0941	2442	963	294	19	314, 876. 187
59	570	0817	2700	969	328	19	316, 726. 488
39 00	8. 50913528	8. 51090692	1. 312956	2. 37974	6. 08362	7. 8718	4, 318, 576. 795

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 39°–40°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
39 00	8. 50913528	8. 51090692	1. 312956	2. 37974	6. 08362	7. 8718	4, 318, 576. 795
1	486	0567	3213	980	396	18	320, 427. 107
2	445	0442	3470	985	431	18	322, 277. 424
3	403	0317	3726	990	465	17	324, 127. 747
4	361	0192	3982	2. 37996	499	16	325, 978. 075
05	320	8. 51090067	4239	2. 38001	533	16	327, 828. 408
6	278	8. 51089942	4495	006	568	16	329, 678. 747
7	236	9817	4752	012	602	15	331, 529. 091
8	195	9692	5009	017	636	14	333, 379. 440
9	153	9566	5265	022	670	14	335, 229. 795
10	8. 50913111	8. 51089441	1. 315521	2. 38028	6. 08704	7. 8714	4, 337, 080. 155
11	069	9316	5778	033	739	13	338, 930. 520
12	8. 50913028	9191	6034	038	773	12	340, 780. 890
13	8. 50912986	9066	6289	044	807	12	342, 631. 266
14	944	8941	6546	049	842	12	344, 481. 647
15	903	8816	6802	054	876	11	346, 332. 034
16	861	8691	7058	059	910	10	348, 182. 426
17	819	8565	7315	064	945	10	350, 032. 823
18	777	8440	7571	070	6. 08979	09	351, 883. 226
19	736	8315	7826	075	6. 09013	09	353, 733. 634
20	8. 50912694	8. 51088190	1. 318083	2. 38080	6. 09048	7. 8708	4, 355, 584. 047
21	652	8064	8339	085	082	08	357, 434. 465
22	610	7939	8594	090	116	07	359, 284. 889
23	569	7814	8851	095	151	07	361, 135. 318
24	527	7689	9107	100	185	06	362, 985. 753
25	485	7563	9362	106	220	06	364, 836. 193
26	443	7438	9619	111	254	05	366, 686. 638
27	402	7313	1. 319874	116	288	05	368, 537. 089
28	360	7187	1. 320130	121	323	04	370, 387. 545
29	318	7062	0386	126	357	04	372, 238. 006
30	8. 50912276	8. 51086936	1. 320641	2. 38131	6. 09392	7. 8703	4, 374. 088. 473
31	234	6811	0897	136	426	02	375, 938. 945
32	193	6686	1153	141	460	02	377, 789. 422
33	151	6560	1408	146	495	01	379, 639. 905
34	109	6435	1664	151	530	01	381, 490. 393
35	067	6309	1920	156	564	00	383, 340. 886
36	8. 50912025	6184	2175	160	598	7. 8700	385, 191. 385
37	8. 50911984	6058	2431	165	633	7. 8699	387, 041. 889
38	942	5933	2687	170	668	98	388, 892. 398
39	900	5807	2942	175	702	98	390, 742. 913
40	8. 50911858	8. 51085682	1. 323197	2. 38180	6. 09737	7. 8697	4, 392, 593. 433
41	816	5556	3453	185	771	97	394, 443. 959
42	774	5431	3708	190	806	96	396, 294. 490
43	732	5305	3963	194	840	96	398, 145. 026
44	691	5180	4219	199	875	95	399, 995. 567
45	649	5054	4474	204	910	94	401, 846. 114
46	607	4928	4729	209	944	94	403, 696. 666
47	565	4803	4985	214	6. 09979	93	405, 547, 224
48	523	4677	5240	218	6. 10013	93	407, 397. 787
49	481	4551	5495	223	048	92	409, 248. 355
50	8. 50911439	8. 51084426	1. 325751	2. 38228	6. 10083	7. 8692	4, 411, 098. 928
51	397	4300	6005	232	117	91	412, 949. 507
52	356	4174	6260	237	152	90	414, 800. 091
53	314	4049	6516	242	187	90	416, 650. 681
54	272	3923	6771	246	221	89	418, 501. 276
55	230	3797	7025	251	256	88	420, 351. 877
56	188	3672	7281	256	291	88	422, 202. 483
57	146	3546	7536	260	325	87	424, 053. 094
58	104	3420	7790	265	360	87	425, 903. 710
59	062	3294	8045	269	395	86	427, 754. 332
40 00	8. 50911020	8. 51083168	1. 328301	2. 38274	6. 10430	7. 8686	4, 429, 604. 959

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 40°–41°

Lat.		log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
°	′							*Meters*
40	00	8.50911020	8.51083168	1.328301	2.38274	6.10430	7.8686	4,429,604.959
	1	8.50910978	3043	8555	278	464	85	431,455.592
	2	936	2917	8810	283	499	84	433,306.230
	3	894	2791	9065	287	534	84	435,156.873
	4	852	2665	9320	292	569	83	437,007.522
	05	810	2539	9574	296	603	82	438,858.176
	6	768	2413	1.329829	301	638	82	440,708.835
	7	727	2287	1.330084	305	673	81	442,559.500
	8	685	2162	0338	310	708	80	444,410.170
	9	643	2036	0594	314	743	80	446,260.845
	10	8.50910601	8.51081910	1.330848	2.38318	6.10778	7.8679	4,448,111.526
	11	559	1784	1102	323	812	79	449,962.212
	12	517	1658	1357	327	847	78	451,812.904
	13	475	1532	1612	332	882	77	453,663.601
	14	433	1406	1866	336	917	77	455,514.303
	15	391	1280	2121	340	952	76	457,365.011
	16	349	1154	2375	344	6.10987	75	459,215.724
	17	307	1028	2629	349	6.11022	75	461,066.442
	18	265	0902	2884	353	056	74	462,917.166
	19	223	0776	3139	357	091	73	464,767.895
	20	8.50910181	8.51080650	1.333393	2.38362	6.11126	7.8673	4,466,618.629
	21	139	0524	3648	366	161	72	468,469.369
	22	097	0398	3902	370	196	71	470,320.114
	23	055	0271	4156	374	231	71	472,170.865
	24	8.50910013	0145	4411	378	266	70	474,021.621
	25	8.50909970	8.51080019	4665	382	301	69	475,872.382
	26	928	8.51079893	4919	387	336	69	477,723.149
	27	886	9767	5172	391	371	68	479,573.921
	28	844	9641	5427	395	406	67	481,424.699
	29	802	9515	5681	399	441	67	483,275.482
	30	8.50909760	8.51079388	1.335935	2.38403	6.11476	7.8666	4,485,126.270
	31	718	9262	6190	407	511	65	486,977.064
	32	676	9136	6444	411	546	65	488,827.863
	33	634	9010	6697	415	581	64	490,678.667
	34	592	8884	6952	419	616	63	492,529.477
	35	550	8757	7206	423	651	63	494,380.292
	36	508	8631	7459	427	687	62	496,231.112
	37	466	8505	7714	431	722	61	498,081.938
	38	424	8379	7968	435	757	61	499,932.769
	39	382	8252	8221	439	792	60	501,783.606
	40	8.50909339	8.51078126	1.338476	2.38443	6.11827	7.8659	4,503,634.448
	41	297	8000	8729	447	862	58	505,485.296
	42	255	7873	8983	451	897	58	507,336.149
	43	213	7747	9237	455	932	57	509,187.007
	44	171	7621	9491	459	6.11968	56	511,037.871
	45	129	7494	9745	463	6.12003	56	512,888.740
	46	087	7368	1.339998	467	038	55	514,739.614
	47	045	7242	1.340252	470	073	54	516,590,494
	48	8.50909002	7115	0506	474	108	54	518,441.379
	49	8.50908960	6989	0759	478	144	53	520,292.269
	50	8.50908918	8.51076863	1.341013	2.38482	6.12179	7.8652	4,522,143.165
	51	876	6736	1267	486	214	51	523,994.066
	52	834	6610	1520	489	249	51	525,844.973
	53	792	6483	1774	493	284	50	527,695.885
	54	750	6357	2028	497	320	49	529,546.802
	55	708	6230	2281	500	355	48	531,397.725
	56	665	6104	2535	504	390	48	533,248.653
	57	623	5977	2789	508	426	47	535,099.587
	58	581	5851	3042	512	461	46	536,950.526
	59	539	5724	3296	515	496	46	538,801.470
41	00	8.50908497	8.51075598	1.343549	2.38519	6.12532	7.8645	4,540,652.420

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 41°–42°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
41 00	8. 50908497	8. 51075598	1. 343549	2. 38519	6. 12532	7. 8645	4, 540, 652. 420
1	455	5471	3802	522	567	44	542, 503. 375
2	412	5345	4055	526	602	43	544, 354. 336
3	370	5218	4309	530	638	42	546, 205. 302
4	328	5092	4563	533	673	42	548, 056. 273
05	286	4965	4815	537	708	41	549, 907. 250
6	244	4839	5070	540	744	40	551, 758. 232
7	201	4712	5323	544	779	40	553, 609. 220
8	159	4585	5576	548	814	39	555, 460. 213
9	117	4459	5829	551	850	38	557, 311. 211
10	8. 50908075	8. 51074332	1. 346083	2. 38554	6. 12885	7. 8637	4, 559, 162. 215
11	8. 50908033	4206	6335	558	921	36	561, 013. 224
12	8. 50907990	4079	6589	562	956	36	562, 864. 239
13	948	3952	6842	565	6. 12992	35	564, 715. 259
14	906	3826	7095	568	6. 13027	34	566, 566. 284
15	864	3699	7349	572	062	33	568, 417. 315
16	821	3572	7602	575	098	33	570, 268. 351
17	779	3446	7855	579	133	32	572, 119. 392
18	737	3319	8107	582	169	31	573, 970. 439
19	695	3192	8361	585	204	30	575, 821. 491
20	8. 50907653	8. 51073065	1. 348614	2. 38589	6. 13240	7. 8629	4, 577, 672. 549
21	610	2939	8867	592	276	29	579, 523. 612
22	568	2812	9120	595	311	28	581, 374. 681
23	526	2685	9373	599	347	27	583, 225. 755
24	484	2558	9626	602	382	26	585, 076. 834
25	441	2432	1. 349879	605	418	26	586, 927. 919
26	399	2305	1. 350132	608	453	25	588, 779. 009
27	357	2178	0385	612	489	24	590, 630. 105
28	315	2051	0638	615	524	23	592, 481. 206
29	272	1925	0891	618	560	22	594, 332. 312
30	8. 50907230	8. 51071798	1. 351143	2. 38621	6. 13596	7. 8622	4, 596, 183. 424
31	188	1671	1397	624	631	21	598, 034. 541
32	145	1544	1650	628	667	20	599, 885. 663
33	103	1417	1902	631	703	19	601, 736. 791
34	061	1290	2154	634	738	18	603, 587. 925
35	8. 50907019	1164	2408	637	774	17	605, 439. 064
36	8. 50906976	1037	2661	640	810	17	607, 290. 208
37	934	0910	2913	643	845	16	609, 141. 357
38	892	0783	3166	646	881	15	610, 992. 512
39	849	0656	3419	649	917	14	612, 843. 673
40	8. 50906807	8. 51070529	1. 353671	2. 38652	6. 13952	7. 8613	4, 614, 694. 839
41	765	0402	3925	655	6. 13988	12	616, 546. 010
42	722	0275	4177	658	6. 14024	12	618, 397. 187
43	680	0148	4429	661	060	11	620, 248. 369
44	638	8. 51070021	4682	664	095	10	622, 099. 556
45	596	8. 51069894	4935	667	131	09	623, 950. 749
46	553	9768	5187	670	167	08	625, 801. 947
47	511	9641	5439	673	203	07	627, 653. 151
48	469	9514	5693	676	238	07	629, 504. 360
49	426	9387	5945	679	274	06	631, 355. 575
50	8. 50906384	8. 51069260	1. 356197	2. 38682	6. 14310	7. 8605	4, 633, 206. 795
51	342	9133	6450	685	346	04	635, 058. 020
52	299	9006	6702	688	382	03	636, 909. 251
53	257	8879	6955	691	418	02	638, 760. 487
54	215	8752	7208	693	454	02	640, 611. 728
55	172	8625	7460	696	489	01	642, 462. 975
56	130	8497	7712	699	525	7. 8600	644, 314. 228
57	088	8370	7965	702	561	7. 8599	646, 165. 486
58	045	8243	8217	705	597	98	648, 016. 749
59	8. 50906003	8116	8469	707	633	97	649, 868. 018
42 00	8. 50905960	8. 51067989	1. 358721	2. 38710	6. 14669	7. 8596	4, 651, 719. 292

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 42°–43°

Lat.	log A′	log B	Log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
42 00	8. 50905960	8. 51067989	1. 358721	2. 38710	6. 14669	7. 8596	4, 651, 719. 292
1	918	7862	8975	713	705	95	653, 570. 571
2	876	7735	9227	716	741	94	655, 421. 856
3	833	7608	9479	718	777	94	657, 273. 146
4	791	7481	9732	721	812	93	659, 124. 442
05	749	7354	1. 359984	724	849	92	660, 975. 743
6	706	7227	1. 360236	726	884	91	662, 827. 050
7	664	7100	0488	729	920	90	664, 678. 362
8	622	6972	0740	732	956	89	666, 529. 679
9	579	6845	0992	734	6. 14992	88	668, 381. 002
10	8. 50905537	8. 51066718	1. 361244	2. 38737	6. 15028	7. 8587	4, 670, 232. 330
11	494	6591	1497	740	064	87	672, 083. 664
12	452	6464	1749	742	101	86	673, 935. 003
13	410	6337	2001	744	137	85	675, 786. 348
14	367	6209	2254	747	173	84	677, 637. 698
15	325	6082	2505	750	209	83	679, 489. 053
16	282	5955	2757	752	245	82	681, 340. 414
17	240	5828	3010	755	281	81	683, 191. 780
18	198	5701	3262	757	317	80	685, 043. 152
19	155	5573	3514	760	353	79	686, 894. 529
20	8. 50905113	8. 51065446	1. 363767	2. 38762	6. 15389	7. 8578	4, 688, 745. 911
21	070	5319	4018	764	425	78	690, 597. 299
22	8. 50905028	5192	4270	767	462	77	692, 448. 693
23	8. 50904986	5064	4522	769	498	76	694, 300. 091
24	943	4937	4774	772	534	75	696, 151. 495
25	901	4810	5026	774	570	74	698, 002. 905
26	858	4683	5278	776	606	73	699, 854. 320
27	816	4555	5531	779	642	72	701, 705. 741
28	773	4428	5782	781	679	71	703, 557. 167
29	731	4301	6034	783	715	70	705, 408. 598
30	8. 50904689	8. 51064174	1. 366286	2. 38786	6. 15751	7. 8569	4, 707, 260. 035
31	646	4046	6538	788	787	68	709, 111. 477
32	604	3919	6791	790	824	67	710, 962. 925
33	561	3792	7041	792	860	66	712, 814. 378
34	519	3664	7294	795	896	65	714, 665. 836
35	476	3537	7545	797	932	64	716, 517. 300
36	434	3410	7797	799	6. 15968	63	718, 368. 769
37	391	3282	8050	801	6. 16005	62	720, 220. 244
38	349	3155	8301	804	041	62	722, 071. 724
39	307	3028	8553	806	078	61	723, 923. 210
40	8. 50904264	8. 51062900	1. 368805	2. 38808	6. 16114	7. 8560	4, 725, 774. 701
41	222	2773	9057	810	150	59	727, 626. 197
42	179	2645	9308	812	186	58	729, 477. 699
43	137	2518	9560	814	223	57	731, 329. 206
44	094	2391	1. 369812	816	259	56	733, 180. 719
45	052	2263	1. 370064	818	296	55	735, 032. 237
46	8. 50904009	2136	0315	820	332	54	736, 883. 761
47	8. 50903967	2008	0567	823	368	53	738, 735. 290
48	924	1881	0819	825	405	52	740, 586. 824
49	882	1754	1070	827	441	51	742, 438. 364
50	8. 50903839	8. 51061626	1. 371322	2. 38829	6. 16478	7. 8550	4, 744, 289. 910
51	797	1499	1574	831	514	49	746, 141. 460
52	755	1371	1825	833	550	48	747, 993. 016
53	712	1244	2077	835	587	47	749, 844. 578
54	670	1117	2329	836	623	46	751, 696. 145
55	627	0989	2580	838	660	45	753, 547. 718
56	585	0862	2832	840	696	44	755, 399. 296
57	542	0734	3084	842	733	43	757, 250. 879
58	500	0607	3335	844	769	42	759, 102. 468
59	457	0479	3587	846	806	41	760, 954. 062
43 00	8. 50903415	8. 51060352	1. 373839	2. 38848	6. 16842	7. 8540	4, 762, 805. 662

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 43°–44°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
43 00	8. 50903415	8. 51060352	1. 373839	2. 38848	6. 16842	7. 8540	4, 762, 805. 662
1	372	0224	4090	850	879	39	764, 657. 267
2	330	8. 51060097	4341	852	915	38	766, 508. 878
3	287	8. 51059969	4593	853	952	37	768, 360. 494
4	245	9842	4845	855	6. 16989	36	770, 212. 115
05	202	9714	5096	857	6. 17025	35	772, 063. 742
6	160	9587	5347	859	062	34	773, 915. 374
7	117	9459	5600	860	098	33	775, 767. 012
8	075	9332	5851	862	135	32	777, 618. 655
9	8. 50903032	9204	6101	864	172	31	779, 470. 303
10	8. 50902990	8. 51059077	1. 376353	2. 38866	6. 17208	7. 8530	4, 781, 321. 957
11	947	8949	6605	867	245	29	783, 173. 617
12	905	8822	6856	869	282	28	785, 025. 282
13	862	8694	7108	871	318	27	786, 876. 952
14	820	8566	7360	872	355	26	788, 728. 628
15	777	8439	7611	874	392	25	790, 580. 309
16	735	8311	7862	876	428	24	792, 431. 996
17	692	8184	8114	877	465	23	794, 283. 688
18	649	8056	8365	879	502	22	796, 135. 386
19	607	7929	8616	880	538	21	797, 987. 089
20	8. 50902564	8. 51057801	1. 378868	2. 38882	6. 17575	7. 8520	4, 799, 838. 797
21	522	7674	9120	884	612	19	801, 690. 511
22	479	7546	9371	885	649	18	803, 542. 230
23	437	7418	9622	887	685	16	805, 393. 955
24	394	7291	1. 379874	888	722	15	807, 245. 685
25	352	7163	1. 380125	890	759	14	809, 097. 421
26	309	7036	0376	891	796	13	810, 949. 162
27	267	6908	0628	892	833	12	812, 800. 908
28	224	6780	0879	894	869	11	814, 652. 660
29	182	6653	1130	895	906	10	816, 504. 418
30	8. 50902139	8. 51056525	1. 381381	2. 38897	6. 17943	7. 8509	4, 818, 356. 181
31	097	6397	1633	898	6. 17980	08	820, 207. 949
32	054	6270	1884	900	6. 18017	07	822, 059. 722
33	8. 50902011	6142	2135	901	054	06	823, 911. 501
34	8. 50901969	6015	2387	902	091	05	825, 763. 286
35	926	5887	2638	904	128	04	827, 615. 076
36	884	5759	2889	905	164	03	829, 466. 872
37	841	5632	3141	906	201	02	831, 318. 673
38	799	5504	3392	908	238	7. 8500	833, 170. 479
39	756	5376	3643	909	275	7. 8499	835, 022. 291
40	8. 50901714	8. 51055249	1. 383894	2. 38910	6. 18312	7. 8498	4, 836, 874. 108
41	671	5121	4146	911	349	97	838, 725. 931
42	628	4993	4397	913	386	96	840, 577. 759
43	586	4866	4647	914	423	95	842, 429. 593
44	543	4738	4899	915	460	94	844, 281. 432
45	501	4610	5150	916	497	93	846, 133. 276
46	458	4483	5401	917	534	92	847, 985. 126
47	416	4355	5653	919	571	91	849, 836. 981
48	373	4227	5904	920	608	90	851, 688. 842
49	331	4099	6155	921	645	88	853, 540. 708
50	8. 50901288	8. 51053972	1. 386406	2. 38922	6. 18682	7. 8487	4, 855, 392. 580
51	245	3844	6658	923	719	86	857, 244. 457
52	203	3716	6908	924	756	85	859, 096. 340
53	160	3589	7159	925	793	84	860, 948. 228
54	118	3461	7411	926	830	83	862, 800. 121
55	075	3333	7662	927	868	82	864, 652. 020
56	8. 50901033	3206	7913	928	905	81	866, 503. 924
57	8. 50900990	3078	8165	930	942	80	868, 355. 834
58	947	2950	8416	930	6. 18979	78	870, 207. 749
59	905	2822	8666	931	6. 19016	77	872, 059. 670
44 00	8. 50900862	8. 51052695	1. 388917	2. 38932	6. 19053	7. 8476	4, 873, 911. 596

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 44°–45°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
44 00	8. 50900862	8. 51052695	1. 388917	2. 38932	6. 19053	7. 8476	4, 873, 911. 596
1	820	2567	9169	933	090	75	875, 763. 528
2	777	2439	9420	934	128	74	877, 615. 465
3	735	2311	9671	935	165	73	879, 467. 408
4	692	2184	1. 389921	936	202	72	881, 319. 356
05	649	2056	1. 390173	937	239	70	883, 171. 309
6	607	1928	0424	938	276	69	885, 023. 268
7	564	1800	0676	939	314	68	886, 875. 232
8	522	1673	0927	940	351	67	888, 727. 202
9	479	1545	1177	941	388	66	890, 579. 177
10	8. 50900436	8. 51051417	1. 391428	2. 38941	6. 19425	7. 8465	4, 892, 431. 158
11	394	1289	1680	942	463	64	894, 283. 144
12	351	1162	1931	943	500	62	896, 135. 135
13	309	1034	2181	944	537	61	897, 987. 132
14	266	0906	2433	944	575	60	899, 839. 135
15	224	0778	2684	945	612	59	901, 691. 143
16	181	0651	2935	946	649	58	903, 543. 156
17	138	0523	3186	947	686	56	905, 395. 175
18	096	0395	3437	947	724	55	907, 247. 199
19	053	0267	3688	948	761	54	909, 099. 228
20	8. 50900011	8. 51050140	1. 393939	2. 38949	6. 19799	7. 8453	4, 910, 951. 263
21	8. 50899968	8. 51050012	4190	950	836	52	912, 803. 304
22	925	8. 51049884	4441	950	873	51	914, 655. 350
23	883	9756	4692	951	911	50	916, 507. 402
24	840	9628	4944	952	948	48	918, 359. 459
25	798	9501	5194	952	6. 19986	47	920, 211. 521
26	755	9373	5445	953	6. 20023	46	922, 063. 589
27	712	9245	5696	953	061	45	923, 915. 662
28	670	9117	5947	954	098	44	925, 767. 741
29	627	8989	6198	954	136	42	927, 619. 825
30	8. 50899585	8. 51048862	1. 396449	2. 38955	6. 20173	7. 8441	4, 929, 471. 915
31	542	8734	6700	955	210	40	931, 324. 010
32	499	8606	6951	956	248	39	933, 176. 110
33	457	8478	7202	956	286	38	935, 028. 216
34	414	8350	7453	957	323	36	936, 880. 327
35	372	8223	7704	957	360	35	938, 732. 444
36	329	8095	7955	958	398	34	940, 584. 566
37	286	7967	8206	958	436	33	942, 436. 694
38	244	7839	8457	959	473	32	944, 288. 827
39	201	7711	8708	959	511	30	946, 140. 966
40	8. 50899159	8. 51047584	1. 398959	2. 38959	6. 20548	7. 8429	4, 947, 993. 110
41	116	7456	9210	960	586	28	949, 845. 260
42	073	7328	9461	960	624	27	951, 697. 415
43	8. 50899031	7200	9712	960	661	25	953, 549. 575
44	8. 50898988	7072	1. 399962	961	699	24	955, 401. 741
45	946	6945	1. 400214	961	736	23	957, 253. 912
46	903	6817	0465	961	774	22	959, 106. 089
47	860	6689	0715	962	812	20	960, 958. 271
48	818	6561	0967	962	850	19	962, 810. 459
49	775	6433	1218	962	887	18	964, 662. 652
50	8. 50898733	8. 51046306	1. 401468	2. 38962	6. 20925	7. 8417	4, 966, 514. 851
51	690	6178	1720	963	6. 20963	16	968, 367. 055
52	647	6050	1972	963	6. 21000	14	970, 219. 265
53	605	5922	2221	963	038	13	972, 071. 480
54	562	5794	2472	963	076	12	973, 923. 700
55	520	5666	2724	963	114	10	975, 775. 926
56	477	5539	2974	964	151	09	977, 628. 157
57	434	5411	3225	964	189	08	979, 480. 394
58	392	5283	3477	964	227	07	981, 332. 636
59	349	5155	3727	964	265	06	983, 184. 884
45 00	8. 50898307	8. 51045027	1. 403978	2. 38964	6. 21302	7. 8404	4, 985, 037. 137

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 45°–46°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
45 00	8. 50898307	8. 51045027	1. 403978	2. 38964	6. 21302	7. 8404	4, 985, 037. 137
1	264	4900	4230	964	340	03	986, 889. 396
2	221	4772	4480	964	378	02	988, 741. 660
3	179	4644	4731	964	416	7. 8400	990, 593. 929
4	136	4516	4982	964	454	7. 8399	992, 446. 204
05	093	4388	5233	964	492	98	994, 298. 485
6	051	4260	5484	964	530	97	996, 150. 771
7	8. 50898008	4133	5735	964	568	95	998, 003. 062
8	8. 50897966	4005	5986	964	605	94	4, 999, 855. 359
9	923	3877	6237	964	643	93	5, 001, 707. 661
10	8. 50897880	8. 51043749	1. 406488	2. 38964	6. 21681	7. 8392	5, 003, 559. 968
11	838	3621	6738	964	719	90	005, 412. 281
12	795	3493	6990	964	757	89	007, 264. 600
13	753	3366	7241	964	795	88	009, 116. 924
14	710	3238	7491	964	833	86	010, 969. 253
15	667	3110	7743	964	871	85	012, 821. 588
16	625	2982	7994	963	909	84	014, 673. 929
17	582	2854	8244	963	947	82	016, 526. 275
18	540	2727	8495	963	6. 21985	81	018, 378. 626
19	497	2599	8747	963	6. 22023	80	020, 230. 983
20	8. 50897454	8. 51042471	1. 408997	2. 38963	6. 22061	7. 8378	5, 022, 083. 345
21	412	2343	9248	963	099	77	023, 935. 712
22	369	2215	9500	962	137	76	025, 788. 085
23	327	2087	1. 409750	962	175	75	027, 640. 464
24	284	1960	1. 410001	962	213	73	029, 492. 848
25	241	1832	0253	962	251	72	031, 345. 237
26	199	1704	0504	961	289	71	033, 197. 632
27	156	1576	0754	961	328	69	035, 050. 032
28	114	1448	1005	961	366	68	036, 902. 438
29	071	1321	1257	960	404	67	038, 754. 849
30	8. 50897028	8. 51041193	1. 411507	2. 38960	6. 22442	7. 8365	5, 040, 607. 266
31	8. 50896986	1065	1758	960	480	64	042, 459. 688
32	943	0937	2010	959	518	63	044, 312. 116
33	901	0809	2260	959	556	61	046, 164. 549
34	858	0682	2511	958	595	60	048, 016. 988
35	815	0554	2763	958	633	59	049, 869. 432
36	773	0426	3013	958	671	57	051, 721. 881
37	730	0298	3264	957	709	56	053, 574. 336
38	688	0170	3515	957	748	55	055, 426. 796
39	645	8. 51040043	3767	956	786	53	057, 279. 262
40	8. 50896602	8. 51039915	1. 414017	2. 38956	6. 22824	7. 8352	5, 059, 131. 733
41	560	9787	4268	955	862	51	060, 984. 210
42	517	9659	4520	955	900	49	062, 836. 692
43	475	9531	4771	954	939	48	064, 689. 179
44	432	9404	5021	954	6. 22977	46	066, 541. 672
45	389	9276	5273	953	6. 23015	45	068, 394. 171
46	347	9148	5524	952	054	44	070, 246. 675
47	304	9020	5775	952	092	42	072, 099. 184
48	262	8892	6025	951	130	41	073, 951. 699
49	219	8765	6277	951	169	40	075, 804. 219
50	8. 50896176	8. 51038637	1. 416528	2. 38950	6. 23207	7. 8338	5, 077, 656. 745
51	134	8509	6779	949	246	37	079, 509. 276
52	091	8381	7030	948	284	36	081, 361. 813
53	049	8253	7281	948	322	34	083, 214. 355
54	8. 50896006	8126	7532	947	361	33	085, 066. 902
55	8. 50895963	7998	7783	946	399	31	086, 919. 455
56	921	7870	8035	946	438	30	088, 772. 013
57	878	7742	8285	945	476	29	090, 624. 577
58	836	7615	8536	944	514	27	092, 477. 146
59	793	7487	8787	943	553	26	094, 329. 721
46 00	8. 50895750	8. 51037359	1. 419039	2. 38943	6. 23591	7. 8324	5, 096, 182. 301

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 46°–47°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
46 00	8. 50895750	8. 51037359	1. 419039	2. 38943	6. 23591	7. 8324	5, 096, 182. 301
1	708	7231	9290	942	630	23	098, 034. 887
2	665	7104	9541	941	668	22	099, 887. 478
3	623	6976	1. 419792	940	707	20	101, 740. 075
4	580	6848	1. 420043	939	746	19	103, 592. 677
05	538	6720	0295	938	784	18	105, 445. 284
6	495	6593	0546	938	823	16	107, 297. 897
7	452	6465	0797	937	861	15	109, 150. 515
8	410	6337	1048	936	900	13	111, 003. 139
9	367	6209	1299	935	938	12	112, 855. 768
10	8. 50895325	8. 51036082	1. 421550	2. 38934	6. 23977	7. 8310	5, 114, 708. 403
11	282	5954	1801	933	6. 24016	09	116, 561. 043
12	239	5826	2053	932	054	08	118, 413. 689
13	197	5698	2304	931	093	06	120, 266. 340
14	154	5571	2555	930	131	05	122, 118. 997
15	112	5443	2806	929	170	03	123, 971. 659
16	069	5315	3058	928	209	02	125, 824. 326
17	8. 50895027	5188	3309	927	247	7. 8300	127, 676. 999
18	8. 50894984	5060	3559	926	286	7. 8299	129, 529. 677
19	941	4932	3811	925	325	98	131, 382. 361
20	8. 50894899	8. 51034804	1. 424062	2. 38924	6. 24364	7. 8296	5, 133, 235. 050
21	856	4677	4313	923	402	95	135, 087. 745
22	814	4549	4565	922	441	93	136, 940. 445
23	771	4421	4816	920	480	92	138, 793. 150
24	729	4294	5067	919	518	90	140, 645. 861
25	686	4166	5318	918	557	89	142, 498. 578
26	643	4038	5570	917	596	87	144, 351. 300
27	601	3911	5821	916	635	86	146, 204. 027
28	558	3783	6072	915	674	84	148, 056. 760
29	516	3655	6324	913	712	83	149, 909. 498
30	8. 50894473	8. 51033528	1. 426575	2. 38912	6. 24751	7. 8282	5, 151, 762. 241
31	431	3400	6826	911	790	80	153, 614. 990
32	388	3272	7078	910	829	79	155, 467. 745
33	346	3145	7329	908	868	77	157, 320. 505
34	303	3017	7580	907	907	76	159, 173. 271
35	260	2889	7831	906	946	74	161, 026. 042
36	218	2762	8083	904	6. 24984	73	162, 878. 818
37	175	2634	8334	903	6. 25023	71	164, 731. 600
38	133	2506	8585	902	062	70	166, 584. 387
39	090	2379	8837	900	101	68	168, 437. 180
40	8. 50894048	8. 51032251	1. 429088	2. 38899	6 25140	7. 8267	5, 170, 289. 978
41	8. 50894005	2123	9340	898	179	65	172, 142. 781
42	8. 50893963	1996	9592	896	218	64	173, 995. 590
43	920	1868	1. 429843	895	257	62	175, 848. 405
44	878	1741	1. 430094	893	296	61	177, 701. 225
45	835	1613	0345	892	335	59	179, 554. 050
46	793	1485	0597	890	374	58	181, 406. 881
47	750	1358	0848	889	413	56	183, 259. 717
48	707	1230	1100	887	452	55	185, 112. 559
49	665	1103	1352	886	491	53	186, 965. 406
50	8. 50893622	8. 51030975	1. 431603	2. 38884	6. 25530	7. 8252	5, 188, 818. 258
51	580	0847	1854	883	569	50	190, 671. 116
52	537	0720	2105	881	608	49	192, 523. 980
53	495	0592	2357	880	648	47	194, 376. 849
54	452	0465	2609	878	687	46	196, 229. 723
55	410	0337	2860	876	726	44	198, 082. 603
56	367	0210	3112	875	765	43	199, 935. 488
57	325	8. 51030082	3363	873	804	41	201, 788. 379
58	282	8. 51029954	3615	872	843	40	203, 641. 275
59	240	9827	3867	870	882	38	205, 494. 176
47 00	8. 50893197	8. 51029699	1. 434118	2. 38868	6. 25922	7. 8237	5, 207, 347. 083

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 47°–48°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
47 00	8. 50893197	8. 51029699	1. 434118	2. 38868	6. 25922	7. 8237	5, 207, 347. 083
1	155	9572	4369	867	6. 25961	35	209, 199. 996
2	112	9444	4621	865	6. 26000	34	211, 052. 914
3	070	9317	4873	863	039	32	212, 905. 837
4	8. 50893027	9189	5124	861	078	30	214, 758. 766
05	8. 50892985	9062	5376	860	118	29	216, 611. 700
6	942	8934	5628	858	157	27	218, 464. 640
7	900	8807	5879	856	196	26	220, 317. 585
8	857	8679	6131	854	235	24	222, 170. 535
9	815	8552	6383	853	275	23	224, 023. 491
10	8. 50892772	8. 51028424	1. 436635	2. 38851	6. 26314	7. 8221	5, 225, 876. 452
11	730	8297	6886	849	353	20	227, 729. 419
12	687	8169	7137	847	393	18	229, 582. 391
13	645	8042	7390	845	432	16	231, 435. 369
14	602	7914	7641	843	471	15	233, 288. 352
15	560	7787	7892	841	511	13	235, 141. 341
16	517	7659	8145	840	550	12	236, 994. 335
17	475	7532	8396	838	590	10	238, 847. 334
18	432	7404	8648	836	629	09	240, 700. 339
19	390	7277	8900	834	668	07	242, 553. 349
20	8. 50892347	8. 51027150	1. 439152	2. 38832	6. 26708	7. 8206	5, 244, 406. 365
21	305	7022	9403	830	747	04	246, 259. 386
22	262	6895	9655	828	787	02	248, 112. 413
23	220	6767	1. 439907	826	826	7. 8201	249, 965. 445
24	177	6640	1. 440159	824	866	7. 8199	251, 818. 483
25	135	6512	0411	822	905	98	253, 671. 526
26	092	6385	0663	820	944	96	255, 524. 574
27	050	6258	0915	818	6. 26984	94	257, 377. 628
28	8. 50892007	6130	1166	815	6. 27024	93	259, 230. 687
29	8. 50891965	6003	1419	813	063	91	261, 083. 752
30	8. 50891923	8. 51025876	1. 441671	2. 38811	6. 27103	7. 8190	5, 262, 936. 822
31	880	5748	1922	809	142	88	264, 789. 898
32	838	5621	2175	807	182	86	266, 642. 979
33	795	5493	2426	805	221	85	268, 496. 065
34	753	5366	2678	803	261	83	270, 349. 157
35	710	5239	2930	800	300	82	272, 202. 254
36	668	5111	3183	798	340	80	274, 055. 357
37	625	4984	3434	796	380	78	275, 908. 465
38	583	4857	3686	794	419	77	277, 761. 579
39	541	4729	3939	791	459	75	279, 614. 698
40	8. 50891498	8. 51024602	1. 444190	2. 38789	6. 27499	7. 8174	5, 281, 467. 823
41	456	4475	4442	787	538	72	283, 320. 953
42	413	4348	4695	785	578	70	285, 174. 088
43	371	4220	4947	782	618	69	287, 027. 229
44	328	4093	5199	780	658	67	288, 880. 375
45	286	3966	5451	778	697	65	290, 733. 526
46	244	3838	5703	775	737	64	292, 586. 683
47	201	3711	5955	773	777	62	294, 439. 846
48	159	3584	6207	770	816	60	296, 293. 014
49	116	3457	6460	768	856	59	298, 146. 187
50	8. 50891074	8. 51023329	1. 446712	2. 38766	6. 27896	7. 8157	5, 299, 999. 366
51	8. 50891031	3202	6964	763	936	56	301, 852. 550
52	8. 50890989	3075	7217	761	6. 27976	54	303, 705. 740
53	947	2948	7469	758	6. 28015	52	305, 558. 935
54	904	2820	7720	756	055	51	307, 412. 136
55	862	2693	7972	753	095	49	309, 265. 342
56	819	2566	8225	751	135	47	311, 118. 543
57	777	2439	8477	748	175	46	312, 971. 770
58	735	2312	8729	746	215	44	314, 824. 992
59	692	2185	8982	743	255	42	316, 678. 219
48 00	8. 50890650	8. 51022057	1. 449235	2. 38741	6. 28294	7. 8141	5, 318, 531. 452

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 48°–49°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
48 00	8. 50890650	8. 51022057	1. 449235	2. 38741	6. 28294	7. 8141	5, 318, 531. 452
1	607	1930	9487	738	334	39	320, 384. 691
2	565	1803	9740	736	374	37	322, 237. 935
3	523	1676	1. 449992	733	414	36	324, 091. 184
4	480	1549	1. 450244	730	454	34	325, 944. 439
05	438	1422	0497	728	494	32	327, 797. 699
6	396	1294	0749	725	534	31	329, 650. 965
7	353	1167	1001	722	574	29	331, 504. 236
8	311	1040	1254	720	614	27	333, 357. 512
9	268	0913	1507	717	654	26	335, 210. 794
10	8. 50890226	8. 51020786	1. 451759	2. 38714	6. 28694	7. 8124	5, 337, 064. 081
11	184	0659	2011	712	734	22	338, 917. 374
12	141	0532	2264	709	774	20	340, 770. 672
13	099	0405	2517	706	814	19	342, 623. 976
14	057	0278	2769	703	855	17	344, 477. 285
15	8. 50890014	0151	3022	700	895	15	346, 330. 600
16	8. 50889972	8. 51020024	3275	698	935	14	348, 183. 920
17	930	8. 51019897	3527	695	6. 28975	12	350, 037. 245
18	887	9770	3779	692	6. 29015	10	351, 890. 575
19	845	9643	4032	689	055	08	353, 743. 911
20	8. 50889803	8. 51019516	1. 454285	2. 38686	6. 29095	7. 8107	5, 355, 597. 253
21	760	9389	4537	684	135	05	357, 450. 600
22	718	9262	4791	681	176	03	359, 303. 952
23	676	9135	5043	678	216	02	361, 157. 310
24	633	9008	5295	675	256	7. 8100	363, 010. 673
25	591	8881	1. 455549	672	296	7. 8098	364, 864. 042
26	549	8754	5802	669	337	96	366, 717. 416
27	506	8627	6054	666	377	95	368, 570. 796
28	464	8500	6307	663	417	93	370, 424. 181
29	422	8373	6560	660	457	91	372, 277. 571
30	8. 50889379	8. 51018246	1. 456813	2. 38657	6. 29498	7. 8090	5, 374, 130. 966
31	337	8119	7065	654	538	88	375, 984. 367
32	295	7992	7319	651	578	86	377, 837. 774
33	252	7865	7571	648	618	84	379, 691. 186
34	210	7738	7824	645	659	83	381, 544. 603
35	168	7611	8078	642	699	81	383, 398. 026
36	126	7485	8330	638	740	79	385, 251. 454
37	083	7358	8583	635	780	77	387, 104. 888
38	8. 50889041	7231	8837	632	820	76	388, 958. 327
39	8. 50888999	7104	9089	629	861	74	390, 811. 772
40	8. 50888956	8. 51016977	1. 459342	2. 38626	6. 29901	7. 8072	5, 392, 665. 222
41	914	6850	9596	623	942	70	394, 518. 677
42	872	6724	1. 459849	620	6. 29982	68	396, 372. 138
43	830	6597	1. 460101	616	6. 30022	67	398, 225. 604
44	787	6470	0354	613	063	65	400, 079. 075
45	745	6343	0608	610	103	63	401, 932. 552
46	703	6216	0861	607	144	61	403, 786. 034
47	661	6090	1114	604	184	60	405, 639. 522
48	618	5963	1368	600	225	58	407, 493. 015
49	576	5836	1621	597	266	56	409, 346. 514
50	8. 50888534	8. 51015709	1. 461873	2. 38594	6. 30306	7. 8054	5, 411, 200. 018
51	492	5583	2128	590	347	52	413, 053. 527
52	449	5456	2380	587	387	51	414, 907. 042
53	407	5329	2633	584	428	49	416, 760. 562
54	365	5202	2887	580	468	47	418, 614. 088
55	323	5076	3141	577	509	45	420, 467. 619
56	280	4949	3393	573	550	44	422, 321. 155
57	238	4822	3648	570	590	42	424, 174. 697
58	196	4696	3901	567	631	40	426, 028. 244
59	154	4569	4154	563	672	38	427, 881. 797
49 00	8. 50888112	8. 51014442	1. 464407	2. 38560	6. 30712	7. 8036	5, 429, 735. 355

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 49°–50°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
49 00	8.50888112	8.51014442	1.464407	2.38560	6.30712	7.8036	5,429,735.355
1	069	4316	4661	556	753	34	431,588.919
2	8.50888027	4189	4914	553	794	33	433,442.488
3	8.50887985	4063	5167	549	834	31	435,296.062
4	943	3936	5422	546	875	29	437,149.642
05	901	3809	5675	542	916	27	439,003.227
6	858	3683	5928	539	956	26	440,856.817
7	816	3556	6183	535	6.30997	24	442,710.413
8	774	3430	6436	531	6.31038	22	444,564.014
9	732	3303	6689	528	079	20	446,417.621
10	8.50887690	8.51013177	1.466944	2.38524	6.31120	7.8018	5,448,271.233
11	647	3050	7197	521	160	16	450,124.850
12	605	2924	7450	517	201	14	451,978.473
13	563	2797	7705	513	242	13	453,832.101
14	521	2671	7958	510	283	11	455,685.735
15	479	2544	8211	506	324	09	457,539.374
16	437	2418	8465	502	365	07	459,393.019
17	394	2291	8720	498	406	05	461,246.669
18	352	2165	8973	495	446	03	463,100.324
19	310	2038	9227	491	487	02	464,953.985
20	8.50887268	8.51011912	1.469481	2.38487	6.31528	7.8000	5,466,807.651
21	226	1785	9735	484	569	7.7998	468,661.322
22	184	1659	1.469988	480	610	96	470,514.999
23	142	1533	1.470243	476	651	94	472,368.681
24	099	1406	0497	472	692	92	474,222.369
25	057	1280	0750	468	733	90	476,076.062
26	8.50887015	1153	1005	464	774	88	477,929.760
27	8.50886973	1027	1259	460	815	87	479,783.464
28	931	0901	1513	457	856	85	481,637.173
29	889	0774	1767	453	897	83	483,490.888
30	8.50886847	8.51010648	1.472021	2.38449	6.31938	7.7981	5,485,344.608
31	805	0522	2275	445	6.31979	79	487,198.333
32	763	0395	2530	441	6.32020	77	489,052.064
33	720	0269	2784	437	062	75	490,905.800
34	678	0143	3037	433	103	74	492,759.542
35	636	8.51010017	3291	429	144	72	494,613.289
36	594	8.51009890	3546	425	185	70	496,467.041
37	552	9764	3800	421	226	68	498,320.799
38	510	9638	4054	417	267	66	500,174.562
39	468	9512	4309	413	308	64	502,028.331
40	8.50886426	8.51009385	1.474563	2.38409	6.32350	7.7962	5,503,882.105
41	384	9259	4817	405	391	60	505,735.884
42	342	9133	5073	401	432	58	507,589.669
43	300	9007	5327	397	473	56	509,443.459
44	258	8881	5581	393	515	54	511,297.254
45	216	8755	5836	388	556	53	513,151.055
46	174	8629	6090	384	597	51	515,004.861
47	132	8502	6344	380	638	49	516,858.673
48	089	8376	6599	376	680	47	518,712.490
49	047	8250	6854	372	721	45	520,566.312
50	8.50886005	8.51008124	1.477108	2.38368	6.32762	7.7943	5,522,420.140
51	8.50885963	7998	7363	363	804	41	524,273.973
52	921	7872	7618	359	845	39	526,127.812
53	879	7746	7872	355	886	37	527,981.656
54	837	7620	8127	350	928	35	529,835.505
55	795	7494	8382	346	6.32969	33	531,689.359
56	753	7368	8636	342	6.33011	31	533,543.219
57	711	7242	8891	338	052	29	535,397.085
58	669	7116	9146	333	094	28	537,250.956
59	627	6990	9401	329	135	26	539,104.832
50 00	8.50885585	8.51006864	1.479655	2.38325	6.33177	7.7924	5,540,958.713

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 50°-51°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
50 00	8. 50885585	8. 51006864	1. 479655	2. 38325	6. 33177	7 7924	5, 540, 958. 713
1	543	6738	1. 479911	320	218	22	542, 812. 600
2	501	6612	1. 480166	316	260	20	544, 666. 492
3	459	6486	0420	311	301	18	546, 520. 390
4	417	6360	0676	307	342	16	548, 374. 293
05	376	6234	0931	302	384	14	550, 228. 202
6	334	6108	1185	298	426	12	552, 082. 116
7	292	5983	1441	294	467	10	553, 936. 035
8	250	5857	1696	289	509	08	555, 789. 959
9	208	5731	1951	285	550	06	557, 643. 889
10	8. 50885166	8. 51005605	1. 482206	2. 38280	6. 33592	7. 7904	5, 559, 497. 824
11	124	5479	2461	276	634	02	561, 351. 765
12	082	5353	2716	271	675	7. 7900	563, 205. 711
13	8. 50885040	5228	2972	266	717	7. 7898	565, 059. 662
14	8. 50884998	5102	3227	262	758	96	566, 913. 619
15	956	4976	3482	257	800	94	568, 767. 581
16	914	4850	3738	253	842	92	570, 621. 549
17	872	4725	3993	248	884	90	572, 475. 522
18	830	4599	4248	243	925	88	574, 329. 500
19	788	4473	4503	239	6. 33967	86	576, 183. 484
20	8. 50884747	8. 51004347	1. 484759	2. 38234	6. 34009	7. 7884	5, 578, 037. 473
21	705	4222	5014	229	050	82	579, 891. 467
22	663	4096	5270	225	092	80	581, 745. 467
23	621	3970	5526	220	134	78	583, 599. 472
24	579	3845	5781	215	176	76	585, 453. 482
25	537	3719	6036	210	218	74	587, 307. 498
26	495	3594	6292	206	260	72	589, 161. 519
27	453	3468	6548	201	301	70	591, 015. 546
28	412	3342	6803	196	343	68	592, 869. 578
29	370	3217	7059	192	385	66	594, 723. 615
30	8. 50884328	8. 51003091	1. 487315	2. 38187	6. 34427	7. 7864	5, 596, 577. 658
31	286	2966	7570	182	469	62	598, 431. 706
32	244	2840	7826	177	511	60	600, 285. 759
33	202	2715	8082	172	553	58	602, 139. 817
34	160	2589	8337	167	595	56	603, 993. 881
35	119	2464	8594	162	636	54	605, 847. 951
36	077	2338	8849	157	678	52	607, 702. 026
37	8. 50884035	2213	9105	152	720	50	609, 556. 106
38	8. 50883993	2087	9362	148	762	48	611, 410. 191
39	951	1962	9617	142	804	46	613, 264. 282
40	8. 50883910	8. 51001836	1. 489873	2. 38138	6. 34846	7. 7844	5, 615, 118. 378
41	868	1711	1. 490130	133	888	42	616, 972. 480
42	826	1586	0385	128	931	40	618, 826. 587
43	784	1460	0641	122	6. 34973	38	620, 680. 699
44	742	1335	0898	118	6. 35015	35	622, 534. 816
45	701	1209	1154	112	057	33	624, 388. 939
46	659	1084	1410	107	099	31	626, 243. 067
47	617	0959	1667	102	141	29	628, 097. 201
48	575	0834	1922	097	183	27	629, 951. 340
49	533	0708	2178	092	225	25	631, 805. 484
50	8. 50883492	8. 51000583	1. 492435	2. 38087	6. 35268	7. 7823	5, 633, 659. 634
51	450	0458	2691	082	310	21	635, 513. 789
52	408	0332	2947	077	352	19	637, 367. 950
53	366	0207	3204	072	394	17	639, 222. 116
54	325	8. 51000082	3461	066	436	15	641, 076. 287
55	283	8. 50999957	3717	061	478	13	642, 930. 463
56	241	9832	3974	056	521	10	644, 784. 645
57	200	9706	4230	051	563	08	646, 638. 832
58	158	9581	4486	046	605	06	648, 493. 024
59	116	9456	4744	040	648	04	650, 347. 222
51 00	8. 50883074	8. 50999331	1. 495000	2. 38035	6. 35690	7. 7802	5, 652, 201. 425

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 51°–52°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
51 00	8. 50883074	8. 50999331	1. 495000	2. 38035	6. 35690	7. 7802	5, 652, 201. 425
1	8. 50883033	9206	5256	030	732	7. 7800	654, 055. 634
2	8. 50882991	9081	5514	024	774	7. 7798	655, 909. 848
3	949	8956	5770	019	817	96	657, 764. 067
4	908	8831	6026	014	859	94	659, 618. 291
05	866	8706	6284	008	902	92	661, 472. 521
6	824	8581	6540	2. 38003	944	90	663, 326. 756
7	783	8456	6797	2. 37998	6. 35986	87	665, 180. 997
8	741	8331	7054	992	6. 36029	85	667, 035. 243
9	699	8206	7311	987	071	83	668, 889. 494
10	8. 50882658	8. 50998081	1. 497568	2. 37981	6. 36114	7. 7781	5, 670, 743. 751
11	616	7956	7825	976	156	79	672, 598. 013
12	574	7831	8082	970	199	77	674, 452. 280
13	533	7706	8339	965	241	75	676, 306. 552
14	491	7581	8596	959	284	73	678, 160. 830
15	449	7456	8853	954	326	70	680, 015. 113
16	408	7331	9110	948	369	68	681, 869. 402
17	366	7206	9368	943	411	66	683, 723. 696
18	325	7081	9625	937	454	64	685, 577. 995
19	283	6957	1. 499881	932	496	62	687, 432. 299
20	8. 50882241	8. 50996832	1. 500139	2. 37926	6. 36539	7. 7760	5, 689, 286. 609
21	200	6707	0396	920	582	58	691, 140. 924
22	158	6582	0653	915	624	55	692, 995. 245
23	117	6457	0911	909	667	53	694, 849. 571
24	075	6333	1169	904	710	51	696, 703. 902
25	8. 50882033	6208	1426	898	752	49	698, 558. 238
26	8. 50881992	6083	1684	892	795	47	700, 412. 580
27	950	5959	1941	886	838	45	702, 266. 927
28	909	5834	2198	881	880	42	704, 121. 280
29	867	5709	2457	875	923	40	705, 975. 638
30	8. 50881826	8. 50995585	1. 502714	2. 37869	6. 36966	7. 7738	5, 707, 830. 001
31	784	5460	2971	864	6. 37008	36	709, 684. 369
32	743	5335	3230	858	051	34	711, 538. 743
33	701	5211	3487	852	094	32	713, 393. 122
34	659	5086	3744	846	137	29	715, 247. 506
35	618	4962	4003	840	180	27	717, 101. 896
36	576	4837	4260	834	222	25	718, 956. 291
37	535	4713	4518	829	265	23	720, 810. 691
38	493	4588	4776	823	308	21	722, 665. 097
39	452	4464	5034	817	351	18	724, 519. 508
40	8. 50881410	8. 50994339	1. 505292	2. 37811	6. 37394	7. 7716	5, 726, 373. 924
41	369	4215	5550	805	437	14	728, 228. 346
42	327	4090	5808	799	480	12	730, 082. 773
43	286	3966	6066	793	523	10	731, 937. 205
44	244	3841	6325	787	566	08	733, 791. 643
45	203	3717	6582	781	608	05	735, 646. 086
46	162	3592	6840	775	652	03	737, 500. 534
47	120	3468	7099	769	694	7. 7701	739, 354. 987
48	079	3344	7357	763	738	7. 7699	741, 209. 446
49	8. 50881037	3219	7615	757	780	96	743, 063. 910
50	8. 50880996	8. 50993095	1. 507874	2. 37751	6. 37824	7. 7694	5, 744, 918. 380
51	954	2971	8132	745	867	92	746, 772. 855
52	913	2847	8391	739	910	90	748, 627. 335
53	872	2722	8649	733	953	88	750, 481. 820
54	830	2598	8907	727	6. 37996	85	752, 336. 311
55	789	2474	9166	721	6. 38039	83	754, 190. 807
56	747	2350	9425	715	082	81	756, 045. 308
57	706	2225	9683	708	125	79	757, 899. 814
58	664	2101	1. 509942	702	168	76	759, 754. 326
59	623	1977	1. 510201	696	212	74	761, 608. 843
52 00	8. 50880582	8. 50991853	1. 510459	2. 37690	6. 38255	7. 7672	5, 763, 463. 366

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 52°-53°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
52 00	8. 50880582	8. 50991953	1. 510459	2. 37690	6. 38255	7. 7672	5, 763, 463. 366
1	540	1729	0719	684	298	70	765, 317. 894
2	499	1605	0977	677	341	67	767, 172. 427
3	458	1481	1236	671	384	65	769, 026. 965
4	416	1357	1495	665	428	63	770, 881. 509
05	375	1233	1754	658	471	61	772, 736. 058
6	334	1109	2012	652	514	58	774, 590. 612
7	292	0985	2272	646	558	56	776, 445. 172
8	251	0861	2531	640	601	54	778, 299. 737
9	210	0737	2789	633	644	52	780, 154. 307
10	8. 50880168	8. 50990613	1. 513049	2. 37627	6. 38687	7. 7649	5, 782, 008. 882
11	127	0489	3308	620	731	47	783, 863. 463
12	086	0365	3567	614	774	45	785, 718. 049
13	044	0241	3827	608	818	42	787, 572. 640
14	8. 50880003	8. 50990117	4086	601	861	40	789, 427. 237
15	8. 50879962	8. 50989993	4344	595	904	38	791, 281. 839
16	920	9869	4604	588	948	36	793, 136. 446
17	879	9745	4863	582	6. 38991	33	794, 991. 058
18	838	9622	5124	575	6. 39035	31	796, 845. 676
19	797	9498	5383	569	078	29	798, 700. 299
20	8. 50879755	8. 50989374	1. 515642	2. 37562	6. 39122	7. 7626	5, 800, 554. 927
21	714	9250	5902	556	165	24	802, 409. 561
22	673	9127	6161	549	209	22	804. 264. 200
23	632	9003	6421	543	252	20	806, 118. 844
24	590	8879	6681	536	296	17	807, 973. 494
25	549	8756	6940	530	339	15	809, 828. 149
26	508	8632	7200	523	383	13	811, 682. 809
27	467	8508	7460	516	426	10	813, 537. 474
28	426	8385	7719	510	470	08	815, 392. 144
29	384	8261	7979	503	514	06	817, 246. 820
30	8. 50879343	8. 50988137	1. 518240	2. 37496	6. 39557	7. 7603	5, 819, 101. 501
31	302	8014	8499	490	601	7. 7601	820, 956. 188
32	261	7890	8759	483	645	7. 7599	822, 810. 880
33	220	7767	9019	476	688	96	824, 665. 577
34	178	7643	9279	469	732	94	826. 520. 279
35	137	7520	9539	463	776	92	828, 374. 986
36	096	7396	1. 519800	456	820	89	830, 229. 699
37	055	7273	1. 520060	449	863	87	832, 084. 417
38	8. 50879014	7149	0320	442	907	85	833, 939. 140
39	8. 50878973	7026	0580	435	951	82	835, 793. 869
40	8. 50878932	8. 50986903	1. 520840	2. 37429	6. 39995	7. 7580	5, 837, 648. 603
41	890	6779	1101	422	6. 40038	78	839, 503. 342
42	849	6656	1361	415	082	75	841, 358. 086
43	808	6533	1622	408	126	73	843, 212. 836
44	767	6409	1883	401	170	70	845, 067. 591
45	726	6286	2143	394	214	68	846, 922. 351
46	685	6163	2403	387	258	66	848, 777. 117
47	644	6039	2664	380	302	63	850. 631. 888
48	603	5916	2925	373	346	61	852, 486. 664
49	562	5793	3185	366	389	59	854, 341. 445
50	8. 50878521	8. 50985670	1. 523446	2. 37359	6. 40433	7. 7556	5, 856, 196. 232
51	480	5547	3707	352	477	54	858, 051. 024
52	439	5423	3968	345	521	52	859, 905. 821
53	398	5300	4229	338	565	49	861, 760. 623
54	356	5177	4489	331	609	47	863, 615. 430
55	315	5054	4751	324	653	44	865, 470. 243
56	274	4931	5012	317	698	42	867, 325. 061
57	233	4808	5272	310	742	40	869, 179. 884
58	192	4685	5534	303	786	37	871, 034. 713
59	151	4562	5795	296	830	35	872, 889. 547
53 00	8. 50878110	8. 50984439	1. 526056	2. 37289	6. 40874	7. 7532	5, 874, 744. 386

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 53°-54°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
53 00	8. 50878110	8. 50984439	1. 526056	2. 37289	6. 40874	7. 7532	5, 674, 744. 386
1	069	4316	6317	281	918	30	876, 599. 231
2	8. 50878028	4193	6578	274	6. 40962	28	878, 454. 080
3	8. 50877987	4070	6839	267	6. 41006	25	880, 308. 935
4	946	3947	7101	260	050	23	882, 163. 795
05	905	3824	7362	242	095	20	884, 018. 661
6	865	3701	7625	255	139	18	885, 873. 531
7	824	3579	7886	238	183	16	887, 728. 407
8	783	3456	8147	231	227	13	889, 583. 288
9	742	3333	8409	223	272	11	891, 438. 175
10	8. 50877701	8. 50983210	1. 528670	2. 37216	6. 41316	7. 7508	5, 893, 293. 066
11	660	3087	8932	209	360	06	895, 147. 963
12	619	2965	9194	202	404	03	897, 002. 865
13	578	2842	9455	194	449	7. 7501	898, 857. 772
14	537	2719	9717	187	493	7. 7499	900, 712. 685
15	496	2596	1. 529979	179	537	96	902, 567. 603
16	455	2474	1. 530241	172	582	94	904, 422. 526
17	414	2351	0503	164	626	91	906, 277. 454
18	374	2229	0765	157	671	89	908, 132. 388
19	333	2106	1027	150	715	86	909, 987. 326
20	8. 50877292	8. 50981983	1. 531289	2. 37142	6. 41759	7. 7484	5, 911, 842. 270
21	251	1861	1551	135	804	81	913, 697. 220
22	210	1738	1813	127	848	79	915, 552. 174
23	169	1616	2076	120	893	76	917, 407. 134
24	128	1493	2338	112	937	74	919, 262. 099
25	088	1371	2601	104	6. 41982	72	921, 117. 069
26	047	1248	2863	097	6. 42026	69	922, 972. 044
27	8. 50877006	1126	3125	089	071	67	924, 827. 025
28	8. 50876965	1003	3388	082	115	64	926, 682. 011
29	924	0881	3650	074	160	62	928, 537. 002
30	8. 50876884	8. 50980759	1. 533912	2. 37066	6. 42205	7. 7459	5, 930, 391. 998
31	843	0636	4175	059	249	57	932, 247. 000
32	802	0514	4438	051	294	54	934, 102. 007
33	761	0392	4700	044	338	52	935, 957. 019
34	721	0269	4963	036	383	49	937, 812. 036
35	680	0147	5226	028	428	47	939, 667. 058
36	639	8. 50980025	5489	020	473	44	941, 522. 086
37	598	8. 50979903	5752	013	517	42	943, 377. 119
38	558	9781	6014	2. 37005	562	39	945, 232. 157
39	517	9658	6278	2. 36997	607	37	947, 087. 200
40	8. 50876476	8. 50979536	1. 536541	2. 36989	6. 42652	7. 7434	5, 948, 942. 249
41	435	9414	6803	981	696	32	950, 797. 303
42	395	9292	7067	974	741	29	952, 652. 362
43	354	9170	7330	966	786	27	954, 507. 426
44	313	9048	7594	958	831	24	956, 362. 495
45	273	8926	7857	950	876	22	958, 217. 570
46	232	8804	8119	642	920	19	960, 072. 650
47	191	8682	8384	934	6. 42965	17	961, 927. 735
48	151	8560	8647	925	6. 43010	14	963, 782. 825
49	110	8438	8910	918	055	12	965, 637. 920
50	8. 50876069	8. 50978316	1. 539174	2. 36910	6. 43100	7. 7409	5, 967, 493. 021
51	8. 50876029	8194	9437	902	145	07	969, 348. 127
52	8. 50875988	8072	9701	894	190	04	971, 203. 238
53	947	7950	1. 539964	886	235	7. 7402	973, 058. 354
54	907	7828	1. 540228	878	280	7. 7399	974, 913. 476
55	866	7707	0492	870	325	96	976, 768. 602
56	826	7585	0756	862	370	94	978, 623. 734
57	785	7463	1019	854	415	91	980, 478. 871
58	744	7341	1284	846	460	89	982, 334. 014
59	704	7220	1547	838	505	86	984, 189. 161
54 00	8. 50875663	8. 50977098	1. 541812	2. 36830	6. 43550	7. 7384	5, 986, 044. 314

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 54°–55°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
54 00	8. 50875663	8. 50977098	1. 541812	2. 36830	6. 43550	7. 7384	5, 986, 044. 314
1	623	6976	2076	822	595	81	987, 899. 472
2	582	6854	2339	814	640	78	989, 754. 635
3	542	6733	2604	805	686	76	991, 609. 803
4	501	6611	2868	797	731	73	993, 464. 977
05	461	6490	3132	789	776	71	995, 320. 155
6	420	6368	3397	781	821	68	997, 175. 339
7	380	6247	3661	773	866	66	999, 030. 528
8	339	6125	3925	764	912	63	6, 000, 885. 722
9	299	6004	4190	756	6. 43957	60	002, 740. 922
10	8. 50875258	8. 50975882	1. 544454	2. 36748	6. 44002	7. 7358	6, 004, 596. 127
11	218	5761	4719	740	047	55	006, 451. 337
12	177	5639	4984	731	093	53	008, 306. 552
13	137	5518	5248	723	138	50	010, 161. 772
14	096	5396	5513	714	183	48	012, 016. 997
15	056	5275	5778	706	229	45	013, 872. 228
16	8. 50875015	5154	6043	698	274	42	015, 727. 464
17	8. 50874975	5032	6308	689	319	40	017, 582. 705
18	934	4911	6572	681	365	37	019, 437. 951
19	894	4790	6838	672	410	34	021, 293. 202
20	8. 50874854	8. 50974669	1. 547102	2. 36664	6. 44456	7. 7332	6, 023, 148. 458
21	813	4547	7368	656	501	29	025, 003. 720
22	773	4426	7633	647	547	27	026, 858. 987
23	732	4305	7898	639	592	24	028, 714. 259
24	692	4184	8164	630	638	21	030, 569. 536
25	652	4063	8429	622	683	19	032, 424. 818
26	611	3942	8694	613	728	16	034, 280. 106
27	571	3821	8960	604	774	14	036, 135. 399
28	531	3700	9225	596	820	11	037, 990. 697
29	490	3578	9491	587	865	08	039, 846. 000
30	8. 50874450	8. 50973457	1. 549756	2. 36579	6. 44911	7. 7306	6, 041, 701. 308
31	410	3337	1. 550021	570	6. 44956	03	043, 556. 621
32	369	3216	0287	562	6. 45002	7. 7300	045, 411. 940
33	329	3095	0553	553	048	7. 7298	047, 267. 264
34	289	2974	0819	544	094	95	049, 122. 593
35	248	2853	1085	535	139	92	050, 977. 927
36	208	2732	1350	527	185	90	052, 833. 266
37	168	2611	1617	518	231	87	054, 688. 610
38	128	2490	1883	509	276	84	056, 543. 959
39	087	2370	2148	500	322	82	058, 399. 314
40	8. 50874047	8. 50972249	1. 552415	2. 36492	6. 45368	7. 7279	6, 060, 254. 674
41	8. 50874007	2128	2681	483	414	76	062, 110. 039
42	8. 50873967	2007	2947	474	460	74	063, 965. 409
43	926	1887	3213	465	505	71	065, 820. 785
44	886	1766	3479	456	551	68	067, 676. 165
45	846	1645	3746	448	597	66	069, 531. 551
46	806	1525	4012	439	643	63	071, 386. 942
47	765	1404	4280	430	689	60	073, 242. 338
48	725	1284	4546	421	735	58	075, 097. 739
49	685	1163	4812	412	781	55	076, 953. 145
50	8. 50873645	8. 50971043	1. 555079	2. 36403	6. 45827	7. 7252	6, 078, 808. 556
51	605	0922	5346	394	873	50	080, 663. 973
52	565	0802	5613	385	919	47	082, 519. 395
53	524	0681	5879	376	6. 45965	44	084, 374. 822
54	484	0561	6146	367	6. 46011	42	086, 230. 254
55	444	0440	6414	358	057	39	088, 085. 691
56	404	0320	6680	349	103	36	089, 941. 133
57	364	0200	6948	340	149	33	091, 796. 581
58	324	8. 50970079	7215	331	195	31	093, 652. 033
59	284	8. 50969959	7481	322	241	28	095, 507. 491
55 00	8. 50873244	8. 50969839	1. 557749	2. 36313	6. 46287	7. 7225	6, 097, 362. 954

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 55°–56°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
55 00	8.50873244	8.50969839	1.557749	2.36313	6.46287	7.7225	6,097,362.954
1	204	9719	8016	304	333	22	099,218.422
2	163	9598	8284	294	380	20	101,073.895
3	123	9478	8551	285	426	17	102,929.373
4	083	9358	8818	276	472	14	104,784.856
05	043	9238	9086	267	518	12	106,640.345
6	8.50873003	9118	9354	258	564	09	108,495.839
7	8.50872963	8998	9622	248	611	06	110,351.337
8	923	8878	1.559889	239	657	03	112,206.841
9	883	8758	1.560156	230	703	7.7200	114,062.350
10	8.50872843	8.50968638	1.560425	2.36221	6.46750	7.7198	6,115,917.864
11	803	8518	0692	211	796	95	117,773.384
12	763	8398	0961	202	842	92	119,628.908
13	723	8278	1229	193	889	90	121,484.438
14	683	8158	1496	183	935	87	123,339.972
15	643	8038	1765	174	6.46981	84	125,195.512
16	603	7918	2033	165	6.47028	81	127,051.057
17	563	7798	2301	155	074	78	128,906.607
18	524	7678	2569	146	121	76	130,762.162
19	484	7559	2837	136	167	73	132,617.723
20	8.50872444	8.50967439	1.563106	2.36127	6.47214	7.7170	6,134,473.288
21	404	7319	3374	118	260	67	136,328.858
22	364	7199	3642	108	307	65	138,184.434
23	324	7080	3912	098	353	62	140,040.015
24	284	6960	4180	089	400	59	141,895.601
25	244	6840	4449	080	446	56	143,751.192
26	204	6721	4718	070	493	53	145,606.788
27	164	6601	4987	060	540	51	147,462.389
28	125	6482	5255	051	586	48	149,317.995
29	085	6362	5524	041	633	45	151,173.606
30	8.50872045	8.50966243	1.565794	2.36032	6.47680	7.7142	6,153,029.223
31	8.50872005	6123	6062	022	726	39	154,884.845
32	8.50871965	6004	6332	012	773	37	156,740.471
33	926	5884	6601	2.36003	820	34	158,596.103
34	886	5765	6870	2.35993	866	31	160,451.740
35	846	5646	7140	983	6.47913	28	162,307.382
36	806	5526	7409	974	6.47960	25	164,163.029
37	766	5407	7679	964	6.48007	22	166,018.681
38	727	5288	7948	954	054	20	167,874.339
39	687	5169	8217	944	100	17	169,730.001
40	8.50871647	8.50965049	1.568487	2.35935	6.48147	7.7114	6,171,585.668
41	607	4930	8756	925	194	11	173,441.341
42	568	4811	9027	915	241	08	175,297.019
43	528	4692	9296	905	288	06	177,152.702
44	488	4573	9567	895	335	7.7103	179,008.390
45	449	4454	1.569836	886	382	7.7100	180,864.083
46	409	4335	1.570106	876	429	7.7097	182,719.781
47	369	4215	0376	866	476	94	184,575.484
48	330	4096	0646	856	523	91	186,431.192
49	290	3978	0917	846	570	88	188,286.905
50	8.50871250	8.50963859	1.571187	2.35836	6.48617	7.7086	6,190,142.623
51	211	3740	1457	826	664	83	191,998.347
52	171	3621	1728	816	711	80	193,854.075
53	131	3502	1998	806	758	77	195,709.809
54	092	3383	2269	796	805	74	197,565,548
55	052	3264	2539	786	852	71	199,421.292
56	8.50871013	3145	2810	776	900	68	201,277.041
57	8.50870973	3027	3080	766	947	65	203,132.795
58	933	2908	3351	756	6.48994	62	204,988.554
59	894	2789	3622	746	6.49041	60	206,844.318
56 00	8.50870854	8.50962671	1.573893	2.35736	6.49088	7.7057	6,208,700.087

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 56°–57°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
56 00	8. 50870854	8. 50962671	1. 573893	2. 35736	6. 49088	7. 7057	6, 208, 700. 087
1	815	2552	4164	725	136	54	210, 555. 861
2	775	2433	4435	715	183	51	212, 411. 640
3	736	2315	4705	705	230	48	214, 267. 425
4	696	2196	4977	695	278	45	216, 123. 214
05	657	2078	5248	685	325	42	217, 979. 009
6	617	1959	5520	674	372	39	219, 834. 808
7	578	1841	5791	664	420	36	221, 690. 613
8	538	1722	6063	654	467	33	223, 546. 422
9	499	1604	6334	644	514	30	225, 402. 237
10	8. 50870459	8. 50961485	1. 576605	2. 35633	6. 49562	7. 7028	6, 227, 258. 057
11	420	1367	6877	623	609	25	229, 113. 882
12	380	1249	7148	613	657	22	230, 969. 712
13	341	1130	7421	602	704	19	232, 825. 547
14	301	1012	7692	592	752	16	234, 681. 387
15	262	0894	7963	582	799	13	236, 537. 232
16	223	0775	8236	571	847	10	238, 393. 082
17	183	0657	8507	561	894	07	240, 248. 937
18	144	0539	8780	550	942	04	242, 104. 797
19	104	0421	9052	540	6. 49990	7. 7001	243, 960. 663
20	8. 50870065	8. 50960303	1. 579325	2. 35530	6. 50037	7. 6998	6, 245, 816. 533
21	8. 50870026	0185	9597	519	085	95	247, 672. 408
22	8. 50869986	8. 50960067	1. 579868	508	132	92	249, 528. 289
23	947	8. 50959949	1. 580141	498	180	89	251, 384. 174
24	908	9831	0413	487	228	86	253, 240. 065
25	868	9713	0687	477	276	83	255, 095. 961
26	829	9595	0959	466	323	80	256, 951. 861
27	790	9477	1232	456	371	78	258, 807. 767
28	750	9359	1504	445	419	74	260, 663. 677
29	711	9241	1777	434	467	72	262, 519. 593
30	8. 50869672	8. 50959123	1. 582050	2. 35424	6. 50514	7. 6969	6, 264, 375. 514
31	633	9005	2323	413	562	66	266, 231. 440
32	593	8888	2596	402	610	63	268, 087. 371
33	554	8770	2869	392	658	60	269, 943. 306
34	515	8652	3143	381	706	57	271, 799. 247
35	476	8534	3415	370	754	54	273, 655. 193
36	436	8417	3688	360	802	51	275, 511. 144
37	397	8299	3962	349	850	48	277, 367. 100
38	358	8182	4235	338	898	45	279, 223. 061
39	319	8064	4509	327	946	42	281, 079. 027
40	8. 50869280	8. 50957947	1. 584782	2. 35316	6. 50994	7. 6939	6, 282, 934. 998
41	240	7829	5056	306	6. 51042	36	284, 790. 974
42	201	7712	5330	295	090	33	286, 646. 955
43	162	7594	5603	284	138	30	288, 502. 942
44	123	7477	5877	273	186	26	290, 358. 933
45	084	7359	6151	262	234	24	292, 214. 929
46	045	7242	6426	251	282	20	294, 070. 930
47	8. 50869006	7125	6699	240	330	18	295, 926. 936
48	8. 50868966	7007	6974	229	378	14	297, 782. 947
49	927	6890	7248	218	427	11	299, 638. 964
50	8. 50868888	8. 50956773	1. 587522	2. 35207	6. 51475	7. 6908	6, 301, 494. 985
51	849	6656	7796	196	523	05	303, 351. 011
52	810	6538	8070	185	571	7. 6902	305, 207. 042
53	771	6421	8345	174	620	7. 6899	307, 063. 078
54	732	6304	8619	163	668	96	308, 919. 120
55	693	6187	8895	152	716	93	310, 775. 166
56	654	6070	9169	141	764	90	312, 631. 217
57	615	5953	9444	130	813	87	314, 487. 273
58	576	5836	9719	119	861	84	316, 343. 335
59	537	5719	1. 589993	108	910	81	318, 199. 401
57 00	8. 50868498	8. 50955602	1. 590269	2. 35097	6. 51958	7. 6878	6, 320, 055. 472

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 57°-58°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
57 00	8.50868498	8.50955602	1.590269	2.35097	6.51958	7.6878	6,320,055.472
1	459	5485	0543	086	6.52006	75	321,911.548
2	420	5368	0819	074	055	72	323,767.630
3	381	5251	1094	063	103	69	325,623.716
4	342	5134	1370	052	152	66	327,479.807
05	303	5018	1644	041	200	62	329,335.904
6	264	4901	1920	029	249	59	331,192.005
7	225	4784	2195	018	298	56	333,048.111
8	187	4667	2471	2.35007	346	53	334,904.222
9	148	4551	2747	2.34995	395	50	336,760.338
10	8.50868109	8.50954434	1.593022	2.34984	6.52443	7.6847	6,338,616.459
11	070	4318	3298	973	492	44	340,472.586
12	8.50868031	4201	3574	961	540	41	342,328.717
13	8.50867992	4084	3850	950	589	38	344,184.853
14	953	3968	4126	938	638	34	346,040.994
15	915	3851	4402	927	686	31	347,897.140
16	876	3735	4678	916	735	28	349,753.291
17	837	3618	4954	904	784	25	351,609.447
18	798	3502	5231	893	833	22	353,465.608
19	759	3386	5507	881	882	19	355,321.774
20	8.50867721	8.50953269	1.595784	2.34870	6.52930	7.6816	6,357,177.945
21	682	3153	6060	858	6.52979	13	359,034.121
22	643	3037	6337	846	6.53028	10	360,890.302
23	604	2921	6613	835	077	06	362,746.488
24	566	2804	6890	823	126	03	364,602.679
25	527	2688	7167	812	175	7.6800	366,458.875
26	488	2572	7444	800	224	7.6797	368,315.075
27	449	2456	7721	788	273	94	370,171.281
28	411	2340	7997	777	322	91	372,027.492
29	372	2224	8275	765	371	88	373,883.707
30	8.50867333	8.50952108	1.598552	2.34754	6.53420	7.6784	6,375,739.928
31	295	1992	8830	742	469	81	377,596.154
32	256	1876	9106	730	518	78	379,452.384
33	217	1760	9384	718	567	75	381,308.620
34	179	1644	9661	706	616	72	383,164.860
35	140	1528	1.599940	695	665	68	385,021.106
36	101	1412	1.600217	683	714	65	386,877.356
37	063	1296	0495	671	764	62	388,733.611
38	8.50867024	1181	0772	659	813	59	390,589.871
39	8.50866986	1065	1050	647	862	56	392,446.137
40	8.50866947	8.50950949	1.601328	2.34636	6.53911	7.6753	6,394,302.407
41	909	0833	1606	624	6.53960	49	396,158.682
42	870	0718	1885	612	6.54010	46	398,014.962
43	831	0602	2162	600	059	43	399,871.247
44	793	0487	2441	588	108	40	401,727.537
45	754	0371	2719	576	158	37	403,583.832
46	716	0256	2998	564	207	33	405,440.132
47	677	0140	3276	552	256	30	407,296.436
48	639	8.50950025	3555	540	306	27	409,152.746
49	600	8.50949909	3833	528	355	24	411,009.061
50	8.50866562	8.50949794	1.604112	2.34516	6.54405	7.6720	6,412,865.380
51	524	9678	4391	504	454	17	414,721.704
52	485	9563	4669	492	504	14	416,578.034
53	447	9448	4949	480	553	11	418,434.368
54	408	9332	5228	467	603	08	420,290.708
55	370	9217	5507	455	652	04	422,147.052
56	331	9102	5786	443	702	7.6701	424,003.401
57	293	8987	6066	431	751	7.6698	425,859.755
58	255	8872	6345	419	801	95	427,716.114
59	216	8757	6625	406	851	91	429,572.478
58 00	8.50866178	8.50948642	1.606904	2.34394	6.54900	7.6688	6,431,428.846

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 58°–59°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
58 00	8. 50866178	8. 50948642	1. 606904	2. 34394	6. 54900	7. 6688	6, 431, 428. 846
1	140	8527	7184	382	6. 54950	85	433, 285, 220
2	101	8412	7463	370	6. 55000	82	435, 141. 599
3	063	8297	7743	357	049	78	436, 997. 983
4	8. 50866025	8182	8023	345	099	75	438, 854. 371
05	8. 50865986	8067	8302	333	149	72	440, 710. 764
6	948	7952	8583	320	199	68	442, 567. 163
7	910	7837	8862	308	248	65	444, 423. 566
8	871	7722	9143	296	298	62	446, 279. 974
9	833	7607	9423	283	348	59	448, 136. 387
10	8. 50865795	8. 50947493	1. 609704	2. 34271	6. 55398	7. 6655	6, 449, 992. 805
11	757	7378	1. 609984	258	448	52	451, 849. 228
12	718	7263	1. 610265	246	498	49	453, 705. 655
13	680	7149	0545	234	548	46	455, 562. 088
14	642	7034	0826	221	598	42	457, 418. 525
15	604	6919	1106	208	648	39	459, 274. 968
16	566	6805	1388	196	698	36	461, 131. 415
17	528	6690	1668	183	748	32	462, 987. 867
18	489	6576	1950	171	798	29	464, 844. 324
19	451	6461	2230	158	848	26	466, 700. 786
20	8. 50865413	8. 50946347	1. 612512	2. 34146	6. 55898	7. 6622	6, 468, 557. 253
21	375	6233	2793	133	948	19	470, 413. 725
22	337	6118	3074	120	6. 55998	16	472, 270. 202
23	299	6004	3356	108	6. 56048	12	474, 126. 683
24	261	5890	3637	095	099	09	475, 983. 170
25	223	5775	3919	082	149	06	477, 839. 661
26	184	5661	4200	070	199	7. 6602	479, 696. 157
27	146	5547	4482	057	249	7. 6599	481, 552. 658
28	108	5433	4764	044	300	96	483, 409. 164
29	070	5319	5046	032	350	92	485, 265. 675
30	8. 50865032	8. 50945205	1. 615328	2. 34019	6. 56400	7. 6589	6, 487, 122. 191
31	8. 50864994	5091	5610	2. 34006	451	86	488, 978. 711
32	956	4977	5892	2. 33993	501	82	490, 835. 237
33	918	4863	6175	980	551	79	492, 691. 767
34	880	4749	6457	967	602	76	494, 548. 303
35	842	4635	6740	954	652	72	496, 404. 843
36	804	4521	7022	942	703	69	498, 261. 388
37	766	4407	7305	929	753	66	500, 117. 937
38	728	4293	7587	916	804	62	501, 974. 492
39	691	4179	7870	903	854	59	503, 831. 052
40	8. 50864653	8, 50944066	1. 618153	2. 33890	6. 56905	7. 6555	6, 505, 687. 616
41	615	3952	8436	877	6. 56955	52	507, 544. 185
42	577	3838	8719	864	6. 57006	49	509, 400. 760
43	539	3725	9002	851	056	45	511, 257. 339
44	501	3611	9285	838	107	42	513, 113. 923
45	463	3498	9569	825	158	38	514, 970. 511
46	425	3384	1. 619852	811	208	35	516, 827. 105
47	388	3270	1. 620136	798	259	32	518, 683. 703
48	350	3157	0419	785	310	28	520, 540. 306
49	312	3044	0702	772	360	25	522, 396. 915
50	8. 50864274	8. 50942930	1. 620986	7. 33759	6. 57411	7. 6521	6, 524, 253. 528
51	236	2817	1269	746	462	18	526, 110. 145
52	199	2703	1554	733	513	15	527, 966. 768
53	161	2590	1837	719	564	11	529, 823. 396
54	123	2477	2122	706	615	08	531, 680. 028
55	085	2364	2406	693	666	04	533, 536. 665
56	048	2250	2690	680	716	7. 6501	535, 393. 307
57	8. 50864010	2137	2974	666	767	7. 6498	537, 249. 954
58	8. 50863972	2024	3259	653	818	94	539, 106. 606
59	934	1911	3543	640	869	91	540, 963. 262
59 00	8. 50863897	8. 50941798	1. 623828	2. 33626	6. 57920	7. 6487	6, 542, 819. 924

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 59°–60°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
59 00	8. 50863897	8. 50941798	1. 623828	2. 33626	6. 57920	7. 6487	6, 542, 819. 924
1	859	1685	4112	613	6. 57971	84	544, 676. 590
2	821	1572	4398	600	6. 58022	80	546, 533. 261
3	784	1459	4682	586	073	77	548, 389. 937
4	746	1346	4968	573	124	73	550, 246. 618
05	708	1233	5252	559	176	70	552, 103. 303
6	671	1120	5538	546	227	66	553, 959. 994
7	633	1008	5823	532	278	63	555, 816. 689
8	596	0895	6108	519	329	60	557, 673. 389
9	558	0782	6393	505	380	56	559, 530. 093
10	8. 50863521	8. 50940669	1. 626679	2. 33492	6. 58431	7. 6452	6, 561, 386. 803
11	483	0557	6964	478	483	49	563, 243. 517
12	445	0444	7251	465	534	46	565, 100. 237
13	408	0331	7536	451	585	42	566, 956. 961
14	370	0219	7822	438	637	39	568, 813. 690
15	333	8. 50940106	8108	424	688	35	570, 670. 423
16	295	8. 50939994	8394	410	739	32	572, 527. 162
17	258	9881	8680	396	791	28	574, 383. 905
18	220	9769	8967	383	842	25	576, 240. 653
19	183	9657	9252	369	894	21	578, 097. 406
20	8. 50863145	8. 50939544	1. 629539	2. 33355	6. 58945	7. 6418	6, 579, 954. 164
21	108	9432	1. 629825	342	6. 58996	14	581, 810. 926
22	071	9320	1. 630112	328	6. 59048	10	583, 667. 694
23	8. 50863033	9207	0399	314	100	07	585, 524. 466
24	8. 50862996	9095	0686	300	151	04	587, 381. 243
25	958	8983	0972	286	203	7. 6400	589, 238. 025
26	921	8871	1260	273	254	7. 6396	591, 094. 812
27	884	8759	1546	259	306	93	592, 951. 603
28	846	8647	1834	245	358	89	594, 808. 399
29	809	8535	2121	231	409	86	596, 665. 200
30	8. 50862772	8. 50938423	1. 632409	2. 33217	6. 59461	7. 6382	6, 598, 522. 006
31	734	8311	2695	203	513	79	600, 378. 816
32	697	8199	2984	189	564	75	602, 235. 632
33	660	8087	3271	175	616	72	604, 092. 452
34	622	7975	3559	161	668	68	605, 949. 277
35	585	7863	3846	147	720	64	607, 806. 106
36	548	7751	4134	133	772	61	609, 662. 941
37	511	7640	4422	119	824	57	611, 519. 780
38	473	7528	4711	105	876	54	613, 376. 624
39	436	7416	4998	091	927	50	615, 233. 472
40	8. 50862399	8. 50937305	1. 635287	2. 33077	6. 59979	7. 6347	6, 617, 090. 326
41	362	7193	5575	063	6. 60031	43	618, 947. 184
42	325	7082	5864	048	083	40	620, 804. 047
43	287	6970	6152	034	135	36	622, 660. 915
44	250	6859	6441	020	187	32	624, 517. 788
45	213	6747	6730	2. 33006	239	29	626, 374. 665
46	176	6636	7019	2. 32992	292	25	628, 231. 547
47	139	6524	7308	977	344	22	630, 088. 434
48	102	6413	7597	963	396	18	631, 945. 326
49	065	6302	7886	949	448	14	633, 802. 222
50	8. 50862028	8. 50936190	1. 638175	2. 32934	6. 60500	7. 6311	6, 635, 659. 123
51	8. 50861990	6079	8465	920	552	07	637, 516. 029
52	953	5968	8754	906	604	04	639, 372. 940
53	916	5857	9044	892	657	7. 6300	641, 229. 855
54	879	5746	9333	877	709	7. 6296	643, 086. 775
55	842	5635	9623	863	761	93	644, 943. 700
56	805	5523	1. 639912	848	814	89	646, 800. 630
57	768	5412	1. 640203	834	866	85	648, 657. 564
58	731	5302	0492	819	918	82	650, 514. 503
59	694	5191	0783	805	6. 60971	78	652, 371. 447
60 00	8. 50861657	8. 50935080	1. 641073	2. 32790	6. 61023	7. 6274	6, 654, 228. 396

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 60°-61°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
60 00	8. 50861657	8. 50935080	1. 641073	2. 32790	6. 61023	7. 6274	6, 654, 228. 396
1	620	4969	1363	776	075	71	656, 085. 349
2	583	4858	1653	761	128	67	657, 942. 308
3	546	4747	1944	747	181	64	659, 799. 270
4	510	4636	2234	732	233	60	661, 656. 238
05	473	4526	2526	718	286	56	663, 513. 210
6	436	4415	2816	703	338	52	665, 370. 187
7	399	4304	3107	688	391	49	667, 227. 169
8	362	4194	3398	674	444	45	669, 084. 153
9	325	4083	3689	659	496	41	670, 941. 147
10	8. 50861288	8. 50933973	1. 643981	2. 32644	6. 61549	7. 6238	6, 672, 798. 143
11	251	3862	4272	630	602	34	674, 655. 144
12	215	3752	4564	615	654	30	676, 512. 149
13	178	3641	4855	600	707	27	678, 369. 160
14	141	3531	5147	585	760	23	680, 226. 174
15	104	3421	5438	570	813	19	682, 083. 194
16	067	3310	5730	556	866	16	683, 940. 218
17	8. 50861031	3200	6022	541	918	12	685, 797. 247
18	8. 50860994	3090	6314	526	6. 61971	08	687, 654. 281
19	957	2980	6606	511	6. 62024	04	689, 511. 320
20	8. 50860921	8. 50932869	1. 646898	2. 32496	6. 62077	7. 6201	6, 691, 368. 363
21	884	2759	7190	481	130	7. 6197	693, 225. 411
22	847	2649	7483	466	183	93	695, 082. 464
23	810	2539	7775	451	236	90	696, 939. 521
24	774	2429	8068	436	289	86	698, 796. 583
25	737	2319	8360	421	342	82	700, 653. 650
26	700	2209	8654	406	395	78	702, 510. 721
27	664	2099	8947	391	448	75	704, 367. 797
28	627	1990	9240	376	502	71	706, 224. 878
29	591	1880	9533	361	554	67	708, 081. 964
30	554	8. 50931770	1. 649826	2. 32346	6. 62608	7. 6163	6, 709, 939. 054
31	517	1660	1. 650120	331	661	60	711, 796. 149
32	481	1551	0413	316	714	56	713, 653. 249
33	444	1441	0707	301	768	52	715, 510. 353
34	408	1331	1000	286	821	48	717, 367. 462
35	371	1222	1294	270	874	45	719, 224. 575
36	335	1112	1587	255	927	41	721, 081. 694
37	298	1003	1882	240	6. 62981	37	722, 938. 817
38	262	0893	2175	225	6. 63034	33	724, 795. 945
39	225	0784	2470	209	088	30	726, 653. 077
40	8. 50860189	8. 50930674	1. 652765	2. 32194	6. 63141	7. 6126	6, 728, 510. 214
41	152	0565	3059	179	195	22	730, 367. 356
42	116	0456	3354	163	248	18	732, 224. 502
43	080	0346	3648	148	301	14	734, 081. 653
44	043	0237	3943	132	355	11	735, 938. 809
45	8. 50860007	0128	4237	117	409	07	737, 795. 970
46	8. 50859970	8. 50930019	4533	102	462	7. 6103	739, 653. 135
47	934	8. 50929910	4827	086	516	7. 6099	741, 510. 305
48	898	9801	5123	071	569	95	743, 367. 479
49	861	9692	5417	055	623	92	745, 224. 658
50	8. 50859825	8. 50929583	1. 655713	2. 32040	6. 63677	7. 6088	6, 747, 081. 842
51	789	9474	6009	024	730	84	748, 939. 030
52	752	9365	6304	2. 32009	784	80	750, 796. 223
53	716	9256	6600	2. 31993	838	76	752, 653. 421
54	680	9147	6895	978	892	72	754, 510. 623
55	643	9038	7192	962	6. 63946	69	756, 367. 830
56	607	8929	7487	946	6. 64000	65	758, 225. 042
57	571	8821	7784	931	053	61	760, 082. 258
58	535	8712	8079	915	108	57	761, 939. 479
59	498	8603	8376	899	161	53	763, 796. 705
61 00	8. 50859462	8. 50928495	1. 658672	2. 31884	6. 64215	7. 6049	6, 765, 653. 935

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 61°–62°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
61 00	8.50859462	8.50928495	1.658672	2.31884	6.64215	7.6049	6,765,653.935
1	426	8386	8969	868	270	46	767,511.170
2	390	8278	9266	852	324	42	769,368.410
3	354	8169	9562	836	377	38	771,225.654
4	318	8061	9860	821	431	34	773,082.903
05	281	7952	1.660156	805	485	30	774,940.156
6	245	7844	0454	789	540	26	776,797.415
7	209	7735	0750	773	594	22	778,654.678
8	173	7627	1048	757	648	18	780,511.945
9	137	7519	1345	741	702	14	782,369.217
10	8.50859101	8.50927411	1.661643	2.31726	6.64756	7.6011	6,784,226.494
11	065	7303	1941	710	811	07	786,083.775
12	8.50859029	7194	2238	694	865	7.6003	787,941.061
13	8.50858993	7086	2536	678	919	7.5999	789,798.352
14	957	6978	2834	662	6.64973	95	791,655.647
15	921	6870	3132	646	6.65028	91	793,512.946
16	885	6762	3430	630	082	87	795,370.251
17	849	6654	3729	614	137	83	797,227.560
18	813	6546	4028	598	191	79	799,084.873
19	777	6439	4325	581	246	75	800,942.191
20	8.50858741	8.50926331	1.664625	2.31565	6.65300	7.5971	6,802,799.514
21	705	6223	4923	549	355	68	804,656.841
22	669	6115	5222	533	409	64	806,514.174
23	633	6007	5521	517	464	60	808,371.510
24	597	5900	5820	501	518	56	810,228.852
25	561	5792	6119	484	573	52	812,086.197
26	526	5685	6419	468	628	48	813,943.548
27	490	5577	6718	452	682	44	815,800.903
28	454	5470	7017	436	737	40	817,658.263
29	418	5362	7317	419	792	36	819,515.627
30	8.50858382	8.50925255	1.667617	2.31403	6.65847	7.5932	6,821,372.996
31	346	5147	7917	387	902	28	823,230.370
32	311	5040	8216	370	6.65956	24	825,087.748
33	275	4933	8517	354	6.66011	20	826,945.130
34	239	4825	8818	337	066	16	828,802.518
35	203	4718	9117	321	121	12	830,659.910
36	168	4611	9418	305	176	08	832,517.306
37	132	4504	9718	288	231	04	834,374.707
38	096	4397	1.670019	272	286	7.5900	836,232.113
39	061	4290	0320	255	341	7.5896	838,089.523
40	8.50858025	8.50924183	1.670621	2.31238	6.66396	7.5892	6,839,946.938
41	8.50857989	4076	0922	222	451	88	841,804.357
42	954	3969	1223	205	506	84	843,661.781
43	918	3862	1525	189	561	80	845,519.209
44	882	3755	1826	172	616	76	847,376.642
45	847	3648	2128	156	672	72	849,234.080
46	811	3542	2428	139	727	68	851,091.522
47	776	3435	2731	122	782	64	852,948.969
48	740	3328	3033	106	837	60	854,806.420
49	705	3221	3334	089	893	56	856,663.876
50	8.50857669	8.50923115	1.673637	2.31072	6.66948	7.5852	6,858,521.336
51	634	3008	3939	055	6.67004	48	860,378.801
52	598	2902	4241	038	059	44	862,236.270
53	562	2795	4544	022	114	40	864,093.745
54	527	2689	4846	2.31005	170	36	865,951.223
55	492	2582	5149	2.30988	225	32	867,808.706
56	456	2476	5452	971	281	28	869,666.194
57	421	2370	5755	954	336	24	871,523.687
58	385	2264	6057	937	392	19	873,381.184
59	350	2157	6361	920	448	15	875,238.685
62 00	8.50857314	8.50922051	1.676665	2.30903	6.67503	7.5811	6,877,096.191

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 62°-63°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
62 00	8. 50857314	8. 50922051	1. 676665	2. 30903	6. 67503	7. 5811	6, 877, 096. 191
1	279	1945	6967	886	559	07	878, 953. 702
2	244	1839	7271	869	614	7. 5803	880, 811. 216
3	208	1733	7574	852	670	7. 5799	882, 668. 736
4	173	1627	7879	835	726	95	884, 526. 260
05	138	1521	8183	818	781	91	886, 383. 789
6	102	1415	8486	801	837	87	888, 241. 322
7	067	1309	8791	784	893	83	890, 098. 860
8	8. 50857032	1203	9095	767	6. 67949	78	891, 956. 402
9	8. 50856996	1097	9399	750	6. 68005	74	893, 813. 949
10	8. 50856961	8. 50920992	1. 679703	2. 30733	6. 68061	7. 5770	6, 895, 671. 500
11	926	0886	1. 680008	715	117	66	897, 529. 056
12	891	0780	0314	698	173	62	899, 386. 616
13	856	0674	0618	681	229	58	901, 244. 181
14	820	0569	0923	664	285	54	903, 101. 750
15	785	0463	1228	646	341	50	904, 959. 324
16	750	0358	1533	629	397	46	906, 816. 902
17	715	0252	1839	612	453	41	908, 674. 485
18	680	0147	2144	594	509	37	910, 532. 073
19	645	8. 50920041	2450	577	565	33	912, 389. 665
20	8. 50856609	8. 50919937	1. 682755	2. 30560	6. 68621	7. 5729	6, 914, 247. 261
21	574	9831	3061	542	678	25	916, 104. 862
22	539	9725	3368	525	734	20	917, 962. 467
23	504	9620	3673	507	790	16	919, 820. 077
24	469	9515	3980	490	846	12	921, 677. 691
25	434	9410	4286	472	903	08	923, 535. 310
26	399	9305	4593	455	6. 68959	04	925, 392. 934
27	364	9200	4900	437	6. 69016	7. 5700	927, 250. 561
28	329	9095	5206	420	072	7. 5696	929, 108. 194
29	294	8990	5513	402	129	91	930, 965. 831
30	8. 50856259	8. 50918885	1. 685819	2. 30384	6. 69185	7. 5687	6, 932, 823. 472
31	224	8780	6127	367	242	83	934, 681. 118
32	189	8675	6434	349	298	79	936, 538. 768
33	154	8570	6741	332	355	74	938, 396. 423
34	119	8466	7049	314	411	70	940, 254. 083
35	084	8361	7356	296	468	66	942, 111. 746
36	049	8256	7664	278	525	62	943, 969. 415
37	8. 50856015	8152	7973	261	581	58	945, 827. 088
38	8. 50855980	8047	8280	243	638	53	947, 684. 765
39	945	7942	8588	225	695	49	949, 542. 447
40	8. 50855910	8. 50917838	1. 688896	2. 30207	6. 69752	7. 5645	6, 951, 400. 133
41	875	7733	9205	189	808	41	953, 257. 824
42	840	7629	9514	172	865	36	955, 115. 519
43	806	7525	1. 689822	154	922	32	956, 973. 218
44	771	7420	1. 690131	136	6. 69979	28	958, 830. 922
45	736	7316	0439	118	6. 70036	24	960, 688. 631
46	701	7212	0749	100	093	20	962, 546. 344
47	667	7108	1058	082	150	15	964, 404. 061
48	632	7003	1367	064	207	11	966, 261. 783
49	597	6899	1677	046	264	07	968, 119. 509
50	8. 50855562	8. 50916795	1. 691987	2. 30028	6. 70321	7. 5602	6, 969, 977. 240
51	528	6691	2296	2. 30010	378	7. 5598	971, 834. 975
52	493	6587	2606	2. 29992	435	94	973, 692. 715
53	458	6483	2915	973	493	90	975, 550. 459
54	424	6379	3226	955	550	85	977, 408. 208
55	389	6276	3536	937	607	81	979, 265. 960
56	355	6172	3846	919	664	77	981, 123. 718
57	320	6068	4157	901	722	72	982, 981. 480
58	285	5964	4467	882	779	68	984, 839. 246
59	251	5861	4778	864	836	64	986, 697. 017
63 00	8. 50855216	8. 50915757	1. 695089	2. 29846	6. 70894	7. 5559	6, 988, 554. 792

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 63°–64°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
63 00	8. 50855216	8. 50915757	1. 695089	2. 29846	6. 70894	7. 5559	6, 988, 554. 792
1	182	5653	5399	828	6. 70951	55	990, 412. 572
2	147	5550	5711	809	6. 71009	51	992, 270. 356
3	113	5446	6023	791	066	46	994, 128. 144
4	078	5343	6333	773	124	42	995, 985. 937
05	044	5239	6645	754	181	38	997, 843. 735
6	8. 50855009	5136	6956	736	239	34	999, 701. 536
7	8. 50854975	5033	7269	717	297	29	7, 001, 559. 343
8	941	4929	7581	699	354	25	003, 417. 153
9	906	4826	7892	680	412	20	005, 274. 968
10	8. 50854872	8. 50914723	1. 698205	2. 29662	6. 71470	7. 5516	7, 007, 132. 788
11	837	4620	8517	643	527	12	008, 990. 612
12	803	4517	8829	625	585	07	010, 848. 440
13	769	4414	9142	606	643	7. 5503	012, 706. 273
14	734	4311	9455	588	701	7. 5499	014, 564. 110
15	700	4208	1. 699768	569	758	94	016, 421. 952
16	666	4105	1. 700081	550	816	90	018, 279. 797
17	631	4002	0394	532	874	86	020, 137. 648
18	597	3899	0707	513	932	81	021, 995. 502
19	563	3796	1021	494	6. 71990	77	023, 853. 362
20	8. 50854529	8. 50913693	1. 701334	2. 29476	6. 72048	7. 5472	7, 025, 711. 225
21	494	3591	1648	457	106	68	027, 569. 093
22	460	3488	1961	438	165	64	029, 426. 965
23	426	3385	2276	419	223	59	031, 284. 842
24	392	3283	2590	400	281	55	033, 142. 723
25	357	3180	2904	382	339	50	035, 000. 608
26	323	3078	3218	363	397	46	036, 858. 498
27	289	2975	3533	344	455	42	038, 716. 392
28	255	2873	3847	325	514	37	040, 574. 291
29	221	2771	4162	306	572	33	042, 432. 194
30	8. 50854187	8. 50912668	1. 704477	2. 29287	6. 72630	7. 5428	7, 044, 290. 101
31	153	2566	4792	268	689	24	046, 148. 013
32	119	2464	5108	249	747	19	048, 005. 929
33	° 085	2362	5423	230	806	15	049, 863. 849
34	051	2259	5738	211	864	10	051, 721. 774
35	8. 50854017	2157	6054	192	923	06	053, 579. 703
36	8. 50853982	2055	6369	173	6. 72981	7. 5402	055, 437. 637
37	948	1953	6686	154	6. 73040	7. 5397	057, 295. 575
38	915	1851	7002	135	098	92	059, 153. 517
39	881	1749	7318	115	157	88	061, 011. 464
40	8. 50853847	8. 50911648	1. 707634	2. 29096	6. 73216	7. 5384	7, 062, 869. 415
41	813	1546	7951	077	274	79	064, 727. 370
42	779	1444	8267	058	333	75	066, 585. 330
43	745	1342	8584	038	392	70	068, 443. 294
44	711	1241	8901	019	450	66	070, 301. 263
45	677	1139	9218	2. 29000	510	61	072, 159. 236
46	643	1037	9536	2. 28981	568	57	074, 017. 213
47	609	0936	1. 709852	961	627	52	075, 875. 194
48	575	0834	1. 710170	942	686	48	077, 733. 180
49	542	0733	0488	922	745	43	079, 591. 170
50	8. 50853508	8. 50910631	1. 710805	2. 28903	6. 73804	7. 5339	7, 081, 449. 165
51	474	0530	1123	884	863	34	083, 307. 164
52	440	0429	1442	864	922	30	085, 165. 167
53	407	0327	1759	845	6. 73981	25	087, 023. 174
54	373	0226	2078	825	6. 74040	20	088, 881. 186
55	339	0125	2397	806	100	16	090, 739. 202
56	305	8. 50910024	2715	786	159	11	092, 597. 223
57	272	8. 50909923	3034	766	218	07	094, 455. 248
58	238	9822	3353	747	277	7. 5302	096, 313. 277
59	204	9721	3672	727	337	7. 5298	098, 171. 310
64 00	8. 50853171	8. 50909620	1. 713991	2. 28708	6. 74396	7. 5293	7, 100, 029. 348

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 64°–65°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
64 00	8.50853171	8.50909620	1.713991	2.28708	6.74396	7.5293	7,100,029.348
1	137	9519	4310	688	456	89	101,887.390
2	103	9418	4630	668	515	84	103,745.437
3	070	9317	4950	648	574	79	105,603.488
4	036	9216	5269	629	634	75	107,461.543
05	8.50853003	9116	5589	609	693	70	109,319.602
6	8.50852969	9015	5910	589	753	66	111,177.666
7	936	8914	6229	569	812	61	113,035.734
8	902	8814	6550	549	872	56	114,893.806
9	868	8713	6871	530	931	52	116,751.883
10	8.50852835	8.50908613	1.717191	2.28510	6.74991	7.5247	7,118,609.964
11	801	8512	7512	490	6.75051	43	120,468.049
12	768	8412	7833	470	111	38	122,326.139
13	735	8312	8154	450	171	33	124,184.232
14	701	8211	8476	430	230	29	126,042.331
15	668	8111	8797	410	290	24	127,900.433
16	634	8011	9118	390	350	20	129,758.540
17	601	7911	9440	370	410	15	131,616.650
18	568	7810	1.719763	350	470	10	133,474.766
19	534	7710	1.720084	329	530	06	135,332.885
20	8.50852501	8.50907610	1.720406	2.28309	6.75590	7.5201	7,137,191.009
21	467	7510	0729	289	650	7.5196	139,049.137
22	434	7410	1051	269	710	92	140,907.269
23	401	7310	1374	249	770	87	142,765.406
24	368	7211	1697	228	830	82	144,623.547
25	334	7111	2019	208	890	78	146,481.692
26	301	7011	2343	188	6.75950	73	148,339.842
27	268	6911	2666	168	6.76011	68	150,197.995
28	235	6812	2989	147	071	64	152,056.153
29	201	6712	3313	127	132	59	153,914.316
30	8.50852168	8.50906612	1.723637	2.28107	6.76192	7.5154	7,155,772.482
31	135	6513	3960	086	252	50	157,630.653
32	102	6413	4284	066	313	45	159,488.828
33	069	6314	4609	045	373	40	161,347.007
34	036	6215	4933	025	434	36	163,205.191
35	8.50852002	6115	1.725257	2.28004	494	31	165,063.378
36	8.50851969	6016	5582	2.27984	555	26	166,921.570
37	936	5917	5907	963	615	21	168,779.767
38	903	5818	6232	943	676	17	170,637.967
39	870	5718	6557	922	737	12	172,496.172
40	8.50851837	8.50905619	1.726882	2.27901	6.76797	7.5107	7,174,354.381
41	804	5520	7208	881	858	7.5102	176,212.594
42	771	5421	7533	860	919	7.5098	178,070.812
43	738	5322	7859	839	6.76980	93	179,929.033
44	705	5223	8185	819	6.77040	88	181,787.259
45	672	5125	8511	798	101	83	183,645.490
46	639	5026	8838	777	162	79	185,503.724
47	606	4927	9163	756	223	74	187,361.963
48	573	4828	9490	735	284	69	189,220.206
49	541	4730	1.729816	715	345	64	191,078.453
50	8.50851508	8.50904631	1.730143	2.27694	6.77406	7.5060	7,192,936.704
51	475	4532	0471	673	467	55	194,794.960
52	442	4434	0798	652	528	50	196,653.219
53	409	4335	1125	631	590	45	198,511.483
54	376	4237	1452	610	651	40	200,369.752
55	344	4138	1780	589	712	36	202,228.024
56	311	4040	2107	568	773	31	204,086.300
57	278	3942	2436	547	835	26	205,944.581
58	245	3844	2764	526	896	21	207,802.866
59	213	3745	3093	505	957	16	209,661.156
65 00	8.50851180	8.50903647	1.733421	2.27484	6.78019	7.5011	7,211,519.449

The characteristics of log A′, log B, log C, and log D have been increased by 10. Thecharacte ristics of log E and log F have been increased by 20.

LATITUDE 65°–66°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
65 00	8.50851180	8.50903647	1.733421	2.27484	6.78019	7.5011	7,211,519.449
1	147	3549	3749	462	080	07	213,377.746
2	114	3451	4078	441	142	7.5002	215,236.048
3	082	3353	4407	420	203	7.4997	217,094.354
4	049	3255	4736	399	265	92	218,952.664
05	8.50851016	3157	5066	378	327	87	220,810.979
6	8.50850984	3059	5394	356	388	82	222,669.297
7	951	2961	5724	335	450	78	224,527.620
8	919	2864	6054	314	511	73	226,385.947
9	886	2766	6383	292	573	68	228,244.278
10	8.50850854	8.50902668	1.736714	2.27271	6.78635	7.4963	7,230,102.613
11	821	2571	7044	250	697	58	231,960.952
12	788	2473	7375	228	759	53	233,819.296
13	756	2376	7705	207	821	48	235,677.644
14	723	2278	8036	185	883	43	237,535.996
15	691	2181	8367	164	6.78945	38	239,394.352
16	658	2083	8698	142	6.79007	34	241,252.713
17	626	1986	9029	121	069	29	243,111.077
18	594	1889	9361	099	131	24	244,969.446
19	561	1791	1.739692	078	193	19	246,827.819
20	8.50850529	8.50901694	1.740024	2.27056	6.79255	7.4914	7,248,686.196
21	496	1597	0356	034	317	09	250,544.577
22	464	1500	0688	2.27013	380	7.4904	252,402.962
23	432	1403	1020	2.26991	442	7.4899	254,261.352
24	399	1306	1352	969	504	94	256,119.746
25	367	1209	1685	947	566	89	257,978.143
26	335	1112	2017	926	629	84	259,836.545
27	302	1015	2350	904	691	79	261,694.951
28	270	0918	2684	882	754	74	263,553.361
29	238	0822	3017	860	816	69	265,411.776
30	8.50850206	8.50900725	1.743350	2.26838	6.79879	7.4864	7,267,270.194
31	174	0628	3684	816	6.79941	60	269,128.617
32	141	0532	4018	794	6.80004	54	270,987.043
33	109	0435	4351	772	066	50	272,845.474
34	077	0339	4685	750	129	45	274,703.909
35	045	0242	5020	728	192	40	276,562.348
36	8.50850013	0146	5355	706	255	35	278,420.792
37	8.50849981	8.50900049	5689	684	317	30	280,279.239
38	948	8.50899953	6024	662	380	25	282,137.690
39	916	9857	6359	640	443	20	283,996.146
40	8.50849884	8.50899761	1.746693	2.26618	6.80506	7.4814	7,285,854.606
41	852	9664	7029	596	569	10	287,713.070
42	820	9568	7365	574	632	04	289,571.538
43	788	9472	7700	551	695	7.4800	291,430.010
44	756	9376	8036	529	758	7.4794	293,288.486
45	724	9280	8372	507	822	89	295,146.967
46	692	9184	8708	484	884	84	297,005.451
47	660	9088	9044	462	6.80948	79	298,863.940
48	628	8993	9381	440	6.81011	74	300,722.432
49	596	8897	1.749718	417	074	69	302,580.929
50	8.50849564	8.50898801	1.750054	2.26395	6.81138	7.4764	7,304,439.430
51	533	8705	0391	372	201	59	306,297.935
52	501	8610	0729	350	264	54	308,156.444
53	469	8514	1066	328	327	49	310,014.957
54	437	8419	1403	305	391	44	311,873.474
55	405	8323	1741	283	454	39	313,731.995
56	373	8228	2079	260	518	34	315,590.521
57	342	8132	2418	237	582	29	317,449.050
58	310	8037	2755	215	645	24	319,307.584
59	278	7942	3094	192	709	18	321,166.121
66 00	8.50849246	8.50897847	1.753433	2.26170	6.81773	7.4713	7,323,024.663

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 66°–67°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
66 00	8. 50849246	8. 50897847	1. 753433	2. 26170	6. 81773	7. 4713	7, 323, 024. 663
1	215	7751	3772	147	837	08	324, 883. 209
2	183	7656	4110	124	900	7. 4703	326, 741. 759
3	151	7561	4450	101	6. 81964	7. 4698	328, 600. 313
4	119	7466	4789	078	6. 82028	93	330, 458. 871
05	088	7371	5129	056	091	88	332, 317. 433
6	056	7276	5468	033	156	82	334, 175. 999
7	8. 50849025	7181	5808	2. 26010	220	77	336, 034. 569
8	8. 50848993	7086	6148	2. 25987	284	72	337, 893. 143
9	961	6992	6488	964	348	67	339, 751. 722
10	8. 50848930	8. 50896897	1. 756829	2. 25941	6. 82412	7. 4662	7, 341, 610. 304
11	898	6802	7170	918	476	57	343, 468. 890
12	867	6708	7511	895	540	52	345, 327. 481
13	835	6613	7851	872	604	46	347, 186. 075
14	804	6519	8192	849	669	41	349, 044. 674
15	772	6424	8534	826	733	36	350, 903. 276
16	741	6330	8876	803	798	31	352, 761. 883
17	709	6235	9217	780	862	26	354, 620. 494
18	678	6141	9559	757	926	20	356, 479. 108
19	646	6047	9901	734	6. 82991	15	358, 337. 727
20	8. 50848615	8. 50895952	1. 760244	2. 25710	6. 83055	7. 4610	7, 360, 196. 350
21	583	5858	0585	687	120	05	362, 054. 977
22	552	5764	0928	664	184	7. 4600	363, 913. 608
23	521	5670	1271	641	249	7. 4594	365, 772. 242
24	489	5576	1615	617	314	89	367, 630. 881
25	458	5482	1957	594	378	84	369, 489. 524
26	427	5388	2301	570	443	79	371, 348. 171
27	395	5294	2644	547	508	73	373, 206. 822
28	364	5200	2989	524	573	68	375, 065. 477
29	333	5107	3332	500	637	63	376, 924. 136
30	8. 50848302	8. 50895013	1. 763676	2. 25477	6. 83702	7. 4558	7, 378, 782. 799
31	270	4919	4021	453	767	52	380, 641. 466
32	239	4826	4365	430	832	47	382, 500. 137
33	208	4732	4709	406	897	42	384, 358. 812
34	177	4639	5055	382	6. 83962	37	386, 217. 491
35	146	4545	5400	359	6. 84028	31	388, 076. 174
36	115	4452	5745	335	093	26	389, 934. 861
37	083	4358	6090	312	158	21	391, 793. 552
38	052	4265	6436	288	223	15	393, 652. 247
39	8. 50848021	4172	6782	264	289	10	395, 510. 946
40	8. 50847990	8. 50894078	1. 767128	2. 25240	6. 84354	7. 4505	7, 397, 369. 649
41	959	3985	7474	217	419	7. 4500	399, 228. 356
42	928	3892	7820	193	484	7. 4494	401, 087. 067
43	897	3799	8167	169	550	89	402, 945. 782
44	866	3706	8514	145	616	84	404, 804. 501
45	835	3613	8861	121	681	78	406, 663. 224
46	804	3520	9208	097	747	73	408, 521. 951
47	773	3427	9555	073	812	68	410, 380. 682
48	742	3335	1. 769903	049	878	62	412, 239. 416
49	711	3242	1. 770250	025	944	57	414, 098. 155
50	8. 50847680	8. 50893149	1. 770599	2. 25001	6. 85010	7. 4451	7, 415, 956. 898
51	650	3056	0947	2. 24977	075	46	417, 815. 645
52	619	2964	1295	953	141	41	419, 674. 396
53	588	2871	1644	929	207	35	421, 533. 150
54	557	2779	1992	905	273	30	423, 391. 909
55	526	2686	2341	880	339	24	425, 250. 671
56	495	2594	2691	856	405	19	427, 109. 438
57	465	2502	3040	832	471	14	428, 968. 208
58	434	2409	3389	808	537	08	430, 826. 983
59	403	2317	3739	784	603	7. 4403	432, 685. 762
67 00	8. 50847372	8. 50892225	1. 774089	2. 24759	6. 85669	7. 4398	7, 434, 544. 544

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 67°–68°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
67 00	8. 50847372	8. 50892225	1. 774089	2. 24759	6. 85669	7. 4398	7, 434, 544. 544
1	342	2133	4439	735	736	92	436, 403. 330
2	311	2041	4789	711	802	87	438, 262. 120
3	280	1949	5140	686	868	81	440, 120. 915
4	250	1857	5491	662	6. 85934	76	441, 979. 713
05	219	1765	5842	637	6. 86001	70	443, 838. 515
6	188	1673	6193	613	067	65	445, 697. 321
7	158	1581	6544	588	134	60	447, 556. 131
8	127	1489	6895	564	200	54	449, 414. 944
9	097	1398	7247	539	267	49	451, 273. 762
10	8. 50847066	8. 50891306	1. 777599	2. 24514	6. 86334	7. 4343	7, 453, 132. 584
11	035	1214	7951	490	400	38	454, 991. 410
12	8. 50847005	1123	8303	465	467	32	456, 850. 239
13	8. 50846974	1031	8656	440	534	27	458, 709. 072
14	944	0940	9009	416	601	21	460, 567. 910
15	914	0848	9362	391	667	16	462, 426. 751
16	883	0757	1. 779714	366	734	10	464, 285. 596
17	853	0666	1. 780068	341	801	7. 4305	466, 144. 445
18	822	0574	0422	316	868	7. 4299	468, 003. 298
19	792	0483	0776	292	6. 86935	94	469, 862. 155
20	8. 50846761	8. 50890392	1. 781129	2. 24267	6. 87002	7. 4288	7, 471, 721. 016
21	731	0301	1483	242	070	83	473, 579. 881
22	701	0210	1838	217	136	77	475, 438. 750
23	670	0119	2193	192	204	72	477, 297. 622
24	640	8. 50890028	2548	167	271	66	479, 156. 498
25	610	8. 50889937	2902	142	338	60	481, 015. 379
26	579	9846	3257	117	406	55	482, 874. 263
27	549	9755	3613	092	473	49	484, 733. 151
28	519	9665	3969	067	540	44	486, 592. 043
29	489	9574	4324	041	608	38	488, 450. 939
30	8. 50846459	8. 50889483	1. 784680	2. 24016	6. 87675	7. 4233	7, 490, 309. 839
31	428	9393	5036	2. 23991	743	27	492, 168. 743
32	398	9302	5393	966	810	22	494, 027. 650
33	368	9212	5750	940	878	16	495, 886. 561
34	338	9121	6107	915	6. 87946	10	497, 745. 477
35	308	9031	6463	890	6. 88014	7. 4205	499, 604. 396
36	278	8941	6820	864	082	7. 4199	501, 463. 319
37	248	8851	7178	839	149	94	503, 322. 245
38	218	8760	7536	814	217	88	505, 181. 176
39	187	8670	7893	788	285	82	507, 040. 111
40	8. 50846157	8. 50888580	1. 788251	2. 23763	6. 88353	7. 4177	7, 508, 899. 049
41	127	8490	8610	737	421	71	510, 757. 991
42	097	8400	8969	712	489	65	512, 616. 937
43	067	8310	9327	686	557	60	514, 475. 887
44	037	8220	1. 789687	660	626	54	516, 334. 841
45	8. 50846008	8130	1. 790045	635	694	48	518, 193. 799
46	8. 50845978	8041	0405	609	762	43	520, 052. 760
47	948	7951	0764	583	830	37	521, 911. 726
48	918	7861	1124	558	899	31	523, 770. 695
49	888	7772	1485	532	6. 88967	26	525, 629. 668
50	8. 50845858	8. 50887682	1. 791844	2. 23506	6. 89036	7. 4120	7, 527, 488. 645
51	828	7592	2205	480	104	14	529, 347. 626
52	798	7503	2566	454	172	09	531, 206. 610
53	769	7414	2927	429	241	7. 4103	533, 065. 599
54	739	7324	3288	403	310	7. 4097	534, 924. 591
55	709	7235	3649	377	378	92	536, 783. 587
56	679	7146	4010	351	447	86	538, 642. 586
57	650	7056	4372	325	516	80	540, 501. 590
58	620	6967	4734	299	585	74	542, 360. 598
59	590	6878	5097	273	654	69	544, 219. 609
68 00	8. 50845560	8. 50886789	1. 795458	2. 23247	6. 89722	7. 4063	7, 546, 078. 624

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 68°–69°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
68 00	8. 50845560	8. 50886789	1. 795458	2. 23247	6. 89722	7. 4063	7, 546, 078. 624
1	531	6700	5821	220	791	57	547, 937. 643
2	501	6611	6184	194	860	51	549, 796. 666
3	472	6522	6548	168	929	46	551, 655. 692
4	442	6434	6911	142	6. 89998	40	553, 514. 722
05	412	6345	7274	116	6. 90068	34	555, 373. 757
6	383	6256	7638	089	137	28	557, 232. 794
7	353	6167	8002	063	206	22	559, 091. 836
8	324	6079	8366	037	275	17	560, 950. 882
9	294	5990	8731	2. 23010	344	11	562, 809. 931
10	8. 50845265	8. 50885902	1. 799096	2. 22984	6. 90414	7. 4005	7, 564. 668. 984
11	235	5813	9460	958	483	7. 3999	566. 528. 041
12	206	5725	1. 799825	931	553	94	568. 387. 101
13	176	5637	1. 800191	905	622	88	570, 246. 166
14	147	5548	0556	878	692	82	572, 105. 234
15	117	5460	0922	852	762	76	573, 964. 306
16	088	5372	1288	825	831	70	575, 823. 382
17	059	5284	1654	798	901	64	577, 682. 461
18	8. 50845029	5196	2020	772	6. 90971	59	579, 541. 544
19	8. 50845000	5108	2387	745	6. 91041	53	581, 400. 631
20	8. 50844971	8. 50885020	1. 802754	2. 22718	6. 91110	7. 3947	7, 583, 259. 722
21	941	4932	3122	692	181	41	585, 118. 817
22	912	4844	3488	665	250	35	586, 977. 915
23	883	4756	3856	638	321	29	588, 837. 017
24	854	4668	4224	611	390	23	590, 696. 123
25	824	4581	4592	584	461	18	592, 555. 232
26	795	4493	4960	558	531	12	594, 414. 346
27	766	4406	5329	531	601	06	596, 273. 463
28	737	4318	5697	504	671	7. 3900	598, 132. 584
29	708	4231	6066	477	742	7. 3894	599, 991. 709
30	8. 50844678	8. 50884143	1. 806435	2. 22450	6. 91812	7. 3888	7, 601, 850. 837
31	649	4056	6805	422	882	82	603, 709. 969
32	620	3969	7175	396	6. 91953	76	605, 569. 105
33	591	3881	7545	368	6. 92023	70	607, 428. 245
34	562	3794	7914	341	094	64	609, 287. 388
35	533	3707	8285	314	165	58	611, 146. 535
36	504	3620	8656	287	235	52	613, 005. 686
37	475	3533	9027	260	306	46	614, 864. 841
38	446	3446	9398	232	377	40	616, 723. 999
39	417	3359	1. 809769	205	448	34	618, 583. 161
40	8. 50844388	8. 50883272	1. 810141	2. 22178	6. 92518	7. 3828	7, 620, 442. 327
41	359	3185	0512	150	589	22	622, 301. 496
42	330	3098	0884	123	660	17	624, 160. 670
43	301	3012	1256	095	731	11	626, 019. 846
44	272	2925	1629	068	802	7. 3805	627, 879. 027
45	244	2838	2002	040	874	7. 3799	629, 738. 211
46	215	2752	2375	2. 22013	6. 92945	93	631, 597. 399
47	186	2665	2747	2. 21985	6. 93016	86	633, 456. 591
48	157	2579	3121	958	087	80	635, 315. 786
49	128	2493	3495	930	159	74	637, 174. 985
50	8. 50844100	8. 50882406	1. 813869	2. 21902	6. 93230	7. 3768	7, 639, 034. 188
51	071	2320	4213	875	301	62	640, 893. 394
52	042	2234	4618	847	373	56	642, 752. 604
53	8. 50844013	2148	4992	819	444	50	644, 611. 818
54	8. 50843985	2062	5366	792	516	44	646, 471. 036
55	956	1976	5742	764	588	38	648, 330. 257
56	927	1890	6117	736	659	32	650, 189. 482
57	899	1804	6493	708	731	26	652, 048. 710
58	870	1718	6869	680	803	20	653, 907. 942
59	841	1632	7245	652	875	14	655, 767. 178
69 00	8. 50843813	8. 50881546	1. 817622	2. 21624	6. 93947	7. 3708	7, 657, 626. 418

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 69°-70°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
69 00	8. 50843813	8. 50881546	1. 817622	2. 21624	6. 93947	7. 3708	7, 657, 626. 418
1	784	1460	7997	596	6. 94019	7. 3702	659, 485. 661
2	756	1375	8374	568	091	7. 3696	661, 344. 908
3	727	1289	8751	540	163	90	663, 204. 159
4	699	1204	9129	512	235	83	665, 063. 413
05	670	1118	9507	484	307	77	666, 922. 671
6	642	1033	1. 819885	455	379	71	668, 781. 933
7	613	0947	1. 820263	427	451	65	670, 641. 198
8	585	0862	0640	399	524	59	672, 500, 467
9	556	0777	1019	371	596	53	674, 359. 740
10	8. 50843528	8. 50880691	1. 821398	2. 21342	6. 94668	7. 3646	7, 676, 219. 016
11	499	0606	1777	314	741	40	678, 078. 296
12	471	0521	2156	286	814	34	679, 937. 579
13	443	0436	2536	257	886	28	681, 796. 866
14	414	0351	2916	229	6. 94959	22	683, 656. 157
15	386	0266	3295	200	6. 95031	16	685, 515. 452
16	358	0181	3676	172	104	10	687, 374. 750
17	330	0096	4056	143	177	7. 3603	689, 234. 051
18	301	8. 50880012	4437	115	250	7. 3597	691, 093. 357
19	273	8. 50879927	4819	086	323	91	692, 952. 666
20	8. 50843245	8. 50879842	1. 825200	2. 21057	6. 95396	7. 3585	7, 694, 811, 978
21	217	9758	5582	029	469	78	696, 671. 294
22	188	9673	5964	2. 21000	542	72	698, 530. 614
23	160	9589	6345	2. 20971	615	66	700, 389. 937
24	132	9504	6727	942	688	60	702, 249. 264
25	104	9420	7110	914	761	53	704, 108. 595
26	076	9336	7493	885	835	47	705, 967. 929
27	048	9251	7876	856	908	41	707, 827. 267
28	8. 50843020	9167	8260	827	6. 95982	35	709, 686. 608
29	8. 50842992	9083	8643	798	6. 96055	28	711, 545. 953
30	8. 50842964	8. 50878999	1. 829027	2. 20769	6. 96128	7. 3522	7, 713, 405. 302
31	936	8915	9411	740	202	16	715, 264. 654
32	908	8831	1. 829795	711	275	10	717, 124. 010
33	880	8747	1. 830180	682	349	7. 3503	718, 983. 370
34	852	8663	0565	653	423	7. 3497	720, 842. 733
35	824	8579	0950	623	497	91	722, 702. 100
36	796	8495	1336	594	571	84	724, 561. 470
37	768	8412	1721	565	644	78	726, 420. 844
38	740	8328	2108	536	718	72	728, 280. 221
39	712	8244	2493	506	792	65	730, 139. 602
40	8. 50842684	8. 50878161	1. 832879	2. 20477	6. 96867	7. 3459	7, 731, 998. 987
41	657	8077	3266	448	6. 96941	53	733, 858. 375
42	629	7994	3653	418	6. 97015	46	735, 717. 767
43	601	7911	4041	389	089	40	737, 577. 162
44	573	7827	4429	359	163	34	739, 436. 561
45	545	7744	4816	330	238	27	741, 295. 964
46	518	7661	5205	300	312	21	743, 155. 370
47	490	7578	5593	271	386	14	745, 014. 779
48	462	7495	5981	241	461	08	746, 874. 192
49	435	7412	6370	212	536	7. 3402	748, 733. 609
50	8. 50842407	8. 50877329	1. 836759	2. 20182	6. 97610	7. 3395	7, 750, 593. 029
51	379	7246	7149	152	685	89	752, 452. 453
52	352	7163	7538	122	760	82	754, 311. 880
53	324	7080	7928	093	835	76	756, 171. 311
54	296	6997	8319	063	909	69	758, 030. 745
55	269	6915	8709	033	6. 97984	63	759, 890. 183
56	241	6832	9100	2. 20003	6. 98059	56	761, 749. 625
57	214	6749	9491	2. 19973	134	50	763, 609. 070
58	186	6667	1. 839881	943	209	44	765, 468. 518
59	159	6584	1. 840273	913	284	37	767, 327. 970
70 00	8. 50842131	8. 50876502	1. 840665	2. 19883	6. 98360	7. 3331	7, 769, 187. 426

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 70°–71°

Lat.		log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
°	′							*Meters*
70	00	8. 50842131	8. 50876502	1. 840665	2. 19883	6. 98360	7. 3331	7, 769, 187. 426
	1	104	6420	1057	853	435	24	771, 046. 885
	2	077	6337	1450	823	510	18	772, 906. 348
	3	049	6255	1843	793	586	11	774, 765. 814
	4	8. 50842022	6173	2236	762	661	7. 3305	776, 625. 284
	05	8. 50841994	6091	2629	732	737	7. 3298	778, 484. 757
	6	967	6009	3023	702	812	92	780, 344. 234
	7	940	5927	3416	672	888	85	782, 203. 714
	8	912	5845	3810	642	6. 98964	78	784, 063. 198
	9	885	5763	4204	611	6. 99039	72	785, 922. 685
	10	8. 50841858	8. 50875681	1. 844599	2. 19581	6. 99115	7. 3265	7, 787, 782. 176
	11	830	5599	4993	550	191	59	789, 641. 670
	12	803	5518	5389	520	267	52	791, 501. 168
	13	776	5436	5784	489	343	46	793, 360. 669
	14	749	5354	6180	459	419	39	795, 220. 174
	15	722	5273	6576	428	495	33	797, 079. 682
	16	694	5191	6972	398	571	26	798, 939. 194
	17	667	5110	7369	367	647	19	800, 798. 709
	18	640	5028	7766	336	723	13	802, 658. 228
	19	613	4947	8163	306	800	06	804, 517. 750
	20	8. 50841586	8. 50874866	1. 848560	2. 19275	6. 99876	7. 3200	7, 806, 377. 276
	21	559	4785	8958	244	6. 99953	7. 3193	808, 236. 805
	22	532	4704	9356	213	7. 00029	86	810, 096. 338
	23	505	4622	1. 849754	182	106	80	811, 955. 874
	24	478	4541	1. 850153	151	182	73	813, 815. 414
	25	451	4460	0552	120	259	66	815, 674. 957
	26	424	4380	0951	089	336	60	817, 534. 503
	27	397	4299	1350	058	413	53	819, 394. 053
	28	370	4218	1750	2. 19027	489	46	821, 253. 607
	29	343	4137	2150	2. 18996	566	40	823, 113. 164
	30	8. 50841316	8. 50874057	1. 852550	2. 18965	7. 00643	7. 3133	7, 824, 972. 724
	31	289	3976	2951	934	721	26	826, 832. 288
	32	262	3895	3352	903	797	20	828, 691. 855
	33	236	3815	3752	872	875	13	830, 551. 426
	34	209	3734	4154	840	7. 00952	06	832, 411. 000
	35	182	3654	4555	809	7. 01029	7. 3100	834, 270. 578
	36	155	3574	4957	778	106	7. 3093	836, 130. 158
	37	129	3493	5360	746	184	86	837, 989. 743
	38	102	3413	5762	715	262	79	839, 849. 331
	39	075	3333	6165	683	339	73	841, 708. 922
	40	8. 50841048	8. 50873253	1. 856569	2. 18652	7. 01416	7. 3066	7, 843, 568. 517
	41	8. 50841022	3173	6972	620	494	59	845, 428. 115
	42	8. 50840995	3093	7376	589	572	52	847, 287. 717
	43	968	3013	7780	557	650	46	849, 147. 322
	44	942	2933	8185	525	728	39	851, 006. 930
	45	915	2853	8589	494	806	32	852, 866. 542
	46	889	2773	8994	462	884	25	854, 726. 158
	47	862	2694	9399	430	7. 01962	18	856, 585. 776
	48	835	2614	1. 859804	398	7. 02040	12	858, 445. 398
	49	809	2535	1. 860210	367	118	7. 3005	860, 305. 024
	50	8. 50840782	8. 50872455	1. 860616	2. 18335	7. 02196	7. 2998	7, 862, 164. 653
	51	756	2376	1023	303	274	91	864, 024. 285
	52	729	2296	1430	271	353	84	865, 883. 921
	53	703	2217	1837	239	431	77	867, 743. 560
	54	677	2138	2244	207	510	70	869, 603. 203
	55	650	2058	2652	175	588	64	871, 462. 849
	56	624	1979	3060	142	667	57	873, 322. 498
	57	597	1900	3468	110	746	50	875, 182. 150
	58	571	1821	3877	078	824	43	877, 041. 807
	59	545	1742	4286	046	903	36	878, 901. 466
71	00	8. 50840518	8. 50871663	1. 864695	2. 18014	7. 02982	7. 2929	7, 880, 761. 130

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 71°–72°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
71 00	8.50840518	8.50871663	1.864695	2.18014	7.02982	7.2929	7,880,761.130
1	492	1584	5105	2.17981	7.03061	22	882,620.796
2	466	1505	5515	949	140	15	884,480.466
3	440	1427	5925	917	219	08	886,340.139
4	413	1348	6335	884	298	7.2902	888,199.815
05	387	1269	6745	852	377	7.2895	890,059.495
6	361	1191	7156	819	456	88	891,919.178
7	335	1112	7567	787	536	81	893,778.864
8	309	1034	7979	754	615	74	895,638.554
9	282	0955	8391	722	695	67	897,498.247
10	8.50840256	8.50870877	1.868803	2.17689	7.03774	7.2860	7,899,357.944
11	230	0799	9216	656	854	53	901,217.644
12	204	0720	1.869629	624	7.03934	46	903,077.347
13	178	0642	1.870042	591	7.04013	39	904,937.054
14	152	0564	0456	558	093	32	906,796.764
15	126	0486	0870	525	173	25	908,656.477
16	100	0408	1284	492	253	18	910,516.194
17	074	0330	1699	459	333	11	912,375.914
18	048	0252	2113	426	413	7.2804	914,235.637
19	8.50840022	0175	2528	393	493	7.2797	916,095.364
20	8.50839996	8.50870097	1.872944	2.17360	7.04573	7.2790	7,917,955.094
21	970	8.50870019	3360	327	653	83	919,814.827
22	945	8.50869941	3776	294	734	76	921,674.564
23	919	9864	4192	261	814	68	923,534.304
24	893	9786	4609	228	895	61	925,394.047
25	867	9709	5026	194	7.04975	54	927,253.794
26	841	9631	5443	161	7.05056	47	929,113.544
27	815	9554	5861	128	136	40	930,973.297
28	790	9477	6279	094	217	33	932,833.053
29	764	9400	6697	061	298	26	934,692.813
30	8.50839738	8.50869322	1.877116	2.17027	7.05379	7.2719	7,936,552.576
31	713	9245	7534	2.16994	460	12	938,412.343
32	687	9168	7953	960	541	7.2704	940,272.113
33	661	9091	8373	927	622	7.2697	942,131.886
34	636	9014	8793	893	703	90	943,991.662
35	610	8938	9213	860	784	83	945,851.442
36	584	8861	1.879634	826	865	76	947,711.225
37	559	8784	1.880055	792	7.05947	69	949,571.011
38	533	8707	0476	758	7.06028	62	951,430.800
39	508	8631	0898	724	110	54	953,290.593
40	8.50839482	8.50868554	1.881320	2.16691	7.06191	7.2647	7,955,150.389
41	457	8478	1742	657	273	40	957,010.188
42	431	8401	2165	623	354	33	958,869.991
43	406	8325	2588	589	436	26	960,729.797
44	380	8248	3011	555	518	18	962,589.606
45	355	8172	3434	521	600	11	964,449.418
46	329	8096	3858	486	682	7.2604	966,309.234
47	304	8020	4283	452	764	7.2596	968,169.053
48	279	7944	4707	418	846	89	970,028.875
49	253	7868	5132	384	7.06928	82	971,888.701
50	8.50839228	8.50867792	1.885557	2.16350	7.07010	7.2575	7,973,748.530
51	203	7716	5983	315	093	67	975,608.362
52	177	7640	6409	281	175	60	977,468.197
53	152	7564	6835	247	258	53	979,328.035
54	127	7488	7262	212	340	46	981,187.877
55	102	7413	7689	178	423	38	983,047.722
56	076	7337	8116	143	505	31	984,907.570
57	051	7262	8544	108	588	24	986,767.422
58	026	7186	8972	074	671	16	988,627.276
59	8.50839001	7111	9400	039	754	09	990,487.134
72 00	8.50838976	8.50867035	1.889829	2.16004	7.07837	7.2501	7,992,346.995

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 72°–73°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
72 00	8.50838976	8.50867035	1.889829	2.16004	7.07837	7.2501	7,992,346.995
1	951	6960	1.890258	2.15970	7.07920	7.2494	994,206.859
2	926	6885	0687	935	7.08003	87	996,066.727
3	901	6810	1117	900	086	79	997,926.598
4	876	6734	1547	865	169	72	999,786.472
05	851	6659	1978	830	253	64	8,001,646.349
6	826	6584	2408	795	336	57	003,506.230
7	801	6509	2839	760	420	50	005,366.113
8	776	6435	3271	725	503	42	007,226.000
9	751	6360	3703	690	587	35	009,085.890
10	8.50838726	8.50866285	1.894135	2.15655	7.08670	7.2427	8,010,945.783
11	701	6210	4567	620	754	20	012,805.680
12	676	6136	5000	585	838	12	014,665.580
13	651	6061	5433	550	7.08922	7.2405	016,525.483
14	626	5987	5867	514	7.09006	7.2398	018,385.389
15	601	5912	6301	479	090	90	020,245.298
16	577	5838	6735	443	174	82	022,105.210
17	552	5763	7170	408	258	75	023,965.126
18	527	5689	7605	372	342	68	025,825.045
19	502	5615	8040	337	427	60	027,684.967
20	8.50838478	8.50865541	1.898476	2.15301	7.09512	7.2352	8,029,544.892
21	453	5467	8912	266	596	45	031,404.820
22	428	5393	9348	230	681	37	033,264.752
23	404	5319	1.899785	194	765	30	035,124.687
24	379	5245	1.900222	159	850	22	036,984.625
25	354	5171	0660	123	7.09935	15	038,844.566
26	330	5097	1098	087	7.10020	07	040,704.510
27	305	5023	1536	051	104	7.2300	042,564.457
28	281	4950	1974	2.15015	190	7.2292	044,424.408
29	256	4876	2413	2.14979	275	84	046,284.361
30	8.50838232	8.50864802	1.902853	2.14943	7.10360	7.2277	8,048,144.318
31	207	4729	3292	907	445	69	050,004.278
32	183	4656	3732	871	530	62	051,864.241
33	158	4582	4173	835	616	54	053,724.207
34	134	4509	4614	799	701	46	055,584.177
35	109	4436	5055	763	787	39	057,444.149
36	085	4362	5496	726	872	31	059,304.125
37	060	4289	5938	690	7.10958	23	061,164.104
38	036	4216	6381	654	7.11044	16	063,024.086
39	8.50838012	4143	6823	617	130	08	064,884.071
40	8.50837988	8.50864070	1.907266	2.14581	7.11216	7.2200	8,066,744.059
41	963	3997	7711	544	302	7.2192	068,604.050
42	939	3925	8154	508	388	85	070,464.044
43	915	3852	8598	471	474	77	072,324.042
44	890	3779	9043	434	561	69	074,184.043
45	866	3707	9488	398	647	62	076,044.047
46	842	3634	1.909933	361	733	54	077,904.053
47	818	3561	1.910379	324	820	46	079,764.063
48	794	3489	0825	287	906	38	081,624.076
49	770	3417	1271	250	7.11993	30	083,484.093
50	8.50837746	8.50863344	1.911718	2.14214	7.12080	7.2123	8,085,344.112
51	721	3272	2165	176	167	15	087,204.134
52	697	3200	2613	140	254	7.2107	089,064.160
53	673	3128	3061	102	341	7.2099	090,924.188
54	649	3056	3509	065	428	92	092,784.220
55	625	2984	3958	2.14028	515	84	094,644.255
56	601	2912	4407	2.13991	602	76	096,504.293
57	577	2840	4856	954	689	68	098,364.334
58	553	2768	5306	916	777	60	100,224.378
59	529	2696	5756	879	864	52	102,084.425
73 00	8.50837506	8.50862624	1.916207	2.13842	7.12952	7.2044	8,103,944.475

The characteristics of log A′, log B, log C, and log D have been increased by 10. Characteristics of log E and log F have been increased by 20.

LATITUDE 73°–74°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
73 00	8.50837506	8.50862624	1.916207	2.13842	7.12952	7.2044	8,103,944.475
1	482	2553	6658	804	7.13039	36	105,804.528
2	458	2481	7109	767	127	29	107,664.584
3	434	2410	7561	729	215	21	109,524.643
4	410	2338	8013	692	303	13	111,384.706
05	386	2267	8466	654	391	7.2005	113,244.771
6	363	2195	8919	616	479	7.1997	115,104.840
7	339	2124	9373	579	567	89	116,964.911
8	315	2053	1.919827	541	655	81	118,824.986
9	291	1982	1.920281	503	743	73	120,685.063
10	8.50837268	8.50861911	1.920736	2.13465	7.13832	7.1965	8,122,545.144
11	244	1840	1191	427	7.13920	57	124,405.228
12	220	1769	1646	389	7.14009	49	126,265.315
13	197	1698	2102	351	097	41	128,125.405
14	173	1627	2558	313	186	33	129,985.498
15	149	1556	3015	275	275	25	131,845.593
16	126	1486	3472	237	364	17	133,705.692
17	102	1415	3929	199	452	09	135,565.794
18	079	1344	4387	161	542	7.1901	137,425.899
19	055	1274	4845	122	631	7.1893	139,286.007
20	8.50837032	8.50861203	1.925304	2.13084	7.14720	7.1885	8,141,146.118
21	8.50837008	1133	5763	046	809	77	143,006.232
22	8.50836985	1063	6222	2.13007	899	69	144,866.349
23	961	0992	6682	2.12969	7.14988	61	146,726.469
24	938	0922	7142	930	7.15078	53	148,586,593
25	915	0852	7604	892	167	45	150,446.719
26	891	0782	8065	853	257	36	152,306.848
27	868	0712	8526	814	347	28	154,166.980
28	845	0642	8988	776	437	20	156,027.115
29	821	0572	9451	737	527	12	157,887.253
30	8.50836798	8.50860502	1.929913	2.12698	7.15617	7.1804	8,159,747.394
31	775	0432	1.930376	659	707	7.1796	161,607.538
32	752	0363	0840	620	797	88	163,467.685
33	728	0293	1304	581	887	79	165,327.835
34	705	0223	1768	542	7.15978	71	167,187.988
35	682	0154	2233	503	7.16068	63	169,048,144
36	659	0084	2698	464	159	55	170,908.303
37	636	8.50860015	3164	425	249	47	172,768.465
38	613	8.50859946	3630	385	340	38	174,628.630
39	589	9876	4097	346	431	30	176,488.798
40	8.50836566	8.50859807	1.934564	2.12307	7.16522	7.1722	8,178,348.969
41	543	9738	5032	267	613	14	180,209.142
42	520	9669	5499	228	704	7.1705	182,069.319
43	497	9600	5967	188	795	7.1697	183,929.499
44	474	9531	6436	149	886	89	185,789.682
45	451	9462	6905	109	7.16978	80	187,649.867
46	428	9393	7375	070	7.17069	72	189,510.056
47	405	9324	7844	2.12030	161	64	191,370.247
48	383	9256	8315	2.11990	252	56	193,230.442
49	360	9187	8786	950	344	47	195,090.639
50	8.50836337	8.50859118	1.939257	2.11911	7.17436	7.1639	8,196,950.840
51	314	9050	1.939729	871	528	30	198,811.043
52	291	8981	1.940201	831	620	22	200,671.249
53	268	8913	0674	791	712	14	202,531.458
54	246	8845	1147	751	804	7.1605	204,391.670
55	223	8776	1620	711	897	7.1597	206,251.885
56	200	8708	2094	670	7.17989	89	208,112.103
57	177	8640	2568	630	7.18081	80	209,972.324
58	155	8572	3043	590	174	72	211,832.548
59	132	8504	3518	550	267	63	213,692.775
74 00	8.50836109	8.50858436	1.943994	2.11509	7.18359	7.1555	8,215,553.004

The characteristics of log A′, log B, log C, and log D have been increased by 10. Characteristics of log E and log F have been increased by 20.

LATITUDE 74°-75°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
74 00	8. 50836109	8. 50858436	1. 943994	2. 11509	7. 18359	7. 1555	8, 215, 553. 004
1	087	8368	4470	469	452	46	217, 413. 237
2	064	8300	4947	428	545	38	219, 273. 472
3	041	8232	5424	388	638	30	221, 133. 711
4	8. 50836019	8165	5901	347	731	21	222, 993. 952
05	8. 50835996	8097	6379	307	824	12	224, 854. 196
6	974	8029	6857	266	7. 18918	7. 1504	226, 714. 443
7	951	7962	7336	225	7. 19011	7. 1496	228, 574. 693
8	929	7894	7815	184	104	87	230, 434. 946
9	906	7827	8295	144	198	78	232, 295. 201
10	8. 50835884	8. 50857760	1. 948775	2. 11103	7. 19292	7. 1470	8, 234, 155. 460
11	862	7692	9255	062	385	61	236, 015. 721
12	839	7625	1. 949737	2. 11021	479	53	237, 875. 986
13	817	7558	1. 950219	2. 10980	573	44	239, 736. 253
14	794	7491	0701	939	667	36	241, 596. 523
15	772	7424	1183	898	761	27	243, 456. 796
16	750	7357	1666	856	855	18	245, 317. 072
17	727	7290	2149	815	7. 19950	10	247, 177. 351
18	705	7223	2633	774	7. 20044	7. 1401	249, 037. 632
19	683	7157	3117	732	139	7. 1392	250, 897. 917
20	8. 50835661	8. 50857090	1. 953602	2. 10691	7. 20233	7. 1384	8, 252, 758. 204
21	638	7023	4088	650	328	75	254, 618. 494
22	616	6957	4573	608	423	66	256, 478. 787
23	594	6890	5059	566	518	58	258, 339. 083
24	572	6824	5546	525	613	49	260, 199. 382
25	550	6757	6033	483	708	40	262, 059. 683
26	528	6691	6520	441	803	32	263, 919. 988
27	506	6625	7008	399	898	23	265, 780. 295
28	484	6559	7497	358	7. 20994	14	267, 640. 605
29	462	6492	7985	316	7. 21089	7. 1306	269, 500. 918
30	8. 50835440	8. 50856426	1. 958476	2. 10274	7. 21184	7. 1297	8, 271, 361. 233
31	418	6360	8965	232	280	88	273, 221. 552
32	396	6295	9456	190	376	79	275, 081. 874
33	374	6229	1. 959947	147	472	70	276, 942. 198
34	352	6163	1. 960438	105	568	62	278, 802. 525
35	330	6097	0929	063	664	53	280, 662. 855
36	308	6031	1422	2. 10021	760	44	282, 523. 187
37	286	5966	1914	2. 09978	856	35	284, 383. 523
38	264	5900	2409	936	7. 21952	26	286, 243. 861
39	242	5835	2902	893	7. 22049	18	288, 104. 202
40	8. 50835221	8. 50855769	1. 963396	2. 09851	7. 22146	7. 1209	8, 289, 964. 546
41	199	5704	3891	808	242	7. 1200	291, 824. 892
42	177	5639	4386	766	339	7. 1191	293, 685. 242
43	155	5574	4882	723	436	82	295, 545. 594
44	134	5508	5378	680	533	73	297, 405. 949
45	112	5443	5874	637	630	64	299, 266. 307
46	090	5378	6372	594	727	55	301, 126. 668
47	068	5313	6870	552	824	46	302, 987. 031
48	047	5248	7368	508	7. 22922	37	304, 847. 397
49	025	5184	7867	465	7. 23019	28	306, 707. 766
50	8. 50835004	8. 50855119	1. 968366	2. 09422	7. 23117	7. 1119	8, 308, 568. 138
51	8. 50834982	5054	8865	379	215	10	310, 428. 513
52	961	4989	9365	336	312	7. 1101	312, 288. 890
53	939	4925	1. 969867	293	410	7. 1092	314, 149. 270
54	918	4860	1. 970368	249	508	83	316, 009. 653
55	896	4796	0869	206	606	74	317, 870. 039
56	875	4731	1371	162	705	65	319, 730. 427
57	853	4667	1874	119	803	56	321, 590. 818
58	832	4603	2377	075	7. 23901	47	323, 451. 212
59	810	4539	2880	2. 09032	7. 24000	38	325, 311. 609
75 00	8. 50834789	8. 50854475	1. 973386	2. 08988	7. 24098	7. 1029	8, 327, 172. 008

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 75°–76°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
75 00	8.50834789	8.50854475	1.973386	2.08988	7.24098	7.1029	8,327,172.008
1	768	4410	3890	944	197	20	329,032.410
2	746	4346	4395	900	296	11	330,892.815
3	725	4283	4901	857	395	7.1002	332,753.223
4	704	4219	5407	813	494	7.0993	334,613.633
05	682	4155	5914	769	593	84	336,474.046
6	661	4091	6421	725	692	74	338,334.462
7	640	4027	6929	680	791	65	340,194.880
8	619	3964	7437	636	891	56	342,055.301
9	597	3900	7946	592	7.24990	47	343,915.725
10	8.50834576	8.50853837	1.978455	2.08548	7.25090	7.0938	8,345,776.152
11	555	3773	8965	504	190	28	347,636.582
12	534	3710	9475	459	290	19	349,497.014
13	513	3647	1.979987	415	390	10	351,357.449
14	492	3584	1.980498	370	490	7.0901	353,217.886
15	471	3520	1010	326	590	7.0891	355,078.326
16	450	3457	1523	281	690	82	356,938.769
17	429	3394	2036	236	791	73	358,799.215
18	408	3331	2549	191	891	64	360,659.663
19	387	3268	3063	147	7.25992	54	362,520.114
20	8.50834366	8.50853206	1.983579	2.08102	7.26093	7.0845	8,364,380.568
21	345	3143	4094	057	194	36	366,241.025
22	324	3080	4609	2.08012	294	26	368,101.484
23	303	3017	5125	2.07967	396	17	369,961.946
24	282	2955	5642	922	497	7.0808	371,822.410
25	262	2892	6159	876	598	7.0798	373,682.877
26	241	2830	6678	831	700	89	375,543.347
27	220	2768	7196	786	801	79	377,403.820
28	199	2705	7715	740	7.26903	70	379,264.295
29	178	2643	8234	695	7.27004	60	381,124.773
30	8.50834158	8.50852581	1.988754	2.07649	7.27106	7.0751	8,382,985.253
31	137	2519	9274	604	208	42	384,845.736
32	116	2457	1.989796	558	310	32	386,706.222
33	096	2395	1.990318	512	413	23	388,566.711
34	075	2333	0840	467	515	13	390,427.202
35	054	2271	1363	421	617	7.0704	392,287.696
36	034	2209	1886	375	720	7.0694	394,148.192
37	8.50834013	2147	2411	329	822	85	396,008.691
38	8.50833993	2086	2935	283	7.27925	75	397,869.193
39	972	2024	3460	237	7.28028	66	399,729.698
40	8.50833952	8.50851962	1.993985	2.07191	7.28131	7.0656	8,401,590.205
41	931	1901	4511	145	234	46	403,450.715
42	911	1840	5038	098	338	37	405,311.227
43	890	1778	5566	052	441	27	407,171.742
44	870	1717	6093	2.07006	544	18	409,032.259
45	849	1656	6622	2.06959	648	7.0608	410,892.779
46	829	1595	7150	913	752	7.0598	412,753.302
47	809	1534	7680	866	855	89	414,613.828
48	788	1473	8211	819	7.28959	79	416,474.356
49	768	1412	8741	773	7.29063	70	418,334.886
50	8.50833748	8.50851351	1.999272	2.06726	7.29168	7.0560	8,420,195.419
51	727	1290	1.999804	679	272	50	422,055.955
52	707	1229	2.000336	632	376	40	423,916.494
53	687	1169	0869	585	481	31	425,777.035
54	667	1108	1403	538	585	21	427,637.579
55	647	1047	1937	491	690	11	429,498.125
56	626	0987	2472	444	795	7.0501	431,358.674
57	606	0926	3007	397	7.29900	7.0492	433,219.225
58	586	0866	3543	349	7.30005	82	435,079.779
59	566	0806	4080	302	110	72	436,940.336
76 00	8.50833546	8.50850746	2.004617	2.06254	7.30216	7.0462	8,438,800.895

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 76°–77°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
76 00	8.50833546	8.50850746	2.004617	2.06254	7.30216	7.0462	8,438,800.895
1	526	0685	5154	207	321	52	440,661.457
2	506	0625	5692	159	427	43	442,522.021
3	486	0565	6231	112	532	33	444,382.588
4	466	0505	6771	064	638	23	446,243.158
05	446	0445	7311	2.06016	744	13	448,103.730
6	426	0386	7852	2.05968	850	7.0403	449,964.305
7	406	0326	8393	920	7.30956	7.0393	451,824.882
8	386	0266	8934	872	7.31063	83	453,685.461
9	366	0207	2.009478	824	169	73	455,546.043
10	8.50833346	8.50850147	2.010020	2.05776	7.31276	7.0363	8,457,406.628
11	327	0088	0564	728	382	53	459,267.216
12	307	8.50850028	1108	680	489	44	461,127.806
13	287	8.50849969	1653	632	596	34	462,988.398
14	267	9909	2199	583	703	24	464,848.993
15	247	9850	2745	535	810	14	466,709.591
16	228	9791	3291	486	7.31918	7.0304	468,570.191
17	208	9732	3838	438	7.32025	7.0293	470,430.794
18	188	9673	4387	389	133	83	472,291.399
19	169	9614	4935	340	241	73	474,152.007
20	8.50833149	8.50849555	2.015484	2.05291	7.32348	7.0263	8,476,012.617
21	129	9496	6034	242	456	53	477,873.230
22	110	9437	6584	194	564	43	479,733.845
23	090	9379	7136	144	673	33	481,594.463
24	071	9320	7687	095	781	23	483,455.083
25	051	9262	8240	2.05046	889	13	485,315.706
26	032	9203	8792	2.04997	7.32998	7.0202	487,176.331
27	8.50833012	9145	9346	948	7.33107	7.0192	489,036.959
28	8.50832993	9086	2.019900	898	216	82	490,897.589
29	973	9028	2.020455	849	325	72	492,758.222
30	8.50832954	8.50848970	2.021010	2.04799	7.33434	7.0162	8,494,618.857
31	935	8911	1566	750	543	52	496,479.495
32	915	8853	2124	700	652	41	498,340.136
33	896	8795	2681	650	762	31	500,200.779
34	877	8737	3239	601	871	21	502,061.424
35	857	8679	3797	551	7.33981	10	503,922.072
36	838	8622	4357	501	7.34091	7.0100	505,782.722
37	819	8564	4917	451	201	7.0090	507,643.375
38	799	8506	5477	401	311	80	509,504.030
39	780	8448	6038	350	422	69	511,364.687
40	8.50832761	8.50848391	2.026600	2.04300	7.34532	7.0059	8,513,225.347
41	742	8333	7163	250	642	48	515,086.010
42	723	8276	7726	200	753	38	516,946.675
43	704	8219	8290	149	864	28	518,807.343
44	684	8161	8854	099	7.34975	17	520,668.013
45	665	8104	9420	2.04048	7.35086	7.0007	522,528.685
46	646	8047	2.029985	2.03997	197	6.9996	524,389.360
47	627	7990	2.030552	946	309	86	526,250.037
48	608	7933	1118	896	420	76	528,110.717
49	589	7876	1687	845	532	65	529,971.399
50	8.50832570	8.50847819	2.032255	2.03794	7.35644	6.9954	8,531,832.084
51	551	7762	2824	743	755	44	533,692.771
52	532	7705	3394	692	868	33	535,553.461
53	514	7649	3965	641	7.35980	23	537,414.153
54	495	7592	4536	589	7.36092	12	539,274.847
55	476	7535	5108	538	204	6.9902	541,135.544
56	457	7479	5680	486	317	6.9891	542,996.243
57	438	7422	6254	435	430	81	544,856.945
58	419	7366	6827	383	543	70	546,717.649
59	401	7310	7402	332	656	59	548,578.355
77 00	8.50832382	8.50847253	2.037977	2.03280	7.36769	6.9849	8,550,439.064

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 77°-78°

Lat.		log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
°	′							*Meters*
77	00	8.50832382	8.50847253	2.037977	2.03280	7.36769	6.9849	8,550,439.064
	1	363	7197	8554	228	882	38	552,299.775
	2	344	7141	9130	176	7.36996	27	554,160.489
	3	326	7085	2.039707	124	7.37109	17	556,021.205
	4	307	7029	2.040285	072	223	6.9806	557,881.924
	05	288	6973	0864	2.03020	337	6.9795	559.742.645
	6	270	6917	1443	2.02968	451	84	561,603.368
	7	251	6862	2023	916	565	74	563,464.094
	8	233	6806	2604	863	679	63	565.324.822
	9	214	6750	3186	811	794	52	567,185.552
	10	8.50832196	8.50846695	2.043768	2.02758	7.37908	6.9741	8,569,046.285
	11	177	6639	4351	706	7.38023	31	570,907.020
	12	159	6584	4934	653	138	20	572,767.758
	13	140	6528	5519	600	253	6.9709	574,628.498
	14	122	6473	6104	548	368	6.9698	576,489.240
	15	103	6418	6690	495	483	87	578,349.985
	16	085	6363	7276	442	598	76	580,210.732
	17	067	6308	7864	389	714	65	582,071.481
	18	048	6253	8452	336	830	54	583,932.233
	19	030	6198	9040	282	7.38946	44	585,792.987
	20	8.50832012	8.50846143	2.049629	2.02229	7.39062	6.9633	8,587,653.744
	21	8.50831993	6088	2.050220	176	178	22	589,514.503
	22	975	6033	0811	122	294	11	591,375.264
	23	957	5979	1402	069	411	6.9600	593,236.028
	24	939	5924	1995	2.02015	527	6.9589	595,096.794
	25	921	5869	2588	2.01962	644	78	596,957.562
	26	902	5815	3181	908	761	67	598,818.332
	27	884	5760	3776	854	878	56	600,679.105
	28	866	5706	4372	800	7.39995	44	602,539,880
	29	848	5652	4967	746	7.40113	33	604,400.658
	30	8.50831830	8.50845598	2.055564	2.01692	7.40230	6.9522	8,606,261.438
	31	812	5543	6161	638	348	11	608,122.220
	32	794	5489	6760	583	466	6.9500	609,983.005
	33	776	5435	7359	529	584	6.9489	611,843.792
	34	758	5381	7958	474	702	78	613,704.581
	35	740	5328	8559	420	820	66	615,565.372
	36	722	5274	9160	365	7.40939	55	617,426.166
	37	704	5220	2.059762	311	7.41057	44	619,286.962
	38	686	5166	2.060365	256	176	33	621,147.760
	39	668	5113	0969	201	295	22	623,008.561
	40	8.50831650	8.50845059	2.061573	2.01146	7.41414	6.9410	8,624,869.364
	41	633	5006	2178	091	533	6.9399	626,730.169
	42	615	4952	2784	2.01036	653	88	628,590.977
	43	597	4899	3391	2.00981	772	76	630,451.787
	44	579	4846	3998	926	7.41892	65	632,312.599
	45	562	4792	4606	870	7.42012	54	634,173.413
	46	544	4739	5215	815	132	42	636,034.230
	47	526	4686	5825	759	252	31	637,895.049
	48	508	4633	6435	704	372	20	639,755.870
	49	491	4580	7047	648	493	6.9308	641,616.693
	50	8.50831473	8.50844527	2.067659	2.00592	7.42614	6.9297	8,643,477.519
	51	456	4475	8271	536	734	85	645,338.347
	52	438	4422	8886	480	855	74	647,199.177
	53	420	4369	2.069500	424	7.42976	62	649,060.010
	54	403	4317	2.070115	368	7.43098	51	650.920.845
	55	385	4264	0731	312	219	39	652,781.682
	56	368	4212	1348	256	341	28	654,642.521
	57	350	4159	1966	199	462	16	656,503.363
	58	333	4107	2584	142	585	6.9204	658,364.207
	59	316	4055	3204	086	707	6.9193	660,225.053
78	00	8.50831298	8.50844002	2.073824	2.00029	7.43829	6.9181	8,662.085.901

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 78°–79°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
78 00	8.50831298	8.50844002	2.073824	2.00029	7.43829	6.9181	8,662,085.901
1	281	3950	4444	1.99972	7.43951	70	663,946.752
2	264	3898	5067	916	7.44074	58	665,807.604
3	246	3846	5689	859	197	46	667,668.459
4	229	3794	6312	802	320	35	669,529.317
05	212	3743	6936	745	443	23	671,390.176
6	194	3691	7561	687	566	11	673,251.038
7	177	3639	8187	630	690	6.9100	675,111.902
8	160	3587	8813	573	813	6.9088	676,972.768
9	143	3536	2.079441	515	7.44937	76	678,833.636
10	8.50831126	8.50843484	2.080069	1.99458	7.45061	6.9064	8,680,694.506
11	108	3433	0698	400	185	52	682,555.379
12	091	3382	1329	342	309	41	684,416.254
13	074	3330	1959	284	434	29	686,277.131
14	057	3279	2591	226	558	17	688,138.010
15	040	3228	3224	168	683	6.9005	689,998.892
16	023	3177	3857	110	808	6.8993	691,859.775
17	8.50831006	3126	4491	1.99052	7.45933	81	693,720.661
18	8.50830989	3075	5127	1.98994	7.46059	69	695,581.549
19	972	3024	5762	935	184	57	697,442.439
20	8.50830955	8.50842973	2.086399	1.98877	7.46310	6.8945	8,699,303.332
21	938	2922	7037	818	436	33	701,164.226
22	921	2872	7675	760	562	21	703,025.123
23	904	2821	8314	701	688	6.8909	704,886.022
24	888	2771	8955	642	814	6.8897	706,746.923
25	871	2720	2.089596	583	7.46941	85	708,607.827
26	854	2670	2.090238	524	7.47068	73	710,468.732
27	837	2619	0881	465	194	61	712,329.640
28	820	2569	1525	406	321	49	714,190.549
29	804	2519	2169	346	449	37	716,051.461
30	8.50830787	8.50842469	2.092814	1.98287	7.47576	6.8825	8,717,912.375
31	770	2419	3461	227	704	13	719,773.291
32	754	2369	4108	168	832	6.8800	721,634.210
33	737	2319	4756	108	7.47960	6.8788	723,495.130
34	720	2269	5406	1.98048	7.48088	76	725,356.053
35	704	2219	6056	1.97988	216	64	727,216.978
36	687	2169	6706	928	345	51	729,077.905
37	671	2120	7359	868	473	39	730,938.834
38	654	2070	8011	808	602	27	732,799.765
39	638	2021	8665	748	731	14	734,660.698
40	8.50830621	8.50841971	2.099320	1.97687	7.48861	6.8702	8,736,521.633
41	605	1922	2.099975	627	7.48990	6.8690	738,382.571
42	588	1872	2.100632	566	7.49120	77	740,243.510
43	572	1823	1289	505	250	65	742,104.452
44	555	1774	1946	444	380	53	743,965.396
45	539	1725	2606	384	510	40	745,826.342
46	523	1676	3266	322	640	28	747,687.290
47	506	1627	3926	261	771	15	749,548.240
48	490	1578	4589	200	7.49902	6.8603	751,409.192
49	474	1529	5252	139	7.50032	6.8590	753,270.146
50	8.50830458	8.50841480	2.105915	1.97077	7.50164	6.8578	8,755,131.103
51	441	1432	6580	1.97016	295	65	756,992.061
52	425	1383	7246	1.96954	426	52	758,853.022
53	409	1335	7912	893	558	40	760,713.985
54	393	1286	8580	831	690	27	762,574.950
55	377	1238	9248	769	822	15	764,435,916
56	361	1189	2.109918	707	7.50955	6.8502	766,296.885
57	344	1141	2.110589	645	7.51087	6.8489	768,157.856
58	328	1093	1260	582	220	77	770,018.829
59	312	1045	1932	520	353	64	771,879.804
79 00	8.50830296	8.50840997	2.112606	1.96458	7.51486	6.8451	8,773,740.781

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 79°–80°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
79 00	8. 50830296	8. 50840997	2. 112606	1. 96458	7. 51486	6. 8451	8, 773, 740. 781
1	280	0949	3280	395	619	38	775, 601. 761
2	264	0901	3956	332	752	26	777, 462. 742
3	248	0853	4632	270	7. 51886	13	779, 323. 725
4	232	0805	5308	207	7. 52020	6. 8400	781, 184. 711
05	217	0757	5987	144	154	6. 8387	783, 045. 698
6	201	0710	6666	081	288	74	784, 906. 688
7	185	0662	7346	1. 96017	423	61	786, 767. 679
8	169	0615	8028	1. 95954	558	48	788, 628. 673
9	153	0567	8710	891	692	36	790, 489. 668
10	8. 50830137	8. 50840520	2. 119393	1. 95827	7. 52828	6. 8323	8, 792, 350. 666
11	122	0472	2. 120077	764	7. 52963	6. 8310	794, 211. 665
12	106	0425	0762	700	7. 53098	6. 8297	796, 072. 667
13	090	0378	1449	636	234	84	797, 933. 671
14	074	0331	2136	572	370	71	799, 794. 677
15	059	0284	2824	508	506	58	801, 655. 684
16	043	0237	3514	444	642	44	803, 516. 694
17	027	0190	4204	380	779	31	805, 377. 706
18	8. 50830012	0143	4895	315	7. 53916	18	807, 238. 719
19	8. 50829996	0097	5588	251	7. 54052	6. 8205	809, 099. 735
20	8. 50829981	8. 50840050	2. 126281	1. 95186	7. 54190	6. 8192	8, 810, 960. 753
21	965	8. 50840003	6976	121	327	79	812, 821. 773
22	950	8. 50839957	7671	1. 95056	464	66	814, 682. 794
23	934	9910	8367	1. 94992	602	52	816, 543. 818
24	919	9864	9065	927	740	39	818, 404. 844
25	903	9818	2. 129763	861	7. 54878	26	820, 265. 872
26	888	9771	2. 130463	796	7. 55017	6. 8112	822, 126. 902
27	872	9725	1164	731	156	6. 8099	823, 987. 933
28	857	9679	1865	665	294	86	825, 848. 967
29	842	9633	2569	600	434	72	827, 710. 002
30	8. 50829826	8. 50839587	2. 133272	1. 94534	7. 55573	6. 8059	8, 829, 571. 040
31	811	9541	3977	468	712	46	831, 432. 080
32	796	9495	4683	402	852	32	833, 293. 121
33	780	9449	5390	336	7. 55992	19	835, 154. 165
34	765	9404	6099	270	7. 56132	6. 8005	837, 015. 210
35	750	9358	6808	204	272	6. 7992	838, 876. 258
36	735	9312	7518	137	413	78	840, 737. 307
37	720	9267	8230	071	554	65	842, 598. 358
38	705	9221	8942	1. 94004	695	51	844, 459. 412
39	689	9176	2. 139656	1. 93937	836	38	846, 320. 467
40	8. 50829674	8. 50839131	2. 140371	1. 93870	7. 56978	6. 7924	8, 848, 181. 524
41	659	9086	1086	803	7. 57119	6. 7910	850, 042. 583
42	644	9040	1804	736	261	6. 7897	851, 903. 644
43	629	8995	2521	669	403	83	853, 764. 707
44	614	8950	3241	601	546	69	855, 625. 772
45	599	8905	3961	534	688	56	857, 486. 839
46	584	8861	4682	466	831	42	859, 347. 908
47	569	8816	5405	399	7. 57974	28	861, 208. 978
48	554	8771	6128	331	7. 58117	14	863, 070. 051
49	540	8726	6854	263	261	6. 7800	864, 931. 126
50	8. 50829525	8. 50838682	2. 147579	1. 93195	7. 58405	6. 7786	8, 866, 792. 202
51	510	8637	8306	126	548	73	868, 653. 280
52	495	8593	9035	1. 93058	693	59	870, 514. 361
53	480	8548	2. 149764	1. 92990	837	45	872, 375. 443
54	465	8504	2. 150495	921	7. 58982	31	874, 236. 527
55	451	8460	1226	852	7. 59127	17	876, 097. 613
56	436	8416	1959	784	272	6. 7703	877, 958. 701
57	421	8372	2693	715	417	6. 7689	879, 819. 790
58	407	8328	3428	646	563	75	881, 680. 882
59	392	8284	4165	576	709	61	883, 541. 975
80 00	8. 50829377	8. 50838240	2. 154902	1. 92507	7. 59855	6. 7647	8, 885, 403. 071

The characteristics of log A′, log B, log C, and log D, have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 80°-81°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
80 00	8.50829377	8.50838240	2.154902	1.92507	7.59855	6.7647	8,885,403.071
1	363	8196	5642	438	7.60001	632	887,264.168
2	348	8152	6381	368	0148	618	889,125.267
3	334	8108	7122	298	0295	604	890,986.368
4	319	8065	7865	228	0442	590	892,847.471
05	304	8021	8608	158	0589	576	894,708.576
6	290	7978	2.159353	088	0736	562	896,569.683
7	276	7934	2.160099	1.92018	0884	547	898,430.791
8	261	7891	0845	1.91948	1032	533	900,291.901
9	247	7848	1594	877	1180	519	902,153.013
10	8.50829232	8.50837805	2.162343	1.91807	7.61329	6.7504	8,904,014.127
11	218	7762	3095	736	1478	490	905,875.243
12	204	7718	3846	665	1627	476	907,736.361
13	189	7675	4600	594	1776	461	909,597.481
14	175	7633	5354	523	1925	447	911,458.603
15	161	7590	6109	452	2075	432	913,319.726
16	146	7547	6867	380	2225	418	915,180.851
17	132	7504	7625	309	2375	403	917,041.978
18	118	7462	8385	237	2526	389	918,903.106
19	104	7419	9145	166	2677	374	920,764.237
20	8.50829090	8.50837377	2.169908	1.91094	7.62828	6.7359	8,922,625.369
21	075	7334	2.170670	1.91021	2979	345	924,486.504
22	061	7292	1434	1.90949	3130	330	926,347.640
23	047	7250	2201	877	3282	316	928,208.778
24	033	7207	2967	804	3434	301	930,069.917
25	019	7165	3736	732	3587	286	931,931.059
26	8.50829005	7123	4506	659	3739	271	933,792.202
27	8.50828991	7081	5277	586	3892	256	935,653.347
28	977	7039	6049	513	4045	242	937,514.494
29	963	6997	6823	440	4198	227	939,375.643
30	8.50828949	8.50836956	2.177598	1.90367	7.64352	6.7212	8,941,236.793
31	935	6914	8373	293	4506	197	943,097.945
32	921	6872	9151	220	4660	182	944,959.099
33	908	6831	2.179930	146	4815	167	946,820.255
34	894	6789	2.180710	1.90072	4969	152	948,681.413
35	880	6748	1491	1.89998	5124	137	950,542.572
36	866	6706	2275	924	5279	122	952,403.733
37	852	6665	3058	850	5435	107	954,264.896
38	839	6624	3844	776	5591	092	956,126.061
39	825	6583	4631	701	5747	077	957,987.227
40	8.50828811	8.50836542	2.185418	1.89626	7.65903	6.7062	8,959,848.395
41	798	6501	6209	552	6060	046	961,709.565
42	784	6460	6999	476	6217	031	963,570.737
43	770	6419	7792	402	6374	016	965,431.911
44	757	6378	8585	326	6531	6.7001	967,293.086
45	743	6337	2.189381	251	6689	6.6986	969,154.263
46	730	6297	2.190177	175	6847	970	971,015.442
47	716	6256	0975	100	7005	955	972,876.622
48	703	6216	1774	1.89024	7164	939	974,737.804
49	689	6175	2575	1.88948	7322	924	976,598,988
50	8.50828676	8.50836135	2.193377	1.88871	7.67482	6.6909	8,978,460.174
51	662	6094	4179	795	7641	893	980,321.361
52	649	6054	4985	719	7800	878	982,182.550
53	635	6014	5791	642	7960	862	984,043.741
54	622	5974	6599	565	8121	846	985,904.934
55	609	5934	7408	488	8281	831	987,766.128
56	595	5894	8219	412	8442	815	989,627.324
57	582	5854	9030	334	8603	800	991,488.522
58	569	5814	2.199844	257	8765	784	993,349.721
59	556	5775	2.200659	179	8926	768	995,210.922
81 00	8.50828542	8.50835735	2.201476	1.88102	7.69088	6.6752	8,997,072.125

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 81°–82°

Lat.		log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
°	′							*Meters*
81	00	8. 50828542	8. 50835735	2. 201476	1. 88102	7. 69088	6. 6752	8, 997, 072. 125
	1	529	5695	2293	1. 88024	9251	737	8, 998, 933. 330
	2	516	5656	3113	1. 87946	9413	721	9, 000, 794. 536
	3	503	5616	3933	868	9576	705	002, 655. 744
	4	490	5577	4756	790	9739	689	004, 516. 954
	05	477	5538	5579	711	7. 69903	673	006, 378. 165
	6	464	5498	6405	633	7. 70066	658	008, 239. 378
	7	450	5459	7231	554	0230	642	010, 100. 593
	8	437	5420	8059	475	0395	626	011, 961. 809
	9	424	5381	8889	396	0560	610	013, 823. 027
	10	8. 50828411	8. 50835342	2. 209720	1. 87317	7. 70725	6. 6594	9, 015, 684. 246
	11	399	5303	2. 210553	237	0890	577	017, 545. 468
	12	386	5265	1387	158	1056	561	019, 406. 691
	13	373	5226	2223	1. 87078	1222	545	021, 267. 916
	14	360	5187	3060	1. 86998	1388	529	023, 129. 142
	15	347	5149	3900	918	1554	513	024, 990. 370
	16	334	5110	4740	838	1721	496	026, 851. 600
	17	321	5072	5582	758	1888	480	028, 712. 831
	18	308	5033	6426	677	2056	464	030, 574. 064
	19	296	4995	7271	596	2224	448	032, 435. 298
	20	8. 50828283	8. 50834957	2. 218117	1. 86516	7. 72392	6. 6431	9, 034, 296. 534
	21	270	4918	8966	434	2560	415	036, 157. 772
	22	258	4880	2. 219816	353	2729	398	038, 019. 012
	23	245	4842	2. 220668	272	2898	382	039, 880. 253
	24	232	4804	1520	190	3067	366	041, 741. 496
	25	220	4766	2376	109	3237	349	043, 602. 740
	26	207	4729	3232	1. 86027	3407	332	045, 463. 986
	27	194	4691	4090	1. 85945	3578	316	047, 325. 234
	28	182	4653	4949	863	3748	299	049, 186. 483
	29	169	4616	5811	780	3919	282	051, 047. 734
	30	8. 50828157	8. 50834578	2. 226673	1. 85698	7. 74091	6. 6266	9, 052, 908. 986
	31	144	4541	7538	615	4262	249	054, 770. 240
	32	132	4503	8404	532	4434	232	056, 631. 496
	33	119	4466	2. 229272	449	4607	216	058, 492. 753
	34	107	4429	2. 230141	366	4780	199	060, 354. 012
	35	095	4392	1013	283	4952	182	062, 215. 272
	36	082	4354	1885	199	5126	165	064, 076. 534
	37	070	4317	2760	115	5300	148	065, 937. 798
	38	058	4280	3636	1. 85031	5474	131	067, 799. 063
	39	045	4244	4514	1. 84947	5648	114	069, 660. 330
	40	8. 50828033	8. 50834207	2. 235393	1. 84863	7. 75823	6. 6097	9, 071, 521. 598
	41	021	4170	6275	778	5998	080	073, 382. 868
	42	8. 50828009	4133	7158	694	6173	063	075, 244. 140
	43	8. 50827996	4097	8043	609	6349	046	077, 105. 413
	44	984	4060	8929	524	6525	028	078, 966. 688
	45	972	4024	2. 239818	439	6702	6. 6011	080, 827. 964
	46	960	3987	2. 240707	354	6879	6. 5994	082, 689. 242
	47	948	3951	1599	268	7056	977	084, 550. 521
	48	936	3915	2492	182	7233	959	086, 411. 802
	49	924	3879	3388	096	7411	942	088, 273. 084
	50	8. 50827912	8. 50833843	2. 244285	1. 84010	7. 77589	6. 5924	9, 090, 134. 368
	51	900	3807	5184	1. 83924	7768	907	091, 995. 654
	52	888	3771	6085	837	7947	890	093, 856. 941
	53	876	3735	6987	751	8126	872	095, 718. 230
	54	864	3699	7892	664	8306	854	097, 579. 520
	55	852	3663	8797	577	8486	837	099, 440. 812
	56	840	3627	2. 249706	490	8667	819	101, 302. 105
	57	828	3592	2. 250615	402	8848	802	103, 163. 400
	58	816	3556	1527	315	9029	784	105, 024. 696
	59	804	3521	2440	227	9210	766	106, 885. 994
82	00	8. 50827793	8. 50833486	2. 253356	1. 83139	7. 79392	6. 5748	9, 108, 747. 293

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 82°–83°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
82 00	8.50827793	8.50833486	2.253356	1.83139	7.79392	6.5748	9,108,747.293
1	781	3450	4272	1.83051	9574	730	110,608.594
2	769	3415	5191	1.82962	9757	713	112,469.896
3	757	3380	6112	874	7.79940	695	114,331.200
4	746	3345	7035	785	7.80124	677	116,192.505
05	734	3310	7959	696	0307	659	118,053.812
6	722	3275	8886	607	0492	641	119,915.120
7	711	3240	2.259814	517	0676	623	121,776.430
8	699	3205	2.260745	428	0861	605	123,637.742
9	688	3170	1678	338	1046	587	125,499.055
10	8.50827676	8.50833136	2.262611	1.82248	7.81232	6.5568	9,127,360.369
11	664	3101	3548	158	1418	550	129,221.685
12	653	3067	4486	1.82068	1605	532	131,083.002
13	641	3032	5426	1.81977	1792	514	132,944.321
14	630	2998	6367	886	1979	495	134,805.641
15	619	2963	7312	795	2167	477	136,666.963
16	607	2929	8257	704	2355	458	138,528.286
17	596	2895	2.269206	613	2543	440	140,389.611
18	584	2861	2.270155	521	2732	422	142,250.937
19	573	2827	1108	429	2922	403	144,112.264
20	8.50827562	8.50832793	2.272061	1.81337	7.83111	6.5384	9,145,973.593
21	550	2759	3018	245	3302	366	147,834.924
22	539	2725	3976	152	3492	347	149,696.256
23	528	2692	4936	1.81060	3683	328	151,557.589
24	517	2658	5898	1.80967	3874	310	153,418.924
25	505	2624	6862	874	4066	291	155,280.260
26	494	2591	7829	781	4258	272	157,141.598
27	483	2557	8797	687	4451	253	159,002.937
28	472	2524	2.279768	593	4644	234	160,864.278
29	461	2491	2.280740	500	4837	215	162,725.620
30	8.50827450	8.50832457	2.281715	1.80405	7.85031	6.5196	9,164,586.963
31	439	2424	2692	311	5226	177	166,448.308
32	428	2391	3671	216	5420	158	168,309.654
33	417	2358	4652	122	5616	139	170,171.002
34	406	2325	5635	1.80026	5811	120	172,032.351
35	395	2292	6621	1.79931	6007	101	173,893.702
36	384	2260	7608	836	6204	081	175,755.054
36	373	2227	8598	740	6401	062	177,616.407
38	362	2194	2.289589	644	6598	043	179,477.762
39	351	2162	2.290584	548	6796	023	181,339.118
40	8.50827340	8.50832129	2.291581	1.79451	7.86994	6.5004	9,183,200.475
41	330	2097	2579	355	7193	6.4984	185,061.834
42	319	2064	3580	258	7392	965	186,923.194
43	308	2032	4582	161	7591	945	188,784.556
44	297	2000	5588	1.79064	7791	926	190,645.919
45	287	1968	6595	1.78966	7992	906	192,507.283
46	276	1936	7605	868	8193	886	194,368.649
47	265	1904	8618	770	8394	866	196,230.016
48	255	1872	2.299632	672	8596	847	198,091.385
49	244	1840	2.300649	573	8798	827	199,952.755
50	8.50827233	8.50831808	2.301667	1.78475	7.89000	6.4807	9,201,814.126
51	223	1776	2689	376	9205	787	203,675.499
52	212	1745	3712	276	9408	767	205,536.873
53	202	1713	4738	177	9612	747	207,398.248
54	191	1682	5767	1.78077	7.89817	727	209,259.625
55	181	1650	6797	1.77977	7.90022	707	211,121.003
56	170	1619	7831	877	0228	686	212,982.382
57	160	1588	8866	777	0434	666	214,843.763
58	150	1556	2.309904	676	0641	646	216,705.145
59	139	1525	2.310945	575	0848	626	218,566.529
83 00	8.50827129	8.50831494	2.311987	1.77474	7.91055	6.4605	9,220,427.913

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 83°-84°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
83 00	8. 50827129	8. 50831494	2. 311987	1. 77474	7. 91055	6. 4605	9, 220, 427. 913
1	118	1463	3033	372	1263	585	222, 289. 300
2	108	1432	4080	271	1472	564	224, 150. 687
3	098	1401	5130	169	1681	544	226, 012. 076
4	088	1371	6183	1. 77067	1890	523	227, 873. 466
05	077	1340	7238	1. 76964	2100	502	229, 734. 857
6	067	1309	8296	861	2311	482	231, 596. 250
7	057	1279	2. 319355	758	2522	461	233, 457. 644
8	047	1248	2. 320418	655	2734	440	235, 319. 039
9	037	1218	1483	552	2946	419	237, 180. 436
10	8. 50827027	8. 50831188	2. 322551	1. 76448	7. 93158	6. 4398	9, 239, 041. 834
11	016	1157	3622	344	3371	377	240, 903. 233
12	8. 50827006	1127	4694	240	3585	356	242, 764. 633
13	8. 50826996	1097	5770	135	3799	335	244, 626. 035
14	986	1067	6847	1. 76030	4014	314	246, 487. 438
15	976	1037	7928	1. 75925	4229	293	248, 348. 843
16	966	1007	2. 329012	820	4445	272	250, 210. 248
17	956	0977	2. 330097	714	4661	250	252, 071. 655
18	947	0947	1186	608	4878	229	253, 933. 063
19	937	0918	2277	502	5095	208	255, 794. 473
20	8. 50826927	8. 50830888	2. 333371	1. 75396	7. 95313	6. 4186	9, 257, 655. 884
21	917	0859	4468	289	5531	165	259, 517. 296
22	907	0829	5566	182	5750	143	261, 378. 709
23	897	0800	6669	1. 75075	5970	122	263, 240. 124
24	888	0770	7774	1. 74967	6190	100	265, 101. 540
25	878	0741	8881	859	6410	078	266, 962. 957
26	868	0712	2. 339991	751	6631	056	268, 824. 375
27	858	0683	2. 341104	643	6853	035	270, 685. 794
28	849	0654	2220	534	7075	6. 4013	272, 547. 215
29	839	0625	3339	425	7298	6. 3991	274, 408. 637
30	8. 50826829	8. 50830596	2. 344459	1. 74316	7. 97521	6. 3969	9, 276, 270. 060
31	820	0567	5584	206	7745	947	278, 131. 485
32	810	0538	6711	1. 74096	7970	925	279, 992. 911
33	801	0510	7841	1. 73986	8195	902	281, 854. 338
34	791	0481	2. 348974	876	8420	880	283, 715. 766
35	782	0453	2. 350109	765	8647	858	285, 577. 195
36	772	0424	1248	654	8874	836	287, 438. 626
37	763	0396	2390	543	9101	813	289, 300. 058
38	753	0368	3534	431	9329	791	291, 161. 491
39	744	0339	4682	319	9558	768	293, 022. 925
40	8. 50826734	8. 50830311	2. 355831	1. 73207	7. 99787	6. 3746	9, 294, 884, 361
41	725	0283	6985	1. 73094	8. 00017	723	296, 745. 798
42	716	0255	8142	1. 72981	0247	700	298, 607. 236
43	706	0227	2. 359301	868	0478	678	300, 468. 675
44	697	0199	2. 360463	755	0710	655	302, 330. 115
45	688	0172	1629	641	0942	632	304, 191. 557
46	679	0144	2797	527	1175	609	306, 052. 999
47	669	0116	3969	412	1408	586	307, 914. 443
48	660	0089	5143	298	1642	563	309, 775. 888
49	651	0061	6321	183	1877	540	311, 637. 334
50	8. 50826642	8. 50830034	2. 367503	1. 72067	8. 02112	6. 3516	9, 313, 498. 782
51	633	8. 50830006	8686	1. 71952	2348	493	315, 360. 231
52	624	8. 50829979	2. 369874	835	2585	470	317, 221. 681
53	615	952	2. 371065	719	2822	446	319, 083. 132
54	606	925	2258	602	3060	423	320, 944. 584
55	597	898	3455	485	3298	399	322, 806. 037
56	588	871	4655	368	3538	376	324, 667. 491
57	579	844	5858	250	3777	352	326, 528. 947
58	570	817	7065	132	4018	328	328, 390. 403
59	561	790	8274	1. 71014	4259	304	330, 251. 861
84 00	8. 50826552	8. 50829763	2. 379488	1. 70895	8. 04501	6. 3280	9, 332, 113. 320

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 84°-85°

Lat.		log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
°	′							*Meters*
84	00	8. 50826552	8. 50829763	2. 379488	1. 70895	8. 04501	6. 3280	9, 332, 113. 320
	1	543	9737	2. 380705	776	4743	257	333, 974. 781
	2	534	9710	1924	657	4986	233	335, 836. 242
	3	525	9684	3148	537	5230	208	337, 697. 704
	4	516	9657	4375	417	5475	184	339, 559. 168
	05	508	9631	5604	297	5720	160	341, 420. 633
	6	499	9605	6838	176	5966	136	343, 282. 099
	7	490	9578	8075	1. 70055	6212	112	345, 143. 566
	8	482	9552	2. 389315	1. 69934	6460	087	347, 005. 034
	9	473	9526	2. 390559	812	6708	063	348, 866. 503
	10	8. 50826464	8. 50829500	2. 391807	1. 69690	8. 06956	6. 3038	9, 350, 727. 973
	11	456	9474	3057	567	7205	6. 3013	352, 589. 444
	12	447	9449	4312	444	7456	6. 2989	354, 450. 917
	13	438	9423	5570	321	7706	964	356, 312. 391
	14	430	9397	6831	197	7958	939	358, 173. 865
	15	421	9372	8096	1. 69073	8210	914	360, 035. 341
	16	413	9346	2. 399365	1. 68949	8463	889	361, 896. 818
	17	404	9321	2. 400637	824	8717	864	363, 758. 296
	18	396	9295	1914	699	8971	839	365, 619. 775
	19	387	9270	3193	574	9226	814	367, 481. 255
	20	8. 50826379	8. 50829245	2. 404477	1. 68448	8. 09482	6. 2788	9, 369, 342. 737
	21	371	9220	5764	322	9739	763	371, 204. 219
	22	362	9194	7055	195	8. 09997	738	373, 065. 703
	23	354	9169	8350	1. 68068	8. 10254	712	374, 927. 187
	24	346	9144	2. 409649	1. 67940	0514	686	376, 788. 673
	25	337	9120	2. 410950	813	0773	661	378, 650. 160
	26	329	9095	2257	684	1033	635	380, 511. 647
	27	321	9070	3567	556	1295	609	382, 373. 136
	28	313	9045	4882	427	1556	583	384, 234. 626
	29	304	9021	6199	298	1819	557	386, 096. 117
	30	8. 50826296	8. 50828996	2. 417521	1. 67168	8. 12083	6. 2531	9, 387, 957. 609
	31	288	8972	2. 418847	1. 67038	2348	505	389, 819. 102
	32	280	8948	2. 420176	1. 66907	2613	479	391, 680. 596
	33	272	8923	1511	776	2879	452	393, 542. 091
	34	264	8899	2849	645	3146	426	395, 403. 587
	35	256	8875	4190	513	3414	400	397, 265. 084
	36	248	8851	5536	381	3682	373	399, 126. 583
	37	240	8827	6887	248	3951	346	400, 988. 082
	38	232	8803	8240	1. 66115	4221	320	402, 849. 582
	39	224	8779	2. 429599	1. 65982	4492	293	404, 711. 083
	40	8. 50826216	8. 50828755	2. 430962	1. 65848	8. 14764	6. 2266	9, 406, 572. 585
	41	208	8732	2328	713	5037	239	408, 434. 089
	42	200	8708	3700	578	5310	212	410, 295. 593
	43	192	8684	5075	443	5584	185	412, 157. 099
	44	184	8661	6454	308	5860	157	414, 018. 605
	45	177	8638	7839	172	6137	130	415, 880. 112
	46	169	8614	2. 439227	1. 65035	6413	103	417, 741. 621
	47	161	8591	2. 440619	1. 64898	6691	075	419, 603. 130
	48	153	8568	2017	761	6969	048	421, 464. 640
	49	146	8545	3418	623	7249	6. 2020	423, 326. 152
	50	8. 50826138	8. 50828522	2. 444825	1. 64484	8. 17529	6. 1992	9, 425, 187. 664
	51	130	8499	6235	346	7810	964	427, 049. 177
	52	123	8476	7650	206	8092	936	428, 910. 692
	53	115	8453	2. 449070	1. 64067	8376	908	430, 772. 207
	54	107	8430	2. 450493	1. 63926	8660	880	432, 633. 723
	55	100	8407	1922	786	8945	852	434, 495. 241
	56	092	8385	3356	645	9231	823	436, 356. 759
	57	085	8362	4794	503	9518	795	438, 218. 278
	58	077	8340	6237	361	8. 19806	766	440, 079. 798
	59	070	8318	7685	219	8. 20095	738	441, 941. 319
85	00	8. 50826062	8. 50828295	2. 459137	1. 63076	8. 20385	6. 1709	9, 443, 802. 841

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 85°-86°

Lat.		log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
°	′							*Meters*
85	00	8. 50826062	8. 50828295	2. 459137	1. 63076	8. 20385	6. 1709	9, 443, 802. 841
	1	055	8273	2. 460594	1. 62932	0675	680	445, 664. 364
	2	048	8251	2055	788	0967	651	447, 525. 888
	3	040	8229	3522	643	1260	622	449, 387. 413
	4	033	8207	4993	498	1553	593	451, 248. 939
	05	026	8185	6470	353	1848	564	453, 110. 466
	6	018	8163	7952	207	2144	535	454, 971. 994
	7	011	8141	2. 469439	1. 62060	2440	505	456, 833. 522
	8	8. 50826004	8119	2. 470931	1. 61913	2738	476	458, 695. 052
	9	8. 50825997	8098	2428	766	3036	446	460, 556. 582
	10	8. 50825989	8. 50828076	2. 473930	1. 61618	8. 23336	6. 1416	9, 462, 418. 114
	11	982	8055	5436	469	3637	387	464, 279. 646
	12	975	8033	6949	320	3939	357	466, 141. 180
	13	968	8012	8466	170	4242	327	468, 002. 714
	14	961	7991	2. 479988	1. 61020	4545	296	469, 864. 249
	15	954	7969	2. 481516	1. 60870	4850	266	471, 725. 785
	16	947	7948	3050	718	5156	236	473, 587. 322
	17	940	7927	4589	567	5464	205	475, 448. 860
	18	933	7906	6132	414	5771	175	477, 310. 399
	19	926	7885	7682	261	6081	144	479, 171. 938
	20	8. 50825919	8. 50827864	2. 489237	1. 60108	8. 26391	6. 1113	9, 481, 033. 479
	21	912	7844	2. 490797	1. 59954	6702	082	482, 895. 020
	22	905	7823	2363	799	7015	051	484, 756. 563
	23	898	7802	3935	644	7329	6. 1020	486, 618. 106
	24	891	7782	5512	488	7643	6. 0989	488, 479. 650
	25	885	7761	7094	332	7959	958	490, 341. 195
	26	878	7741	2. 498683	175	8276	926	492, 202. 741
	27	871	7721	2. 500278	1. 59018	8595	895	494, 064. 288
	28	864	7700	1878	1. 58860	8914	863	495, 925. 835
	29	857	7680	3484	701	9234	831	497, 787. 384
	30	8. 50825851	8. 50827660	2. 505096	1. 58542	8. 29556	6. 0799	9, 499, 648. 933
	31	844	7640	6714	382	8. 29879	767	501, 510. 483
	32	837	7620	8338	222	8. 30204	735	503, 372. 034
	33	831	7600	2. 509967	1. 58061	0529	703	505, 233. 586
	34	824	7581	2. 511603	1. 57899	0856	670	507, 095. 139
	35	818	7561	3246	737	1183	638	508, 956. 692
	36	811	7541	4893	574	1512	605	510, 818. 247
	37	805	7522	6548	411	1843	572	512, 679. 802
	38	798	7502	8209	246	2174	539	514, 541. 358
	39	792	7483	2. 519876	1. 57082	2507	506	516, 402. 915
	40	8. 50825785	8. 50827463	2. 521548	1. 56916	8. 32841	6. 0473	9, 518, 264. 473
	41	779	7444	3228	750	3176	440	520, 126, 032
	42	772	7425	4915	583	3513	406	521, 987. 591
	43	766	7406	6608	416	3851	373	523, 849. 151
	44	760	7387	2. 528306	248	4190	339	525, 710. 712
	45	753	7368	2. 530012	1. 56079	4530	305	527, 572. 274
	46	747	7349	1725	1. 55910	4873	271	529, 433. 837
	47	741	7330	3444	740	5216	237	531, 295. 400
	48	734	7311	5169	569	5560	203	533, 156. 965
	49	728	7292	6903	398	5907	168	535, 018. 530
	50	8. 50825722	8. 50827274	2. 538642	1. 55226	8. 36254	6. 0134	9, 536, 880. 096
	51	716	7255	2. 540389	1. 55053	6603	099	538, 741. 663
	52	710	7237	2142	1. 54879	6952	064	540, 603. 230
	53	703	7218	3903	705	7304	6. 0030	542, 464. 798
	54	697	7200	5671	530	7657	5. 9994	544, 326. 367
	55	691	7182	7446	354	8012	959	546, 187. 937
	56	685	7163	2. 549227	178	8368	924	548, 049. 508
	57	679	7145	2. 551016	1. 54001	8724	888	549, 911. 079
	58	673	7127	2813	1. 53823	9084	853	551, 772. 651
	59	667	7109	4618	644	9443	817	553, 634. 224
86	00	8. 50825661	8. 50827091	2. 556428	1. 53465	8. 39806	5. 9781	9, 555, 495. 798

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 86°-87°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
86 00	8. 50825661	8. 50827091	2. 556428	1. 53465	8. 39806	5. 9781	9, 555, 495. 798
1	655	7074	58248	3285	8. 40169	745	557, 357. 373
2	649	7056	60074	3104	0533	708	559, 218. 948
3	643	7038	61909	2922	0900	672	561, 080. 524
4	638	7021	63751	2740	1267	635	562, 942. 101
05	632	7003	65600	2556	1637	599	564, 803. 679
6	626	6986	67458	2372	2008	562	566, 665. 257
7	620	6968	69323	2188	2380	525	568, 526. 836
8	614	6951	71197	2002	2755	488	570, 388. 416
9	609	6934	73078	1815	3130	450	572, 249. 996
10	8. 50825603	8. 50826917	2. 574967	1. 51628	8. 43508	5. 9413	9, 574, 111. 577
11	597	6900	76865	1440	3887	375	575, 973. 159
12	592	6883	78772	1251	4267	337	577, 834. 742
13	586	6866	80685	1061	4650	299	579, 696. 325
14	580	6849	82608	0871	5034	261	581, 557. 910
15	575	6832	84540	0679	5420	222	583, 419. 495
16	569	6815	86480	0487	5807	184	585, 281. 080
17	564	6799	88428	0294	6196	145	587, 142. 666
18	558	6782	90385	1. 50100	6587	106	589, 004. 253
19	553	6766	92351	1. 49905	6980	067	590, 865. 841
20	8. 50825547	8. 50826749	2. 594326	1. 49709	8. 47374	5. 9028	9, 592, 727. 430
21	542	6733	96310	9512	7770	5. 8988	594, 589. 019
22	536	6717	2. 598302	9314	8168	949	596, 450. 609
23	531	6701	2. 600304	9116	8568	909	598, 312. 199
24	526	6684	02315	8916	8970	869	600, 173. 790
25	520	6668	04336	8716	9374	829	602, 035. 382
26	515	6652	06366	8514	8. 49779	788	603, 896. 975
27	510	6637	08404	8312	8. 50186	748	605, 758. 568
28	504	6621	10453	8109	0595	707	607, 620. 162
29	499	6605	12512	7904	1007	666	609, 481. 757
30	8. 50825494	8. 50826589	2. 614580	1. 47699	8. 51420	5. 8625	9, 611, 343. 352
31	489	6574	16658	7493	1835	584	613, 204. 948
32	483	6558	18745	7286	2252	542	615, 066. 545
33	478	6543	20843	7077	2671	500	616, 928. 142
34	473	6527	22951	6868	3092	459	618, 789. 740
35	468	6512	25070	6658	3515	416	620, 651. 339
36	463	6497	27199	6446	3941	374	622, 512. 938
37	458	6482	29337	6234	4368	332	624, 374. 538
38	453	6467	31486	6020	4798	289	626, 236. 139
39	448	6452	33646	5806	5229	246	628, 097. 740
40	8. 50825443	8. 50826437	2. 635818	1. 45590	8. 55662	5. 8203	9, 629, 959. 342
41	438	6422	37999	5374	6098	159	631, 820. 944
42	433	6407	40191	5156	6537	116	633, 682. 547
43	428	6392	42395	4937	6977	072	635, 544. 151
44	423	6378	44610	4717	7419	5. 8028	637, 405. 756
45	418	6363	46836	4496	7864	5. 7983	639, 267. 361
46	414	6349	49074	4273	8311	939	641, 128. 966
47	409	6334	51322	4050	8760	894	642, 990. 572
48	404	6320	53583	3825	9212	849	644, 852. 179
49	399	6306	55855	3599	8. 59666	804	646, 713. 787
50	8. 50825395	8. 50826292	2. 658140	1. 43372	8. 60123	5. 7758	9, 648, 575. 395
51	390	6277	60436	3144	0582	712	650, 437. 004
52	385	6263	62744	2915	1043	667	652, 298. 613
53	381	6249	65065	2684	1506	620	654, 160. 223
54	376	6236	67398	2452	1973	574	656, 021. 834
55	371	6222	69744	2219	2442	527	657, 883. 445
56	367	6208	72102	1984	2913	480	659, 745. 057
57	362	6194	74472	1748	3386	433	661, 606. 669
58	358	6181	76856	1512	3863	386	663, 468. 282
59	353	6167	79254	1273	4342	338	665, 329. 895
87 00	8. 50825349	8. 50826154	2. 681664	1. 41033	8. 64823	5. 7290	9, 667, 191. 509

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 87°-88°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
87 00	8.50825349	8.50826154	2.681664	1.41033	8.64823	5.7290	9,667,191.509
1	344	6140	84088	0792	5308	242	669,053.124
2	340	6127	86526	0550	5795	193	670,914.739
3	335	6114	88976	0306	6284	144	672,776.355
4	331	6101	91441	1.40061	6777	095	674,637.971
05	327	6088	93919	1.39814	7272	5.7046	676,499.588
6	322	6075	96413	9566	7771	5.6996	678,361.205
7	318	6062	2.698920	9317	8272	946	680,222.823
8	314	6049	2.701442	9066	8775	896	682,084.442
9	309	6036	03977	8814	9282	845	683,946.061
10	8.50825305	8.50826023	2.706529	1.38560	8.69792	5.6794	9,685,807.681
11	301	6011	09095	8304	8.70305	743	687,669.301
12	297	5998	11677	8047	0821	692	689,530.922
13	293	5986	14274	7789	1340	640	691,392.543
14	289	5973	16886	7529	1862	588	693,254.165
15	284	5961	19513	7267	2387	536	695,115.787
16	280	5949	22157	7004	2916	483	696,977.410
17	276	5937	24818	6739	3448	430	698,839.033
18	272	5924	27494	6473	3982	376	700,700.657
19	268	5912	30187	6205	4521	323	702,562.281
20	8.50825264	8.50825900	2.732897	1.35935	8.75062	5.6269	9,704,423.906
21	260	5889	35623	5664	5607	214	706,285.532
22	256	5877	38367	5390	6155	160	708,147.158
23	252	5865	41128	5115	6707	105	710,008.784
24	249	5853	43907	4838	7262	5.6049	711,870.411
25	245	5842	46704	4560	7822	5.5994	713,732.039
26	241	5830	49518	4280	8384	937	715,593.667
27	237	5819	52351	3998	8950	881	717,455.295
28	233	5807	55202	3714	8.79520	824	719,316.924
29	229	5796	58073	3428	8.80094	767	721,178.553
30	8.50825226	8.50825785	2.760962	1.33140	8.80672	5.5709	9,723,040.183
31	222	5774	63871	2850	1253	651	724,901.814
32	218	5763	66799	2558	1838	593	726,763.445
33	215	5752	69747	2265	2427	534	728,625.076
34	211	5741	72714	1969	3021	475	730,486.708
35	207	5730	75702	1671	3618	415	732,348.340
36	204	5719	78711	1371	4219	355	734,209.973
37	200	5709	81741	1069	4825	295	736,071.606
38	197	5698	84792	0765	5435	234	737,933.239
39	193	5687	87865	0459	6049	172	739,794.873
40	8.50825190	8.50825677	2.790960	1.30151	8.86668	5.5111	9,741,656.508
41	186	5667	94075	1.29840	7290	5.5049	743,518.143
42	183	5656	2.797214	9527	7918	5.4986	745,379.778
43	179	5646	2.800376	9212	8550	923	747,241.414
44	176	5636	03561	8894	9187	859	749,103.051
45	173	5626	06770	8574	8.89828	795	750,964.688
46	169	5616	10002	8252	8.90474	731	752,826.325
47	166	5606	13259	7928	1125	666	754,687.962
48	163	5596	16539	7601	1781	600	756,549.600
49	159	5586	19844	7271	2442	534	758,411.239
50	8.50825156	8.50825576	2.823175	1.26939	8.93108	5.4468	9,760,272.877
51	153	5567	26532	6604	3779	401	762,134.516
52	150	5557	29915	6267	4455	333	763,996.156
53	147	5548	33324	5927	5137	265	765,857.796
54	143	5538	36761	5584	5824	197	767,719.436
55	140	5529	40224	5239	6516	128	769,581.077
56	137	5519	43716	4890	7214	5.4058	771,442.718
57	134	5510	47234	4539	7917	5.3988	773,304.360
58	131	5501	50783	4185	8627	917	775,166.002
59	128	5492	54360	3829	8.99342	845	777,027.645
88 00	8.50825125	8.50825483	2.857967	1.23469	9.00063	5.3773	9,778,889.289

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 88°–89°

Lat.	log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
° ′							*Meters*
88 00	8.50825125	8.50825483	2.857967	1.23469	9.00063	5.3773	9,778,889.289
1	122	5474	61604	3106	0790	701	780,750.932
2	119	5465	65272	2740	1524	628	782,612.576
3	116	5457	68971	2371	2263	554	784,474.220
4	113	5448	72702	1999	3009	479	786,335.864
05	110	5439	76464	1623	3761	404	788,197.509
6	108	5431	80260	1245	4520	328	790,059.154
7	105	5422	84089	0863	5286	252	791,920.799
8	102	5414	87952	0477	6058	175	793,782.445
9	099	5406	91850	0088	6837	097	795,644.091
10	8.50825097	8.50825397	2.895783	1.19696	9.07624	5.3018	9,797,505.738
11	094	5389	2.899752	9300	8417	5.2939	799,367.385
12	091	5381	2.903757	8900	9.09218	859	801,229.032
13	088	5373	07800	8496	9.10026	778	803,090.680
14	086	5365	11879	8089	0842	697	804,952.328
15	083	5357	15999	7678	1666	615	806,813.976
16	081	5349	20157	7263	2497	532	808,675.625
17	078	5342	24356	6844	3337	448	810,537.274
18	075	5334	28595	6420	4184	363	812,398.923
19	073	5327	32877	5993	5040	278	814,260.573
20	8.50825070	8.50825319	2.937200	1.15562	9.15905	5.2191	9,816,122.223
21	068	5312	41568	5126	6778	104	817,983.873
22	065	5304	45979	4685	7660	5.2016	819,845.524
23	063	5297	50436	4240	8551	5.1927	821,707.175
24	061	5290	54938	3791	9.19452	837	823,568.826
25	058	5283	59488	3336	9.20361	746	825,430.477
26	056	5276	64086	2877	1281	654	827,292.129
27	054	5269	68733	2413	2210	561	829,153.781
28	051	5262	73430	1944	3149	467	831,015.433
29	049	5255	78179	1470	4098	372	832,877.086
30	8.50825047	8.50825248	2.982980	1.10990	9.25059	5.1277	9,834,738.739
31	045	5242	87835	0506	6029	180	836,600.392
32	042	5235	92744	1.10015	7011	5.1082	838,462.046
33	040	5228	2.997710	1.09520	8004	5.0982	840,323.700
34	038	5222	3.002733	9018	9.29008	882	842,185.354
35	036	5216	07813	8510	9.30024	780	844,047.008
36	034	5209	12955	7997	1052	678	845,908.663
37	032	5203	18158	7477	2093	574	847,770.318
38	030	5197	23425	6951	3146	468	849,631.973
39	028	5191	28755	6418	4212	362	851,493.629
40	8.50825026	8.50825185	3.034153	1.05879	9.35291	5.0254	9,853,355.284
41	024	5179	39617	5334	6384	145	855,216.940
42	022	5173	45152	4781	7490	5.0034	857,078.597
43	020	5167	50757	4221	8611	4.9922	858,940.253
44	018	5162	56437	3653	9.39747	809	860,801.910
45	016	5156	62191	3079	9.40898	694	862,663.567
46	014	5150	68022	2496	2064	577	864,525.224
47	012	5145	73932	1905	3246	459	866,386.881
48	011	5139	79924	1307	4444	339	868,248.539
49	009	5134	86000	0700	5659	218	870,110.197
50	8.50825007	8.50825129	3.092162	1.00084	9.46891	4.9095	9,871,971.855
51	005	5124	3.098412	0.99460	8141	4.8970	873,833.513
52	004	5119	3.104754	8826	9.49409	843	875,695.172
53	002	5114	11190	8183	9.50696	714	877,556.831
54	8.50825000	5109	17723	7530	2003	584	879,418.490
55	8.50824999	5104	24355	6867	3329	451	881,280.149
56	997	5099	31090	6194	4676	317	883,141.809
57	995	5094	37931	5510	6044	180	885,003.468
58	994	5089	44881	4816	7434	4.8041	886,865.128
59	992	5085	51944	4110	9.58846	4.7900	888,726.788
89 00	8.50824991	8.50825080	3.159124	0.93392	9.60282	4.7756	9,890,588.448

The characteristics of log A′, log B, log C, and log D have been increased by 10. The characteristics of log E and log F have been increased by 20.

LATITUDE 89°–90°

Lat.		log A′	log B	log C	log D	log E	log F	Arc of meridian from Equator
°	′							*Meters*
89	00	8. 50824991	8. 50825080	3. 159124	0. 93392	9. 60282	4. 7756	9, 890, 588. 448
	1	989	5076	66425	2663	1742	. 7610	892, 450. 109
	2	988	5072	73851	1921	3227	. 7462	894, 311. 770
	3	986	5067	81404	1166	4738	. 7311	896, 173. 431
	4	985	5063	89092	0. 90397	6275	. 7157	898, 035. 092
	05	984	5059	3. 196919	0. 89615	7841	. 7001	899, 896. 753
	6	982	5055	3. 204889	8818	9. 69434	. 6841	901, 758. 414
	7	981	5051	13009	8007	9. 71058	. 6679	903, 620. 075
	8	980	5047	21282	7180	2713	. 6514	905, 481. 737
	9	978	5043	29717	6337	4400	. 6345	907, 343. 399
	10	8. 50824977	8. 50825039	3. 238318	0. 85477	9. 76120	4. 6173	9, 909, 205. 061
	11	976	5036	47093	4600	7875	. 5997	911, 066. 723
	12	975	5032	56049	3705	9. 79666	. 5818	912, 928. 386
	13	974	5028	65194	2791	9. 81494	. 5636	914, 790. 048
	14	972	5025	74535	1857	3363	. 5449	916, 651. 711
	15	971	5022	84082	0. 80902	5272	. 5258	918, 513. 374
	16	970	5018	3. 293843	0. 79927	7224	. 5063	920, 375. 037
	17	969	5015	3. 303828	8929	9. 89221	. 4863	922, 236. 700
	18	968	5012	14048	7907	9. 91265	. 4659	924, 098. 363
	19	967	5009	24514	6861	3358	. 4449	925, 960. 026
	20	8. 50824966	8. 50825006	3. 335239	0. 75788	9. 95503	4. 4235	9, 927, 821. 689
	21	965	5003	46236	4689	7702	. 4015	929, 683. 353
	22	964	5000	57518	3561	9. 99958	. 3790	931, 545. 017
	23	963	4997	69100	2403	10. 02275	. 3558	933, 406. 681
	24	962	4994	81000	0. 71213	. 04655	. 3320	935, 268. 345
	25	961	4992	3. 393235	0. 69990	. 07102	. 3075	937, 130. 009
	26	960	4989	3. 405825	8731	. 09620	. 2823	938, 991. 673
	27	960	4987	18791	7435	. 12212	. 2564	940, 853. 337
	28	959	4984	32155	6099	. 14886	. 2297	942, 715. 001
	29	958	4982	45944	4720	. 17643	. 2021	944, 576. 666
	30	8. 50824957	8. 50824980	3. 460186	0. 63296	10. 20491	4. 1736	9, 946, 438. 330
	31	957	4977	74910	1824	. 23436	. 1442	948, 299. 995
	32	956	4975	3. 490150	0. 60300	. 26484	. 1137	950, 161. 660
	33	955	4973	3. 505945	0. 58721	. 29643	. 0821	952, 023. 325
	34	954	4971	22336	7082	. 32922	. 0494	953, 884. 990
	35	954	4969	39370	5379	. 36328	4. 0153	955, 746. 655
	36	953	4968	57100	3606	. 39874	3. 9798	957, 608. 320
	37	953	4966	75584	0. 51758	. 43570	. 9429	959, 469. 985
	38	952	4964	3. 594889	0. 49827	. 47432	. 9042	961, 331. 651
	39	952	4963	3. 615093	. 47807	. 51472	. 8638	963, 193. 316
	40	8. 50824951	8. 50824961	3. 636283	0. 45688	10. 55710	3. 8215	9. 965, 054. 981
	41	951	4960	58560	. 43461	. 60165	. 7769	966, 916. 647
	42	950	4958	3. 682041	. 41113	. 64862	. 7300	968, 778. 312
	43	950	4957	3. 706865	. 38630	. 69827	. 6803	970, 639. 978
	44	949	4956	. 733195	. 35998	. 75092	. 6276	972, 501. 644
	45	949	4954	. 761224	. 33195	. 80698	. 5716	974, 363. 310
	46	949	4953	. 791187	. 30199	. 86691	. 5117	976, 224. 975
	47	948	4952	. 823372	. 26980	10. 93128	. 4473	978, 086. 641
	48	948	4951	. 858135	. 23504	11. 00080	. 3778	979, 948. 307
	49	948	4951	. 895924	. 19725	. 07638	. 3022	981, 809. 973
	50	8. 50824947	8. 50824950	3. 937317	0. 15586	11. 15917	3. 2194	9, 983, 671. 639
	51	947	4949	3. 983074	. 11010	. 25068	. 1279	985, 533. 305
	52	947	4948	4. 034227	. 05895	. 35299	3. 0256	987, 394. 971
	53	947	4948	. 092219	0. 00096	. 46897	2. 9096	989, 256. 637
	54	947	4947	. 159166	9. 93401	. 60286	. 7757	991, 118. 303
	55	946	4947	. 238348	. 85483	. 76123	. 6174	992, 979. 969
	56	946	4947	. 335258	. 75792	11. 95505	. 4235	994, 841. 635
	57	946	4946	. 460196	. 63298	12. 20492	2. 1737	996, 703. 301
	58	946	4946	. 636288	. 45689	12. 55711	1. 8215	998, 564. 967
	59	946	4946	4. 937318	9. 15586	13. 15917	. 2194	10, 000, 426. 633
90	00	8. 50824946	8. 50824946	∞	−∞	∞	−∞	10, 002, 288. 299

The characteristics of log A′, log B, and log C have been increased by 10. For log D the characteristics through latitude 89°53′ have also been increased by 10; for latitude 89°54′ to 90°, inclusive, the characteristics have been increased by 20. For log E and log F an increase of 20 has been made.