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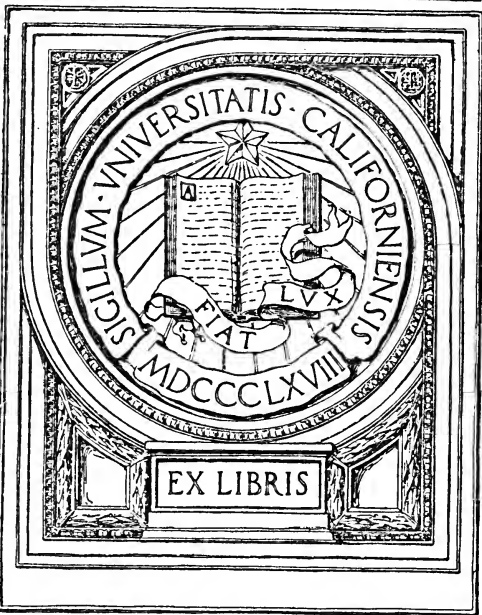


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FOUR-PLACE
LOGARITHMIC
AND
TRIGONOMETRIC
TABLES
TOGETHER WITH
INTEREST TABLES

EDITED BY

LOUIS C. KARPINSKI
ASSOCIATE PROFESSOR OF MATHEMATICS
UNIVERSITY OF MICHIGAN

GEORGE WAHR, PUBLISHER
ANN ARBOR, MICHIGAN

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EXPLANATION OF THE TABLES

1, **General.** These tables are arranged to give maximum speed in computing which falls within the range of the tables. For engineers, physicists, chemists, surveyors, and for statistical experts the tables will be found to be adequate for 90% to 99% of ordinary work. For students of science and mathematics these tables make possible a far greater amount of drill in actual computation than with five-place tables; the use of the four-place table emphasizes the fact that computation should not be carried beyond the places to which measurement is made, and this is rarely to more than four significant figures.

Certain distinct innovations in these tables are to be noted. In the first place both horizontal and vertical interpolation forms are given in order to afford the variety of experience which will be of service when further and more extensive tables are used. In the second place no lines are used to separate the columns as it is the experience of computers that the lines which are commonly found in tables retard the speed of computation, affecting the eye unpleasantly. In the third place the entry headings, in bold-face type, are repeated in the middle of the tables to reduce to a minimum the necessary movement of the eyes and to eliminate any uncertainty as to column order, thus increasing both speed and accuracy.

2, **Particular.**

TABLE II

Mechanical interpolation, in horizontal form, is introduced. In reading the logarithm of a number requiring interpolation, like 232.4, the logarithm of 232 is read

EXPLANATION OF THE TABLES

as 2.3655 and to this 7, the $\frac{4}{10}$ of the tabular difference, is added mentally, noting the 7 in column 4 of the difference table. In writing this logarithm 2.36 is written immediately when read; 55 is noted mentally; a glance to the right, column 4, shows that 7 is to be added, giving 62; then 2.36 is completed to 2.3662, the required logarithm. An error of one unit in the last place is possible, but that is equally true with ordinary interpolation. Mean tabular differences are given.

For numbers between 1000 and 2009 it is desirable to use the special table, TABLE III, as errors of one to two units of the last place are common in this interval when the horizontal scheme of interpolation is used.

TABLE IV AND TABLE V

Mean differences are given and the mechanical scheme of horizontal interpolation is to be employed as in TABLE II. However where the tabular difference is 10 or less interpolation is to be effected by noting the difference and using the multiplication table.

Thus, $\log \sin 32^\circ 26'$ is obtained by writing first, 9.72, noting 82 mentally; then 12 from column 6 is added to 82, making 94; finally 9.7294 is written as the required logarithm.

$\log \cos 32^\circ 26'$ is obtained by writing 9.92, noting 68 mentally; the tabular difference, a decrease, is noted as 8; then $\frac{6}{10}$ of 8 is obtained mentally as 5, since $6 \times 8 = 48$ giving here 4.8 or 5; finally 63 is written, giving 9.9263 as the required logarithm.

TABLE IV differs from TABLE V in that the given tabular difference does not apply to the double line. In the lower one of each pair of lines, the interpolation is to be performed mentally, except in the last twelve lines where both tabular differences are given.

EXPLANATION OF THE TABLES

TABLE VI

This table can be used for logarithms of cotangents between 0° and 14° , and for logarithms of tangents between 76° and 90° , both by minutes, by writing the complement to 10 of the logarithm of the given tangent or cotangent. Thus $\log \cot 4^\circ 15'$ is obtained by noting 8.8699 in the table, and writing 1.1301 as $\log \cot 4^\circ 15'$. This same value would be obtained, in a similar manner, for $\log \tan 85^\circ 45'$.

TABLE VII AND TABLE VIII

Vertical interpolation is introduced. Thus, $\sin 32^\circ 26'$ is obtained by writing first .53, noting 48 mentally and noting at the right the mean tabular difference, 24; then $6/10$ of this difference is read as 14, which added to 48 gives 62; finally, .5362 is the required value. The correct four-place value is .5363, and this would have been obtained by using the actual tabular difference, 25 (.0025), between .5348 and .5373.

Were .5362 given as the sine of an angle the angle would be obtained by noting that .5348 is $\sin 32^\circ 20'$; the tabular difference of 24 is noted, and the actual difference of 14 units of the last place is found to be nearest to $6/10$ of 24, giving $32^\circ 26'$ as the angle. Were 25, the real and not the mean tabular difference used, the 14 would be mid-way between $5/10$ and $6/10$ of the difference; in this event computers make it a rule to take the even digit, giving here again $32^\circ 26'$.



TABLE I

CONSTANTS WITH THEIR LOGARITHMS

	NUMBER	LOGARITHM
Base of natural logarithms	$e = 2.71828183$	0.4342945
Modulus of common logarithms	$u = 0.43429448$	9.6377843-10
Circumference of a circle in degrees	= 360	2.5563025
Circumference of a circle in minutes	= 21600	4.3344538
Circumference of a circle in seconds	= 1296000	6.1126050
Radius of a circle in degrees or 1 radian	= 57.29578	1.7581226
Radius of a circle in minutes	= 3437.7468	3.5362739
Radius of a circle in seconds	= 206264.806	5.3144251
Ratio of a circumference to diameter	= 3.14159265	0.4971499

VOLUMES AND WEIGHTS

Cubic inches in one gallon (U. S.),	= 231	2.3636
Gallons in one cubic foot	= 7.48	.8739
Cubic inches in one bushel	= 2150.4	3.3325
Pounds per cubic foot of water (4° C)	= 62.43	1.7954
Pounds per cubic foot of air (0° C)	= .0807	8.9069-10
Cubic feet in one cubic meter	= 35.32	1.5480
Cubic meters in one cubic yard	= .76	9.8808-10
Cubic inches in one liter	= 61.03	1.7855
Liters in one gallon (U. S.)	= 3.786	.5782
Pounds in one kilogram 2.2 or	= 2.2046	.3434
Metric ton in pounds	= 2205	3.3434
Volume of sphere, $= 4.1888r^3$	= 4.1888r ³ .	.6221
Acceleration gravity, g , at sea level, New York, cm. sec. system	= 980.2	2.9913
Acceleration gravity, g , at sea level, New York, ft. sec. system	= 32.16	1.5073

LENGTHS AND AREAS

Inches in one meter (By Act of Congress)	= 39.37	1.5952
Feet in 1 rod, 16.5; yds. in 1 rod, 5.5	= 16.5	1.2148
Square feet in one acre	= 43560	4.6391

160 SQUARE RODS=1 ACRE; 640 ACRES=1 SQ. MILE.

3.281 FEET=1.094 YDS.=1 METER.

1 HORSE POWER=33,000 FT.-LB. Per Min.=550 FT.-LB. Per Sec.

1 KILOWATT=1.341 HORSEPOWER=737.5 FT.-LB. Per Second

1 CUBIC FOOT Per Sec.=448.9 GAL. Per Min.=1.9835 ACRE-FT. Per Day.

1 ACRE-FT. Per Day=5.042 CU. FT. Per Sec.

1 BTU.=778.4 FT.-LB.=252 KG.-CAL.

1 REV. Per Min.=6 Per Sec.=.2832 RADIANS Per Min.

1 FT. Per Sec.=.6818 MILES Per Hour.

LOG_e10=2.302585; LOG₁₀E=.434294.

TABLE II

LOGARITHMS OF NUMBERS: 100-549																				
N	0	1	2	3	4	5	6	7	8	9	D	1	2	3	4	5	6	7	8	9
10	0000	0043	0086	0128	0170	0212	0253	0294	0334	0374	41	4	8	12	17	21	25	29	33	37
11	0414	0453	0492	0531	0569	0607	0645	0682	0719	0755	38	4	8	11	15	19	23	26	30	34
12	0792	0828	0864	0899	0934	0969	1004	1038	1072	1106	35	3	7	10	14	17	21	24	28	31
13	1139	1173	1206	1239	1271	1303	1335	1367	1399	1430	32	3	6	10	13	16	19	23	26	29
14	1461	1492	1523	1553	1584	1614	1644	1673	1703	1732	30	3	6	9	12	15	18	21	24	27
15	1761	1790	1818	1847	1875	1903	1931	1959	1987	2014	28	3	6	8	11	14	17	20	22	25
16	2041	2068	2095	2122	2148	2175	2201	2227	2253	2279	27	3	5	8	11	13	16	18	21	24
17	2304	2330	2355	2380	2405	2430	2455	2480	2504	2529	25	2	5	7	10	12	15	17	20	22
18	2553	2577	2601	2625	2648	2672	2695	2718	2742	2765	24	2	5	7	9	12	14	16	19	21
19	2788	2810	2833	2856	2878	2900	2923	2945	2967	2989	23	2	4	7	9	11	13	16	18	20
20	3010	3032	3054	3075	3096	3118	3139	3160	3181	3201	22	2	4	6	8	11	13	15	17	19
21	3222	3243	3263	3284	3304	3324	3345	3365	3385	3404	21	2	4	6	8	10	12	14	16	18
22	3424	3444	3464	3483	3502	3522	3541	3560	3579	3598	20	2	4	6	8	10	12	14	16	17
23	3617	3636	3655	3674	3692	3711	3729	3747	3766	3784	19	2	4	6	7	9	11	13	15	17
24	3802	3820	3838	3856	3874	3892	3909	3927	3945	3962	18	2	4	5	7	9	11	12	14	16
25	3979	3997	4014	4031	4048	4065	4082	4099	4116	4133	17	2	4	5	7	9	10	12	14	16
26	4150	4166	4183	4200	4216	4232	4249	4265	4281	4298	16	2	3	5	7	8	10	11	13	15
27	4314	4330	4346	4362	4378	4393	4409	4425	4440	4456	15	2	3	5	6	8	9	11	12	14
28	4472	4487	4502	4518	4533	4548	4564	4579	4594	4609	15	2	3	5	6	8	9	11	12	14
29	4624	4639	4654	4669	4683	4698	4713	4728	4742	4757	14	1	3	4	6	7	9	10	12	13
N	0	1	2	3	4	5	6	7	8	9	D	1	2	3	4	5	6	7	8	9
30	4771	4786	4800	4814	4829	4843	4857	4871	4886	4900	14	1	3	4	6	7	9	10	11	13
31	4914	4928	4942	4955	4969	4983	4997	5011	5024	5038	13	1	3	4	5	7	8	10	11	12
32	5051	5065	5079	5092	5105	5119	5132	5145	5159	5172	13	1	3	4	5	7	8	9	11	12
33	5185	5198	5211	5224	5237	5250	5263	5276	5289	5302	13	1	3	4	5	7	8	9	11	12
34	5315	5328	5340	5353	5366	5378	5391	5403	5416	5428	12	1	2	4	5	6	7	9	10	11
35	5441	5453	5465	5478	5490	5502	5514	5527	5539	5551	12	1	2	4	5	6	7	9	10	11
36	5563	5575	5587	5599	5611	5623	5635	5647	5658	5670	12	1	2	4	5	6	7	8	10	11
37	5682	5694	5705	5717	5729	5740	5752	5763	5775	5786	11	1	2	4	5	6	7	8	9	11
38	5798	5809	5821	5832	5843	5855	5866	5877	5888	5899	11	1	2	4	5	6	7	8	9	10
39	5911	5922	5933	5944	5955	5966	5977	5988	5999	6010	11	1	2	3	4	5	7	8	9	10
40	6021	6031	6042	6053	6064	6075	6085	6096	6107	6117	11	1	2	3	4	5	6	8	9	10
41	6128	6138	6149	6160	6170	6180	6191	6201	6212	6222	10	1	2	3	4	5	6	7	8	9
42	6232	6243	6253	6263	6274	6284	6294	6304	6314	6325	10	1	2	3	4	5	6	7	8	9
43	6335	6345	6355	6365	6375	6385	6395	6405	6415	6425	10	1	2	3	4	5	6	7	8	9
44	6435	6444	6454	6464	6474	6484	6493	6503	6513	6522	10	1	2	3	4	5	6	7	8	9
45	6532	6542	6551	6561	6571	6580	6590	6599	6609	6618	10	1	2	3	4	5	6	7	8	9
46	6628	6637	6646	6656	6665	6675	6684	6693	6702	6712	9	1	2	3	4	5	6	7	7	8
47	6721	6730	6739	6749	6758	6767	6776	6785	6794	6803	9	1	2	3	4	5	6	7	7	8
48	6812	6821	6830	6839	6848	6857	6866	6875	6884	6893	9	1	2	3	4	5	6	7	7	8
49	6902	6911	6920	6928	6937	6946	6955	6964	6972	6981	9	1	2	3	4	4	5	6	7	8
50	6990	6998	7007	7016	7024	7033	7042	7050	7059	7067	9	1	2	3	4	4	5	6	7	8
51	7076	7084	7093	7101	7110	7118	7126	7135	7143	7152	8	1	2	3	3	4	5	6	7	8
52	7160	7168	7177	7185	7193	7202	7210	7218	7226	7235	8	1	2	3	3	4	5	6	7	7
53	7243	7251	7259	7267	7275	7284	7292	7300	7308	7316	8	1	2	3	4	4	5	6	6	7
54	7324	7332	7340	7348	7356	7364	7372	7380	7388	7396	8	1	2	3	4	4	5	6	6	7
N	0	1	2	3	4	5	6	7	8	9	D	1	2	3	4	5	6	7	8	9

TABLE II

LOGARITHMS OF NUMBERS: 550-999

N	0	1	2	3	4	5	6	7	8	9	D	1	2	3	4	5	6	7	8	9
55	7404	7412	7419	7427	7435	7443	7451	7459	7466	7474	8	1	2	2	3	4	5	5	6	7
56	7482	7490	7497	7505	7513	7520	7528	7536	7543	7551	8	1	2	2	3	4	5	5	6	7
57	7559	7566	7574	7582	7589	7597	7604	7612	7619	7627	8	1	1	2	3	4	5	5	6	7
58	7634	7642	7649	7657	7664	7672	7679	7686	7694	7701	7	1	1	2	3	4	4	5	6	7
59	7709	7716	7723	7731	7738	7745	7752	7760	7767	7774	7	1	1	2	3	4	4	5	6	7
60	7782	7789	7796	7803	7810	7818	7825	7832	7839	7846	1	1	1	2	3	4	4	5	6	6
61	7853	7860	7868	7875	7882	7889	7896	7903	7910	7917	7	1	1	2	3	3	4	5	6	6
62	7924	7931	7938	7945	7952	7959	7966	7973	7980	7987	7	1	1	2	3	3	4	5	6	6
63	7993	8000	8007	8014	8021	8028	8035	8041	8048	8055	7	1	1	2	3	3	4	5	6	6
64	8062	8069	8075	8082	8089	8096	8102	8109	8116	8122	7	1	1	2	3	3	4	5	6	6
65	8129	8136	8142	8149	8156	8162	8169	8176	8182	8189	7	1	1	2	3	3	4	5	6	6
66	8195	8202	8209	8215	8222	8228	8235	8241	8248	8254	7	1	1	2	3	3	4	5	6	6
67	8261	8267	8274	8280	8287	8293	8299	8306	8312	8319	6	1	1	2	3	3	4	5	6	6
68	8325	8331	8338	8344	8351	8357	8363	8370	8376	8382	6	1	1	2	3	3	4	5	6	6
69	8388	8395	8401	8407	8414	8420	8426	8432	8439	8445	6	1	1	2	3	3	4	4	5	6
70	8451	8457	8463	8470	8476	8482	8488	8494	8500	8506	6	1	1	2	3	3	4	4	5	6
71	8513	8519	8525	8531	8537	8543	8549	8555	8561	8567	6	1	1	2	3	3	4	4	5	6
72	8573	8579	8585	8591	8597	8603	8609	8615	8621	8627	6	1	1	2	3	3	4	4	5	6
73	8633	8639	8645	8651	8657	8663	8669	8675	8681	8686	6	1	1	2	3	3	4	4	5	6
74	8692	8698	8704	8710	8716	8722	8727	8733	8739	8745	6	1	1	2	2	3	4	4	5	6
75	8751	8756	8762	8768	8774	8779	8785	8791	8797	8802	6	1	1	2	2	3	3	4	5	5
76	8808	8814	8820	8825	8831	8837	8842	8848	8854	8859	6	1	1	2	2	3	3	4	4	5
77	8865	8871	8876	8882	8887	8893	8899	8904	8910	8915	6	1	1	2	2	3	3	4	4	5
78	8921	8927	8932	8938	8943	8949	8954	8960	8965	8971	6	1	1	2	2	3	3	4	4	5
79	8976	8982	8987	8993	8998	9004	9009	9015	9020	9025	5	1	1	2	2	3	3	4	4	5
80	9031	9036	9042	9047	9053	9058	9063	9069	9074	9079	5	1	1	2	2	3	3	4	4	5
81	9085	9090	9096	9101	9106	9112	9117	9122	9128	9133	5	1	1	2	2	3	3	4	4	5
82	9138	9143	9149	9154	9159	9165	9170	9175	9180	9186	5	1	1	2	2	3	3	4	4	5
83	9191	9196	9201	9206	9212	9217	9222	9227	9232	9238	5	1	1	2	2	3	3	4	4	5
84	9243	9248	9253	9258	9263	9269	9274	9279	9284	9289	5	1	1	2	2	3	3	4	4	5
85	9294	9299	9304	9309	9315	9320	9325	9330	9335	9340	5	1	1	2	2	3	3	4	4	5
86	9345	9350	9355	9360	9365	9370	9375	9380	9385	9390	5	1	1	2	2	3	3	4	4	5
87	9395	9400	9405	9410	9415	9420	9425	9430	9435	9440	5	1	1	2	2	3	3	4	4	5
88	9445	9450	9455	9460	9465	9469	9474	9479	9484	9489	5	0	1	1	2	2	3	3	4	4
89	9494	9499	9504	9509	9513	9518	9523	9528	9533	9538	5	0	1	1	2	2	3	3	4	4
90	9542	9547	9552	9557	9562	9566	9571	9576	9581	9586	5	0	1	1	2	2	3	3	4	4
91	9590	9595	9600	9605	9609	9614	9619	9624	9628	9633	5	0	1	1	2	2	3	3	4	4
92	9638	9643	9647	9652	9657	9661	9666	9671	9675	9680	5	0	1	1	2	2	3	3	4	4
93	9685	9689	9694	9699	9703	9708	9713	9717	9722	9727	5	0	1	1	2	2	3	3	4	4
94	9731	9736	9741	9745	9750	9754	9759	9763	9768	9773	5	0	1	1	2	2	3	3	4	4
95	9777	9782	9786	9791	9795	9800	9805	9809	9814	9818	5	0	1	1	2	2	3	3	4	4
96	9823	9827	9832	9836	9841	9845	9850	9854	9859	9863	4	0	1	1	2	2	3	3	4	4
97	9868	9872	9877	9881	9886	9890	9894	9899	9903	9908	4	0	1	1	2	2	3	3	4	4
98	9912	9917	9921	9926	9930	9934	9939	9943	9948	9952	4	0	1	1	2	2	3	3	4	4
99	9956	9961	9965	9969	9974	9978	9983	9987	9991	9996	4	0	1	1	2	2	3	3	4	4
N	0	1	2	3	4	5	6	7	8	9	D	1	2	3	4	5	6	7	8	9

TABLE III

LOGARITHMS OF NUMBERS: 1090-1509

No.	0	1	2	3	4	5	6	7	8	9
100	0000	0004	0009	0013	0017	0022	0026	0030	0035	0039
101	0043	0048	0052	0056	0060	0065	0069	0073	0077	0082
102	0086	0090	0095	0099	0103	0107	0111	0116	0120	0124
103	0128	0133	0137	0141	0145	0149	0154	0158	0162	0166
104	0170	0175	0179	0183	0187	0191	0195	0199	0204	0208
105	0212	0216	0220	0224	0228	0233	0237	0241	0245	0249
106	0253	0257	0261	0265	0269	0273	0278	0282	0286	0290
107	0294	0298	0302	0306	0310	0314	0318	0322	0326	0330
108	0334	0338	0342	0346	0350	0354	0358	0362	0366	0370
109	0374	0378	0382	0386	0390	0394	0398	0402	0406	0410
110	0414	0418	0422	0426	0430	0434	0438	0441	0445	0449
111	0453	0457	0461	0465	0469	0473	0477	0481	0484	0488
112	0492	0496	0500	0504	0508	0512	0515	0519	0523	0527
113	0531	0535	0538	0542	0546	0550	0554	0558	0561	0565
114	0569	0573	0577	0580	0584	0588	0592	0596	0599	0603
115	0607	0611	0615	0618	0622	0626	0630	0633	0637	0641
116	0645	0648	0652	0656	0660	0663	0667	0671	0674	0678
117	0682	0686	0689	0693	0697	0700	0704	0708	0711	0715
118	0719	0722	0726	0730	0734	0737	0741	0745	0748	0752
119	0755	0759	0763	0766	0770	0774	0777	0781	0785	0788
120	0792	0795	0799	0803	0806	0810	0813	0817	0821	0824
121	0828	0831	0835	0839	0842	0846	0849	0853	0856	0860
122	0864	0867	0871	0874	0878	0881	0885	0888	0892	0896
123	0899	0903	0906	0910	0913	0917	0920	0924	0927	0931
124	0934	0938	0941	0945	0948	0952	0955	0959	0962	0966
125	0969	0973	0976	0980	0983	0986	0990	0993	0997	1000
126	1004	1007	1011	1014	1017	1021	1024	1028	1031	1035
127	1038	1041	1045	1048	1052	1055	1059	1062	1065	1069
128	1072	1075	1079	1082	1086	1089	1092	1096	1099	1103
129	1106	1109	1113	1116	1119	1123	1126	1129	1133	1136
130	1139	1143	1146	1149	1153	1156	1159	1163	1166	1169
131	1173	1176	1179	1183	1186	1189	1193	1196	1199	1202
132	1206	1209	1212	1216	1219	1222	1225	1229	1232	1235
133	1239	1242	1245	1248	1252	1255	1258	1261	1265	1268
134	1271	1274	1278	1281	1284	1287	1290	1294	1297	1300
135	1303	1307	1310	1313	1316	1319	1323	1326	1329	1332
136	1335	1339	1342	1345	1348	1351	1355	1358	1361	1364
137	1367	1370	1374	1377	1380	1383	1386	1389	1392	1396
138	1399	1402	1405	1408	1411	1414	1418	1421	1424	1427
139	1430	1433	1436	1440	1443	1446	1449	1452	1455	1458
140	1461	1464	1467	1471	1474	1477	1480	1483	1486	1489
141	1492	1495	1498	1501	1504	1508	1511	1514	1517	1520
142	1523	1526	1529	1532	1535	1538	1541	1544	1547	1550
143	1553	1556	1559	1562	1565	1569	1572	1575	1578	1581
144	1584	1587	1590	1593	1596	1599	1602	1605	1608	1611
145	1614	1617	1620	1623	1626	1629	1632	1635	1638	1641
146	1644	1647	1649	1652	1655	1658	1661	1664	1667	1670
147	1673	1676	1679	1682	1685	1688	1691	1694	1697	1700
148	1703	1706	1708	1711	1714	1717	1720	1723	1726	1729
149	1732	1735	1738	1741	1744	1746	1749	1752	1755	1758
150	1761	1764	1767	1770	1772	1775	1778	1781	1784	1787
No.	0	1	2	3	4	5	6	7	8	9

TABLE III

LOGARITHMS OF NUMBERS: 1500-2009

No.	0	1	2	3	4	5	6	7	8	9
150	1761	1764	1767	1770	1772	1775	1778	1781	1784	1787
151	1790	1793	1796	1798	1801	1804	1807	1810	1813	1816
152	1818	1821	1824	1827	1830	1833	1836	1838	1841	1844
153	1847	1850	1853	1855	1858	1861	1864	1867	1870	1872
154	1875	1878	1881	1884	1886	1889	1892	1895	1898	1901
155	1903	1906	1909	1912	1915	1917	1920	1923	1926	1928
156	1931	1934	1937	1940	1942	1945	1948	1951	1953	1956
157	1959	1962	1965	1967	1970	1973	1976	1978	1981	1984
158	1987	1989	1992	1995	1998	2000	2003	2006	2009	2011
159	2014	2017	2019	2022	2025	2028	2030	2033	2036	2038
160	2041	2044	2047	2049	2052	2055	2057	2060	2063	2066
161	2068	2071	2074	2076	2079	2082	2084	2087	2090	2092
162	2095	2098	2101	2103	2106	2109	2111	2114	2117	2119
163	2122	2125	2127	2130	2133	2135	2138	2140	2143	2146
164	2148	2151	2154	2156	2159	2162	2164	2167	2170	2172
165	2175	2177	2180	2183	2185	2188	2191	2193	2196	2198
166	2201	2204	2206	2209	2212	2214	2217	2219	2222	2225
167	2227	2230	2232	2235	2238	2240	2243	2245	2248	2251
168	2253	2256	2258	2261	2263	2266	2269	2271	2274	2276
169	2279	2281	2284	2287	2289	2292	2294	2297	2299	2302
170	2304	2307	2310	2312	2315	2317	2320	2322	2325	2327
171	2330	2333	2335	2338	2340	2343	2345	2348	2350	2353
172	2355	2358	2360	2363	2365	2368	2370	2373	2375	2378
173	2380	2383	2385	2388	2390	2393	2395	2398	2400	2403
174	2405	2408	2410	2413	2415	2418	2420	2423	2425	2428
175	2430	2433	2435	2438	2440	2443	2445	2448	2450	2453
176	2455	2458	2460	2463	2465	2467	2470	2472	2475	2477
177	2480	2482	2485	2487	2490	2492	2494	2497	2499	2502
178	2504	2507	2509	2512	2514	2516	2519	2521	2524	2526
179	2529	2531	2533	2536	2538	2541	2543	2545	2548	2550
180	2553	2555	2558	2560	2562	2565	2567	2570	2572	2574
181	2577	2579	2582	2584	2586	2589	2591	2594	2596	2598
182	2601	2603	2605	2608	2610	2613	2615	2617	2620	2622
183	2625	2627	2629	2632	2634	2636	2639	2641	2643	2646
184	2648	2651	2653	2655	2658	2660	2662	2665	2667	2669
185	2672	2674	2676	2679	2681	2683	2686	2688	2690	2693
186	2695	2697	2700	2702	2704	2707	2709	2711	2714	2716
187	2718	2721	2723	2725	2728	2730	2732	2735	2737	2739
188	2742	2744	2746	2749	2751	2753	2755	2758	2760	2762
189	2765	2767	2769	2772	2774	2776	2778	2781	2783	2785
190	2788	2790	2792	2794	2797	2799	2801	2804	2806	2808
191	2810	2813	2815	2817	2819	2822	2824	2826	2828	2831
192	2833	2835	2838	2840	2842	2844	2847	2849	2851	2853
193	2856	2858	2860	2862	2865	2867	2869	2871	2874	2876
194	2878	2880	2882	2885	2887	2889	2891	2894	2896	2898
195	2900	2903	2905	2907	2909	2911	2914	2916	2918	2920
196	2923	2925	2927	2929	2931	2934	2936	2938	2940	2942
197	2945	2947	2949	2951	2953	2956	2958	2960	2962	2964
198	2967	2969	2971	2973	2975	2978	2980	2982	2984	2986
199	2989	2991	2993	2995	2997	2999	3002	3004	3006	3008
200	3010	3012	3015	3017	3019	3021	3023	3025	3028	3030
No.	0	1	2	3	4	5	6	7	8	9

TABLE IV

LOGARITHMS OF SINES AND COSINES

A°	0'	10'	20'	30'	40'	50'	60'	A°	INTERPOLATION	
0°	sin	7.4637	7648	9408	*0558	*1627	*2419	cos 89°	Do not interpolate between	
log	cos	10.0000	0000	0000	0000	0000	*9999	log sin	log sin 0° and log sin 3°.	
1°	sin	8.2419	3088	3668	4179	4637	5050	5428	cos 83°	In the interval between
log	cos	9.9999	9999	9999	9999	9998	9998	9997	log sin	log sin 3° and log sin 14°.
2°	sin	8.5428	5776	6097	6397	6677	6940	7188	cos 87°	interpolation may be used
log	cos	9.9997	9997	9996	9996	9995	9995	9994	log sin	with the actual difference
3°	sin	8.7188	7423	7645	7857	8059	8251	8436	cos 85°	obtained by subtraction
log	cos	9.9994	9993	9993	9992	9991	9990	9989	log sin	with a possible error
4°	sin	8.8436	8613	8783	8946	9104	9256	9403	cos 85°	of one unit, fourth place.
log	cos	9.9989	9989	9988	9987	9986	9985	9983	log sin	Similarity for log cos 87°-90°.
5°	sin	8.9403	9545	9682	9816	9945	*0070	*0192	cos 84°	do not interpolate;
log	cos	9.9983	9982	9981	9980	9979	9977	9976	log sin	between log cos 76° and 87°
6°	sin	9.0192	0311	0426	0539	0648	0755	0859	cos 83°	interpolation may be used.
log	cos	9976	9975	9973	9972	9971	9969	9968	log sin	Separate tables are given
7°	sin	0859	0961	1060	1157	1252	1345	1436	cos 82°	to four places, giving
log	cos	9968	9966	9964	9963	9961	9959	9958	log sin	log sines from 0° to 14°
8°	sin	1436	1525	1612	1697	1781	1863	1943	cos 81°	by minutes.
log	cos	9958	9956	9954	9952	9950	9948	9946	log sin	Mechanical Interpolation
9°	sin	1943	2022	2100	2176	2251	2324	2397	cos 80°	The following scheme gives
log	cos	9946	9944	9942	9940	9938	9936	9934	log sin	tenths of the mean difference
10°	sin	9.2397	2468	2538	2606	2674	2740	2806	cos 79°	applying throughout the line
log	cos	9.9934	9931	9929	9927	9924	9922	9919	log sin	to which these differences
11°	sin	2806	2870	2934	2997	3058	3119	3179	cos 78°	attach.
log	cos	9919	9917	9914	9912	9909	9907	9904	log sin	Regard the differences
A°	0'		10'	20'	30'	40'	50'	60'	A°	as units of the fourth place;
	60'		50'	40'	30'	20'	10'	0'		they change the last place,
12°	sin	3179	3238	3296	3353	3410	3466	3521	cos 77°	or two (sometimes more)
log	cos	9904	9901	9899	9896	9893	9890	9887	log sin	of the logarithm.
13°	sin	3521	3575	3629	3682	3734	3786	3837	cos 76°	An error of one unit
log	cos	9887	9884	9881	9878	9875	9872	9869	log sin	is possible in the last place.
14°	sin	3837	3887	3937	3986	4035	4083	4130	cos 75°	
log	cos	9869	9866	9863	9859	9856	9853	9849	log sin	1 2 3 4 5 6 7 8 9
15°	sin	4130	4177	4223	4269	4314	4359	4403	cos 74°	49 5 10 15 20 24 29 34 39 44
log	cos	9849	9846	9843	9839	9836	9832	9828	log sin	interpolate mentally
16°	sin	4403	4447	4491	4533	4576	4618	4659	cos 73°	46 5 9 14 18 23 27 32 35 41
log	cos	9828	9825	9821	9817	9814	9810	9806	log sin	using multiplication table
17°	sin	4659	4700	4741	4781	4821	4861	4900	cos 72°	45 4 9 13 17 21 26 30 34 38
log	cos	9806	9802	9798	9794	9790	9786	9782	log sin	for small differences
18°	sin	4900	4939	4977	5015	5052	5090	5126	cos 71°	40 4 8 12 16 20 24 28 32 36
log	cos	9782	9778	9774	9770	9765	9761	9757	log sin	mentally
19°	sin	5126	5163	5199	5235	5270	5306	5341	cos 70°	38 4 8 11 15 19 23 26 30 34
log	cos	9757	9752	9748	9743	9739	9734	9730	log sin	mentally
20°	sin	9.5341	5375	5409	5443	5477	5510	5543	cos 69°	36 4 7 11 14 18 21 25 29 32
log	cos	9.9730	9725	9721	9716	9711	9706	9702	sin log	34 3 7 10 13 17 20 24 27 30
21°	sin	5543	5576	5609	5641	5673	5704	5736	cos 68°	32 3 6 10 13 16 19 22 26 29
log	cos	9702	9697	9692	9687	9682	9677	9672	log sin	30 3 6 9 12 15 18 21 24 27
22°	sin	5736	5767	5798	5828	5859	5889	5919	cos 67°	30 3 6 9 12 15 18 21 24 27
log	cos	9672	9667	9661	9656	9651	9646	9640	log sin	
		60'	50'	40'	30'	20'	10'	0'	A°	1 2 3 4 5 6 7 8 9

TABLE IV

LOGARITHMS OF SINES AND COSINES

Mean Differences

A°	0'	10'	20'	30'	40'	50'	60'		d	1	2	3	4	5	6	7	8	9
23° sin	9.5919	5948	5978	6007	6036	6065	6093	cos 66°	29	3	6	9	12	15	17	20	23	26
log cos	9.9640	9635	9629	9624	9618	9613	9607	log sin	interpolate mentally									
24° sin	6093	6121	6149	6177	6205	6232	6259	cos 65°	28	3	6	8	11	14	17	19	22	25
log cos	9607	9602	9596	9590	9584	9579	9573	log sin	using multiplication table									
25° sin	6259	6286	6313	6340	6366	6392	6418	cos 64°	26	3	5	8	11	13	16	19	21	24
log cos	9573	9567	9561	9555	9549	9543	9537	log sin	for small differences									
25° sin	6418	6444	6470	6495	6521	6546	6570	cos 63°	25	3	5	8	10	13	15	18	20	23
log cos	9537	9530	9524	9518	9512	9505	9499	log sin	interpolate mentally									
27° sin	6570	6595	6620	6644	6668	6692	6716	cos 62°	24	2	5	7	10	12	15	17	19	22
log cos	9499	9492	9486	9479	9473	9466	9459	log sin	for small differences									
28° sin	6716	6740	6763	6787	6810	6833	6856	cos 61°	23	2	5	7	9	12	14	16	19	21
log cos	9459	9453	9446	9439	9432	9425	9418	log sin	using multiplication table									
29° sin	6856	6878	6901	6923	6946	6968	6990	cos 60°	22	2	4	7	9	11	13	16	18	20
log cos	9418	9411	9404	9397	9390	9383	9375	log sin										
30° sin	9.6990	7012	7033	7055	7076	7097	7118	cos 59°	21	2	4	6	9	11	13	15	17	19
log cos	9.9375	9368	9361	9353	9346	9338	9331	log sin										
31° sin	7118	7139	7160	7181	7201	7222	7242	cos 58°	21	2	4	6	8	10	12	14	16	18
log cos	9331	9323	9315	9308	9300	9292	9284	log sin										
32° sin	7242	7262	7282	7302	7322	7342	7361	cos 57°	20	2	4	6	8	10	12	14	16	18
log cos	9284	9276	9268	9260	9252	9244	9236	sin log										
33° sin	7361	7380	7400	7419	7438	7457	7476	cos 56°	19	2	4	6	8	10	11	13	15	17
log cos	9236	9228	9219	9211	9203	9194	9186	log sin										
34° sin	7476	7494	7513	7531	7550	7568	7586	cos 55°	18	2	4	6	7	9	11	13	15	17
log cos	9186	9177	9169	9160	9151	9142	9134	log sin										
A°	0'	10'	20'	30'	40'	50'	60'	A°	d	1	2	3	4	5	6	7	8	9
35° sin	7586	7604	7622	7640	7657	7675	7692	cos 54°	18	2	4	5	7	9	11	12	14	16
log cos	9134	9125	9116	9107	9098	9089	9080	log sin	interpolate mentally									
36° sin	7692	7710	7727	7744	7761	7778	7795	cos 53°	17	2	3	5	7	9	10	12	14	15
log cos	9080	9070	9061	9052	9042	9033	9023	log sin	using multiplication tables									
37° sin	7795	7811	7828	7844	7861	7877	7893	cos 52°	16	2	3	5	7	8	10	12	13	15
log cos	9023	9014	9004	8995	8985	8975	8965	log sin	for small differences									
38° sin	7893	7910	7926	7941	7957	7973	7989	cos 51°	16	2	3	5	6	8	10	11	13	14
log cos	8965	8955	8945	8935	8925	8915	8905	log sin										
39° sin	7989	8004	8020	8035	8050	8066	8081	cos 50°	15	2	3	5	6	8	9	11	12	14
log cos	8905	8895	8884	8874	8864	8853	8843	log sin										
40° sin	9.8843	8096	8111	8125	8140	8155	8169	cos 49°	15	1	3	4	6	7	9	10	12	13
log cos	9.8843	8832	8821	8810	8800	8789	8778	log sin										
41° sin	8169	8184	8198	8213	8227	8241	8255	cos 48°	14	1	3	4	6	7	9	10	11	13
log cos	8778	8767	8756	8745	8733	8722	8711	log sin										
42° sin	8255	8269	8283	8297	8311	8324	8338	cos 47°	14	1	3	4	7	8	10	11	12	
log cos	8711	8699	8688	8676	8665	8653	8641	log sin										
43° sin	8338	8351	8365	8378	8391	8405	8418	cos 46°	13	1	3	4	5	7	8	9	11	12
log cos	8641	8629	8618	8606	8594	8582	8569	log sin										
44° sin	8418	8431	8444	8457	8469	8482	8495	cos 45°	13	1	3	4	5	6	8	9	10	12
log cos	8569	8557	8545	8532	8520	8507	8495	log sin										
45° sin	8495	8507	8520	8532	8545	8557	8569	cos 44°	12	1	2	4	5	6	7	9	10	11
log cos	8495	8482	8469	8457	8444	8431	8418	log sin										
	60'	50'	40'	30'	20'	10'	0'	A°	d	1	2	3	4	5	6	7	8	9

TABLE V

LOGARITHMS OF TANGENTS AND COTANGENTS

A°	0'	10'	20'	30'	40'	50'	60'	A°	INTERPOLATION
0° tan		7.4637	7648	9409	*0658	*1627	*2419	cot 89°	Do not interpolate between
log cot		2.5363	2352	0591	*9342	*8373	*7581	log tan	log tan 0° and log tan 3°,
1° tan	8.2419	3089	3669	4181	4638	5053	5431	cot 83°	or log cot 87° and log cot 90°.
log cot	1.7581	6911	6331	5819	5362	4947	4569	log tan	
2° tan	8.5431	5779	6101	6401	6682	6945	7194	cot 87°	In the interval between
log cot	1.4569	4221	3899	3599	3318	3055	2806	log tan	log tan 3° and log tan 14°, or
3° tan	8.7194	7429	7652	7865	8067	8261	8446	cot 86°	log cot 76° and log cot 87°
log cot	1.2806	2571	2348	2135	1933	1739	1554	log tan	interpolation may be used
4° tan	8.8446	8624	8795	8960	9118	9272	9420	cot 85°	log tan with the actual difference
log cot	1.1554	1376	1205	1040	0882	0728	0580	log tan	obtained by subtraction
5° tan	8.9420	9563	9701	9836	9966	*0093	*0216	cot 84°	log tan with a possible error of
log cot	1.0580	0437	0299	0164	0034	*9907	*9784	log tan	one unit, fourth place.
6° tan	9.0216	0336	0453	0567	0678	0786	0891	cot 83°	Separate tables are given
log cot	0.9784	9664	9547	9433	9322	9214	9109	log tan	with four place values
7° tan	9.0891	0995	1096	1194	1291	1385	1478	cot 82°	log tan 0° to log tan 14°
log cot	0.9109	9005	8904	8806	8709	8615	8522	log tan	log cot 76° to log cot 90°
8° tan	9.1478	1569	1658	1745	1831	1915	1997	cot 81°	by minutes.
log cot	0.8522	8431	8342	8255	8169	8085	8003	log tan	
9° tan	9.1997	2078	2158	2236	2313	2389	2463	cot 80°	Mechanical Interpolation
log cot	0.8003	7922	7842	7764	7687	7611	7537	log tan	The following scheme gives
10° tan	9.2463	2536	2609	2680	2750	2819	2887	cot 79°	tenths of the mean difference
log cot	0.7537	7464	7391	7320	7250	7181	7113	log tan	applying throughout the line
11° tan	9.2887	2953	3020	3085	3149	3212	3275	cot 78°	to which attached.
log cot	0.7113	7047	6980	6915	6851	6788	6725	log tan	
A° D	0'	10'	20'	30'	40'	50'	60'	cot 77°	as units of the fourth place;
12° tan	9.3275	3336	3397	3458	3517	3576	3634	log tan	they change the last place,
log cot	0.6725	6664	6603	6542	6483	6424	6366	cot 76°	A° or two places (or more)
13° tan	9.3634	3691	3748	3804	3859	3914	3968	log tan d	of the logarithm.
log cot	0.6366	6309	6252	6196	6141	6086	6032	cot 75°	An error of one unit
14° tan	9.3968	4021	4074	4127	4178	4230	4281	log tan	is possible in the last place.
log cot	0.6032	5979	5926	5873	5822	5770	5719	cot 74°	
15° tan	9.4281	4331	4381	4430	4479	4527	4575	log tan	1 2 3 4 5 6 7 8 9
log cot	0.5719	5669	5619	5570	5521	5473	5425	cot 73°	5 10 15 20 25 29 34 39 44
16° tan	9.4575	4622	4669	4716	4762	4808	4853	log tan	49
log cot	0.5425	5378	5331	5284	5238	5192	5147	cot 72°	46
17° tan	9.4853	4898	4943	4987	5031	5075	5118	log tan	44
log cot	0.5147	5102	5057	5013	4969	4925	4882	cot 71°	44
18° tan	9.5118	5161	5203	5245	5287	5329	5370	log tan	42
log cot	0.4882	4839	4797	4755	4713	4671	4630	cot 70°	42
19° tan	9.5370	5411	5451	5491	5531	5571	5611	log tan	40
log cot	0.4630	4589	4549	4509	4469	4429	4389	cot 69°	40
20° tan	9.5611	5650	5689	5727	5766	5804	5842	log tan	39
log cot	0.4389	4350	4311	4273	4234	4196	4158	cot 68°	39
21° tan	9.5842	5879	5917	5954	5991	6028	6064	log tan	37
log cot	0.4158	4121	4083	4046	4009	3972	3936	cot 67°	37
22° tan	9.6064	6100	6136	6172	6208	6243	6279	log tan	36
log cot	0.3936	3900	3864	3828	3792	3757	3721	cot 66°	36
A°	C0'	50'	40'	40'	20'	10'	0'	A° d	1 2 3 4 5 6 7 8 9

TABLE V

LOGARITHMS OF TANGENTS AND COTANGENTS											Mean Differences							
A°	0'	10'	20'	30'	40'	50'	60'	A°	d	1	2	3	4	5	6	7	8	9
23° tan	9.6279	6314	6348	6383	6417	6452	6486	cot 66°	34	3	7	10	14	17	21	24	28	31
log cot	0.3721	3686	3652	3617	3583	3548	3514	log tan	34									
24° tan	9.6486	6520	6553	6587	6620	6654	6687	cot 65°	33	3	7	10	13	17	20	23	27	30
log cot	0.3514	3480	3447	3413	3380	3346	3313	log tan	33									
25° tan	9.6687	6720	6752	6785	6817	6850	6882	cot 64°	33	3	7	10	13	16	20	23	26	29
log cot	0.3313	3280	3248	3215	3183	3150	3118	log tan	33									
26° tan	9.6882	6914	6946	6977	7009	7040	7072	cot 63°	32	3	6	9	13	16	19	22	25	28
log cot	0.3118	3086	3054	3023	2991	2960	2928	log tan	32									
27° tan	9.7072	7103	7134	7165	7196	7226	7257	cot 62°	31	3	6	9	12	15	19	22	25	28
log cot	0.2928	2897	2866	2835	2804	2774	2743	log tan	31									
28° tan	9.7257	7287	7317	7348	7378	7408	7438	cot 61°	30	3	6	9	12	15	18	21	24	27
log cot	0.2743	2713	2683	2652	2622	2592	2562	log tan	30									
29° tan	9.7438	7467	7497	7526	7556	7585	7614	cot 60°	29	3	6	9	12	15	18	21	24	27
log cot	0.2562	2533	2503	2474	2444	2415	2386	log tan	29									
30° tan	9.7614	7644	7673	7701	7730	7759	7788	cot 59°	29	3	6	9	12	14	17	20	23	26
log cot	0.2386	2356	2327	2299	2270	2241	2212	log tan	29									
31° tan	9.7788	7816	7845	7873	7902	7930	7958	cot 58°	28	3	6	9	11	14	17	20	23	26
log cot	0.2212	2184	2155	2127	2098	2070	2042	log tan	28									
32° tan	9.7958	7986	8014	8042	8070	8097	8125	cot 57°	28	3	6	8	11	14	17	19	22	25
log cot	0.2042	2014	1986	1958	1930	1903	1875	log tan	28									
33° tan	9.8125	8153	8180	8208	8235	8263	8290	cot 56°	27	3	5	8	11	14	16	19	22	25
log cot	0.1875	1847	1820	1792	1765	1737	1710	log tan	27									
34° tan	9.8290	8317	8344	8371	8398	8425	8452	cot 55°	27	3	5	8	11	14	16	19	22	24
log cot	0.1710	1683	1656	1629	1602	1575	1548	log tan	27									
A°	0'	10'	20'	30'	40'	50'	60'	A°	d	1	2	3	4	5	6	7	8	9
35° tan	9.8452	8479	8506	8533	8559	8586	8613	cot 54°	27	3	5	8	11	13	16	19	21	24
log cot	0.1548	1521	1494	1467	1441	1414	1387	log tan	27									
36° tan	9.8613	8639	8666	8692	8718	8745	8771	cot 53°	26	3	5	8	11	13	16	18	21	24
log cot	0.1387	1361	1334	1308	1282	1255	1229	log tan	26									
37° tan	9.8771	8797	8824	8850	8876	8902	8928	cot 52°	26	3	5	8	10	13	16	18	21	24
log cot	0.1229	1203	1176	1150	1124	1098	1072	log tan	26									
38° tan	9.8928	8954	8980	9006	9032	9058	9084	cot 51°	26	3	5	8	10	13	16	18	21	23
log cot	0.1072	1046	1020	9994	9968	9942	9916	log tan	26									
39° tan	9.9084	9110	9135	9161	9187	9212	9238	cot 50°	26	3	5	8	10	13	15	18	21	23
log cot	0.0916	0890	0865	0839	0813	0788	0762	log tan	26									
40° tan	9.9238	9264	9289	9315	9341	9366	9392	cot 49°	26	3	5	8	10	13	15	18	21	23
log cot	0.0762	0736	0711	0685	0659	0634	0608	log tan	26									
41° tan	9.9392	9417	9443	9468	9494	9519	9544	cot 48°	25	3	5	8	10	13	15	18	20	23
log cot	0.0608	0583	0557	0532	0506	0481	0456	log tan	25									
42° tan	9.9544	9570	9595	9621	9646	9671	9697	cot 47°	25	3	5	8	10	13	15	18	20	23
log cot	0.0456	0430	0405	0379	0354	0329	0303	log tan	25									
43° tan	9.9697	9722	9747	9772	9798	9823	9848	cot 46°	25	3	5	8	10	13	15	18	20	23
log cot	0.0303	0278	0253	0228	0202	0177	0152	log tan	25									
44° tan	9.9848	9874	9899	9924	9949	9975*0000		cot 45°	25	3	5	8	10	13	15	18	20	23
log cot	0.0152	0126	0101	0076	0051	0025	0000	log tan	25									
45° tan	0.0000	0025	0051	0076	0101	0126	0152	cot 44°	25	3	5	8	10	13	15	18	20	23
log cot	0.0000	*9975*	*9949*	*9924*	*9899*	*9874*	*9848	log tan	25									
A°	CJ	5J	40'	30'	20'	10'	0'	A°	d	1	2	3	4	5	6	7	8	9

TABLE VI

	L Sin L Tan	L Sin L Tan	L Sin L Tan	L Sin L Tan	L Sin L Tan	L Sin L Tan	L Sin L Tan	L Sin L Tan	L Sin L Tan	L Sin L Tan	L Sin L Tan	L Sin L Tan			
	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°			
0'		8.2419	.2419	.5428	.5431	.7188	.7194	.8436	.8446	8.9403	.9420	9.0192	.0216	60'	
1'	6.4637	.4637	.2490	.2491	.5454	.5467	.7212	.7218	.8454	.8465	.9417	.9434	9.0204	.0228	59'
2'	6.7648	.7648	.2561	.2562	.5500	.5503	.7236	.7242	.8472	.8483	.9432	.9449	9.0216	.0240	58'
3'	6.9408	.9408	.2630	.2631	.5535	.5538	.7260	.7266	.8490	.8501	.9446	.9453	9.0228	.0253	57'
4'	7.0358	.0658	.2699	.2700	.5571	.5573	.7283	.7290	.8508	.8518	.9460	.9477	9.0240	.0265	56'
5'	7.1627	.1627	.2766	.2767	.5605	.5608	.7307	.7313	.8525	.8536	.9475	.9492	9.0252	.0277	55'
6'	7.2419	.2419	.2832	.2833	.5640	.5643	.7330	.7337	.8543	.8554	.9489	.9506	9.0264	.0289	54'
7'	7.3088	.3088	.2898	.2899	.5674	.5677	.7354	.7360	.8560	.8572	.9503	.9520	9.0276	.0300	53'
8'	7.3668	.3668	.2962	.2963	.5708	.5711	.7377	.7383	.8578	.8589	.9517	.9534	9.0287	.0312	52'
9'	7.4180	.4180	.3025	.3026	.5742	.5745	.7400	.7406	.8595	.8607	.9531	.9549	9.0299	.0324	51'
10'	7.4637	.4637	.3088	.3089	.5776	.5779	.7423	.7429	.8613	.8624	.9545	.9563	9.0311	.0336	50'
11'	7.5051	.5051	.3150	.3150	.5809	.5812	.7445	.7452	.8630	.8642	.9559	.9577	9.0323	.0348	49'
12'	7.5429	.5429	.3210	.3211	.5842	.5845	.7468	.7475	.8647	.8659	.9573	.9591	9.0334	.0360	48'
13'	7.5777	.5777	.3270	.3271	.5875	.5878	.7491	.7497	.8665	.8676	.9587	.9605	9.0346	.0371	47'
14'	7.6099	.6099	.3329	.3330	.5907	.5911	.7513	.7520	.8682	.8694	.9601	.9619	9.0357	.0383	46'
15'	7.6398	.6398	.3388	.3389	.5939	.5943	.7535	.7542	.8699	.8711	.9614	.9633	9.0370	.0395	45'
16'	7.6678	.6678	.3445	.3446	.5972	.5975	.7557	.7565	.8716	.8728	.9628	.9646	9.0380	.0407	44'
17'	7.6942	.6942	.3502	.3503	.6003	.6007	.7580	.7587	.8733	.8745	.9642	.9660	9.0392	.0418	43'
18'	7.7190	.7190	.3558	.3559	.6035	.6038	.7602	.7609	.8749	.8762	.9655	.9674	9.0403	.0430	42'
19'	7.7425	.7425	.3613	.3614	.6066	.6070	.7623	.7631	.8766	.8778	.9669	.9688	9.0415	.0441	41'
20'	7.7648	.7648	.3668	.3669	.6097	.6101	.7645	.7652	.8783	.8795	.9682	.9701	9.0426	.0453	40'
21'	7.7859	.7859	.3722	.3723	.6128	.6132	.7667	.7674	.8799	.8812	.9696	.9715	9.0438	.0464	39'
22'	7.8061	.8062	.3775	.3776	.6159	.6163	.7688	.7696	.8816	.8829	.9709	.9729	9.0450	.0476	38'
23'	7.8255	.8255	.3828	.3829	.6189	.6193	.7710	.7717	.8833	.8845	.9723	.9742	9.0460	.0487	37'
24'	7.8439	.8439	.3880	.3881	.6220	.6223	.7731	.7739	.8849	.8862	.9736	.9756	9.0472	.0499	36'
25'	7.8617	.8617	.3931	.3932	.6250	.6254	.7752	.7760	.8865	.8878	.9750	.9769	9.0483	.0510	35'
26'	7.8787	.8787	.3982	.3983	.6279	.6283	.7773	.7781	.8882	.8895	.9763	.9782	9.0494	.0521	34'
27'	7.8951	.8951	.4032	.4033	.6309	.6313	.7794	.7802	.8898	.8911	.9776	.9796	9.0505	.0533	33'
28'	7.9109	.9109	.4082	.4083	.6339	.6343	.7815	.7823	.8914	.8927	.9789	.9809	9.0516	.0544	32'
29'	7.9261	.9261	.4131	.4132	.6368	.6372	.7836	.7844	.8930	.8944	.9803	.9823	9.0527	.0555	31'
	L Sin L Tan	L Sin L Tan	L Sin L Tan	L Sin L Tan	L Sin L Tan	L Sin L Tan	L Sin L Tan	L Sin L Tan	L Sin L Tan	L Sin L Tan	L Sin L Tan	L Sin L Tan	L Sin L Tan	L Sin L Tan	
	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°			
30'	7.9408	.9409	.4179	.4181	.6397	.6401	.7857	.7865	.8946	.8960	.9816	.9836	9.0539	.0567	30'
31'	7.9551	.9551	.4227	.4229	.6426	.6430	.7877	.7886	.8962	.8976	.9829	.9849	9.0550	.0578	29'
32'	7.9389	.9689	.4275	.4276	.6454	.6459	.7898	.7906	.8978	.8992	.9842	.9862	9.0561	.0589	28'
33'	7.9322	.9823	.4322	.4323	.6483	.6487	.7918	.7927	.8994	.9008	.9855	.9875	9.0572	.0600	27'
34'	7.9952	.9952	.4368	.4370	.6511	.6515	.7939	.7947	.9010	.9024	.9868	.9888	9.0583	.0611	26'
35'	8.0078	.0078	.4414	.4416	.6539	.6544	.7959	.7967	.9026	.9040	.9881	.9901	9.0594	.0622	25'
36'	8.0200	.0200	.4459	.4461	.6567	.6571	.7979	.7988	.9042	.9056	.9894	.9915	9.0605	.0633	24'
37'	8.0319	.0319	.4504	.4506	.6595	.6599	.7999	.8008	.9057	.9071	.9907	.9928	9.0616	.0645	23'
38'	8.0435	.0435	.4549	.4551	.6622	.6627	.8019	.8028	.9073	.9087	.9919	.9940	9.0626	.0656	22'
39'	8.0548	.0548	.4593	.4595	.6650	.6654	.8039	.8048	.9089	.9103	.9932	.9953	9.0637	.0667	21'
40'	8.0658	.0658	.4637	.4638	.6677	.6682	.8059	.8067	.9104	.9118	.9945	.9966	9.0648	.0678	20'
41'	8.0765	.0765	.4680	.4682	.6704	.6709	.8078	.8087	.9119	.9134	.9958	.9979	9.0659	.0688	19'
42'	8.0870	.0870	.4723	.4725	.6731	.6736	.8098	.8107	.9135	.9150	.9970	.9992	9.0670	.0699	18'
43'	8.0972	.0972	.4765	.4767	.6758	.6762	.8117	.8126	.9150	.9165	.9983	.0005	9.0680	.0710	17'
44'	8.1072	.1072	.4807	.4809	.6784	.6789	.8137	.8146	.9166	.9180	.9996	.0017	9.0691	.0721	16'
45'	8.1169	.1170	.4848	.4851	.6810	.6815	.8156	.8165	.9181	.9196	9.0038	.0030	9.0702	.0732	15'
46'	8.1265	.1265	.4890	.4892	.6837	.6842	.8175	.8185	.9196	.9211	9.0321	.0313	9.0712	.0743	14'
47'	8.1358	.1359	.4930	.4933	.6863	.6868	.8194	.8204	.9211	.9226	9.0333	.0355	9.0723	.0754	13'
48'	8.1450	.1450	.4971	.4973	.6889	.6894	.8213	.8223	.9226	.9241	9.0346	.0368	9.0734	.0764	12'
49'	8.1539	.1540	.5011	.5013	.6914	.6920	.8232	.8242	.9241	.9256	9.0358	.0380	9.0744	.0775	11'
50'	8.1627	.1627	.5050	.5053	.6940	.6945	.8251	.8261	.9256	.9272	9.0370	.0393	9.0755	.0786	10'
51'	8.1713	.1713	.5090	.5092	.6965	.6971	.8270	.8280	.9271	.9287	9.0383	.0405	9.0765	.0796	9'
52'	8.1797	.1798	.5129	.5131	.6991	.6996	.8289	.8299	.9286	.9302	9.0395	.0418	9.0776	.0807	8'
53'	8.1880	.1880	.5167	.5170	.7016	.7021	.8307	.8317	.9301	.9316	9.0407	.0430	9.0786	.0818	7'
54'	8.1961	.1962	.5206	.5208	.7041	.7046	.8326	.8336	.9315	.9331	9.0420	.0443	9.0797	.0828	6'
55'	8.2041	.2041	.5243	.5246	.7066	.7071	.8345	.8355	.9330	.9346	9.0432	.0455	9.0807	.0839	5'
56'	8.2119	.2120	.5281	.5283	.7090	.7096	.8363	.8373	.9345	.9361	9.0444	.0467	9.0818	.0849	4'
57'	8.2196	.2196	.5318	.5321	.7115	.7121	.8381	.8392	.9359	.9376	9.0456	.0480	9.0828	.0860	3'
58'	8.2271	.2272	.5355	.5358	.7140	.7145	.8400	.8410	.9374	.9390	9.0468	.0492	9.0838	.0871	2'
59'	8.2346	.2346	.5392	.5394	.7164	.7170	.8418	.8428	.9389	.9405	9.0480	.0504	9.0849	.0881	1'
60'	8.2419	.2419	.5428	.5431	.7188	.7194	.8436	.8446	.9403	.9420	9.0492	.0516	9.0859	.0891	0'
	89°	88°	87°	86°	85°	84°	83°								

L Cos L Cot L Cos L Cot L Cos L Cot L Cos L Cot L Cos L Cot L Cos L Cot L Cos L Cot L Cos L Cot

TABLE VI.

	L Sin L Tan L Sin L Tan			L Sin L Tan L Sin L Tan			L Sin L Tan L Sin L Tan			L Sin L Tan L Sin L Tan					
	7°		8°		9°		10°		11°		12°		13°		
0'	9.0859	.0891	.1436	.1478	.1943	.1997	.2397	.2463	.2806	.2887	.3179	.3275	.3521	.3634	60'
1'	9.0869	.0902	.1445	.1487	.1951	.2005	.2404	.2471	.2812	.2893	.3185	.3281	.3527	.3639	59'
2'	9.0879	.0912	.1453	.1496	.1959	.2013	.2411	.2478	.2819	.2900	.3191	.3287	.3533	.3645	58'
3'	9.0890	.0923	.1462	.1505	.1967	.2022	.2418	.2485	.2825	.2907	.3197	.3293	.3539	.3651	57'
4'	9.0900	.0933	.1471	.1515	.1975	.2030	.2425	.2493	.2832	.2913	.3202	.3300	.3547	.3659	56'
5'	9.0910	.0943	.1480	.1524	.1983	.2038	.2432	.2500	.2838	.2920	.3208	.3306	.3554	.3666	55'
6'	9.0920	.0954	.1489	.1533	.1991	.2046	.2439	.2507	.2845	.2927	.3214	.3312	.3561	.3673	54'
7'	9.0930	.0964	.1498	.1542	.1999	.2054	.2447	.2515	.2851	.2934	.3220	.3318	.3569	.3681	53'
8'	9.0940	.0974	.1507	.1551	.2007	.2062	.2454	.2522	.2858	.2940	.3226	.3324	.3574	.3686	52'
9'	9.0951	.0984	.1516	.1560	.2015	.2070	.2461	.2529	.2864	.2947	.3232	.3330	.3579	.3691	51'
10'	9.0961	.0995	.1525	.1569	.2022	.2078	.2468	.2536	.2870	.2953	.3238	.3336	.3585	.3697	50'
11'	9.0971	.1005	.1533	.1578	.2030	.2086	.2475	.2544	.2877	.2960	.3244	.3343	.3591	.3703	49'
12'	9.0981	.1015	.1542	.1587	.2037	.2094	.2482	.2551	.2883	.2967	.3250	.3349	.3598	.3710	48'
13'	9.0991	.1025	.1551	.1596	.2046	.2102	.2489	.2558	.2890	.2973	.3255	.3355	.3601	.3713	47'
14'	9.1001	.1035	.1560	.1605	.2054	.2110	.2496	.2565	.2896	.2980	.3261	.3361	.3609	.3721	46'
15'	9.1011	.1045	.1568	.1613	.2061	.2118	.2503	.2573	.2902	.2987	.3267	.3367	.3616	.3728	45'
16'	9.1020	.1056	.1577	.1622	.2069	.2126	.2510	.2580	.2909	.2993	.3273	.3373	.3623	.3735	44'
17'	9.1030	.1066	.1586	.1631	.2077	.2134	.2517	.2587	.2915	.3000	.3279	.3379	.3631	.3743	43'
18'	9.1040	.1076	.1594	.1640	.2085	.2142	.2524	.2594	.2921	.3006	.3284	.3385	.3638	.3756	42'
19'	9.1050	.1086	.1603	.1649	.2092	.2150	.2531	.2601	.2928	.3013	.3290	.3391	.3644	.3764	41'
20'	9.1060	.1096	.1612	.1658	.2100	.2158	.2538	.2609	.2934	.3020	.3296	.3397	.3651	.3774	40'
21'	9.1070	.1106	.1620	.1667	.2108	.2166	.2545	.2616	.2940	.3026	.3302	.3403	.3657	.3783	39'
22'	9.1080	.1116	.1629	.1675	.2115	.2174	.2551	.2623	.2947	.3033	.3308	.3409	.3664	.3791	38'
23'	9.1089	.1125	.1637	.1684	.2123	.2181	.2558	.2630	.2953	.3039	.3313	.3416	.3671	.3800	37'
24'	9.1099	.1135	.1646	.1693	.2131	.2189	.2565	.2637	.2959	.3046	.3319	.3422	.3678	.3809	36'
25'	9.1109	.1145	.1655	.1702	.2138	.2197	.2572	.2644	.2965	.3052	.3325	.3428	.3685	.3818	35'
26'	9.1118	.1155	.1663	.1710	.2146	.2205	.2579	.2651	.2972	.3059	.3331	.3434	.3692	.3827	34'
27'	9.1128	.1165	.1672	.1719	.2153	.2213	.2586	.2658	.2978	.3065	.3336	.3440	.3700	.3836	33'
28'	9.1138	.1175	.1680	.1728	.2161	.2221	.2593	.2666	.2984	.3072	.3342	.3446	.3707	.3845	32'
29'	9.1147	.1185	.1689	.1736	.2169	.2228	.2600	.2673	.2990	.3078	.3348	.3452	.3714	.3854	31'
30'	9.1157	.1194	.1697	.1745	.2176	.2236	.2606	.2680	.2997	.3085	.3353	.3458	.3721	.3863	30'
31'	9.1167	.1204	.1705	.1754	.2184	.2244	.2613	.2687	.3003	.3091	.3359	.3464	.3728	.3872	29'
32'	9.1176	.1214	.1714	.1762	.2191	.2252	.2620	.2694	.3009	.3098	.3365	.3469	.3734	.3881	28'
33'	9.1186	.1223	.1722	.1771	.2199	.2259	.2627	.2701	.3015	.3104	.3370	.3475	.3741	.3889	27'
34'	9.1195	.1233	.1731	.1779	.2206	.2267	.2634	.2708	.3021	.3110	.3376	.3481	.3747	.3897	26'
35'	9.1205	.1243	.1739	.1788	.2214	.2275	.2640	.2715	.3027	.3117	.3382	.3487	.3754	.3906	25'
36'	9.1214	.1252	.1747	.1797	.2221	.2282	.2647	.2722	.3034	.3123	.3387	.3493	.3761	.3914	24'
37'	9.1224	.1262	.1756	.1805	.2229	.2290	.2654	.2729	.3040	.3130	.3393	.3499	.3769	.3922	23'
38'	9.1233	.1272	.1764	.1814	.2236	.2298	.2661	.2736	.3046	.3136	.3399	.3505	.3776	.3930	22'
39'	9.1242	.1281	.1772	.1822	.2243	.2305	.2667	.2743	.3052	.3142	.3404	.3511	.3782	.3938	21'
40'	9.1252	.1291	.1781	.1831	.2251	.2313	.2674	.2750	.3058	.3149	.3410	.3517	.3789	.3946	20'
41'	9.1261	.1300	.1789	.1839	.2258	.2321	.2681	.2757	.3064	.3155	.3416	.3523	.3796	.3954	19'
42'	9.1271	.1310	.1797	.1848	.2266	.2328	.2687	.2764	.3070	.3162	.3421	.3529	.3803	.3961	18'
43'	9.1280	.1319	.1806	.1856	.2273	.2336	.2694	.2770	.3077	.3168	.3427	.3535	.3809	.3969	17'
44'	9.1289	.1329	.1814	.1864	.2280	.2343	.2701	.2777	.3083	.3174	.3432	.3541	.3816	.3977	16'
45'	9.1299	.1338	.1822	.1873	.2288	.2351	.2707	.2784	.3089	.3181	.3438	.3546	.3823	.3985	15'
46'	9.1308	.1348	.1830	.1881	.2295	.2359	.2714	.2791	.3095	.3187	.3444	.3552	.3829	.3994	14'
47'	9.1317	.1357	.1838	.1890	.2303	.2366	.2721	.2798	.3101	.3193	.3449	.3558	.3837	.4002	13'
48'	9.1326	.1367	.1847	.1898	.2310	.2374	.2727	.2805	.3107	.3200	.3455	.3564	.3843	.4010	12'
49'	9.1336	.1376	.1855	.1906	.2317	.2381	.2734	.2812	.3113	.3206	.3460	.3570	.3850	.4018	11'
50'	9.1345	.1385	.1863	.1915	.2324	.2389	.2740	.2819	.3119	.3212	.3466	.3576	.3856	.4026	10'
51'	9.1354	.1395	.1871	.1923	.2332	.2396	.2747	.2825	.3125	.3219	.3471	.3581	.3863	.4034	9'
52'	9.1363	.1404	.1879	.1931	.2339	.2404	.2754	.2832	.3131	.3225	.3477	.3587	.3869	.4042	8'
53'	9.1372	.1413	.1887	.1940	.2346	.2411	.2760	.2839	.3137	.3231	.3482	.3593	.3876	.4050	7'
54'	9.1381	.1423	.1895	.1948	.2353	.2419	.2767	.2846	.3143	.3237	.3488	.3599	.3883	.4058	6'
55'	9.1390	.1432	.1903	.1956	.2361	.2426	.2773	.2853	.3149	.3244	.3493	.3605	.3891	.4066	5'
56'	9.1399	.1441	.1911	.1964	.2368	.2434	.2780	.2859	.3155	.3250	.3499	.3611	.3898	.4074	4'
57'	9.1409	.1450	.1919	.1973	.2375	.2441	.2786	.2866	.3161	.3256	.3504	.3616	.3905	.4082	3'
58'	9.1418	.1460	.1927	.1981	.2382	.2448	.2793	.2873	.3167	.3262	.3510	.3622	.3912	.4090	2'
59'	9.1427	.1469	.1935	.1989	.2390	.2456	.2799	.2880	.3173	.3269	.3515	.3628	.3919	.4098	1'
60'	9.1436	.1478	.1943	.1997	.2397	.2463	.2806	.2887	.3179	.3275	.3521	.3634	.3927	.4106	0'
		82°		81°		80°		79°		78°		77°		76°	

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TABLE VII

NUMERICAL VALUES OF SINES													
A°	0'	10'	20'	30'	40'	50'	60'	A°	d.	P. P.			
0	0.0000	0029	0058	0087	0116	0145	0175	89	29	30	29		
1	0175	0204	0233	0262	0291	0320	0349	88	29	1	3.0	2.9	
2	0349	0378	0407	0436	0465	0494	0523	87	29	2	6.0	5.8	
3	0523	0552	0581	0610	0640	0669	0698	86	29	3	9.0	8.7	
4	0698	0727	0756	0785	0814	0843	0872	85	29	4	12.0	11.6	
5	0.0872	0901	0929	0958	0987	1016	1045	84	29	5	15.0	14.5	
6	1045	1074	1103	1132	1161	1190	1219	83	29	6	18.0	17.4	
7	1219	1248	1276	1305	1334	1363	1392	82	29	7	21.0	20.3	
8	1392	1421	1449	1478	1507	1536	1564	81	29	8	24.0	23.2	
9	1564	1593	1622	1650	1679	1708	1736	80	29	9	27.0	26.1	
10	0.1736	1765	1794	1822	1851	1880	1908	79	29	28	27		
11	1908	1937	1965	1994	2022	2051	2079	78	28	1	2.8	2.7	
12	2079	2108	2136	2164	2193	2221	2250	77	28	2	5.6	5.4	
13	2250	2278	2306	2334	2363	2391	2419	76	28	3	8.4	8.1	
14	2419	2447	2476	2504	2532	2560	2588	75	28	4	11.2	10.8	
15	0.2588	2616	2644	2672	2700	2728	2756	74	28	5	14.0	13.5	
16	2756	2784	2812	2840	2868	2896	2924	73	28	6	16.8	16.2	
17	2924	2952	2979	3007	3035	3062	3090	72	28	7	19.6	18.9	
18	3090	3118	3145	3173	3201	3228	3256	71	28	8	22.4	21.6	
19	3256	3283	3311	3338	3365	3393	3420	70	27	9	25.2	24.3	
A°	0'	10'	20'	30'	40'	50'	60'	d.		26	25		
20	0.3420	3448	3475	3502	3529	3557	3584	69	27	1	2.6	2.5	
21	3584	3611	3638	3665	3692	3719	3746	68	27	2	5.2	5.0	
22	3746	3773	3800	3827	3854	3881	3907	67	27	3	7.8	7.5	
23	3907	3934	3961	3987	4014	4041	4067	66	27	4	10.4	10.0	
24	4067	4094	4120	4147	4173	4200	4226	65	26	5	13.0	12.5	
25	0.4226	4253	4279	4305	4331	4358	4384	64	26	6	15.6	15.0	
26	4384	4410	4436	4462	4488	4514	4540	63	26	7	18.2	17.5	
27	4540	4566	4592	4617	4643	4669	4695	62	26	8	20.8	20.0	
28	4695	4720	4746	4772	4797	4823	4848	61	26	9	23.4	22.5	
29	4848	4874	4899	4924	4950	4975	5000	60	25	24	23		
30	0.5000	5025	5050	5075	5100	5125	5150	59	25	1	2.4	2.3	
31	5150	5175	5200	5225	5250	5275	5299	58	25	2	4.8	4.6	
32	5299	5324	5348	5373	5398	5422	5446	57	24	3	7.2	6.9	
33	5446	5471	5495	5519	5544	5568	5592	56	24	4	9.6	9.2	
34	5592	5616	5640	5664	5688	5712	5736	55	24	5	12.0	11.5	
35	0.5736	5760	5783	5807	5831	5854	5878	54	24	6	14.4	13.8	
36	5878	5901	5925	5948	5972	5995	6018	53	23	7	16.8	16.1	
37	6018	6041	6065	6088	6111	6134	6157	52	23	8	19.2	18.4	
38	6157	6180	6202	6225	6248	6271	6293	51	23	9	21.6	20.7	
39	6293	6316	6338	6361	6383	6406	6428	50	22	22	21	20	
40	0.6428	6450	6472	6494	6517	6539	6561	49	22	1	2.2	2.1	2.0
41	6561	6583	6604	6626	6648	6670	6691	48	22	2	4.4	4.2	4.0
42	6691	6713	6734	6756	6777	6799	6820	47	22	3	6.6	6.3	6.0
43	6820	6841	6862	6884	6905	6926	6947	46	21	4	8.8	8.4	8.0
44	6947	6967	6988	7009	7030	7050	7071	45	21	5	11.0	10.5	10.0
A°	60'	50'	40'	30'	20'	10'	0'	A°	d.	6	13.2	12.6	12.0
										7	15.4	14.7	14.0
										8	17.6	16.8	16.0
										9	19.8	18.9	18.0

NUMERICAL VALUES OF COSINES

P. P.

TABLE VII

NUMERICAL VALUES OF SINES

A°	0'	10'	20'	30'	40'	50'	60'	A°	d.	Proportional Parts			
										21	20	19	18
45	0.7071	7092	7112	7133	7153	7173	7193	44	20				
45		7193	7214	7234	7254	7274	7294	43	20	1	2.1	2.0	1.9
47		7314	7333	7353	7373	7392	7412	42	20	2	4.2	4.0	3.8
48		7431	7451	7470	7490	7509	7528	41	19	3	6.3	6.0	5.7
49		7547	7566	7585	7604	7623	7642	40	19	4	8.4	8.0	7.6
										5	10.5	10.0	9.5
51	0.7660	7679	7698	7716	7735	7753	7771	39	18	6	12.6	12.0	11.4
51		7771	7790	7808	7826	7844	7862	38	18	7	14.7	14.0	13.3
52		7880	7898	7916	7934	7951	7969	37	18	8	16.8	16.0	15.2
53		7986	8004	8021	8039	8056	8073	36	17	9	18.9	18.0	17.1
54		8090	8107	8124	8141	8158	8175	35	17				
55	0.8192	8208	8225	8241	8258	8274	8290	34	16		18	17	16
55		8290	8307	8323	8339	8355	8371	33	16	1	1.8	1.7	1.6
57		8387	8403	8418	8434	8450	8465	32	16	2	3.6	3.4	3.2
58		8480	8496	8511	8526	8542	8557	31	15	3	5.4	5.1	4.8
59		8572	8587	8601	8616	8631	8646	30	15	4	7.2	6.8	6.4
										5	9.0	8.5	8.0
60	0.8660	8675	8689	8704	8718	8732	8746	29	14	6	10.8	10.2	9.6
61		8746	8760	8774	8788	8802	8816	28	14	7	12.6	11.9	11.2
62		8829	8843	8857	8870	8884	8897	27	14	8	14.4	13.6	12.8
63		8910	8923	8936	8949	8962	8975	26	13	9	16.2	15.3	14.4
64		8988	9001	9013	9026	9038	9051	25	12				
A°	0'	10'	20'	30'	40'	50'	60'	A°	d.				
65	0.9063	9075	9088	9100	9112	9124	9135	24	12		15	14	13
66		9135	9147	9159	9171	9182	9194	23	12	1	1.5	1.4	1.8
67		9205	9216	9228	9239	9250	9261	22	11	2	3.0	2.8	2.6
68		9272	9283	9293	9304	9315	9325	21	11	3	4.5	4.2	3.9
69		9336	9346	9356	9367	9377	9387	20	10	4	6.0	5.6	5.2
										5	7.5	7.0	6.5
70	0.9397	9407	9417	9426	9436	9446	9455	19	10	6	9.0	8.4	7.8
71		9455	9465	9474	9483	9492	9502	18	9	7	10.5	9.8	9.1
72		9511	9520	9528	9537	9546	9555	17	9	8	12.0	11.2	10.4
73		9563	9572	9580	9588	9596	9605	16	8	9	13.5	12.6	11.7
74		9613	9621	9628	9636	9644	9652	15	8				
75	0.9659	9667	9674	9681	9689	9696	9703	14	7		12	11	
76		9703	9710	9717	9724	9730	9737	13	7	1	1.2	1.1	
77		9744	9750	9757	9763	9769	9775	12	6	2	2.4	2.2	
78		9781	9787	9793	9799	9805	9811	11	6	3	3.6	3.3	
79		9816	9822	9827	9833	9839	9844	10	5	4	4.8	4.4	
										5	6.0	5.5	
80	0.9848	9853	9858	9863	9868	9872	9877	9	5	6	7.2	6.6	
81		9877	9881	9886	9890	9894	9899	8	4	7	8.4	7.7	
82		9903	9907	9911	9914	9918	9922	7	4	8	9.6	8.8	
83		9925	9929	9932	9936	9939	9942	6	3	9	10.8	9.9	
84		9945	9948	9951	9954	9957	9959	5	3				
85	0.9962	9964	9967	9969	9971	9974	9976	4	2				
86		9976	9978	9980	9981	9983	9985	3	2				
87		9986	9988	9989	9990	9992	9993	2	1				
88		9994	9995	9996	9997	9997	9998	1	1				
89		9998	9999	9999	*0000	*0000	*0000	0	0				
A'	60'	50'	40'	30'	20'	10'	0'	A°	d.				

NUMERICAL VALUES OF COSINES

For differences below 10 interpolate mentally, employing the ordinary multiplication table.

TABLE VIII

NUMERICAL VALUES OF THE TANGENT FUNCTION												
A°	0'	10'	20'	30'	40'	50'	60'	A° d.	29	30	31	P.P.
0	0.0000	0029	0058	0087	0116	0145	0175	89 29				
1	0175	0204	0233	0262	0291	0320	0349	88 29 1	2.9	3.0	3.1	3.2 3.3
2	0349	0378	0407	0437	0465	0495	0524	87 29 2	5.8	6.0	6.2	6.4 6.6
3	0524	0553	0582	0612	0641	0670	0699	86 29 3	8.7	9.0	9.3	9.6 9.9
4	0699	0729	0758	0787	0816	0846	0875	85 29 4	11.6	12.0	12.4	12.8 13.2
									5	14.5	15.0	15.5 16.0 16.5
5	0.0875	0904	0934	0963	0992	1022	1051	84 29 6	17.4	18.0	18.6	19.2 19.8
6	1051	1080	1110	1139	1169	1198	1228	83 30 7	20.3	21.0	21.7	22.4 23.1
7	1228	1257	1287	1317	1346	1376	1405	82 30 8	23.2	24.0	24.8	25.6 26.4
8	1405	1435	1465	1495	1524	1554	1584	81 30 9	26.1	27.0	27.9	28.8 29.7
9	1584	1614	1644	1673	1703	1733	1763	80 30				
									34	35	36	37 38
10	0.1763	1793	1823	1853	1883	1914	1944	79 30 1	3.4	3.5	3.6	3.7 3.8
11	1944	1974	2004	2035	2065	2095	2126	78 30 2	6.8	7.0	7.2	7.4 7.6
12	2126	2156	2186	2217	2247	2278	2309	77 30 3	10.2	10.5	10.8	11.1 11.4
13	2309	2339	2370	2401	2432	2462	2493	76 31 4	13.6	14.0	14.4	14.8 15.2
14	2493	2524	2555	2586	2617	2648	2679	75 31 5	17.0	17.5	18.0	18.5 19.0
									6	20.4	21.0	21.6 22.2 22.8
15	0.2679	2711	2742	2773	2805	2836	2867	74 31 7	23.8	24.5	25.2	25.9 26.6
16	2867	2899	2931	2962	2994	3026	3057	73 32 8	27.2	28.0	28.8	29.6 30.4
17	3057	3089	3121	3153	3185	3217	3249	72 32 9	30.6	31.5	32.4	33.3 34.2
18	3249	3281	3314	3346	3378	3411	3443	71 32				
19	3443	3476	3508	3541	3574	3607	3640	70 33				
									39	40	41	42 43
A°	0'	10'	20'	30'	40'	50'	60'	A° d.	1	3.9	4.0	4.1 4.2 4.3
									2	7.8	8.0	8.2 8.4 8.6
20	0.3640	3673	3706	3739	3772	3805	3839	69 33 4	11.7	12.0	12.3	12.6 12.9
21	3839	3872	3906	3939	3973	4006	4040	68 34 5	15.6	16.0	16.4	16.8 17.2
22	4040	4074	4108	4142	4176	4210	4245	67 34 6	19.5	20.0	20.5	21.0 21.5
23	4245	4279	4314	4348	4383	4417	4452	66 34 7	23.2	23.8	24.4	24.6 25.2 25.8
24	4452	4487	4522	4557	4592	4628	4663	65 35 8	27.1	28.0	28.7	29.4 30.1
									9	35.1	36.0	36.9 37.8 38.7
25	0.4663	4699	4734	4770	4806	4841	4877	64 36				
26	4877	4913	4950	4986	5022	5059	5095	63 36				
27	5095	5132	5169	5206	5243	5280	5317	62 37 1	4.4	4.5	4.6	4.7 4.8
28	5317	5354	5392	5430	5467	5505	5543	61 38 2	8.8	9.0	9.2	9.4 9.6
29	5543	5581	5619	5658	5696	5735	5774	60 38 3	13.2	13.5	13.8	14.1 14.4
									4	17.6	18.0	18.4 18.8 19.2
30	0.5774	5812	5851	5890	5930	5969	6009	59 39 5	22.0	22.5	23.0	23.5 24.0
31	6009	6048	6088	6128	6168	6208	6249	58 40 6	26.4	27.0	27.6	28.2 28.8
32	6249	6289	6330	6371	6412	6453	6494	57 41 7	30.8	31.5	32.2	32.9 33.6
33	6494	6536	6577	6619	6661	6703	6745	56 42 8	35.2	36.0	36.8	37.6 38.4
34	6745	6787	6830	6873	6916	6959	7002	55 43 9	39.6	40.5	41.4	42.3 43.2
									5	25.0	26.0	27.0 28.0 29.0
35	0.7002	7046	7089	7133	7177	7221	7265	54 44				
36	7265	7310	7355	7400	7445	7490	7536	53 45 1	5.0	5.2	5.4	5.6 5.8
37	7536	7581	7627	7673	7720	7766	7813	52 46 2	10.0	10.4	10.8	11.2 11.6
38	7813	7860	7907	7954	8002	8050	8098	51 48 3	15.0	15.6	16.2	16.8 17.4
39	8098	8146	8195	8243	8292	8342	8391	50 49 4	20.0	20.8	21.6	22.4 23.2
									6	30.0	31.2	32.4 33.6 34.8
40	0.8391	8441	8491	8541	8591	8642	8693	49 50 6	35.0	36.4	37.8	39.2 40.6
41	8693	8744	8796	8847	8899	8952	9004	48 52 7	40.0	41.6	43.2	46.8 46.4
42	9004	9057	9110	9163	9217	9271	9325	47 54 8	45.0	46.8	48.6	50.4 52.2
43	9325	9380	9435	9490	9545	9601	9657	46 55 9	45.0	46.8	48.6	50.4 52.2
44	9657	9713	9770	9827	9884	9942	0000	45 57				
	60'	50'	40'	30'	20'	10'	0'	A° d.				P.P.
NUMERICAL VALUES OF COTANGENTS												

TABLE VIII

NUMERICAL VALUES OF THE TANGENT FUNCTION

A°	0'	10'	20'	30'	40'	50'	60'	A°	d.	P. P.
45	1.000	1.006	1.012	1.018	1.024	1.030	1.036	44	6	12 13 14 15
46	1.036	1.042	1.048	1.054	1.060	1.066	1.072	43	6 1	1.2 1.3 1.4 1.5
47	1.072	1.079	1.085	1.091	1.098	1.104	1.111	42	6 2	2.4 2.6 2.8 3.0
48	1.111	1.117	1.124	1.130	1.137	1.144	1.150	41	6 3	3.6 3.9 4.2 4.5
49	1.150	1.157	1.164	1.171	1.178	1.185	1.192	40	7 4	4.8 5.2 5.6 6.0
									5	6.0 6.5 7.0 7.5
50	1.192	1.199	1.206	1.213	1.220	1.228	1.235	39	7 6	7.2 7.8 8.4 9.0
51	1.235	1.242	1.250	1.257	1.265	1.272	1.280	38	8 7	8.4 9.1 9.8 10.5
52	1.280	1.288	1.295	1.303	1.311	1.319	1.327	37	8 8	9.6 10.4 11.2 12.0
53	1.327	1.335	1.343	1.351	1.360	1.368	1.376	36	8 9	10.8 11.7 12.6 13.5
54	1.376	1.385	1.393	1.402	1.411	1.419	1.428	35	9	
										17 18 19 20
55	1.428	1.437	1.446	1.455	1.464	1.473	1.483	34	9 1	1.7 1.8 1.9 2.0
56	1.483	1.492	1.501	1.511	1.520	1.530	1.540	33	10 2	3.4 3.6 3.8 4.0
57	1.540	1.550	1.560	1.570	1.580	1.590	1.600	32	10 3	5.1 5.4 5.7 6.0
58	1.600	1.611	1.621	1.632	1.643	1.653	1.664	31	11 4	6.8 7.2 7.6 8.0
59	1.664	1.675	1.686	1.698	1.709	1.720	1.732	30	11 5	8.5 9.0 9.5 10.0
										6 10.2 10.8 11.4 12.0
60	1.732	1.744	1.755	1.767	1.780	1.792	1.804	29	12 7	11.9 12.6 13.3 14.0
61	1.804	1.816	1.829	1.842	1.855	1.868	1.881	28	13 8	13.6 14.4 15.2 16.0
62	1.881	1.894	1.907	1.921	1.935	1.949	1.963	27	14 9	15.3 16.2 17.1 18.0
63	1.963	1.977	1.991	2.006	2.020	2.035	2.050	26	14	
64	2.050	2.066	2.081	2.097	2.112	2.128	2.145	25	16	22 23 24 25
										1 2.2 2.3 2.4 2.5
A°	0'	10'	20'	30'	40'	50'	60'	A°	d.	
65	2.145	2.161	2.177	2.194	2.211	2.229	2.246	24	17 4	4.6 4.8 5.0
66	2.246	2.264	2.282	2.300	2.318	2.337	2.356	23	18 5	6.6 6.9 7.2 7.5
67	2.356	2.375	2.394	2.414	2.434	2.455	2.475	22	20 6	8.8 9.2 9.6 10.0
68	2.475	2.496	2.517	2.539	2.560	2.583	2.605	21	22 7	11.0 11.5 12.0 12.5
69	2.605	2.628	2.651	2.675	2.699	2.723	2.747	20	24 8	13.2 13.8 14.4 15.0
										15.4 16.1 16.8 17.5
										17.6 18.4 19.2 20.0
										19.8 20.7 21.6 22.5
70	2.747	2.773	2.798	2.824	2.850	2.877	2.904	19	26	
71	2.901	2.932	2.960	2.989	3.018	3.047	3.078	18	29	27 28 59 62
72	3.078	3.108	3.140	3.172	3.204	3.237	3.271	17	32 1	2.7 2.8 5.9 6.2
73	3.271	3.305	3.340	3.376	3.412	3.450	3.487	16	36 2	5.4 5.6 11.8 12.4
74	3.487	3.526	3.566	3.606	3.647	3.689	3.732	15	41 3	8.1 8.4 17.7 18.6
										4 10.8 11.2 23.6 24.8
75	3.732	3.776	3.821	3.867	3.914	3.962	4.011	14	46 5	13.5 14.0 29.5 31.0
76	4.011	4.061	4.113	4.165	4.219	4.275	4.331	13	53 6	16.2 16.8 35.4 37.2
77	4.331	4.390	4.449	4.511	4.574	4.638	4.705	12	62 7	18.9 19.6 41.3 43.4
78	4.705	4.773	4.843	4.915	4.989	5.066	5.145	11	73 8	21.6 22.4 47.2 49.6
79	5.145	5.226	5.309	5.396	5.485	5.576	5.671	10	88 9	24.3 25.2 53.1 55.8
80	5.671	5.769	5.871	5.976	6.084	6.197	6.314	9		64 67 68 70
81	6.314	6.435	6.561	6.691	6.827	6.968	7.115	8		1 6.4 6.7 6.8 7.0
82	7.115	7.269	7.429	7.596	7.770	7.953	8.144	7		2 12.8 13.4 13.6 14.0
83	8.144	8.345	8.556	8.777	9.010	9.255	9.514	6		3 19.2 20.1 20.4 21.0
84	9.514	9.788	10.078	10.385	10.712	11.059	11.430	5		4 25.6 26.8 27.2 28.0
										5 32.0 33.5 34.0 35.0
85	11.430	11.826	12.251	12.706	13.197	13.727	14.301	4		6 38.4 40.2 40.8 42.0
86	14.301	14.924	15.605	16.350	17.169	18.075	19.081	3		7 44.8 46.9 47.6 49.0
87	19.081	20.206	21.470	22.904	24.542	26.432	28.636	2		8 51.2 53.6 54.4 56.0
88	28.636	31.242	34.368	38.188	42.964	49.104	57.290	1		9 57.6 60.3 61.2 63.0
89	57.290	68.750	85.940	114.59	171.89	343.77	infinite	0		

NUMERICAL VALUES OF COTANGENTS

TABLE IX

SQUARES, CUBES, SQUARE ROOTS, CUBE ROOTS, RECIPROCALs, 1-100											
n	n ²	n ³	√n	∛n	1/n	n	n ²	n ³	√n	∛n	1/n
1	1	1	1.0000	1.0000	1.00000	51	2601	132651	7.1414	3.7084	.01961
2	4	8	1.4142	1.2599	.50000	52	2704	140608	7.2111	3.7325	.01923
3	9	27	1.7321	1.4422	.33333	53	2809	148877	7.2801	3.7563	.01887
4	16	64	2.0000	1.5874	.25000	54	2916	157464	7.3485	3.7798	.01852
5	25	125	2.2361	1.7100	.20000	55	3025	166375	7.4162	3.8030	.01818
6	36	216	2.4495	1.8171	.16667	56	3136	175616	7.4833	3.8259	.01786
7	49	343	2.6458	1.9129	.14288	57	3249	185193	7.5498	3.8485	.01754
8	64	512	2.8284	2.0000	.12500	58	3364	195112	7.6158	3.8709	.01724
9	81	729	3.0000	2.0801	.11111	59	3481	205379	7.6811	3.8930	.01695
10	100	1000	3.1623	2.1544	.10000	60	3600	216000	7.7460	3.9149	.01667
11	121	1331	3.3166	2.2240	.09091	61	3721	226981	7.8102	3.9365	.01639
12	144	1728	3.4641	2.2894	.08333	62	3844	238328	7.8740	3.9579	.01613
13	169	2197	3.6056	2.3513	.07692	63	3969	250047	7.9373	3.9791	.01587
14	196	2744	3.7417	2.4101	.07143	64	4096	262144	8.0000	4.0000	.01563
15	225	3375	3.8730	2.4662	.06666	65	4225	274625	8.0623	4.0207	.01538
16	256	4096	4.0000	2.5198	.06250	66	4356	287496	8.1240	4.0412	.01515
17	289	4913	4.1231	2.5713	.05882	67	4489	300763	8.1854	4.0615	.01493
18	324	5832	4.2426	2.6207	.05556	68	4624	314432	8.2462	4.0817	.01471
19	361	6859	4.3589	2.6684	.05263	69	4761	328509	8.3066	4.1016	.01449
20	400	8000	4.4721	2.7144	.05000	70	4900	343000	8.3666	4.1213	.01429
21	441	9261	4.5826	2.7589	.04762	71	5041	357911	8.4261	4.1408	.01408
22	484	10648	4.6904	2.8020	.04545	72	5184	373248	8.4853	4.1602	.01389
23	529	12167	4.7958	2.8439	.04348	73	5329	389017	8.5440	4.1793	.01370
24	576	13824	4.8990	2.8845	.04167	74	5476	405224	8.6023	4.1983	.01351
n	n ²	n ³	√n	∛n	1/n	n	n ²	n ³	√n	∛n	1/n
25	625	15625	5.0000	2.9240	.04000	75	5625	421875	8.6603	4.2172	.01333
26	676	17576	5.0990	2.9625	.03846	76	5776	438976	8.7178	4.2358	.01316
27	729	19683	5.1962	3.0000	.03704	77	5929	456533	8.7750	4.2543	.01299
28	784	21952	5.2915	3.0366	.03571	78	6084	474552	8.8318	4.2727	.01282
29	841	24389	5.3852	3.0723	.03448	79	6241	493039	8.8882	4.2908	.01266
30	900	27000	5.4772	3.1072	.03333	80	6400	512000	8.9443	4.3089	.01250
31	961	29791	5.5678	3.1414	.03226	81	6561	531441	9.0000	4.3267	.01235
32	1024	32768	5.6569	3.1748	.03125	82	6724	551368	9.0554	4.3445	.01220
33	1089	35937	5.7446	3.2075	.03030	83	6889	571787	9.1104	4.3621	.01205
34	1156	39304	5.8310	3.2396	.02941	84	7056	592704	9.1652	4.3795	.01190
35	1225	42875	5.9161	3.2711	.02857	85	7225	614125	9.2195	4.3968	.01176
36	1296	46656	6.0000	3.3019	.02778	86	7396	636056	9.2736	4.4140	.01163
37	1369	50653	6.0828	3.3322	.02703	87	7569	658503	9.3274	4.4310	.01149
38	1444	54872	6.1644	3.3620	.02632	88	7744	681472	9.3808	4.4480	.01136
39	1521	59319	6.2450	3.3912	.02564	89	7921	704969	9.4340	4.4647	.01124
40	1600	64000	6.3246	3.4200	.02500	90	8100	729000	9.4868	4.4814	.01111
41	1681	68921	6.4031	3.4482	.02439	91	8281	753571	9.5394	4.4979	.01099
42	1764	74088	6.4807	3.4760	.02381	92	8464	778688	9.5917	4.5144	.01087
43	1849	79507	6.5574	3.5034	.02326	93	8649	804357	9.6437	4.5307	.01075
44	1936	85184	6.6332	3.5303	.02273	94	8836	830584	9.6954	4.5468	.01064
45	2025	91125	6.7082	3.5569	.02222	95	9025	857375	9.7468	4.5629	.01053
46	2116	97336	6.7823	3.5830	.02174	96	9216	884736	9.7980	4.5789	.01042
47	2209	103823	6.8557	3.6088	.02128	97	9409	912673	9.8489	4.5947	.01031
48	2304	110592	6.9282	3.6342	.02083	98	9604	941192	9.8995	4.6104	.01020
49	2401	117649	7.0000	3.6593	.02041	99	9801	970299	9.9499	4.6261	.01010
50	2500	125000	7.0711	3.6840	.02000	100	10000	1000000	10.0000	4.6416	.01000
n	n ²	n ³	√n	∛n	1/n	n	n ²	n ³	√n	∛n	1/n

TABLE X

Degrees to radians		Minutes	Radians to De-		Power Function	
			grees and	minutes	x	E ^x E ^{-x}
10° 0.17453	60' 1.04720	10' 0.00291	1	57°17'45"	0.0	1.0000 1.0000
11° 0.19199	61' 1.05465	11' 0.00320	2	114°35'30"	0.1	1.1052 0.9048
12° 0.20944	62' 1.08210	12' 0.00349	3	171°53'14"	0.2	1.2214 0.8187
13° 0.22689	63' 1.09956	13' 0.00378	4	229°10'59"	0.3	1.3499 0.7408
14° 0.24435	64' 1.11701	14' 0.00407	5	286°28'44"	0.4	1.4918 0.6703
15° 0.26180	65' 1.13446	15' 0.00436	6	343°46'29"	0.5	1.6487 0.6065
16° 0.27925	66' 1.15192	16' 0.00465	7	401° 4'14"	0.6	1.8221 0.5488
17° 0.29671	67' 1.16937	17' 0.00495	8	458°21'58"	0.7	2.0138 0.4966
18° 0.31416	68' 1.18682	18' 0.00524	9	515°39'43"	0.8	2.2255 0.4493
19° 0.33161	69' 1.20428	19' 0.00553			0.9	2.4596 0.4066
20° 0.34907	70° 1.22173	20' 0.00582	.1	5°43'47"	1.0	2.7183 0.3679
21° 0.36652	71° 1.23918	21' 0.00611	.2	11°27'33"	1.1	3.0042 0.3329
22° 0.38397	72° 1.25664	22' 0.00640	.3	17°11'19"	1.2	3.3201 0.3012
23° 0.40143	73° 1.27409	23' 0.00669	.4	22°55'06"	1.3	3.6693 0.2725
24° 0.41888	74° 1.29154	24' 0.00698	.5	28°38'52"	1.4	4.0552 0.2466
25° 0.43633	75° 1.30900	25' 0.00727	.6	34°22'39"	1.5	4.4817 0.2231
26° 0.45379	76° 1.32645	26' 0.00756	.7	40° 4'25"	1.6	4.9530 0.2019
27° 0.47124	77° 1.34390	27' 0.00785	.8	45°50'12"	1.7	5.4739 0.1827
28° 0.48869	78° 1.36136	28' 0.00814	.9	51°33'58"	1.8	6.0496 0.1653
29° 0.50615	79° 1.37881	29' 0.00844			1.9	6.6859 0.1496
30° 0.52360	80° 1.39626	30' 0.00873	.01	0°34'23"	2.0	7.3891 0.1353
31° 0.54105	81° 1.41372	31' 0.00902	.02	1° 8'45"	2.1	8.1662 0.1225
32° 0.55851	82° 1.43117	32' 0.00931	.03	1°43'08"	2.2	9.0250 0.1108
33° 0.57596	83° 1.44862	33' 0.00960	.04	2°17'31"	2.3	9.9742 0.1003
34° 0.59341	84° 1.46608	34' 0.00989	.05	2°51'53"	2.4	11.023 0.0907
35° 0.61087	85° 1.48353	35' 0.01018	.06	3°26'16"	2.5	12.182 0.0821
36° 0.62832	86° 1.50098	36' 0.01047	.07	4° 0'39"	2.6	13.464 0.0743
37° 0.64577	87° 1.51844	37' 0.01076	.08	4°35'01"	2.7	14.880 0.0672
38° 0.66323	88° 1.53589	38' 0.01105	.09	5° 9'24"	2.8	16.445 0.0608
39° 0.68068	89° 1.55334	39' 0.01134	.001	0° 3'26"	2.9	18.174 0.0550
40° 0.69813	90° 1.57080	40' 0.01164	.002	0° 6'52"	3.0	20.086 .0498
41° 0.71559	91° 1.58825	41' 0.01193	.003	0°10'18"	3.0	33.115 .0302
42° 0.73304	92° 1.60570	42' 0.01222	.004	0°13'45"	4.0	54.598 .0183
43° 0.75049	93° 1.62316	43' 0.01251	.005	0°17'11"	5.0	148.41 .0067
44° 0.76794	94° 1.64061	44' 0.01280	.006	0°20'37"	6.0	403.4 .00248
45° 0.78540	95° 1.65806	45' 0.01309	.007	0°24'03"	7.0	1097 .00091
46° 0.80285	96° 1.67552	46' 0.01338	.008	0°27'30"	8.0	2981 .00034
47° 0.82030	97° 1.69297	47' 0.01367	.009	0°30'56"	9.0	8103 .00012
48° 0.83776	98° 1.71042	48' 0.01396			10.0	22000 .00005
49° 0.85521	99° 1.72788	49' 0.01425				
50° 0.87266	100° 1.74533	50' 0.01454				
51° 0.89012	101° 1.76278	51' 0.01484				
52° 0.90757	102° 1.78024	52' 0.01513				
53° 0.92502	103° 1.79769	53' 0.01542				
54° 0.94248	104° 1.81514	54' 0.01571				
55° 0.95993	105° 1.83260	55' 0.01600				
56° 0.97738	106° 1.85005	56' 0.01629				
57° 0.99484	107° 1.86750	57' 0.01658				
58° 1.01229	108° 1.88496	58' 0.01687				
59° 1.02974	109° 1.90241	59' 0.01716				
60° 1.04720	110° 1.91986	60' 0.01745				

Degrees and Minutes to Radians		
1° = .01745	1' = .00029	
2° = .03491	2' = .00058	
3° = .05236	3' = .00087	
4° = .06981	4' = .00116	
5° = .08728	5' = .00145	
6° = .10472	6' = .00175	
7° = .12217	7' = .00204	
8° = .13963	8' = .00233	
9° = .15708	9' = .00262	

TABLE XI

ACCUMULATION OF 1 AT THE END OF n YEARS

Yrs.	1½%	2%	2½%	3%	4%	5%	6%	Yrs.
1	1.01500	1.02000	1.02500	1.03000	1.04000	1.05000	1.06000	1
2	1.03023	1.04040	1.05063	1.06090	1.08160	1.10250	1.12360	2
3	1.04568	1.06121	1.07689	1.09273	1.12486	1.15763	1.19102	3
4	1.06136	1.08243	1.1038	1.12551	1.16986	1.21551	1.26248	4
5	1.07728	1.10408	1.13141	1.15927	1.21665	1.27628	1.33823	5
6	1.09344	1.12616	1.15969	1.19405	1.26532	1.34010	1.41852	6
7	1.10984	1.14869	1.18869	1.22987	1.31593	1.40710	1.50363	7
8	1.12649	1.17166	1.21840	1.26677	1.36857	1.47746	1.59385	8
9	1.14339	1.19509	1.24886	1.30477	1.42331	1.55133	1.68948	9
10	1.16054	1.21900	1.28008	1.34392	1.48024	1.62890	1.79085	10
11	1.17795	1.24337	1.31209	1.38423	1.53945	1.71034	1.89831	11
12	1.19562	1.26824	1.34489	1.42576	1.60103	1.79586	2.01220	12
13	1.21355	1.29361	1.37851	1.46853	1.66507	1.88565	2.13293	13
14	1.23176	1.31948	1.41297	1.51259	1.73168	1.97993	2.26090	14
15	1.25023	1.34587	1.44830	1.55797	1.80094	2.07893	2.39656	15
16	1.26899	1.37279	1.48451	1.60471	1.87298	2.18287	2.54035	16
17	1.28802	1.40024	1.52162	1.65285	1.94730	2.29202	2.69277	17
18	1.30734	1.42825	1.55966	1.70243	2.02582	2.40662	2.85434	18
19	1.32695	1.45681	1.59865	1.75351	2.10685	2.52695	3.02560	19
20	1.34686	1.48595	1.63862	1.80611	2.19112	2.65330	3.20714	20
Yrs.	1½%	2%	2½%	3%	4%	5%	6%	Yrs.
21	1.36706	1.51567	1.67958	1.86029	2.27877	2.78596	3.39956	21
22	1.38756	1.54598	1.72157	1.91610	2.36992	2.92526	3.60354	22
23	1.40838	1.57690	1.76461	1.97359	2.46472	3.07152	3.81975	23
24	1.42950	1.60844	1.80873	2.03279	2.56330	3.22510	4.04893	24
25	1.45095	1.64061	1.85394	2.09378	2.66584	3.38635	4.29187	25
26	1.47271	1.67342	1.90029	2.15659	2.77247	3.55567	4.54938	26
27	1.49480	1.70689	1.94780	2.22129	2.88337	3.73346	4.82235	27
28	1.51722	1.74102	1.99650	2.28793	2.99870	3.92013	5.11169	28
29	1.53998	1.77584	2.04641	2.35657	3.11865	4.11614	5.41839	29
30	1.56308	1.81136	2.09757	2.42726	3.2434	4.32194	5.74349	30
31	1.58653	1.84759	2.15001	2.50008	3.37313	4.53804	6.08810	31
32	1.61032	1.88454	2.20376	2.57508	3.50806	4.76494	6.45339	32
33	1.63448	1.92223	2.25885	2.65234	3.64838	5.00319	6.84059	33
34	1.65900	1.96068	2.31532	2.73191	3.79432	5.25335	7.25103	34
35	1.68388	1.99989	2.37321	2.81386	3.94609	5.51602	7.68609	35
36	1.70914	2.03989	2.43254	2.89828	4.10393	5.79182	8.14725	36
37	1.73478	2.08069	2.49335	2.98523	4.26809	6.08141	8.63609	37
38	1.76080	2.12230	2.55568	3.07478	4.43881	6.38548	9.15425	38
39	1.78721	2.16474	2.61957	3.16703	4.61637	6.70475	9.70351	39
40	1.81402	2.20804	2.68506	3.26204	4.80102	7.03999	10.28572	40
50	2.10524	2.69159	3.43711	4.38391	7.10668	11.46740	18.42015	50
60	2.44322	3.28103	4.39979	5.89160	10.51963	18.67919	32.98769	60
70	2.83546	3.99956	5.63210	7.91782	15.57162	30.42643	59.07593	70
80	3.29066	4.87544	7.20957	10.64089	23.04980	49.56144	105.79599	80
90	3.81895	5.94313	9.22886	14.30047	34.11933	80.73037	189.46450	90
100	4.43205	7.24465	11.81372	19.21863	50.50495	131.50126	339.30208	100
Yrs.	1½%	2%	2½%	3%	4%	5%	6%	Yrs.

TABLE XII

THE PRESENT VALUE OF 1 DUE IN n YEARS

Yrs.	1½%.	2%.	2½%.	3%.	4%.	5%.	6%.	Yrs.
1	0.98522	0.98039	0.97561	0.97087	0.96154	0.95238	0.94340	1
2	0.97066	0.96117	0.95181	0.94260	0.92456	0.90703	0.89000	2
3	0.95632	0.94232	0.92860	0.91514	0.88900	0.86384	0.83962	3
4	0.94218	0.92385	0.90595	0.88849	0.85480	0.82270	0.79209	4
5	0.92826	0.90573	0.88385	0.86261	0.82193	0.78353	0.74726	5
6	0.91454	0.88797	0.86230	0.83748	0.79031	0.74622	0.70496	6
7	0.90103	0.87056	0.84127	0.81309	0.75992	0.71068	0.66506	7
8	0.88771	0.85349	0.82075	0.78941	0.73069	0.67684	0.62741	8
9	0.87459	0.83676	0.80073	0.76642	0.70259	0.64461	0.59190	9
10	0.86167	0.82035	0.78120	0.74409	0.67556	0.61391	0.55839	10
11	0.84893	0.80426	0.76214	0.72242	0.64958	0.58468	0.52679	11
12	0.83639	0.78849	0.74356	0.70138	0.62460	0.55684	0.49697	12
13	0.82403	0.77303	0.72542	0.68095	0.60057	0.53032	0.46884	13
14	0.81185	0.75788	0.70773	0.66112	0.57748	0.50507	0.44230	14
15	0.79985	0.74301	0.69047	0.64186	0.55526	0.48102	0.41727	15
16	0.78803	0.72845	0.67362	0.62317	0.53391	0.45811	0.39365	16
17	0.77639	0.71416	0.65720	0.60502	0.51337	0.43630	0.37136	17
18	0.76491	0.70016	0.64117	0.58739	0.49363	0.41552	0.35034	18
19	0.75361	0.68643	0.62553	0.57029	0.47464	0.39573	0.33051	19
20	0.74247	0.67297	0.61027	0.55368	0.45639	0.37689	0.31180	20
Yrs.	1½%.	2%.	2½%.	3%.	4%.	5%.	6%.	Yrs.
21	0.73150	0.65978	0.59539	0.53755	0.43883	0.35894	0.29416	21
22	0.72069	0.64684	0.58086	0.52189	0.42196	0.34185	0.27751	22
23	0.71004	0.63416	0.56670	0.50669	0.40573	0.32557	0.26180	23
24	0.69954	0.62172	0.55288	0.49193	0.39012	0.31007	0.24698	24
25	0.68921	0.60953	0.53939	0.47761	0.37512	0.29530	0.23300	25
26	0.67902	0.59758	0.52623	0.46369	0.36069	0.28124	0.21981	26
27	0.66899	0.58586	0.51340	0.45019	0.34682	0.26785	0.20737	27
28	0.65910	0.57437	0.50088	0.43708	0.33348	0.25509	0.19563	28
29	0.64936	0.56311	0.48866	0.42435	0.32065	0.24295	0.18456	29
30	0.63976	0.55207	0.47674	0.41199	0.30832	0.23138	0.17411	30
31	0.63031	0.54125	0.46511	0.39999	0.29646	0.22036	0.16425	31
32	0.62099	0.53063	0.45377	0.38834	0.28506	0.20987	0.15496	32
33	0.61182	0.52023	0.44270	0.37703	0.27409	0.19987	0.14619	33
34	0.60277	0.51003	0.43191	0.36604	0.26355	0.19035	0.13791	34
35	0.59387	0.50003	0.42137	0.35538	0.25342	0.18129	0.13011	35
36	0.58509	0.49022	0.41109	0.34503	0.24367	0.17266	0.12274	36
37	0.57644	0.48061	0.40107	0.33498	0.23430	0.16444	0.11579	37
38	0.56792	0.47119	0.39128	0.32523	0.22529	0.15661	0.10924	38
39	0.55953	0.46195	0.38174	0.31575	0.21662	0.14915	0.10306	39
40	0.55126	0.45289	0.37243	0.30656	0.20829	0.14205	0.09722	40
50	0.47500	0.37153	0.29094	0.22811	0.14071	0.08720	0.05429	50
60	0.40930	0.30478	0.22728	0.16973	0.09506	0.05354	0.03031	60
70	0.35268	0.25003	0.17755	0.12630	0.06422	0.03287	0.01693	70
80	0.30389	0.20511	0.13870	0.09398	0.04338	0.02018	0.00945	80
90	0.26185	0.16826	0.10836	0.06993	0.02931	0.01239	0.00527	90
100	0.22563	0.13803	0.08465	0.05203	0.01980	0.00760	0.00295	100
Yrs.	1½%.	2%.	2½%.	3%.	4%.	5%.	6%.	Yrs.

TABLE XIII

THE ACCUMULATION OF AN ANNUITY OF 1 PER ANNUM AT THE END OF n YEARS

Yrs.	1½%.	2%.	2½%.	3%.	4%.	5%.	6%.	Yrs.
1	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1
2	2.01500	2.02000	2.02500	2.03000	2.04000	2.05000	2.06000	2
3	3.04523	3.06040	3.07563	3.09090	3.12160	3.15250	3.18360	3
4	4.09090	4.12161	4.15252	4.18363	4.24646	4.31013	4.37467	4
5	5.15227	5.20404	5.25633	5.30914	5.41632	5.52563	5.63709	5
6	6.22955	6.30812	6.38774	6.46841	6.63298	6.80191	6.97532	6
7	7.32299	7.43428	7.54743	7.66246	7.89829	8.14201	8.39384	7
8	8.43284	8.58297	8.73612	8.89234	9.21423	9.54911	9.89747	8
9	9.55933	9.75463	9.95452	10.15911	10.58280	11.02656	11.49132	9
10	10.70272	10.94972	11.20338	11.46388	12.00611	12.57789	13.18080	10
11	11.86326	12.16872	12.48347	12.80780	13.48635	14.20679	14.97164	11
12	13.04121	13.41209	13.79555	14.19202	15.02581	15.91713	16.86994	12
13	14.23683	14.68033	15.14044	15.61779	16.62684	17.71298	18.88214	13
14	15.45038	15.97394	16.51895	17.08632	18.29191	19.59863	21.01507	14
15	16.68214	17.29342	17.93193	18.59891	20.02359	21.57856	23.27597	15
16	17.93237	18.63929	19.38022	20.15688	21.82453	23.65749	25.67255	16
17	19.20136	20.01207	20.86473	21.76159	23.69751	25.84037	28.21288	17
18	20.48938	21.41231	22.38635	23.41444	25.64541	28.13238	30.90565	18
19	21.79672	22.84056	23.94601	25.11687	27.67123	30.53900	33.75999	19
20	23.12367	24.29737	25.54466	26.87037	29.77808	33.06595	36.78559	20
21	24.47052	25.78332	27.18327	28.67649	31.96920	35.71925	39.99273	21
22	25.83758	27.29898	28.86286	30.53678	34.24797	38.50521	43.39229	22
23	27.22514	28.84496	30.58443	32.45288	36.61789	41.43048	46.99583	23
24	28.63352	30.42186	32.34904	34.42647	39.08260	44.50200	50.81558	24
25	30.06302	32.03030	34.15776	36.45926	41.64591	47.72710	54.86451	25
26	31.51397	33.67091	36.01171	38.55304	44.31174	51.11345	59.15638	26
27	32.98668	35.34432	37.91200	40.70963	47.08421	54.66913	63.70577	27
28	34.48148	37.05121	39.85980	42.93092	49.96758	58.40258	68.52811	28
29	35.99870	38.79223	41.85630	45.21885	52.96629	62.32271	73.63980	29
30	37.53868	40.56808	43.90270	47.57542	56.08494	66.43885	79.05819	30
31	39.10176	42.37944	46.00027	50.00268	59.32834	70.76079	84.80168	31
32	40.68829	44.22703	48.15028	52.50276	62.70147	75.29883	90.88978	32
33	42.29861	46.11157	50.35403	55.07784	66.20953	80.06377	97.34316	33
34	43.93309	48.03380	52.61289	57.73018	69.85791	85.06696	104.18375	34
35	45.59209	49.99448	54.92821	60.46208	73.65222	90.32031	111.43478	35
36	47.27597	51.99437	57.30141	63.27594	77.59831	95.83632	119.12087	36
37	48.98511	54.03425	59.73395	66.17422	81.70225	101.62814	127.26812	37
38	50.71989	56.11494	62.22730	69.15945	85.97034	107.70955	135.90421	38
39	52.48068	58.23724	64.78298	72.23423	90.40915	114.09502	145.05846	39
40	54.26789	60.40198	67.40255	75.40126	95.02552	120.79977	154.76197	40
50	73.68283	84.57940	97.48433	112.79686	152.66703	209.34800	290.33590	50
60	96.21465	114.05154	135.99159	163.05344	237.99069	353.58372	533.12818	60
70	122.36375	149.97791	185.28411	230.59406	364.29046	588.52851	967.93216	70
80	152.71085	193.77195	248.38271	321.36302	551.24498	971.22882	1746.59989	80
90	187.92990	247.15666	329.15425	443.34890	827.98333	1594.60730	3141.07519	90
100	223.80304	312.23230	432.54865	607.28773	1237.62370	2610.02516	5638.36805	100
Yrs.	1½%.	2%.	2½%.	3%.	4%.	5%.	6%.	Yrs.

TABLE XIV

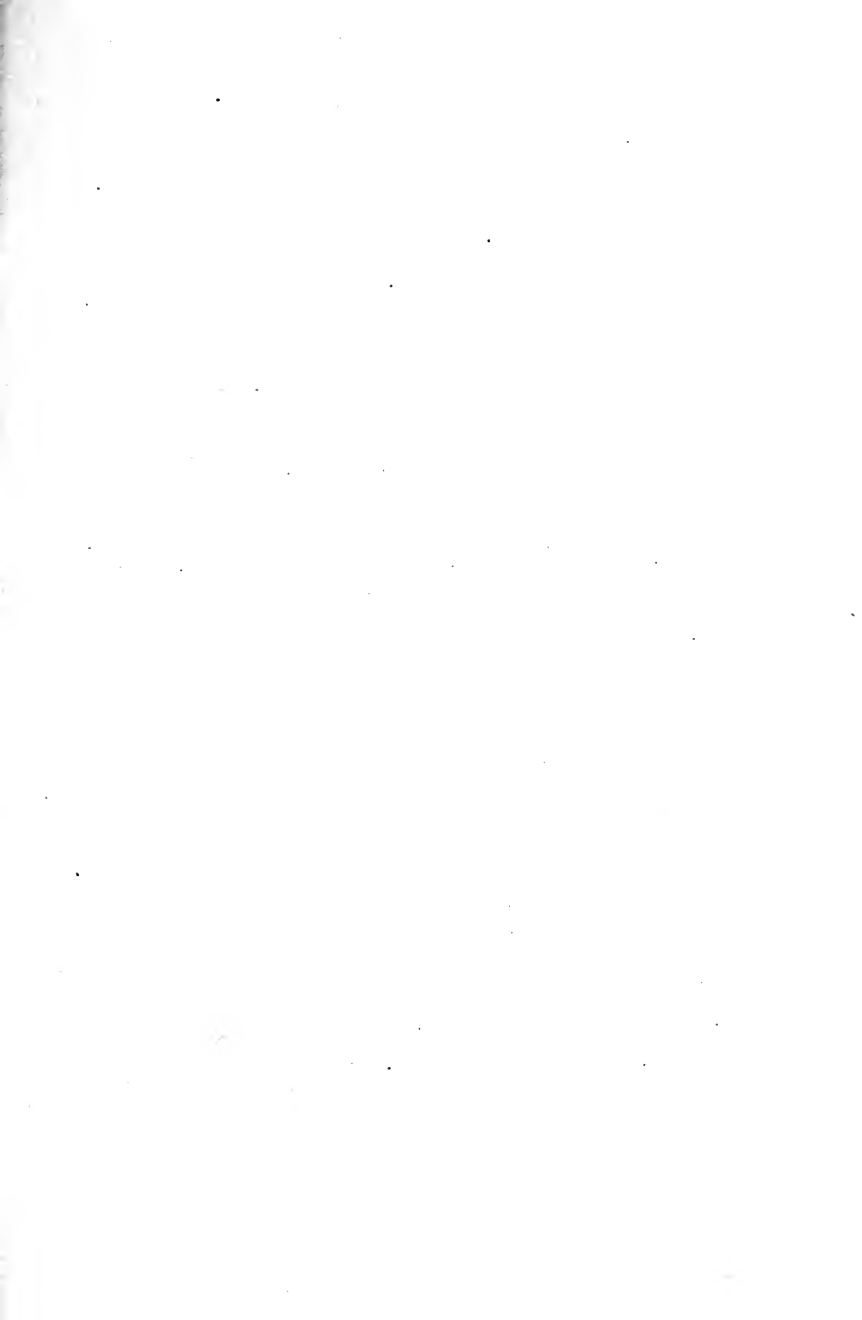
THE PRESENT VALUE OF AN ANNUITY OF 1 FOR n YEARS

Yrs.	1½%.	2%.	2½%.	3%.	4%.	5%.	6%.	Yrs.
1	0.98522	0.98039	0.97561	0.97087	0.96154	0.95238	0.94340	1
2	1.95588	1.94156	1.92742	1.91347	1.88609	1.85941	1.83339	2
3	2.91220	2.88388	2.85602	2.82861	2.77509	2.72325	2.67301	3
4	3.85438	3.80773	3.76197	3.71710	3.62990	3.54595	3.46511	4
5	4.78265	4.71346	4.64583	4.57971	4.45182	4.32948	4.21236	5
6	5.69719	5.60143	5.50813	5.41719	5.24214	5.07569	4.91732	6
7	6.59821	6.47199	6.34939	6.23028	6.00205	5.78637	5.58238	7
8	7.48593	7.32548	7.17014	7.01969	6.73274	6.46321	6.20979	8
9	8.36052	8.16224	7.97087	7.78611	7.43533	7.10782	6.80109	9
10	9.22218	8.98259	8.75206	8.53020	8.11090	7.72173	7.36009	10
11	10.07112	9.78685	9.51421	9.25262	8.76048	8.30641	7.88687	11
12	10.90751	10.57534	10.25776	9.95400	9.38507	8.86325	8.38384	12
13	11.73153	11.34837	10.98319	10.63496	9.98565	9.39357	8.85268	13
14	12.54338	12.10625	11.69091	11.29607	10.56312	9.89864	9.29498	14
15	13.34323	12.84926	12.38138	11.93794	11.11839	10.37966	9.71225	15
16	14.13126	13.57771	13.05500	12.56110	11.65230	10.83777	10.10590	16
17	14.90765	14.29187	13.71220	13.16612	12.16567	11.27407	10.47726	17
18	15.67256	14.99203	14.35336	13.75351	12.65930	11.68959	10.82760	18
19	16.42617	15.67846	14.97889	14.32380	13.13394	12.08532	11.15812	19
20	17.16864	16.35143	15.58916	14.87747	13.59033	12.46221	11.46992	20
21	17.90014	17.01121	16.18455	15.41502	14.02916	12.82115	11.76408	21
22	18.62082	17.65805	16.76541	15.93692	14.45112	13.16300	12.04158	22
23	19.33086	18.29220	17.33211	16.44361	14.85684	13.48857	12.30338	23
24	20.03041	18.91393	17.88499	16.93554	15.24696	13.79864	12.55036	24
25	20.71961	19.52346	18.42438	17.41315	15.62208	14.09394	12.78336	25
26	21.39863	20.12104	18.95061	17.87684	15.98277	14.37519	13.00317	26
27	22.06762	20.70690	19.46401	18.32703	16.32959	14.64303	13.21053	27
28	22.72672	21.28127	19.96489	18.76411	16.66306	14.89813	13.40616	28
29	23.37608	21.84438	20.45355	19.18845	16.98371	15.14017	13.59072	29
30	24.01584	22.39646	20.93029	19.60044	17.29203	15.37245	13.76483	30
31	24.64615	22.93770	21.39541	20.00043	17.58849	15.59281	13.92909	31
32	25.26714	23.46833	21.84918	20.38877	17.87355	15.80268	14.08404	32
33	25.87895	23.98856	22.29188	20.76579	18.14765	16.00255	14.23023	33
34	26.48173	24.49859	22.72379	21.13184	18.41120	16.19290	14.36814	34
35	27.07559	24.99862	23.14516	21.48722	18.66461	16.37419	14.49825	35
36	27.66068	25.48884	23.55625	21.83225	18.90828	16.54685	14.62099	36
37	28.23713	25.96945	23.95732	22.16724	19.14258	16.71129	14.73678	37
38	28.80505	26.44064	24.34860	22.49246	19.36786	16.86789	14.84602	38
39	29.36458	26.90259	24.73034	22.80822	19.58448	17.01704	14.94907	39
40	29.91585	27.35548	25.10278	23.11477	19.79277	17.15909	15.04630	40
50	34.99969	31.42361	28.36231	25.72926	21.48218	18.25593	15.76186	50
60	39.38027	34.76089	30.90866	27.67556	22.62349	18.92929	16.16143	60
70	43.15487	37.49862	32.89786	29.12342	23.39451	19.34268	16.38454	70
80	46.40732	39.74451	34.45182	30.20076	23.91539	19.59646	16.50913	80
90	49.20985	41.58693	35.66577	31.00241	24.26728	19.75226	16.57870	90
100	51.62470	43.09835	36.61411	31.59891	24.50500	19.84791	16.61755	100
Yrs.	1½%.	2%.	2½%.	3%.	4%.	5%.	6%.	Yrs.

TABLE XV

THE ANNUAL SINKING FUND TO ACCUMULATE TO 1 AT THE END OF n YEARS, AND, BY ADDITION OF i , THE ANNUITY WHICH 1 WILL PURCHASE

Yrs.	1½%	2%	2½%	3%	4%	5%	6%	Yrs.
1	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1
2	0.49628	0.49505	0.49383	0.49261	0.49020	0.48780	0.48544	2
3	0.32838	0.32675	0.32514	0.32353	0.32035	0.31721	0.31411	3
4	0.24444	0.24262	0.24082	0.23903	0.23549	0.23201	0.22859	4
5	0.19409	0.19216	0.19025	0.18835	0.18463	0.18097	0.17740	5
6	0.16053	0.15853	0.15655	0.15460	0.15076	0.14702	0.14336	6
7	0.13656	0.13451	0.13250	0.13051	0.12661	0.12282	0.11914	7
8	0.11858	0.11651	0.11447	0.11246	0.10853	0.10472	0.10104	8
9	0.10461	0.10252	0.10046	0.09843	0.09449	0.09069	0.08702	9
10	0.09343	0.09133	0.08926	0.08723	0.08329	0.07950	0.07587	10
11	0.08429	0.08218	0.08011	0.07808	0.07415	0.07039	0.06679	11
12	0.07668	0.07456	0.07249	0.07046	0.06655	0.06283	0.05928	12
13	0.07024	0.06812	0.06605	0.06403	0.06014	0.05646	0.05296	13
14	0.06472	0.06260	0.06054	0.05853	0.05467	0.05102	0.04758	14
15	0.05994	0.05783	0.05577	0.05377	0.04994	0.04634	0.04296	15
16	0.05577	0.05365	0.05160	0.04961	0.04582	0.04227	0.03895	16
17	0.05208	0.04997	0.04793	0.04595	0.04220	0.03870	0.03544	17
18	0.04881	0.04670	0.04467	0.04271	0.03899	0.03555	0.03236	18
19	0.04588	0.04378	0.04176	0.03981	0.03614	0.03275	0.02962	19
20	0.04325	0.04116	0.03915	0.03722	0.03358	0.03024	0.02718	20
21	0.04087	0.03878	0.03679	0.03487	0.03128	0.02800	0.02500	21
22	0.03870	0.03663	0.03465	0.03275	0.02920	0.02597	0.02305	22
23	0.03673	0.03467	0.03270	0.03081	0.02731	0.02414	0.02128	23
24	0.03492	0.03287	0.03091	0.02905	0.02559	0.02247	0.01968	24
25	0.03326	0.03122	0.02928	0.02743	0.02401	0.02095	0.01823	25
	1½%	2%	2½%	3%	4%	5%	6%	
26	0.03173	0.02970	0.02777	0.02594	0.02257	0.01956	0.01690	26
27	0.03032	0.02829	0.02638	0.02456	0.02124	0.01829	0.01570	27
28	0.02900	0.02699	0.02509	0.02329	0.02001	0.01712	0.01459	28
29	0.02778	0.02578	0.02389	0.02211	0.01888	0.01605	0.01358	29
30	0.02664	0.02465	0.02278	0.02102	0.01783	0.01505	0.01265	30
31	0.02557	0.02360	0.02174	0.02000	0.01686	0.01413	0.01179	31
32	0.02458	0.02261	0.02077	0.01905	0.01595	0.01328	0.01100	32
33	0.02364	0.02169	0.01986	0.01816	0.01510	0.01249	0.01027	33
34	0.02276	0.02082	0.01901	0.01732	0.01431	0.01176	0.00960	34
35	0.02193	0.02000	0.01821	0.01654	0.01358	0.01107	0.00897	35
36	0.02115	0.01923	0.01745	0.01580	0.01289	0.01043	0.00839	36
37	0.02041	0.01851	0.01674	0.01511	0.01224	0.00984	0.00786	37
38	0.01972	0.01782	0.01607	0.01446	0.01163	0.00928	0.00736	38
39	0.01905	0.01717	0.01544	0.01384	0.01106	0.00876	0.00689	39
40	0.01842	0.01656	0.01484	0.01326	0.01052	0.00828	0.00646	40
50	0.01357	0.01182	0.01026	0.00887	0.00655	0.00477	0.00344	50
60	0.01039	0.00877	0.00735	0.00613	0.00423	0.00283	0.00188	60
70	0.00817	0.00667	0.00540	0.00434	0.00275	0.00170	0.00103	70
80	0.00655	0.00516	0.00403	0.00311	0.00181	0.00103	0.00057	80
90	0.00532	0.00405	0.00304	0.00226	0.00121	0.00063	0.00032	90
100	0.00437	0.00321	0.00231	0.00165	0.00081	0.00038	0.00018	100
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