

六位三角函数表

测绘出版社

И·別捷尔斯

六位三角函数表

三角函数值由 0° 至 90° 每隔 $10''$ —列

Cotg及Cosec由 $0^{\circ}0'$ 至 $1^{\circ}20'$ 每隔 $1''$ —列

测绘出版社

本表备有三角函数的自然值，在应用计算机进行计算时极为方便。表中除有每隔 $10''$ —列之三角函数值外，并有每 $1''$ —列之 $\cot g$ 及 cosec 的三角函数值和 $W'' \cdot \cot g W$ 、 $W'' \cdot \operatorname{cosec} W$ 之辅助表。

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六位三角函数表

(根据中国工业出版社纸型重印)

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Angle (degrees)	cotg	cosec
0	∞	∞
1	57.29	1.00017
2	28.65	1.00071
3	19.08	1.00143
4	14.30	1.00224
5	11.43	1.00312
6	9.51	1.00407
7	8.16	1.00508
8	7.11	1.00615
9	6.31	1.00728
10	5.67	1.00846
11	5.14	1.00969
12	4.70	1.01097
13	4.33	1.01229
14	4.01	1.01365
15	3.72	1.01505
16	3.46	1.01648
17	3.23	1.01794
18	3.02	1.01943
19	2.83	1.02094
20	2.65	1.02247
21	2.49	1.02402
22	2.34	1.02559
23	2.21	1.02717
24	2.09	1.02877
25	1.98	1.03038
26	1.88	1.03199
27	1.79	1.03362
28	1.71	1.03526
29	1.64	1.03691
30	1.57	1.03857
31	1.51	1.04024
32	1.45	1.04191
33	1.40	1.04359
34	1.35	1.04528
35	1.31	1.04697
36	1.27	1.04867
37	1.23	1.05037
38	1.20	1.05208
39	1.17	1.05379
40	1.14	1.05550
41	1.12	1.05721
42	1.10	1.05892
43	1.08	1.06063
44	1.06	1.06234
45	1.04	1.06405
46	1.03	1.06576
47	1.01	1.06747
48	1.00	1.06918
49	0.99	1.07088
50	0.98	1.07258
51	0.97	1.07428
52	0.96	1.07598
53	0.95	1.07767
54	0.94	1.07936
55	0.93	1.08105
56	0.92	1.08273
57	0.91	1.08441
58	0.90	1.08608
59	0.89	1.08775
60	0.88	1.08941
61	0.87	1.09107
62	0.86	1.09272
63	0.85	1.09437
64	0.84	1.09601
65	0.83	1.09765
66	0.82	1.09928
67	0.81	1.10091
68	0.80	1.10253
69	0.79	1.10415
70	0.78	1.10576
71	0.77	1.10737
72	0.76	1.10897
73	0.75	1.11057
74	0.74	1.11216
75	0.73	1.11375
76	0.72	1.11533
77	0.71	1.11691
78	0.70	1.11848
79	0.69	1.12005
80	0.68	1.12161
81	0.67	1.12317
82	0.66	1.12472
83	0.65	1.12627
84	0.64	1.12781
85	0.63	1.12935
86	0.62	1.13088
87	0.61	1.13241
88	0.60	1.13393
89	0.59	1.13545
90	0.58	1.13696

表 1

cotg 及 cosec 之三角函数值，每隔 1" 一列

cotg 0°

0"	0'	1'	2'	3'	4'	5'	6'	7'	60"
	∞	3438	1719	1145.9	859.4	687.5	573.0	491.1	
1	206265	3381	1705	1139.6	855.9	685.3	571.4	489.9	59
2	103132	3327	1691	1133.3	852.3	683.0	569.8	488.8	58
3	68755	3274	1677	1127.1	848.8	680.7	568.2	487.6	57
4	51566	3223	1663	1121.0	845.3	678.5	566.7	486.5	56
5	41253	3173	1650	1114.9	841.9	676.3	565.1	485.3	55
6	34377	3125	1637	1109.0	838.5	674.1	563.6	484.2	54
7	29466	3079	1624	1103.0	835.1	671.9	562.0	483.1	53
8	25783	3033	1611	1097.2	831.7	669.7	560.5	481.9	52
9	22918	2989	1599	1091.3	828.4	667.5	559.0	480.8	51
10	20626	2947	1587	1085.6	825.1	665.4	557.5	479.7	50
11	18751	2905	1575	1079.9	821.8	663.2	556.0	478.6	49
12	17189	2865	1563	1074.3	818.5	661.1	554.5	477.5	48
13	15867	2826	1551	1068.7	815.3	659.0	553.0	476.4	47
14	14733	2787	1539	1063.2	812.1	656.9	551.5	475.3	46
15	13751	2750	1528	1057.8	808.9	654.8	550.0	474.2	45
16	12892	2714	1517	1052.4	805.7	652.7	548.6	473.1	44
17	12133	2679	1506	1047.0	802.6	650.7	547.1	472.0	43
18	11459	2644	1495	1041.7	799.5	648.6	545.7	470.9	42
19	10856	2611	1484	1036.5	796.4	646.6	544.2	469.9	41
20	10313	2578	1473	1031.3	793.3	644.6	542.8	468.8	40
21	9822	2546	1463	1026.2	790.3	642.6	541.4	467.7	39
22	9376	2515	1453	1021.1	787.3	640.6	540.0	466.7	38
23	8968	2485	1442	1016.1	784.3	638.6	538.5	465.6	37
24	8594	2456	1432	1011.1	781.3	636.6	537.1	464.6	36
25	8251	2427	1423	1006.2	778.4	634.7	535.8	463.5	35
26	7933	2398	1413	1001.3	775.4	632.7	534.4	462.5	34
27	7639	2371	1403	996.4	772.5	630.8	533.0	461.4	33
28	7367	2344	1394	991.7	769.6	628.9	531.6	460.4	32
29	7113	2318	1384	986.9	766.8	626.9	530.2	459.4	31
30	6875	2292	1375	982.2	763.9	625.0	528.9	458.4	30
31	6654	2267	1366	977.6	761.1	623.2	527.5	457.3	29
32	6446	2242	1357	972.9	758.3	621.3	526.2	456.3	28
33	6250	2218	1348	968.4	755.5	619.4	524.8	455.3	27
34	6067	2194	1339	963.9	752.8	617.6	523.5	454.3	26
35	5893	2171	1331	959.4	750.1	615.7	522.2	453.3	25
36	5730	2149	1322	954.9	747.3	613.9	520.9	452.3	24
37	5575	2126	1314	950.5	744.6	612.1	519.6	451.3	23
38	5428	2105	1305	946.2	742.0	610.3	518.3	450.4	22
39	5289	2083	1297	941.8	739.3	608.5	517.0	449.4	21
40	5157	2063	1289	937.6	736.7	606.7	515.7	448.4	20
41	5031	2042	1281	933.3	734.0	604.9	514.4	447.4	19
42	4911	2022	1273	929.1	731.4	603.1	513.1	446.5	18
43	4797	2003	1265	925.0	728.9	601.4	511.8	445.5	17
44	4688	1983	1258	920.8	726.3	599.6	510.6	444.5	16
45	4584	1964	1250	916.7	723.7	597.9	509.3	443.6	15
46	4484	1946	1243	912.7	721.2	596.1	508.0	442.6	14
47	4389	1928	1235	908.7	718.7	594.4	506.8	441.7	13
48	4297	1910	1228	904.7	716.2	592.7	505.6	440.7	12
49	4209	1892	1221	900.7	713.7	591.0	504.3	439.8	11
50	4125	1875	1213	896.8	711.3	589.3	503.1	438.9	10
51	4044	1858	1206	892.9	708.8	587.6	501.9	437.9	9
52	3967	1842	1199	889.1	706.4	586.0	500.6	437.0	8
53	3892	1825	1192	885.3	704.0	584.3	499.4	436.1	7
54	3820	1809	1185	881.5	701.6	582.7	498.2	435.2	6
55	3750	1794	1179	877.7	699.2	581.0	497.0	434.2	5
56	3683	1778	1172	874.0	696.8	579.4	495.8	433.3	4
57	3619	1763	1165	870.3	694.5	577.8	494.6	432.4	3
58	3556	1748	1159	866.7	692.2	576.2	493.5	431.5	2
59	3496	1733	1152	863.0	689.8	574.6	492.3	430.6	1
60	3438	1719	1146	859.4	687.5	573.0	491.1	429.7	0
	59'	58'	57'	56'	55'	54'	53'	52'	

11

1	1.1
2	2.2
3	3.3
4	4.4
5	5.5
6	6.6
7	7.7
8	8.8
9	9.9

17

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

22

1	2.2
2	4.4
3	6.6
4	8.8
5	11.0
6	13.2
7	15.4
8	17.6
9	19.8

25

1	2.6
2	5.2
3	7.8
4	10.4
5	13.0
6	15.6
7	18.2
8	20.8
9	23.4

30

1	3.0
2	6.0
3	9.0
4	12.0
5	15.0
6	18.0
7	21.0
8	24.0
9	27.0

40

1	4.0
2	8.0
3	12.0
4	16.0
5	20.0
6	24.0
7	28.0
8	32.0
9	36.0

50

1	5.0
2	10.0
3	15.0
4	20.0
5	25.0
6	30.0
7	35.0
8	40.0
9	45.0

60

1	6.0
2	12.0
3	18.0
4	24.0
5	30.0
6	36.0
7	42.0
8	48.0
9	54.0

cos ec 0°

14

1	1.4
2	2.8
3	4.2
4	5.6
5	7.0
6	8.4
7	9.8
8	11.2
9	12.6

20

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

24

1	2.4
2	4.8
3	7.2
4	9.6
5	12.0
6	14.4
7	16.8
8	19.2
9	21.6

28

1	2.8
2	5.6
3	8.4
4	11.2
5	14.0
6	16.8
7	19.6
8	22.4
9	25.2

35

1	3.5
2	7.0
3	10.5
4	14.0
5	17.5
6	21.0
7	24.5
8	28.0
9	31.5

45

1	4.5
2	9.0
3	13.5
4	18.0
5	22.5
6	27.0
7	31.5
8	36.0
9	40.5

55

1	5.5
2	11.0
3	16.5
4	22.0
5	27.5
6	33.0
7	38.5
8	44.0
9	49.5

63

1	6.3
2	12.6
3	18.9
4	25.2
5	31.5
6	37.8
7	44.1
8	50.4
9	56.7

	0'	1'	2'	3'	4'	5'	6'	7'	80'
14	∞	3438	1719	1145.9	859.4	687.5	573.0	491.1	60'
1	206265	3381	1705	1139.6	855.9	685.3	571.4	489.9	59
2	103132	3327	1691	1133.3	852.3	683.0	569.8	488.8	58
3	68755	3274	1677	1127.1	848.8	680.7	568.2	487.6	57
4	51566	3223	1663	1121.0	845.3	678.5	566.7	486.5	56
5	41253	3173	1650	1114.9	841.9	676.3	565.1	485.3	55
6	34377	3125	1637	1109.0	838.5	674.1	563.6	484.2	54
7	29466	3079	1624	1103.0	835.1	671.9	562.0	483.1	53
8	25713	3033	1611	1097.2	831.7	669.7	560.5	481.9	52
9	22918	2989	1599	1091.3	828.4	667.5	559.0	480.8	51
10	20626	2947	1587	1085.6	825.1	665.4	557.5	479.7	50
11	18751	2905	1575	1079.9	821.8	663.2	556.0	478.6	49
12	17189	2865	1563	1074.3	818.5	661.1	554.5	477.5	48
13	15857	2826	1551	1068.7	815.3	659.0	553.0	476.4	47
14	14733	2787	1539	1063.2	812.1	656.9	551.5	475.3	46
15	13751	2750	1528	1057.8	808.9	654.8	550.0	474.2	45
16	12892	2714	1517	1052.4	805.7	652.7	548.6	473.1	44
17	12133	2679	1506	1047.0	802.6	650.7	547.1	472.0	43
18	11459	2644	1495	1041.7	799.5	648.6	545.7	470.9	42
19	10856	2611	1484	1036.5	796.4	646.6	544.2	469.9	41
20	10313	2578	1473	1031.3	793.3	644.6	542.8	468.8	40
21	9822	2546	1463	1026.2	790.3	642.6	541.4	467.7	39
22	9376	2515	1453	1021.1	787.3	640.6	540.0	466.7	38
23	8968	2485	1442	1016.1	784.3	638.6	538.6	465.6	37
24	8594	2456	1432	1011.1	781.3	636.6	537.1	464.6	36
25	8251	2427	1423	1006.2	778.4	634.7	535.8	463.5	35
26	7933	2398	1413	1001.3	775.4	632.7	534.4	462.5	34
27	7639	2371	1403	996.4	772.5	630.8	533.0	461.4	33
28	7367	2344	1394	991.7	769.6	628.9	531.6	460.4	32
29	7113	2318	1384	986.9	766.8	626.9	530.2	459.4	31
30	6875	2292	1375	982.2	763.9	625.0	528.9	458.4	30
31	6654	2267	1366	977.6	761.1	623.2	527.5	457.4	29
32	6446	2242	1357	972.9	758.3	621.3	526.2	456.3	28
33	6250	2218	1348	968.4	755.5	619.4	524.8	455.3	27
34	6067	2194	1339	963.9	752.8	617.6	523.5	454.3	26
35	5893	2171	1331	959.4	750.1	615.7	522.2	453.3	25
36	5730	2149	1322	954.9	747.3	613.9	520.9	452.3	24
37	5575	2126	1314	950.5	744.6	612.1	519.6	451.3	23
38	5428	2105	1305	946.2	742.0	610.3	518.3	450.4	22
39	5289	2083	1297	941.8	739.3	608.5	517.0	449.4	21
40	5157	2063	1289	937.6	736.7	606.7	515.7	448.4	20
41	5031	2042	1281	933.3	734.0	604.9	514.4	447.4	19
42	4911	2022	1273	929.1	731.4	603.1	513.1	446.5	18
43	4797	2003	1265	925.0	728.9	601.4	511.8	445.5	17
44	4688	1983	1258	920.8	726.3	599.6	510.6	444.5	16
45	4584	1964	1250	916.7	723.7	597.9	509.3	443.6	15
46	4484	1946	1243	912.7	721.2	596.1	508.0	442.6	14
47	4389	1928	1235	908.7	718.7	594.4	506.8	441.7	13
48	4297	1910	1228	904.7	716.2	592.7	505.6	440.7	12
49	4209	1892	1221	900.7	713.7	591.0	504.3	439.8	11
50	4125	1875	1213	896.8	711.3	589.3	503.1	438.9	10
51	4044	1858	1206	892.9	708.8	587.6	501.9	437.9	9
52	3967	1842	1199	889.1	706.4	586.0	500.6	437.0	8
53	3892	1825	1192	885.3	704.0	584.3	499.4	436.1	7
54	3820	1809	1185	881.5	701.6	582.7	498.2	435.2	6
55	3750	1794	1179	877.7	699.2	581.0	497.0	434.2	5
56	3683	1778	1172	874.0	696.8	579.4	495.8	433.3	4
57	3619	1763	1165	870.3	694.5	577.8	494.6	432.4	3
58	3556	1748	1159	866.7	692.2	576.2	493.5	431.5	2
59	3496	1733	1152	863.0	689.8	574.6	492.3	430.6	1
60	3438	1719	1146	859.4	687.5	573.0	491.1	429.7	0

sec 89°

cotg 0°

	8'	9'	10'	11'	12'	13'	14'	15'	
0"	429.72	381.97	343.77	312.52	286.48	264.44	245.55	229.18	60"
1	428.82	381.26	343.20	312.05	286.08	264.10	245.26	228.93	59
2	427.93	380.56	342.63	311.58	285.68	263.76	244.97	228.67	58
3	427.05	379.86	342.06	311.11	285.29	263.43	244.68	228.42	57
4	426.17	379.16	341.50	310.64	284.89	263.09	244.39	228.17	56
5	425.29	378.47	340.93	310.17	284.50	262.76	244.10	227.92	55
6	424.41	377.77	340.37	309.71	284.11	262.42	243.81	227.66	54
7	423.54	377.08	339.81	309.24	283.72	262.09	243.52	227.41	53
8	422.67	376.39	339.25	308.78	283.33	261.76	243.24	227.16	52
9	421.81	375.71	338.69	308.32	282.94	261.42	242.95	226.91	51
10	420.95	375.03	338.14	307.86	282.55	261.09	242.66	226.66	50
11	420.09	374.35	337.58	307.40	282.17	260.76	242.38	226.41	49
12	419.24	373.67	337.03	306.94	281.78	260.43	242.09	226.17	48
13	418.39	372.99	336.48	306.48	281.40	260.11	241.81	225.92	47
14	417.54	372.32	335.94	306.03	281.01	259.78	241.53	225.67	46
15	416.70	371.65	335.39	305.58	280.63	259.45	241.24	225.42	45
16	415.86	370.98	334.84	305.12	280.25	259.13	240.96	225.18	44
17	415.02	370.31	334.30	304.67	279.87	258.80	240.68	224.93	43
18	414.19	369.65	333.76	304.22	279.49	258.48	240.40	224.69	42
19	413.36	368.99	333.22	303.78	279.11	258.15	240.12	224.44	41
20	412.53	368.33	332.68	303.33	278.74	257.83	239.84	224.20	40
21	411.71	367.67	332.15	302.88	278.36	257.51	239.56	223.96	39
22	410.89	367.02	331.61	302.44	277.98	257.19	239.28	223.71	38
23	410.07	366.37	331.08	302.00	277.61	256.87	239.01	223.47	37
24	409.25	365.72	330.55	301.56	277.24	256.55	238.73	223.23	36
25	408.44	365.07	330.02	301.12	276.86	256.23	238.46	222.99	35
26	407.64	364.42	329.50	300.68	276.49	255.91	238.18	222.75	34
27	406.83	363.78	328.97	300.24	276.12	255.59	237.90	222.51	33
28	406.03	363.14	328.45	299.80	275.75	255.28	237.63	222.27	32
29	405.23	362.50	327.92	299.37	275.39	254.96	237.36	222.03	31
30	404.44	361.87	327.40	298.93	275.02	254.65	237.08	221.79	30
31	403.65	361.23	326.88	298.50	274.65	254.33	236.81	221.55	29
32	402.86	360.60	326.37	298.07	274.29	254.02	236.54	221.31	28
33	402.07	359.97	325.85	297.64	273.92	253.71	236.27	221.08	27
34	401.29	359.35	325.34	297.21	273.56	253.40	236.00	220.84	26
35	400.51	358.72	324.83	296.78	273.20	253.08	235.73	220.60	25
36	399.74	358.10	324.31	296.36	272.84	252.77	235.46	220.37	24
37	398.96	357.48	323.81	295.93	272.48	252.46	235.19	220.13	23
38	398.19	356.86	323.30	295.51	272.12	252.15	234.92	219.90	22
39	397.43	356.24	322.79	295.08	271.76	251.85	234.66	219.66	21
40	396.66	355.63	322.29	294.66	271.40	251.54	234.39	219.43	20
41	395.90	355.02	321.78	294.24	271.04	251.23	234.12	219.20	19
42	395.14	354.41	321.28	293.82	270.69	250.93	233.86	218.96	18
43	394.39	353.80	320.78	293.41	270.33	250.62	233.59	218.73	17
44	393.63	353.19	320.29	292.99	269.98	250.32	233.33	218.50	16
45	392.88	352.59	319.79	292.57	269.63	250.02	233.07	218.27	15
46	392.14	351.99	319.29	292.16	269.27	249.71	232.80	218.04	14
47	391.39	351.39	318.80	291.75	268.92	249.41	232.54	217.81	13
48	390.65	350.79	318.31	291.33	268.57	249.11	232.28	217.58	12
49	389.91	350.19	317.82	290.92	268.22	248.81	232.02	217.35	11
50	389.18	349.60	317.33	290.51	267.88	248.51	231.76	217.12	10
51	388.45	349.01	316.84	290.10	267.53	248.21	231.50	216.89	9
52	387.71	348.42	316.36	289.70	267.18	247.91	231.24	216.66	8
53	386.99	347.83	315.87	289.29	266.84	247.62	230.98	216.44	7
54	386.26	347.25	315.39	288.89	266.49	247.32	230.72	216.21	6
55	385.54	346.66	314.91	288.48	266.15	247.02	230.46	215.98	5
56	384.82	346.08	314.43	288.08	265.80	246.73	230.20	215.76	4
57	384.10	345.50	313.95	287.68	265.46	246.43	229.95	215.53	3
58	383.39	344.92	313.47	287.28	265.12	246.14	229.69	215.31	2
59	382.68	344.35	313.00	286.88	264.78	245.84	229.44	215.08	1
60	381.97	343.77	312.52	286.48	264.44	245.55	229.18	214.86	0

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6	33.0
7	38.5
8	44.0
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3	19.5
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7	45.5
8	52.0
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5	37.5
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7	52.5
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	8'	9'	10'	11'	12'	13'	14'	15'	60'
0"	429.72	381.97	343.78	312.52	286.48	264.44	245.55	229.18	25
1	428.83	381.27	343.20	312.05	286.08	264.10	245.26	228.93	59
2	427.94	380.56	342.63	311.58	285.69	263.77	244.97	228.68	58
3	427.05	379.86	342.06	311.11	285.29	263.43	244.68	228.42	57
4	426.17	379.16	341.50	310.64	284.90	263.09	244.39	228.17	56
5	425.29	378.47	340.93	310.17	284.50	262.76	244.10	227.92	55
6	424.41	377.77	340.37	309.71	284.11	262.42	243.81	227.67	54
7	423.54	377.08	339.81	309.24	283.72	262.09	243.52	227.42	53
8	422.67	376.40	339.25	308.78	283.33	261.76	243.24	227.16	52
9	421.81	375.71	338.69	308.32	282.94	261.43	242.95	226.91	51
10	420.95	375.03	338.14	307.86	282.56	261.10	242.67	226.67	50
11	420.09	374.35	337.59	307.40	282.17	260.77	242.38	226.42	49
12	419.24	373.67	337.03	306.94	281.78	260.44	242.10	226.17	48
13	418.39	372.99	336.48	306.49	281.40	260.11	241.81	225.92	47
14	417.54	372.32	335.94	306.03	281.02	259.78	241.53	225.67	46
15	416.70	371.65	335.39	305.58	280.63	259.45	241.25	225.43	45
16	415.86	370.98	334.85	305.13	280.25	259.13	240.96	225.18	44
17	415.02	370.31	334.30	304.68	279.87	258.80	240.68	224.94	43
18	414.19	369.65	333.76	304.23	279.49	258.48	240.40	224.69	42
19	413.36	368.99	333.22	303.78	279.11	258.15	240.12	224.45	41
20	412.53	368.33	332.69	303.33	278.74	257.83	239.84	224.20	40
21	411.71	367.67	332.15	302.89	278.36	257.51	239.56	223.96	39
22	410.89	367.02	331.62	302.44	277.99	257.19	239.29	223.72	38
23	410.07	366.37	331.08	302.00	277.61	256.87	239.01	223.47	37
24	409.26	365.72	330.55	301.56	277.24	256.55	238.73	223.23	36
25	408.45	365.07	330.02	301.12	276.87	256.23	238.46	222.99	35
26	407.64	364.43	329.50	300.68	276.49	255.91	238.18	222.75	34
27	406.83	363.78	328.97	300.24	276.12	255.60	237.91	222.51	33
28	406.03	363.14	328.45	299.80	275.76	255.28	237.63	222.27	32
29	405.24	362.50	327.93	299.37	275.39	254.96	237.36	222.03	31
30	404.44	361.87	327.40	298.94	275.02	254.65	237.09	221.79	30
31	403.65	361.23	326.89	298.50	274.65	254.33	236.81	221.55	29
32	402.86	360.60	326.37	298.07	274.29	254.02	236.54	221.31	28
33	402.08	359.97	325.85	297.64	273.92	253.71	236.27	221.08	27
34	401.29	359.35	325.34	297.21	273.56	253.40	236.00	220.84	26
35	400.51	358.72	324.83	296.78	273.20	253.09	235.73	220.60	25
36	399.74	358.10	324.32	296.36	272.84	252.78	235.46	220.37	24
37	398.97	357.48	323.81	295.93	272.48	252.47	235.19	220.13	23
38	398.20	356.86	323.30	295.51	272.12	252.16	234.93	219.90	22
39	397.43	356.24	322.79	295.09	271.76	251.85	234.66	219.67	21
40	396.66	355.63	322.29	294.66	271.40	251.54	234.39	219.43	20
41	395.90	355.02	321.79	294.24	271.05	251.24	234.13	219.20	19
42	395.14	354.41	321.29	293.83	270.69	250.93	233.86	218.97	18
43	394.39	353.80	320.79	293.41	270.33	250.63	233.60	218.73	17
44	393.64	353.19	320.29	292.99	269.98	250.32	233.33	218.50	16
45	392.89	352.59	319.79	292.57	269.63	250.02	233.07	218.27	15
46	392.14	351.99	319.30	292.16	269.28	249.72	232.81	218.04	14
47	391.39	351.39	318.80	291.75	268.92	249.41	232.54	217.81	13
48	390.65	350.79	318.31	291.34	268.57	249.11	232.28	217.58	12
49	389.91	350.20	317.82	290.92	268.23	248.81	232.02	217.35	11
50	389.18	349.60	317.33	290.51	267.88	248.51	231.76	217.12	10
51	388.45	349.01	316.84	290.11	267.53	248.21	231.50	216.89	9
52	387.72	348.42	316.36	289.70	267.18	247.92	231.24	216.67	8
53	386.99	347.83	315.87	289.29	266.84	247.62	230.98	216.44	7
54	386.26	347.25	315.39	288.89	266.49	247.32	230.72	216.21	6
55	385.54	346.66	314.91	288.48	266.15	247.02	230.46	215.98	5
56	384.82	346.08	314.43	288.08	265.81	246.73	230.21	215.76	4
57	384.11	345.50	313.95	287.68	265.46	246.43	229.95	215.53	3
58	383.39	344.92	313.47	287.28	265.12	246.14	229.69	215.31	2
59	382.68	344.35	313.00	286.88	264.78	245.85	229.44	215.08	1
60	381.97	343.78	312.52	286.48	264.44	245.55	229.18	214.86	0
	51'	50'	49'	48'	47'	46'	45'	44'	

sec 89°

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	16'	17'	18'	19'	20'	21'	22'	23'	
0"	214.86	202.22	190.98	180.93	171.89	163.70	156.26	149.47	60"
1	214.63	202.02	190.81	180.77	171.74	163.57	156.14	149.36	59
2	214.41	201.82	190.63	180.62	171.60	163.44	156.02	149.25	58
3	214.19	201.63	190.46	180.46	171.46	163.31	155.90	149.14	57
4	213.97	201.43	190.28	180.30	171.31	163.18	155.79	149.03	56
5	213.74	201.23	190.10	180.14	171.17	163.05	155.67	148.93	55
6	213.52	201.04	189.93	179.98	171.03	162.92	155.55	148.82	54
7	213.30	200.84	189.75	179.83	170.89	162.80	155.43	148.71	53
8	213.08	200.65	189.58	179.67	170.75	162.67	155.32	148.60	52
9	212.86	200.45	189.41	179.51	170.61	162.54	155.20	148.50	51
10	212.64	200.26	189.23	179.36	170.46	162.41	155.08	148.39	50
11	212.42	200.06	189.06	179.20	170.32	162.28	154.97	148.28	49
12	212.21	199.87	188.89	179.05	170.18	162.16	154.85	148.18	48
13	211.99	199.67	188.71	178.89	170.04	162.03	154.74	148.07	47
14	211.77	199.48	188.54	178.74	169.90	161.90	154.62	147.96	46
15	211.55	199.29	188.37	178.58	169.76	161.77	154.50	147.86	45
16	211.34	199.10	188.20	178.43	169.62	161.65	154.39	147.75	44
17	211.12	198.90	188.02	178.27	169.48	161.52	154.27	147.65	43
18	210.90	198.71	187.85	178.12	169.35	161.39	154.16	147.54	42
19	210.69	198.52	187.68	177.97	169.21	161.27	154.04	147.44	41
20	210.47	198.33	187.51	177.81	169.07	161.14	153.93	147.33	40
21	210.26	198.14	187.34	177.66	168.93	161.02	153.81	147.22	39
22	210.04	197.95	187.17	177.51	168.79	160.89	153.70	147.12	38
23	209.83	197.76	187.00	177.35	168.65	160.77	153.58	147.01	37
24	209.62	197.57	186.83	177.20	168.52	160.64	153.47	146.91	36
25	209.40	197.38	186.66	177.05	168.38	160.52	153.35	146.81	35
26	209.19	197.19	186.49	176.90	168.24	160.39	153.24	146.70	34
27	208.98	197.00	186.33	176.75	168.10	160.27	153.13	146.60	33
28	208.77	196.82	186.16	176.59	167.97	160.14	153.01	146.49	32
29	208.56	196.63	185.99	176.44	167.83	160.02	152.90	146.39	31
30	208.35	196.44	185.82	176.29	167.69	159.89	152.79	146.28	30
31	208.14	196.25	185.66	176.14	167.56	159.77	152.67	146.18	29
32	207.93	196.07	185.49	175.99	167.42	159.65	152.56	146.08	28
33	207.72	195.88	185.32	175.84	167.28	159.52	152.45	145.97	27
34	207.51	195.70	185.16	175.69	167.15	159.40	152.34	145.87	26
35	207.30	195.51	184.99	175.54	167.01	159.28	152.22	145.77	25
36	207.09	195.32	184.82	175.39	166.88	159.15	152.11	145.66	24
37	206.88	195.14	184.66	175.24	166.74	159.03	152.00	145.56	23
38	206.68	194.96	184.49	175.10	166.61	158.91	151.89	145.46	22
39	206.47	194.77	184.33	174.95	166.47	158.79	151.77	145.36	21
40	206.26	194.59	184.16	174.80	166.34	158.66	151.66	145.25	20
41	206.06	194.40	184.00	174.65	166.21	158.54	151.55	145.15	19
42	205.85	194.22	183.83	174.50	166.07	158.42	151.44	145.05	18
43	205.65	194.04	183.67	174.36	165.94	158.30	151.33	144.95	17
44	205.44	193.86	183.51	174.21	165.81	158.18	151.22	144.85	16
45	205.24	193.67	183.34	174.06	165.67	158.06	151.11	144.74	15
46	205.03	193.49	183.18	173.91	165.54	157.93	151.00	144.64	14
47	204.83	193.31	183.02	173.77	165.41	157.81	150.89	144.54	13
48	204.63	193.13	182.86	173.62	165.27	157.69	150.78	144.44	12
49	204.42	192.95	182.70	173.48	165.14	157.57	150.67	144.34	11
50	204.22	192.77	182.53	173.33	165.01	157.45	150.56	144.24	10
51	204.02	192.59	182.37	173.18	164.88	157.33	150.45	144.14	9
52	203.82	192.41	182.21	173.04	164.75	157.21	150.34	144.04	8
53	203.62	192.23	182.05	172.89	164.61	157.09	150.23	143.94	7
54	203.42	192.05	181.89	172.75	164.48	156.97	150.12	143.84	6
55	203.21	191.87	181.73	172.60	164.35	156.85	150.01	143.74	5
56	203.01	191.69	181.57	172.46	164.22	156.73	149.90	143.64	4
57	202.82	191.52	181.41	172.32	164.09	156.62	149.79	143.54	3
58	202.62	191.34	181.25	172.17	163.96	156.50	149.68	143.44	2
59	202.42	191.16	181.09	172.03	163.83	156.38	149.57	143.34	1
60	202.22	190.98	180.93	171.89	163.70	156.26	149.47	143.24	0

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9	17.1

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2	5.6
3	8.4
4	11.2
5	14.0
6	16.8
7	19.6
8	22.4
9	25.2

	16'	17'	18'	19'	20'	21'	22'	23'	
0"	214.86	202.22	190.99	180.93	171.89	163.70	156.26	149.47	60"
1	214.64	202.02	190.81	180.78	171.75	163.57	156.14	149.36	59
2	214.41	201.83	190.63	180.62	171.60	163.44	156.03	149.25	58
3	214.19	201.63	190.46	180.46	171.46	163.31	155.91	149.14	57
4	213.97	201.43	190.28	180.30	171.32	163.19	155.79	149.04	56
5	213.75	201.23	190.11	180.14	171.18	163.06	155.67	148.93	55
6	213.53	201.04	189.93	179.99	171.03	162.93	155.56	148.82	54
7	213.30	200.84	189.76	179.83	170.89	162.80	155.44	148.71	53
8	213.08	200.65	189.58	179.67	170.75	162.67	155.32	148.61	52
9	212.86	200.45	189.41	179.52	170.61	162.54	155.20	148.50	51
10	212.64	200.26	189.23	179.36	170.47	162.41	155.09	148.39	50
11	212.43	200.06	189.06	179.21	170.33	162.29	154.97	148.29	49
12	212.21	199.87	188.89	179.05	170.19	162.16	154.85	148.18	48
13	211.99	199.68	188.72	178.89	170.05	162.03	154.74	148.07	47
14	211.77	199.48	188.54	178.74	169.91	161.90	154.62	147.97	46
15	211.55	199.29	188.37	178.59	169.77	161.78	154.51	147.86	45
16	211.34	199.10	188.20	178.43	169.63	161.65	154.39	147.76	44
17	211.12	198.91	188.03	178.28	169.49	161.52	154.28	147.65	43
18	210.91	198.71	187.86	178.12	169.35	161.40	154.16	147.54	42
19	210.69	198.52	187.68	177.97	169.21	161.27	154.05	147.44	41
20	210.48	198.33	187.51	177.82	169.07	161.15	153.93	147.33	40
21	210.26	198.14	187.34	177.66	168.93	161.02	153.82	147.23	39
22	210.05	197.95	187.17	177.51	168.79	160.89	153.70	147.12	38
23	209.83	197.76	187.00	177.36	168.66	160.77	153.59	147.02	37
24	209.62	197.57	186.83	177.20	168.52	160.64	153.47	146.91	36
25	209.41	197.38	186.67	177.05	168.38	160.52	153.36	146.81	35
26	209.19	197.19	186.50	176.90	168.24	160.39	153.24	146.70	34
27	208.98	197.01	186.33	176.75	168.11	160.27	153.13	146.60	33
28	208.77	196.82	186.16	176.60	167.97	160.14	153.02	146.50	32
29	208.56	196.63	185.99	176.45	167.83	160.02	152.90	146.39	31
30	208.35	196.44	185.83	176.30	167.70	159.90	152.79	146.29	30
31	208.14	196.26	185.66	176.15	167.56	159.77	152.68	146.18	29
32	207.93	196.07	185.49	175.99	167.42	159.65	152.56	146.08	28
33	207.72	195.88	185.32	175.84	167.29	159.53	152.45	145.98	27
34	207.51	195.70	185.16	175.69	167.15	159.40	152.34	145.87	26
35	207.30	195.51	184.99	175.55	167.02	159.28	152.23	145.77	25
36	207.09	195.33	184.83	175.40	166.88	159.16	152.11	145.67	24
37	206.89	195.14	184.66	175.25	166.75	159.03	152.00	145.57	23
38	206.68	194.96	184.50	175.10	166.61	158.91	151.89	145.46	22
39	206.47	194.77	184.33	174.95	166.48	158.79	151.78	145.36	21
40	206.27	194.59	184.17	174.80	166.34	158.67	151.67	145.26	20
41	206.06	194.41	184.00	174.65	166.21	158.54	151.55	145.16	19
42	205.85	194.22	183.84	174.51	166.08	158.42	151.44	145.05	18
43	205.65	194.04	183.67	174.36	165.94	158.30	151.33	144.95	17
44	205.44	193.86	183.51	174.21	165.81	158.18	151.22	144.85	16
45	205.24	193.68	183.35	174.06	165.68	158.06	151.11	144.75	15
46	205.04	193.50	183.18	173.92	165.54	157.94	151.00	144.65	14
47	204.83	193.31	183.02	173.77	165.41	157.82	150.89	144.55	13
48	204.63	193.13	182.86	173.62	165.28	157.70	150.78	144.44	12
49	204.43	192.95	182.70	173.48	165.14	157.58	150.67	144.34	11
50	204.22	192.77	182.54	173.33	165.01	157.46	150.56	144.24	10
51	204.02	192.59	182.37	173.19	164.88	157.34	150.45	144.14	9
52	203.82	192.41	182.21	173.04	164.75	157.22	150.34	144.04	8
53	203.62	192.23	182.05	172.90	164.62	157.10	150.23	143.94	7
54	203.42	192.05	181.89	172.75	164.49	156.98	150.12	143.84	6
55	203.22	191.88	181.73	172.61	164.36	156.86	150.01	143.74	5
56	203.02	191.70	181.57	172.46	164.22	156.74	149.90	143.64	4
57	202.82	191.52	181.41	172.32	164.09	156.62	149.79	143.54	3
58	202.62	191.34	181.25	172.18	163.96	156.50	149.69	143.44	2
59	202.42	191.16	181.09	172.03	163.83	156.38	149.58	143.34	1
60	202.22	190.99	180.93	171.89	163.70	156.26	149.47	143.24	0

43' 42' 41' 40' 39' 38' 37' 36'

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	24'	25'	26'	27'	28'	29'	30'	31'	
0"	143.237	137.507	132.219	127.321	122.774	118.540	114.589	110.892	60"
1	138	416	134	243	701	472	525	832	59
2	143.038	324	132.049	164	628	404	461	773	58
3	142.939	233	131.965	880	555	336	398	713	57
4	840	142	880	126.008	482	268	335	654	56
5	741	137.051	796	84	410	201	271	595	55
6	643	136.960	712	84	337	133	208	535	54
7	544	869	628	84	264	73	145	476	53
8	446	778	544	84	192	72	082	417	52
9	347	687	460	84	120	68	114.019	358	51
10	142.249	136.597	131.376	26.540	122.047	117.863	113.956	110.299	50
11	151	506	293	463	121.975	795	893	240	49
12	142.053	416	209	385	903	728	830	181	48
13	141.956	326	126	308	831	661	767	122	47
14	858	236	131.042	230	759	594	704	064	46
15	760	146	130.959	153	687	527	642	110.005	45
16	663	136.056	876	126.076	616	460	579	109.946	44
17	566	135.966	793	125.999	544	393	516	888	43
18	469	877	710	922	472	326	454	829	42
19	372	787	627	845	401	260	392	771	41
20	141.275	135.698	130.545	125.769	121.329	117.193	113.329	109.712	40
21	178	609	462	692	258	127	267	654	39
22	141.082	520	380	615	187	117.060	205	596	38
23	140.985	431	297	539	116	116.994	143	537	37
24	889	342	215	463	121.045	927	081	479	36
25	793	253	133	386	120.974	861	113.019	421	35
26	697	165	130.051	310	903	795	112.957	363	34
27	601	135.076	129.969	234	832	729	895	305	33
28	505	134.988	887	158	761	663	833	247	32
29	409	899	805	082	691	597	772	190	31
30	140.314	134.811	129.724	125.006	120.620	116.531	112.710	109.132	30
31	218	723	642	124.931	549	465	648	074	29
32	123	635	561	855	479	399	587	109.016	28
33	140.028	547	479	779	409	334	526	108.959	27
34	139.933	460	308	704	338	268	464	901	26
35	838	372	317	629	268	203	403	844	25
36	743	285	236	553	198	137	342	786	24
37	649	197	155	478	128	072	281	729	23
38	554	110	129.074	403	120.058	116.007	219	672	22
39	460	134.023	128.994	328	119.988	115.941	158	615	21
40	139.366	133.936	128.913	124.253	119.919	115.876	112.097	108.557	20
41	272	849	832	178	849	811	112.037	500	19
42	178	762	752	104	779	746	111.976	443	18
43	139.084	675	672	124.029	710	681	915	386	17
44	138.990	589	591	123.955	640	616	854	329	16
45	896	502	511	880	571	552	794	272	15
46	803	416	431	806	502	487	733	216	14
47	710	330	351	731	433	422	673	159	13
48	616	243	272	657	363	358	612	102	12
49	523	157	192	583	294	293	552	108.046	11
50	138.430	133.072	128.112	123.509	119.225	115.229	111.492	107.989	10
51	338	132.986	128.033	435	157	165	431	932	9
52	245	900	127.953	361	088	100	371	876	8
53	152	814	874	288	119.019	115.036	311	820	7
54	138.060	729	795	214	118.950	114.972	251	763	6
55	137.967	644	716	140	882	908	191	707	5
56	875	558	637	123.067	813	844	131	651	4
57	783	473	558	122.994	745	780	071	595	3
58	691	388	479	920	677	716	111.011	539	2
59	599	303	400	847	608	652	110.952	482	1
60	137.507	132.219	127.321	122.774	118.540	114.589	110.892	107.426	
	35'	34'	33'	32'	31'	30'	29'	28'	

56

1	5.6
2	11.2
3	16.8
4	22.4
5	28.0
6	33.6
7	39.2
8	44.8
9	50.4

61

1	6.1
2	12.2
3	18.3
4	24.4
5	30.5
6	36.6
7	42.7
8	48.8
9	54.9

67

1	6.7
2	13.4
3	20.1
4	26.5
5	33.5
6	40.2
7	46.9
8	53.6
9	60.3

73

1	7.3
2	14.6
3	21.9
4	29.2
5	36.5
6	43.8
7	51.1
8	58.4
9	65.7

79

1	7.9
2	15.8
3	23.7
4	31.6
5	39.5
6	47.4
7	55.3
8	63.2
9	71.1

85

1	8.5
2	17.0
3	25.5
4	34.0
5	42.5
6	51.0
7	59.5
8	68.0
9	76.5

91

1	9.1
2	18.2
3	27.3
4	36.4
5	45.5
6	54.6
7	63.7
8	72.8
9	81.9

97

1	9.7
2	19.4
3	29.1
4	38.8
5	48.5
6	58.2
7	67.9
8	77.6
9	87.3

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58
1 5.8
2 11.6
3 17.4
4 23.2
5 29.0
6 34.8
7 40.6
8 46.4
9 52.2

64
1 6.4
2 12.8
3 19.2
4 25.6
5 32.0
6 38.4
7 44.8
8 51.2
9 57.6

70
1 7.0
2 14.0
3 21.0
4 28.0
5 35.0
6 42.0
7 49.0
8 56.0
9 63.0

76
1 7.6
2 15.2
3 22.8
4 30.4
5 38.0
6 45.6
7 53.2
8 60.8
9 68.4

82
1 8.2
2 16.4
3 24.6
4 32.8
5 41.0
6 49.2
7 57.4
8 65.6
9 73.8

88
1 8.8
2 17.6
3 26.4
4 35.2
5 44.0
6 52.8
7 61.6
8 70.4
9 79.2

94
1 9.4
2 18.8
3 28.2
4 37.6
5 47.0
6 56.4
7 65.8
8 75.2
9 84.6

99
1 9.9
2 19.8
3 29.7
4 39.6
5 49.5
6 59.4
7 69.3
8 79.2
9 89.1

	24'	25'	26'	27'	28'	29'	30'	31'	60"
0"	143.241	137.511	132.222	127.325	122.778	118.544	114.593	110.897	60"
1	141	419	138	247	705	476	529	837	59
2	143.042	328	132.053	168	632	408	466	777	58
3	142.943	237	131.969	90	559	340	402	718	57
4	844	145	884	127.012	486	273	339	659	56
5	745	91	800	84	414	205	276	599	55
6	646	137.054	716	84	341	137	212	540	54
7	548	136.963	632	84	269	69	149	481	53
8	449	99	548	84	196	73	86	422	52
9	351	98	464	84	124	118.002	086	363	51
						117.934	114.023		
10	142.253	136.600	131.380	126.544	122.052	117.867	113.960	110.304	50
11	155	510	296	467	121.979	800	897	245	49
12	142.057	420	213	389	907	732	834	186	48
13	141.959	330	130	312	835	665	771	127	47
14	861	240	131.046	234	733	598	703	068	46
15	764	150	130.963	157	692	531	646	110.009	45
16	667	90	880	83	620	464	583	109.951	44
17	569	136.060	797	83	548	397	521	892	43
18	472	135.970	714	83	477	331	458	834	42
19	375	97	631	83	405	264	396	775	41
20	141.278	135.702	130.549	125.773	121.334	117.197	113.334	109.717	40
21	182	613	466	696	262	131	272	659	39
22	141.085	523	384	619	191	117.064	209	600	38
23	140.989	434	301	543	120	116.998	147	542	37
24	892	346	219	467	121.049	932	085	484	36
25	796	257	137	390	120.978	865	113.023	426	35
26	700	168	130.055	314	907	799	112.961	368	34
27	604	90	129.973	238	836	733	900	310	33
28	509	134.991	891	162	765	667	838	252	32
29	413	903	809	86	695	601	776	194	31
30	140.317	134.815	129.728	125.010	120.624	116.535	112.714	109.136	30
31	222	727	646	124.935	554	469	653	079	29
32	127	639	565	859	483	404	591	109.021	28
33	140.032	551	483	783	413	338	530	108.963	27
34	139.937	463	402	708	343	272	469	906	26
35	842	376	321	633	272	207	407	848	25
36	747	288	240	557	202	142	346	791	24
37	652	201	159	482	132	076	285	734	23
38	558	114	129.078	407	120.062	116.011	224	676	22
39	464	134.026	128.997	332	119.993	115.946	163	619	21
40	139.369	133.939	128.917	124.257	119.923	115.881	112.102	108.562	20
41	275	853	836	182	853	815	112.041	505	19
42	181	766	756	108	784	750	111.980	448	18
43	139.087	679	676	124.033	714	686	919	391	17
44	138.994	592	595	123.959	645	621	859	334	16
45	900	506	515	884	575	556	798	277	15
46	807	420	435	810	506	491	738	220	14
47	713	333	355	735	437	427	677	163	13
48	620	247	275	661	368	362	617	107	12
49	527	161	196	587	299	298	556	108.050	11
50	138.434	133.075	128.116	123.513	119.230	115.233	111.496	107.994	10
51	341	132.990	128.037	439	161	169	436	937	9
52	248	904	127.957	365	092	105	376	881	8
53	156	818	878	292	119.023	115.040	315	824	7
54	188.063	733	799	218	118.955	114.976	255	768	6
55	187.971	647	719	145	886	912	195	712	5
56	879	562	640	123.071	818	848	136	655	4
57	787	477	561	122.998	749	784	076	599	3
58	695	392	483	924	681	720	111.016	543	2
59	603	307	404	851	613	657	110.956	487	1
60	137.511	132.222	127.325	122.778	118.544	114.593	110.897	107.431	0
	35'	34'	33'	32'	31'	30'	29'	28'	

sec 89°

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	32'	33'	34'	35'	36'	37'	38'	39'	60"
0"	107.426	104.171	101.107	98.218	95.489	92.908	90.463	88.144	60"
1	371	118	057	171	445	867	424	106	59
2	315	066	52	124	401	825	384	068	58
3	259	104.013	52	078	357	783	344	88.031	57
4	203	103.961	52	909	313	741	305	87.993	56
5	147	903	52	860	269	700	265	956	55
6	092	856	52	810	225	658	226	918	54
7	107.036	804	52	761	181	616	186	881	53
8	106.981	752	52	712	137	575	147	843	52
9	925	700	52	663	93	533	108	806	51
10	106.870	103.647	53	100.614	97.752	95.049	92.492	90.068	87.768
11	814	595	52	565	706	95.006	450	90.029	731
12	759	543	52	516	660	94.962	409	89.990	694
13	704	491	51	467	614	918	368	950	657
14	649	440	52	418	567	875	326	911	619
15	594	388	52	369	521	831	285	872	582
16	539	336	52	320	475	787	244	833	545
17	484	284	52	271	429	744	202	794	508
18	429	232	52	223	383	700	161	755	471
19	374	181	51	174	337	657	120	716	434
20	106.319	103.129	52	100.125	97.291	94.613	92.079	89.677	87.397
21	264	078	52	077	245	570	92.038	638	360
22	209	103.026	51	107.028	200	527	91.997	599	323
23	155	102.975	52	99.980	154	483	956	560	286
24	100	923	52	931	108	440	915	521	249
25	106.046	872	51	883	062	397	874	482	212
26	105.991	821	52	834	97.017	354	833	443	175
27	937	769	51	786	96.971	311	792	405	138
28	882	718	51	738	926	267	751	366	101
29	828	667	51	690	880	224	710	327	064
30	105.774	102.616	51	99.641	96.834	94.181	91.670	89.288	87.028
31	719	565	51	593	789	138	629	250	86.991
32	665	514	51	545	744	095	588	211	954
33	611	463	51	497	698	052	548	173	918
34	557	412	51	449	653	94.010	507	134	881
35	503	361	51	401	608	93.967	466	096	845
36	449	311	50	353	562	924	426	057	808
37	395	260	51	306	517	881	385	89.019	771
38	341	209	51	258	472	838	345	88.980	735
39	288	159	50	210	427	796	304	942	698
40	105.234	102.108	51	99.162	96.382	93.753	91.264	88.903	86.662
41	180	057	50	115	337	711	224	865	626
42	127	102.007	50	067	292	668	183	827	589
43	073	101.957	51	99.020	247	625	143	789	553
44	105.020	906	51	98.972	202	583	103	750	517
45	104.966	856	50	925	157	541	062	712	480
46	913	806	50	877	112	498	91.022	674	444
47	859	755	51	830	068	456	90.982	636	408
48	806	705	50	782	96.023	413	942	598	372
49	753	655	50	735	95.978	371	902	560	336
50	104.700	101.605	50	98.688	95.934	93.329	90.862	88.522	86.299
51	647	555	50	641	889	287	822	484	263
52	594	505	50	594	844	245	782	446	227
53	541	455	50	546	800	202	742	408	191
54	488	405	50	499	755	160	702	370	155
55	435	355	50	452	711	118	662	332	119
56	382	306	49	405	667	076	622	295	083
57	329	256	50	358	622	93.034	583	257	047
58	276	206	50	312	578	92.992	543	219	86.011
59	224	156	49	265	534	950	503	181	85.976
60	104.171	101.107	49	98.218	95.489	92.908	90.463	88.144	85.940
	27'	26'	25'	24'	23'	22'	21'	20'	

35

1	3.5
2	7.0
3	10.5
4	14.0
5	17.5
6	21.0
7	24.5
8	28.0
9	31.5

37

1	3.7
2	7.4
3	11.1
4	14.8
5	18.5
6	22.2
7	25.9
8	29.6
9	33.3

39

1	3.9
2	7.8
3	11.7
4	15.6
5	19.5
6	23.4
7	27.3
8	31.2
9	35.1

41

1	4.1
2	8.2
3	12.3
4	16.4
5	20.5
6	24.6
7	28.7
8	32.8
9	36.9

43

1	4.3
2	8.6
3	12.9
4	17.2
5	21.5
6	25.8
7	30.1
8	34.4
9	38.7

46

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3	13.8
4	18.4
5	23.0
6	27.6
7	32.2
8	36.8
9	41.4

50

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2	10.0
3	15.0
4	20.0
5	25.0
6	30.0
7	35.0
8	40.0
9	45.0

54

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3	16.2
4	21.6
5	27.0
6	32.4
7	37.8
8	43.2
9	48.6

cosc 0°

36	
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2	7.2
3	10.8
4	14.4
5	18.0
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7	25.2
8	28.8
9	32.4
38	
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2	7.6
3	11.4
4	15.2
5	19.0
6	22.8
7	26.6
8	30.4
9	34.2
40	
1	4.0
2	8.0
3	12.0
4	16.0
5	20.0
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7	28.0
8	32.0
9	36.0
42	
1	4.2
2	8.4
3	12.6
4	16.8
5	21.0
6	25.2
7	29.4
8	33.6
9	37.8
44	
1	4.4
2	8.8
3	13.2
4	17.6
5	22.0
6	26.4
7	30.8
8	35.2
9	39.6
48	
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7	33.6
8	38.4
9	43.2
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3	15.6
4	20.8
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6	31.2
7	36.4
8	41.6
9	46.8
56	
1	5.6
2	11.2
3	16.8
4	22.4
5	28.0
6	33.6
7	39.2
8	44.8
9	50.4

	32'	33'	34'	35'	36'	37'	38'	39'	60"
0°	107.431	104.176	101.112	98.223	95.495	92.914	90.469	88.149	60"
1	375	123	062	176	451	872	429	112	37
2	319	071	101.013	130	406	830	390	074	38
3	264	104.018	100.963	083	352	788	350	88.036	38
4	208	103.966	914	98.036	318	747	310	87.999	37
5	152	913	865	97.990	274	705	271	961	38
6	096	861	815	943	230	663	231	924	37
7	107.041	809	766	897	186	622	192	886	38
8	106.985	757	717	850	142	580	153	849	37
9	930	704	668	804	098	539	113	812	37
10	106.875	103.652	100.619	97.758	95.055	92.497	90.074	87.774	38
11	819	600	570	711	95.011	456	90.035	737	37
12	764	548	521	665	94.967	414	89.995	700	37
13	709	496	472	619	923	373	956	662	38
14	653	444	423	573	880	332	917	625	37
15	598	392	374	526	836	290	878	588	37
16	543	341	325	480	793	249	838	551	37
17	488	289	276	434	749	208	799	513	38
18	433	237	228	388	706	167	760	476	37
19	378	186	179	342	662	125	721	439	37
20	106.324	103.134	100.130	97.296	94.619	92.084	89.382	87.402	37
21	269	082	082	251	575	043	643	365	37
22	214	103.031	100.033	205	532	92.002	604	328	37
23	159	102.980	99.985	159	489	91.961	565	291	37
24	105	928	936	113	445	920	527	254	37
25	100.050	877	888	068	402	879	488	217	37
26	105.996	826	839	97.022	359	838	449	181	36
27	941	774	791	96.976	316	797	410	144	37
28	887	723	743	931	273	757	371	107	37
29	833	672	695	885	230	716	333	070	37
30	105.778	102.621	99.647	96.840	94.187	91.675	89.294	87.033	37
31	724	570	598	794	144	634	255	86.997	36
32	670	519	550	749	101	594	217	960	37
33	616	468	502	703	058	553	178	923	37
34	562	417	454	658	94.015	512	140	887	37
35	508	366	406	613	93.972	472	101	850	37
36	454	316	359	568	929	431	063	814	36
37	400	265	311	522	887	391	89.024	777	37
38	346	214	263	477	844	350	88.986	741	36
39	292	163	215	432	801	310	947	704	37
40	105.239	102.113	99.167	96.387	93.759	91.269	88.909	86.568	36
41	185	062	120	342	716	229	871	631	37
42	131	102.012	072	297	673	189	833	595	36
43	078	101.961	99.025	252	631	148	794	559	37
44	105.024	911	98.977	207	588	108	756	522	36
45	104.971	861	930	162	546	068	718	486	36
46	918	811	882	118	504	91.028	680	450	36
47	864	760	835	073	461	90.988	642	414	37
48	811	710	788	96.028	419	948	604	377	36
49	758	660	740	95.983	377	907	566	341	36
50	104.705	101.610	98.693	95.939	93.334	90.867	88.528	86.305	36
51	651	560	646	894	292	827	490	269	36
52	598	510	599	850	250	787	452	233	36
53	545	460	552	805	208	747	414	197	36
54	492	410	504	761	166	708	376	161	36
55	439	360	457	716	124	668	338	125	36
56	387	310	410	672	082	628	300	089	36
57	334	261	364	628	93.040	588	262	053	36
58	281	211	317	583	92.998	548	225	80.017	36
59	228	161	270	539	956	509	187	85.981	36
60	104.176	101.112	98.223	95.495	92.914	90.469	88.149	85.946	35
	27'	26'	25'	24'	23'	22'	21'	20'	0

sec 89°

cotg 0°

	40'	41'	42'	43'	44'	45'	46'	47'	
0"	85.940	83.844	81.847	79.943	78.126	76.390	74.729	73.139	60"
1	904	809	815	912	097	362	702	113	59
2	868	775	782	881	067	333	675	087	58
3	832	741	750	851	038	305	648	061	57
4	797	707	717	820	78.008	277	621	035	56
5	761	673	685	789	77.979	249	594	73.010	55
6	725	639	653	758	949	221	567	72.984	54
7	690	606	620	727	920	192	540	958	53
8	654	572	588	696	890	164	513	932	52
9	619	538	556	665	861	136	486	906	51
10	85.583	83.501	81.524	79.635	77.831	76.108	74.459	72.881	50
11	548	470	491	604	802	080	432	855	49
12	512	436	459	573	773	052	406	829	48
13	477	403	427	543	743	29	379	803	47
14	441	369	395	512	714	75.996	352	778	46
15	406	335	363	481	685	968	325	752	45
16	371	302	331	451	656	940	298	726	44
17	335	268	299	420	626	912	272	701	43
18	300	234	267	389	597	884	245	675	42
19	265	201	234	359	568	856	218	649	41
20	85.229	83.167	81.203	79.328	77.539	75.828	74.191	72.624	40
21	194	134	171	298	510	800	165	598	39
22	159	100	139	267	481	773	138	573	38
23	124	067	107	237	452	745	111	547	37
24	089	033	075	207	422	717	085	522	36
25	054	83.000	043	176	393	689	058	496	35
26	85.019	82.967	81.011	146	364	661	032	471	34
27	84.984	933	80.979	115	335	634	74.005	445	33
28	949	900	948	085	306	606	73.979	420	32
29	914	867	916	055	277	578	952	394	31
30	84.879	82.833	80.884	79.024	77.248	75.550	73.926	72.369	30
31	844	800	852	78.994	219	523	899	344	29
32	809	767	821	964	191	495	873	318	28
33	774	734	789	934	162	468	846	298	27
34	739	700	757	904	133	440	820	278	26
35	704	667	726	873	104	412	793	242	25
36	670	634	694	843	075	385	767	217	24
37	635	601	663	813	045	357	740	192	23
38	600	568	631	783	77.018	330	714	166	22
39	565	535	600	753	76.989	302	688	141	21
40	84.531	82.502	80.568	78.723	76.960	75.275	73.661	72.116	20
41	496	459	537	693	931	247	635	091	19
42	462	436	505	663	903	220	609	066	18
43	427	403	474	633	874	192	583	040	17
44	392	370	442	603	845	165	556	72.015	16
45	358	337	411	573	817	138	530	71.990	15
46	323	304	380	543	788	110	504	965	14
47	289	271	348	513	760	083	478	940	13
48	256	239	317	483	731	056	452	915	12
49	220	206	286	453	703	028	425	890	11
50	84.186	82.173	80.255	78.423	76.674	75.001	73.399	71.865	10
51	151	140	223	394	646	74.974	373	840	9
52	117	108	192	364	617	946	347	815	8
53	083	075	161	334	589	919	321	790	7
54	049	042	130	304	560	892	295	765	6
55	84.014	82.010	099	275	532	865	269	740	5
56	83.980	81.977	068	245	503	838	243	715	4
57	946	945	037	215	475	810	217	690	3
58	912	912	80.005	186	447	783	191	665	2
59	878	880	79.974	156	418	756	165	640	1
60	83.844	81.847	79.943	78.126	76.390	74.729	73.139	71.615	0

25

1	2.5
2	5.0
3	7.5
4	10.0
5	12.5
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7	17.5
8	20.0
9	22.5

27

1	2.7
2	5.4
3	8.1
4	10.8
5	13.5
6	16.2
7	18.9
8	21.6
9	24.3

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1	2.9
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4	11.6
5	14.5
6	17.4
7	20.3
8	23.2
9	26.1

31

1	3.1
2	6.2
3	9.3
4	12.4
5	15.5
6	18.6
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4	13.2
5	16.5
6	19.8
7	23.1
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9	29.7

35

1	3.5
2	7.0
3	10.5
4	14.0
5	17.5
6	21.0
7	24.5
8	28.0
9	31.5

cosc 0°

	40'	41'	42'	43'	44'	45'	46'	47'	60"
0"	85.946	83.849	81.853	79.950	78.133	76.397	74.736	73.146	60"
1	910	815	821	919	103	368	709	120	59
2	874	781	788	888	074	340	682	094	58
3	838	747	756	857	044	312	655	068	57
4	803	713	723	826	31	284	628	042	56
5	767	679	691	795	77.015	255	601	73.016	55
6	731	645	659	764	31	227	574	72.991	54
7	696	612	626	733	31	199	547	965	53
8	660	578	594	703	30	171	520	939	52
9	625	544	562	672	31	143	493	913	51
10	85.589	83.510	81.530	79.641	77.838	76.115	74.466	72.887	50
11	554	476	497	610	809	087	439	862	49
12	518	442	465	580	779	059	412	836	48
13	483	409	433	549	750	031	386	810	47
14	447	375	401	518	721	76.002	359	785	46
15	412	341	369	488	691	75.974	332	759	45
16	376	308	337	457	662	29	305	733	44
17	341	274	305	426	633	29	278	708	43
18	306	240	273	396	604	29	252	682	42
19	271	207	241	365	574	30	225	656	41
20	85.235	83.173	81.209	79.335	77.545	75.835	74.198	72.631	40
21	200	140	177	304	516	807	172	605	39
22	165	106	145	274	487	779	145	580	38
23	130	073	113	243	458	751	118	554	37
24	095	039	081	213	429	723	092	529	36
25	060	83.006	049	182	400	696	065	503	35
26	85.025	82.973	81.017	152	371	668	038	478	34
27	84.990	939	80.985	122	342	640	74.012	452	33
28	955	905	954	091	313	612	73.985	427	32
29	920	873	922	061	284	585	959	401	31
30	84.885	82.839	80.890	79.031	77.255	75.557	73.932	72.376	30
31	850	806	859	79.001	226	529	906	351	29
32	815	773	827	78.970	197	502	879	325	28
33	780	740	795	940	168	474	853	300	27
34	745	706	764	910	139	447	826	274	26
35	710	673	732	880	111	419	800	249	25
36	676	640	700	850	082	391	774	224	24
37	641	607	669	819	053	364	747	199	23
38	606	574	637	789	77.024	336	721	173	22
39	571	541	606	759	76.995	309	695	148	21
40	84.537	82.503	80.574	78.729	76.967	75.281	73.668	72.123	20
41	502	475	543	699	938	254	642	098	19
42	467	442	511	669	909	226	616	072	18
43	433	409	480	639	881	199	589	047	17
44	398	376	449	609	852	172	563	72.022	16
45	364	343	417	579	823	144	537	71.997	15
46	329	310	386	549	795	117	511	972	14
47	295	278	355	519	766	090	485	947	13
48	260	245	323	489	738	062	458	922	12
49	226	212	292	460	709	035	432	897	11
50	84.192	82.179	80.261	78.430	76.681	75.008	73.406	71.872	10
51	157	147	230	400	652	74.980	380	847	9
52	123	114	198	370	624	953	354	822	8
53	089	081	167	340	595	926	328	797	7
54	054	048	136	311	567	899	302	772	6
55	84.020	82.016	103	281	538	871	276	747	5
56	83.986	81.983	074	251	510	844	250	722	4
57	952	951	043	222	482	817	224	697	3
58	918	918	80.012	192	453	790	198	672	2
59	884	886	79.981	162	425	763	172	647	1
60	88.849	81.853	79.950	78.133	76.397	74.736	73.146	71.622	0
	19'	18'	17'	16'	15'	14'	13'	12'	

26

1	2.6
2	5.2
3	7.8
4	10.4
5	13.0
6	15.6
7	18.2
8	20.8
9	23.4

28

1	2.8
2	5.6
3	8.4
4	11.2
5	14.0
6	16.8
7	19.6
8	22.4
9	25.2

30

1	3.0
2	6.0
3	9.0
4	12.0
5	15.0
6	18.0
7	21.0
8	24.0
9	27.0

32

1	3.2
2	6.4
3	9.6
4	12.8
5	16.0
6	19.2
7	22.4
8	25.6
9	28.8

34

1	3.4
2	6.8
3	10.2
4	13.6
5	17.0
6	20.4
7	23.8
8	27.2
9	30.6

36

1	3.6
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6	21.6
7	25.2
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9	32.4