

Table of Natural Tangents		Minutes					
Degrees	Tangent		10'	20'	30'	40'	50'
0°	0	0.0029	0.0058	0.0087	0.0116	0.0145	
1°	0.0175	0.0204	0.0233	0.0262	0.0291	0.032	
2°	0.0349	0.0378	0.0407	0.0437	0.0466	0.0495	
3°	0.0524	0.0553	0.0582	0.0612	0.0641	0.067	
4°	0.0699	0.0729	0.0758	0.0787	0.0816	0.0846	
5°	0.0875	0.0904	0.0934	0.0963	0.0992	0.1022	
6°	0.1051	0.108	0.111	0.1139	0.1169	0.1198	
7°	0.1228	0.1257	0.1287	0.1317	0.1346	0.1376	
8°	0.1405	0.1435	0.1465	0.1495	0.1524	0.1554	
9°	0.1584	0.1614	0.1644	0.1673	0.1703	0.1733	
10°	0.1763	0.1793	0.1823	0.1853	0.1883	0.1914	
11°	0.1944	0.1974	0.2004	0.2035	0.2065	0.2095	
12°	0.2126	0.2156	0.2186	0.2217	0.2247	0.2278	
13°	0.2309	0.2339	0.237	0.2401	0.2432	0.2462	
14°	0.2493	0.2524	0.2555	0.2586	0.2617	0.2648	
15°	0.2679	0.2711	0.2742	0.2773	0.2805	0.2836	
16°	0.2867	0.2899	0.2931	0.2962	0.2994	0.3026	
17°	0.3057	0.3089	0.3121	0.3153	0.3185	0.3217	
18°	0.3294	0.3281	0.3314	0.3346	0.3378	0.3411	
19°	0.3443	0.3476	0.3508	0.3541	0.3574	0.3607	
20°	0.364	0.3673	0.3706	0.3739	0.3772	0.3805	
21°	0.3839	0.3872	0.3906	0.3939	0.3973	0.4006	
22°	0.404	0.4074	0.4108	0.4142	0.4176	0.421	
23°	0.4245	0.4279	0.4314	0.4348	0.4383	0.4417	
24°	0.4452	0.4487	0.4522	0.4557	0.4592	0.4628	
25°	0.4663	0.4699	0.4734	0.477	0.4806	0.4841	
26°	0.4877	0.4913	0.495	0.4986	0.5022	0.5059	
27°	0.5095	0.5132	0.5169	0.5206	0.5243	0.528	
28°	0.5317	0.5354	0.5392	0.543	0.5467	0.5505	
29°	0.5543	0.5581	0.5619	0.5658	0.5696	0.5735	
30°	0.5774	0.5812	0.5851	0.589	0.593	0.5969	
31°	0.6009	0.6048	0.6088	0.6128	0.6168	0.6208	
32°	0.6249	0.6289	0.633	0.6371	0.6412	0.6453	
33°	0.6494	0.6536	0.6577	0.6619	0.6661	0.6703	
34°	0.6745	0.6787	0.683	0.6873	0.6916	0.6959	
35°	0.7002	0.7046	0.7089	0.7133	0.7177	0.7221	
36°	0.7265	0.731	0.7355	0.74	0.7445	0.749	
37°	0.7536	0.7581	0.7627	0.7673	0.772	0.7766	
38°	0.7813	0.786	0.7907	0.7954	0.8002	0.805	
39°	0.8098	0.8146	0.8195	0.8243	0.8292	0.8342	
40°	0.8391	0.8441	0.8491	0.8541	0.8591	0.8642	
41°	0.8693	0.8744	0.8796	0.8847	0.8899	0.8952	
42°	0.9004	0.9057	0.911	0.9163	0.9217	0.9271	
43°	0.9325	0.938	0.9435	0.949	0.9545	0.9601	
44°	0.9657	0.9713	0.977	0.9827	0.9884	0.9942	

Table of Natural Tangents		Minutes					
Degrees	Tangent		10'	20'	30'	40'	50'
45°	1	1.0058	1.0117	1.0176	1.0235	1.0295	
46°	1.0355	1.0416	1.0477	1.0538	1.0599	1.0661	
47°	1.0724	1.0786	1.085	1.0913	1.0977	1.1041	
48°	1.1106	1.1171	1.1237	1.1303	1.1369	1.1436	
49°	1.1504	1.1571	1.164	1.1708	1.1778	1.1847	
50°	1.1918	1.1988	1.2059	1.2131	1.2203	1.2276	
51°	1.2349	1.2423	1.2497	1.2572	1.2647	1.2723	
52°	1.2799	1.2876	1.2954	1.3032	1.3111	1.319	
53°	1.327	1.3351	1.3432	1.3514	1.3597	1.368	
54°	1.3764	1.3848	1.3934	1.4019	1.4106	1.4193	
55°	1.4281	1.437	1.446	1.455	1.4641	1.4733	
56°	1.4826	1.4919	1.5013	1.5108	1.5204	1.5301	
57°	1.5399	1.5497	1.5597	1.5697	1.5798	1.59	
58°	1.6003	1.6107	1.6212	1.6319	1.6426	1.6534	
59°	1.6643	1.6753	1.6864	1.6977	1.709	1.7205	
60°	1.7321	1.7437	1.7556	1.7675	1.7796	1.7917	
61°	1.804	1.8165	1.8291	1.8418	1.8546	1.8676	
62°	1.8807	1.894	1.9074	1.921	1.9347	1.9486	
63°	1.9626	1.9768	1.9912	2.0057	2.0204	2.0353	
64°	2.0503	2.0655	2.0809	2.0965	2.1123	2.1283	
65°	2.1445	2.1609	2.1775	2.1943	2.2113	2.2286	
66°	2.246	2.2637	2.2817	2.2998	2.3183	2.3369	
67°	2.3559	2.375	2.3945	2.4142	2.4342	2.4545	
68°	2.4751	2.496	2.5172	2.5386	2.5605	2.5826	
69°	2.6051	2.6279	2.6511	2.6746	2.6985	2.7228	
70°	2.7475	2.7725	2.798	2.8239	2.8502	2.877	
71°	2.9042	2.9319	2.96	2.9887	3.0178	3.0475	
72°	3.0777	3.1084	3.1397	3.1716	3.2041	3.2371	
73°	3.2709	3.3052	3.3402	3.3759	3.4124	3.4495	
74°	3.4874	3.5261	3.5656	3.6059	3.647	3.6891	
75°	3.7321	3.776	3.8208	3.8667	3.9136	3.9617	
76°	4.0108	4.0611	4.1126	4.1653	4.2193	4.2747	
77°	4.3315	4.3897	4.4494	4.5107	4.5736	4.6382	
78°	4.7046	4.7729	4.843	4.9152	4.9894	5.0658	
79°	5.1446	5.2257	5.3093	5.3955	5.4845	5.7764	
80°	5.6713	5.7694	5.8708	5.9758	6.0844	6.197	
81°	6.3138	6.4348	6.5606	6.6912	6.8269	6.9682	
82°	7.1154	7.2687	7.4287	7.5958	7.7704	7.953	
83°	8.1443	8.345	8.5555	8.7769	9.0098	9.2553	
84°	9.5144	9.7882	10.078	10.3854	10.7119	11.0594	
85°	11.4301	11.8262	12.2505	12.7062	13.1969	13.7267	
86°	14.3007	14.9244	15.6048	16.3499	17.1693	18.075	
87°	19.0811	20.2056	21.4704	22.9038	24.5418	26.4316	
88°	28.6363	31.2416	34.3678	38.11885	42.9641	49.1039	
89°	57.29	68.7501	85.9398	114.5887	171.8854	343.773	

Cosines		Minutes					
Degrees	Cosine	10'	20'	30'	40'	50'	
0°	1	0.999996	0.999983	0.999962	0.999932	0.999894	
1°	0.999848	0.99979	0.99973	0.99966	0.99958	0.99949	
2°	0.99939	0.99929	0.99917	0.99905	0.99892	0.99877	
3°	0.9986	0.9985	0.9983	0.9981	0.998	0.9978	
4°	0.9976	0.9974	0.9971	0.9969	0.9967	0.9964	
5°	0.9962	0.9959	0.9957	0.9954	0.9951	0.9948	
6°	0.9945	0.9942	0.9939	0.9936	0.9932	0.9929	
7°	0.9925	0.9922	0.9918	0.9914	0.9911	0.9907	
8°	0.9903	0.9899	0.9894	0.989	0.9886	0.9881	
9°	0.9877	0.9872	0.9868	0.9863	0.9857	0.9853	
10°	0.9848	0.9843	0.9838	0.9833	0.9827	0.9822	
11°	0.9816	0.9811	0.9805	0.9799	0.9793	0.9787	
12°	0.9781	0.9775	0.9769	0.9763	0.9757	0.975	
13°	0.9744	0.9737	0.973	0.9724	0.9717	0.971	
14°	0.9703	0.9696	0.9689	0.9681	0.9674	0.9667	
15°	0.9659	9652	0.9644	0.9636	0.9628	0.9621	
16°	0.9613	0.9605	0.9596	0.9588	0.958	0.9572	
17°	0.9563	0.9555	0.9546	0.9537	0.9528	0.952	
18°	9511	0.9502	0.9492	0.9483	0.9474	0.9465	
19°	0.9455	0.9446	0.9436	0.9426	0.9417	0.9407	
20°	0.9397	0.9387	0.9377	0.9367	0.9356	0.9346	
21°	0.9336	0.9325	0.9315	0.9304	0.9293	0.9283	
22°	0.9272	0.9261	0.925	0.9239	0.9228	0.9216	
23°	0.9205	0.9194	0.9182	0.9171	0.9159	0.9147	
24°	0.9135	0.9124	0.9112	0.9135	0.9088	0.9075	
25°	0.9063	0.9051	0.9038	0.9026	0.9013	0.9001	
26°	0.8988	0.8975	0.8962	0.8949	0.8936	0.8923	
27°	0.891	0.8897	0.8884	0.887	0.8857	0.8843	
28°	0.8829	0.8816	0.8802	0.8788	0.8774	0.876	
29°	0.8746	0.8732	0.8718	0.8704	0.8689	0.8675	
30°	0.866	0.8646	0.8631	0.8616	0.8601	0.8587	
31°	0.8572	0.8557	0.8542	0.8526	0.8511	0.8496	
32°	0.848	0.8465	0.845	0.8434	0.8418	0.8403	
33°	0.8387	0.8371	0.8355	0.8339	0.8323	0.8307	
34°	0.829	0.8274	0.8258	0.8241	0.825	0.8208	
35°	0.8192	0.8175	0.8158	0.8141	0.8124	0.8107	
36°	0.809	0.8073	0.8056	0.8039	0.8021	0.8004	
37°	0.9786	0.7969	0.7951	0.7934	0.7916	0.7898	
38°	0.788	0.7862	0.7844	0.7826	0.7807	0.779	
39°	0.7771	0.7753	0.7735	0.7716	0.7698	0.7679	
40°	0.766	0.7642	0.7623	0.7604	0.7585	0.7566	
41°	0.7547	0.7528	0.7509	0.749	0.747	0.7451	
42°	0.7431	0.7412	0.7392	0.7373	0.7353	0.7333	
43°	0.7314	0.7294	0.7274	0.7254	0.7234	0.7214	
44°	0.7193	0.7173	0.7153	0.7133	0.7112	0.7092	

Cosines		Minutes					
Degrees	Cosine	10'	20'	30'	40'	50	
45°	0.7071	0.705	0.703	0.7009	0.6988	0.6967	
46°	0.6947	0.6926	0.6905	0.6884	0.6862	0.6841	
47°	0.682	0.6799	0.6777	0.6756	0.6734	0.6713	
48°	0.6691	0.667	0.6648	0.6626	0.6604	0.6583	
49°	0.6561	0.6539	0.6517	0.6494	0.6472	0.645	
50°	0.6428	0.6406	0.6383	0.6361	0.6338	0.6316	
51°	0.6293	0.6271	0.6248	0.6225	0.6202	0.618	
52°	0.6157	0.6134	0.6111	0.6088	0.6065	0.6041	
53°	0.6018	0.5995	0.5972	0.5948	0.5925	0.5901	
54°	0.5878	0.5854	0.5831	0.5807	0.5783	0.576	
55°	0.5736	0.5712	0.5688	0.5664	0.564	0.5616	
56°	0.5592	0.5568	0.5544	0.5519	0.5495	0.5471	
57°	0.5446	0.5422	0.5398	0.5373	0.5348	0.5324	
58°	0.5299	0.5275	0.525	0.5225	0.52	0.5175	
59°	0.515	0.5125	0.51	0.5075	0.505	0.5025	
60°	0.5	0.4975	0.495	0.4924	0.4899	0.4874	
61°	0.4848	0.4823	0.4797	0.4772	0.4746	0.472	
62°	0.4695	0.4669	0.4643	0.4617	0.4592	0.4566	
63°	0.454	0.4514	0.4488	0.4432	0.4436	0.441	
64°	0.4384	0.4358	0.4331	0.4305	0.4279	0.4253	
65°	0.4226	0.42	0.4173	0.4147	0.412	0.4094	
66°	0.4067	0.4041	0.4014	0.3987	0.3961	0.3934	
67°	0.3907	0.3881	0.3854	0.3827	0.38	0.3773	
68°	0.3746	0.3719	0.3692	0.3665	0.3638	0.3611	
69°	0.3584	0.3557	0.3529	0.3502	0.3475	0.3448	
70°	0.342	0.3393	0.3365	0.3338	0.3311	0.3283	
71°	0.3256	0.3228	0.3201	0.3173	0.3145	0.3118	
72°	0.309	0.3062	0.3035	0.3007	0.2979	0.2952	
73°	0.2924	0.2896	0.2868	0.284	0.2812	0.2784	
74°	0.2756	0.2728	0.27	0.2672	0.2644	0.2616	
75°	0.2588	0.256	0.2532	0.2504	0.2476	0.2447	
76°	0.2419	0.2391	0.2363	0.2334	0.2306	0.2278	
77°	0.225	0.2221	0.2193	0.2164	0.2136	0.2108	
78°	0.2079	0.2051	0.2022	0.1994	0.1965	0.1937	
79°	0.1908	0.188	0.1851	0.1822	0.1794	0.1765	
80°	0.1736	0.1708	0.1679	0.165	0.1622	0.1593	
81°	0.1564	0.1536	0.1507	0.1478	0.1449	0.1421	
82°	0.1392	0.1363	0.1334	0.1305	0.1276	0.1248	
83°	0.1219	0.119	0.1161	0.1132	0.1103	0.1074	
84°	0.1045	0.1016	0.0987	0.0958	0.0929	0.0901	
85°	0.0872	0.0843	0.0814	0.0785	0.0756	0.0727	
86°	0.0698	0.0669	0.064	0.061	0.0581	0.0552	
87°	0.0523	0.0484	0.0465	0.0436	0.0407	0.0387	
88°	0.0349	0.032	0.0291	0.0262	0.0233	0.0204	
89°	0.0175	0.0145	0.0116	0.0087	0.0058	0.0029	

Table of Natural Sines		Minutes				
Degrees	Sine	10'	20'	30'	40'	50'
0°	0	0.0029	0.0058	0.0087	0.0116	0.0145
1°	0.0175	0.0204	0.0233	0.0262	0.0291	0.032
2°	0.0349	0.0378	0.0407	0.0436	0.0465	0.0494
3°	0.0523	0.0552	0.0581	0.061	0.064	0.0669
4°	0.0698	0.0727	0.0756	0.0785	0.0814	0.0843
5°	0.0872	0.0901	0.0929	0.0958	0.0987	0.1016
6°	0.1045	0.1074	0.1103	0.1132	0.1161	0.119
7°	0.1219	0.1248	0.1276	0.1305	0.1334	0.1363
8°	0.1392	0.1412	0.1449	0.1478	0.1507	0.1536
9°	0.1564	0.1593	0.1622	0.165	0.1679	0.1708
10°	0.1736	0.1765	0.1794	0.1822	0.1851	0.188
11°	0.1908	0.1937	0.1965	0.1994	0.2022	0.2051
12°	0.2079	0.2108	0.2136	0.2164	0.2193	0.2221
13°	0.225	0.2278	0.2306	0.2334	0.2363	0.2391
14°	0.2419	0.2447	0.2476	0.2504	0.2532	0.256
15°	0.2588	0.2616	0.2644	0.2672	0.27	0.2728
16°	0.2756	0.2784	0.2812	0.284	0.2868	0.2896
17°	0.2924	0.2952	0.2979	0.3007	0.3035	0.3062
18°	0.309	0.3118	0.3145	0.3173	0.3201	0.3228
19°	0.3256	0.3283	0.3311	0.3338	0.3365	0.3393
20°	0.342	0.3448	0.3475	0.3502	0.3529	0.3557
21°	0.3584	0.3611	0.3638	0.3665	0.3692	0.3719
22°	0.3746	0.3773	0.38	0.3827	0.3854	0.3881
23°	0.3907	0.3934	0.3961	0.3987	0.4014	0.4041
24°	0.4067	0.4094	0.412	0.4147	0.4173	0.42
25°	0.4226	0.4253	0.4279	0.4305	0.4331	0.4358
26°	0.4384	0.441	0.4436	0.4462	0.4488	0.4514
27°	0.454	0.4566	0.4592	0.4617	0.4643	0.4669
28°	0.4695	0.472	0.4746	0.4772	0.4797	0.4823
29°	0.4848	0.4874	0.4899	0.4924	0.495	0.4975
30°	0.5	0.5025	0.505	0.5075	0.51	0.5125
31°	0.515	0.5175	0.52	0.5225	0.525	0.5275
32°	0.5299	0.5324	0.5348	0.5373	0.5398	0.5422
33°	0.5446	0.5471	0.5495	0.5519	0.5544	0.5568
34°	0.5592	0.5616	0.564	0.5664	0.5688	0.5712
35°	0.5736	0.576	0.5783	0.5807	0.5831	0.5854
36°	0.5878	0.5901	0.5925	0.5948	0.5972	0.5995
37°	0.6018	0.6041	0.6065	0.6088	0.6111	0.6134
38°	0.6157	0.618	0.6202	0.6225	0.6248	0.6271
39°	0.6293	0.6316	0.6338	0.6361	0.6383	0.6406
40°	0.6428	0.645	0.6472	0.6494	0.6517	0.6539
41°	0.6561	0.6583	0.6604	0.6626	0.6648	0.667
42°	0.6691	0.6713	0.6734	0.6756	0.6777	0.6799
43°	0.682	0.6841	0.6862	0.6884	0.6905	0.6926
44°	0.6947	0.6967	0.6988	0.7009	0.703	0.705

Table of Natural Sines		Minutes				
Degrees	Sine	10'	20'	30'	40'	50'
45°	0.7071	0.7092	0.7112	0.7133	0.7153	0.7173
46°	0.7193	0.7214	0.7234	0.7254	0.6905	0.7294
47°	0.7314	0.7333	0.7353	0.7373	0.7392	0.7412
48°	0.7431	0.7451	0.747	0.749	0.7509	0.7528
49°	0.7547	0.7566	0.7585	0.7604	0.7623	0.7642
50°	0.766	0.7697	0.7698	0.7075	0.7735	0.7753
51°	0.7771	0.779	0.7808	0.7826	0.7844	0.7862
52°	0.778	0.7898	0.7916	0.7934	0.7951	0.7969
53°	0.7986	0.8004	0.7021	0.7039	0.7056	0.7969
54°	0.809	0.8107	0.8124	0.8141	0.8158	0.8175
55°	0.8192	0.8208	0.8225	0.8241	0.8258	0.8274
56°	0.829	0.8307	0.8323	0.8339	0.8355	0.8371
57°	0.8387	0.8403	0.8418	0.8434	0.845	0.8465
58°	0.848	0.8496	0.8511	0.8526	0.8542	0.8557
59°	0.8572	0.8587	0.8601	0.8616	0.8631	0.8646
60°	0.866	0.8675	0.8689	0.8704	0.8718	0.8732
61°	0.8746	0.876	0.8774	0.8788	0.8802	0.8816
62°	0.8829	0.8843	0.8857	0.887	0.8884	0.8897
63°	0.891	0.8923	0.8936	0.8949	0.8962	0.8975
64°	0.8988	0.9001	0.9013	0.9026	0.9038	0.9051
65°	0.9063	0.9075	0.9088	0.91	0.9112	0.9124
66°	0.9135	0.9147	0.9159	0.9171	0.9182	0.9194
67°	0.9205	0.9216	0.9228	0.9239	0.925	0.9261
68°	0.9272	0.9283	0.9293	0.9304	0.9315	0.9325
69°	0.9336	0.9346	0.9356	0.9367	0.9377	0.9387
70°	0.9397	0.9407	0.9417	0.9426	0.9436	0.9446
71°	0.9455	0.9465	0.9474	0.9483	0.9492	0.9502
72°	0.9511	0.952	0.9528	0.9537	0.9546	0.9555
73°	0.9563	0.9572	0.958	0.9588	0.9596	0.9605
74°	0.9613	0.9621	0.9628	0.9636	0.9644	0.9652
75°	0.9659	0.9667	0.9674	0.9681	0.9689	0.9696
76°	0.9703	0.971	0.9717	0.9724	0.973	0.9737
77°	0.9744	0.975	0.9757	0.9763	0.9769	0.9775
78°	0.9781	0.9787	0.9793	0.9799	0.9805	0.9811
79°	0.9816	0.9822	0.9827	0.9833	0.9838	0.9843
80°	0.9848	0.9853	0.9858	0.9863	0.9868	0.9872
81°	0.9877	0.9881	0.9886	0.989	0.9894	0.9899
82°	0.9903	0.9907	0.9911	0.9914	0.9918	0.9922
83°	0.9925	0.9929	0.9932	0.9936	0.9939	0.9942
84°	0.9945	0.9948	0.9951	0.9954	0.9957	0.9959
85°	0.9962	0.9964	0.9967	0.9969	0.9971	0.9974
86°	0.9976	0.9978	0.998	0.9981	0.9983	0.9985
87°	0.9986	0.9988	0.9989	0.999	0.99917	0.99928
88°	0.99939	0.99949	0.999577	0.999657	0.999729	0.999793
89°	0.999848	0.999894	0.999932	0.999962	0.999983	0.999996