

4670

ZAKŁAD GEODEZJI NIŻSZEJ II POLITECHNIKI WARSZAWSKIEJ
I GEODEZYJNY INSTYTUT NAUKOWO-BADAWCZY

STEFAN HAUSBRANDT

TABLICE WARTOŚCI FUNKCJI
TRYGONOMETRYCZNYCH
SINUS i COSINUS

DO OBLICZANIA MASZYNOWEGO W ODSĘPACH CO 10"

NAŚLADOWNICTWO UKŁADU ZASTRZEGA SIĘ

WARSZAWA 1952

PAŃSTWOWE PRZEDSIĘBIORSTWO WYDAWNICTW KARTOGRAFICZNYCH

4670

STEFAN HAUSBRANDT

TABLICE WARTOŚCI FUNKCJI
TRYGONOMETRYCZNYCH
SINUS i COSINUS

DO OBLICZANIA MASZYNOWEGO

GEODEZYJNY INSTYTUT
NAUKOWO-BADAWCZY
BIBLIOTeka
NR. INW. *963-401*

WARSZAWA 1952

PAŃSTWOWE PRZEDSIĘBIORSTWO WYDAWNICTW KARTOGRAFICZNYCH



P.P.W.K. — Zam. nr 28 — nakład 1111
Obj. 3 1/2 ark. Pap. druk. sat. V kl. 80 g A1
Podpisano do druku 20. II. 1952 roku
Druk ukończono dnia 26. IV. 1952 roku
Redaktor techn.: KOŁODZIEJSKI WŁ.

W S T Ę P

Celem *Tablic* jest przyspieszenie i ułatwienie rachunków w pracach poligonizacyjnych o średniej i wyższej dokładności, tj. w pracach, w których kąty osiowe („azymuty”) wykazuje się z dokładnością rzędu 30'', 20'', 10'', lub większą.

Tablice podają bezpośrednio wartości funkcji trygonometrycznych $\sin$ i $\cos$ od 0° do 90° w przedziałach 10'', co czyni zbędnym posilkowanie się tabelkami interpolacyjnymi. Umieszczenie dużego materiału cyfrowego na 23 stronach osiągnięto dzięki grupowaniu liczb w grupach o niejednakowej liczebności.

Szukając wartości $\sin$ i $\cos$ dla danego kąta należy w tablicy, w nagłówku której podano stopnie danego kąta odszukać kolumnę, w nagłówku której podano dziesiątki minut, po czym szukając wzdłuż kolumny, odnaleźć liczbę minut danego kąta. Liczba minut danego kąta stanowi nagłówek tabliczki, w której dla sekund, wyszczególnionych w lewej lub prawej kolumnie brzegowej, odszukujemy wartości funkcji $\sin$ i $\cos$. Dwie pierwsze cyfry każdej funkcji poprzedzone dużą kropką, zastępującą zero i kropkę dziesiętną, umieszczono ponad odnośnymi grupami trzycyfrowymi każdej tabliczki.

Lewą kolumną brzegową posługujemy się jak zawsze przy wejściu od góry tablicy, prawą kolumną brzegową przy wejściu od dołu.

Tak np. dla kąta $16^\circ 12' 50''$ w tablicy 16° , kolumnie 10', tabliczce 12' według liczby sekund 50'' w lewej kolumnie brzegowej znajdziemy: $\sin .27922$ i $\cos .96023$.

Dla kąta $73^\circ 25' 40''$ w tablicy 73° (wejście od dołu), kolumnie 20', tabliczce 25', według liczby sekund 40'' w prawej kolumnie brzegowej, znajdziemy: $\sin .95846$ i $\cos .28522$.

Interpolowanie wartości funkcji dla poszczególnych sekund, choć bardzo mało kłopotliwe (najwyższa różnica tablicowa wynosi 0.00005), nie jest celowe. Biorąc poprostu średnie wartości funkcji, odpowiadających

sąsiadującym wartościom argumentu, popełnimy w najgorszym razie błąd rzędu ± 2 mm na 100 m, który dla poligonizacji o średniej i wyższej dokładności pozbawiony jest i realnego i rachunkowego znaczenia.

Poligonizacja o dokładności najwyższej, traktująca milimetry jako wielkości realne, musi się posługiwać rachunkiem sześciocyfrowym.

W razie potrzeby wyznaczenia kąta osiowego z wartości przyrostów pamiętać należy o obowiązującej zasadzie ogólnej: posługiwać się tą wartością funkcji, która w otoczeniu szukanej wartości kąta szybciej ulega zmianie, tzn. mniejszą z wartości bezwzględnych obu funkcji. Tak np. dla przyrostów: $\Delta X = 17.85$ i $\Delta Y = 102.47$ tzn. $l = \sqrt{17.85^2 + 102.47^2} = 104.01$, należy określić wartości kąta osiowego z cosinusa: $\frac{17.85}{104.01} = 0.17162$. Znajdziemy $80^\circ 07' 04''$.

Określenie kąta z większego przyrostu (w naszym wypadku z sinusa) służyć może oczywiście jako kontrola.

Niniejsze *Tablice* powstały w wyniku współpracy Zakładu Geodezji Niższej II Politechniki Warszawskiej i Geodezyjnego Instytutu Naukowo-Badawczego przy Głównym Urzędzie Pomiarów Kraju. (Koncepcja i kierownictwo — Stefan Hausbrandt, zgrupowanie materiału — Stanisław Kasperek, maszynopis i opracowanie graficzne — Jerzy Fellmann).

Obrana forma wydawnictwa — litografia z maszynopisu — choć mniej efektowna pod względem graficznym od składu, łatwiej i taniej pozwoliła zrealizować tak konieczną w wydawnictwach tabelarycznych bezbłądność tekstu cyfrowego.

2°															
°	Sin		Cos		Tan		Cot		Sec		Csc		Stn		°
	0'	10'	20'	30'	40'	50'	60'	70'	80'	90'	0'	10'	20'	30'	
0	.03	.99	.03	.99	.04	.99	.04	.99	.04	.99	.04	.99	.04	.99	60
10	.490	.939	.781	.929	.071	.917	.362	.905	.653	.692	.943	.878	.04	.99	50
20	.495	.939	.785	.928	.076	.917	.367	.905	.657	.691	.948	.878	.04	.99	40
30	.500	.939	.790	.928	.081	.917	.372	.904	.662	.691	.953	.877	.04	.99	30
40	.504	.939	.795	.928	.086	.916	.376	.904	.667	.691	.958	.877	.04	.99	20
50	.509	.938	.800	.928	.091	.916	.381	.904	.672	.691	.962	.877	.04	.99	10
60	.514	.938	.805	.928	.096	.916	.386	.904	.677	.691	.967	.877	.04	.99	0
70	.519	.938	.810	.927	.100	.916	.391	.904	.682	.690	.972	.876	.04	.99	60
80	.524	.938	.815	.927	.105	.916	.396	.903	.686	.690	.977	.876	.04	.99	50
90	.529	.938	.819	.927	.110	.916	.401	.903	.691	.689	.982	.876	.04	.99	40
100	.534	.938	.824	.927	.115	.915	.406	.903	.696	.689	.987	.876	.04	.99	30
110	.538	.937	.829	.927	.120	.915	.410	.903	.701	.689	.992	.875	.04	.99	20
120	.543	.937	.834	.926	.125	.915	.415	.902	.706	.689	.996	.875	.04	.99	10
130	.548	.937	.839	.926	.129	.915	.420	.902	.711	.689	.999	.875	.04	.99	0
140	.553	.937	.844	.926	.134	.914	.425	.902	.716	.689	.999	.875	.04	.99	60
150	.558	.937	.848	.926	.139	.914	.430	.902	.721	.689	.999	.875	.04	.99	50
160	.563	.937	.853	.926	.144	.914	.435	.902	.726	.689	.999	.875	.04	.99	40
170	.567	.936	.858	.926	.149	.914	.439	.901	.731	.689	.999	.875	.04	.99	30
180	.572	.936	.863	.925	.154	.914	.444	.901	.736	.689	.999	.875	.04	.99	20
190	.577	.936	.868	.925	.158	.914	.449	.901	.741	.689	.999	.875	.04	.99	10
200	.582	.936	.873	.925	.163	.913	.454	.901	.746	.689	.999	.875	.04	.99	0
210	.587	.936	.878	.925	.168	.913	.459	.901	.751	.689	.999	.875	.04	.99	60
220	.592	.935	.883	.925	.173	.913	.464	.900	.756	.689	.999	.875	.04	.99	50
230	.597	.935	.887	.924	.178	.913	.468	.900	.761	.689	.999	.875	.04	.99	40
240	.601	.935	.892	.924	.183	.912	.473	.900	.766	.689	.999	.875	.04	.99	30
250	.606	.935	.897	.924	.188	.912	.478	.900	.771	.689	.999	.875	.04	.99	20
260	.611	.935	.902	.924	.192	.912	.483	.900	.776	.689	.999	.875	.04	.99	10
270	.616	.935	.907	.924	.197	.912	.488	.900	.781	.689	.999	.875	.04	.99	0
280	.621	.934	.911	.923	.202	.912	.493	.900	.786	.689	.999	.875	.04	.99	60
290	.626	.934	.916	.923	.207	.911	.498	.900	.791	.689	.999	.875	.04	.99	50
300	.631	.934	.921	.923	.212	.911	.502	.900	.796	.689	.999	.875	.04	.99	40
310	.636	.934	.926	.923	.217	.911	.507	.900	.801	.689	.999	.875	.04	.99	30
320	.641	.934	.931	.923	.222	.911	.512	.900	.806	.689	.999	.875	.04	.99	20
330	.646	.934	.936	.923	.227	.911	.517	.900	.811	.689	.999	.875	.04	.99	10
340	.651	.934	.941	.923	.232	.910	.522	.900	.816	.689	.999	.875	.04	.99	0
350	.656	.933	.946	.923	.237	.910	.527	.900	.821	.689	.999	.875	.04	.99	60
360	.661	.933	.951	.923	.242	.910	.532	.900	.826	.689	.999	.875	.04	.99	50
370	.666	.933	.956	.923	.247	.910	.537	.900	.831	.689	.999	.875	.04	.99	40
380	.671	.933	.961	.923	.252	.910	.542	.900	.836	.689	.999	.875	.04	.99	30
390	.676	.933	.966	.923	.257	.910	.547	.900	.841	.689	.999	.875	.04	.99	20
400	.681	.933	.971	.923	.262	.910	.552	.900	.846	.689	.999	.875	.04	.99	10
410	.686	.933	.976	.923	.267	.910	.557	.900	.851	.689	.999	.875	.04	.99	0
420	.691	.933	.981	.923	.272	.910	.562	.900	.856	.689	.999	.875	.04	.99	60
430	.696	.933	.986	.923	.277	.910	.567	.900	.861	.689	.999	.875	.04	.99	50
440	.701	.933	.991	.923	.282	.910	.572	.900	.866	.689	.999	.875	.04	.99	40
450	.706	.933	.996	.923	.287	.910	.577	.900	.871	.689	.999	.875	.04	.99	30
460	.711	.933	.999	.923	.292	.910	.582	.900	.876	.689	.999	.875	.04	.99	20
470	.716	.933	.999	.923	.297	.910	.587	.900	.881	.689	.999	.875	.04	.99	10
480	.721	.933	.999	.923	.302	.910	.592	.900	.886	.689	.999	.875	.04	.99	0
490	.726	.933	.999	.923	.307	.910	.597	.900	.891	.689	.999	.875	.04	.99	60
500	.731	.933	.999	.923	.312	.910	.602	.900	.896	.689	.999	.875	.04	.99	50
510	.736	.933	.999	.923	.317	.910	.607	.900	.901	.689	.999	.875	.04	.99	40
520	.741	.933	.999	.923	.322	.910	.612	.900	.906	.689	.999	.875	.04	.99	30
530	.746	.933	.999	.923	.327	.910	.617	.900	.911	.689	.999	.875	.04	.99	20
540	.751	.933	.999	.923	.332	.910	.622	.900	.916	.689	.999	.875	.04	.99	10
550	.756	.933	.999	.923	.337	.910	.627	.900	.921	.689	.999	.875	.04	.99	0
560	.761	.933	.999	.923	.342	.910	.632	.900	.926	.689	.999	.875	.04	.99	60
570	.766	.933	.999	.923	.347	.910	.637	.900	.931	.689	.999	.875	.04	.99	50
580	.771	.933	.999	.923	.352	.910	.642	.900	.936	.689	.999	.875	.04	.99	40
590	.776	.933	.999	.923	.357	.910	.647	.900	.941	.689	.999	.875	.04	.99	30
600	.781	.933	.999	.923	.362	.910	.652	.900	.946	.689	.999	.875	.04	.99	20
610	.786	.933	.999	.923	.367	.910	.657	.900	.951	.689	.999	.875	.04	.99	10
620	.791	.933	.999	.923	.372	.910	.662	.900	.956	.689	.999	.875	.04	.99	0
630	.796	.933	.999	.923	.377	.910	.667	.900	.961	.689	.999	.875	.04	.99	60
640	.801	.933	.999	.923	.382	.910	.672	.900	.966	.689	.999	.875	.04	.99	50
650	.806	.933	.999	.923	.387	.910	.677	.900	.971	.689	.999	.875	.04	.99	40
660	.811	.933	.999	.923	.392	.910	.682	.900	.976	.689	.999	.875	.04	.99	30
670	.816	.933	.999	.923	.397	.910	.687	.900	.981	.689	.999	.875	.04	.99	20
680	.821	.933	.999	.923	.402	.910	.692	.900	.986	.689	.999	.875	.04	.99	10
690	.826	.933	.999	.923	.407	.910	.697	.900	.991	.689	.999	.875	.04	.99	0
700	.831	.933	.999	.923	.412	.910	.702	.900	.996	.689	.999	.875	.04	.99	60
710	.836	.933	.999	.923	.417	.910	.707	.900	.999	.689	.999	.875	.04	.99	50
720	.841	.933	.999	.923	.422	.910	.712	.900	.999	.689	.999	.875	.04	.99	40
730	.846	.933	.999	.923	.427	.910	.717	.900	.999	.689	.999	.875	.04	.99	30
740	.851	.933	.999	.923	.432	.910	.722	.900	.999	.689	.999	.875	.04	.99	20
750	.856	.933	.999	.923	.437	.910	.727	.900	.999	.689	.999	.875	.04	.99	10
760	.861	.933	.999	.923	.442	.910	.732	.900	.999	.689	.999	.875	.04	.99	0
770	.866	.933	.999	.923	.447	.910	.737	.900	.999	.689	.999	.875	.04	.99	60
780	.871	.933	.999	.923	.452	.910	.742	.900	.999	.689	.999	.875	.04	.99	50
790	.876	.933	.999	.923	.457	.910	.747	.900	.999	.689	.999	.875	.04	.99	40
800	.881	.933	.999	.923	.462	.910	.752	.900	.999	.689	.999	.875	.04	.99	30
810	.886	.933	.999	.923	.467	.910	.757	.900	.999	.689	.999	.875	.04	.99	20
820	.891	.933	.999	.923	.472	.910	.762	.900	.999	.689	.999	.875	.04	.99	10
830	.896	.933	.999	.923	.477	.910	.767	.900	.999	.689	.999	.875	.04	.99	0
840	.901	.933	.999	.923	.482	.910	.772	.900	.999	.689	.999	.875	.04	.99	60
850	.906	.933	.999	.923	.487	.910	.777	.900	.999	.689	.999	.875	.04	.99	50
860	.911	.933	.999	.923	.492	.910	.782	.900	.999	.689	.999	.875	.04	.99	40
870	.916	.933	.999	.923	.497	.910	.787	.900	.999	.689	.999	.875	.04	.99	30
880	.921	.933	.999	.923	.502	.910	.792	.900	.999	.689	.999	.875	.04	.99	20
890	.926	.933	.999	.923	.507	.910	.797	.900	.999	.689	.999	.875	.04	.99	10
900	.931	.933	.999	.923	.512	.910	.802	.900	.999	.689	.999	.875	.04	.99	0
910	.936	.933	.999	.923	.517	.910	.807	.900	.999	.689					

4°

°	Sine		Cosine		Sine		Cosine		Sine		Cosine		Sine		Cosine		Sine		Cosine	
	0'	10'	20'	30'	40'	50'	60'	70'	80'	90'	0'	10'	20'	30'	40'	50'	60'	70'	80'	90'
0	.06	.99	.07	.99	.07	.99	.07	.99	.08	.99	.08	.99	.08	.99	.08	.99	.08	.99	.08	.99
10	.976	.756	.266	.736	.556	.714	.846	.692	.136	.668	.426	.644	.60							
20	.980	.756	.271	.735	.561	.714	.851	.691	.141	.668	.431	.644	50							
30	.985	.756	.275	.735	.566	.713	.856	.691	.146	.668	.435	.644	40							
40	.990	.755	.280	.735	.570	.713	.860	.691	.150	.667	.440	.643	30							
50	.995	.755	.285	.734	.575	.713	.865	.690	.155	.667	.445	.643	20							
60													10							
70	.07	.99	.07	.99	.07	.99	.07	.99	.08	.99	.08	.99	0							
80	.000	.755	.290	.734	.580	.712	.870	.690	.160	.667	.450	.642	60							
90	.005	.754	.295	.734	.585	.712	.875	.689	.165	.666	.455	.642	50							
100	.01	.99	.07	.99	.07	.99	.07	.99	.08	.99	.08	.99	40							
110	.005	.754	.295	.734	.585	.712	.875	.689	.165	.666	.455	.642	30							
120	.010	.754	.300	.733	.590	.712	.880	.689	.170	.666	.460	.642	20							
130	.014	.754	.304	.733	.595	.711	.885	.689	.175	.665	.464	.641	10							
140	.019	.753	.309	.733	.599	.711	.889	.688	.179	.665	.469	.641	0							
150	.024	.753	.314	.732	.604	.710	.894	.688	.184	.665	.474	.640	60							
160	.029	.753	.319	.732	.609	.710	.899	.688	.189	.664	.479	.640	50							
170	.034	.752	.324	.731	.614	.710	.904	.687	.194	.664	.484	.639	40							
180													30							
190	.07	.99	.07	.99	.07	.99	.07	.99	.08	.99	.08	.99	20							
200	.034	.752	.324	.731	.614	.710	.904	.687	.194	.664	.484	.639	10							
210	.039	.752	.329	.731	.619	.709	.909	.687	.199	.663	.489	.639	0							
220	.043	.752	.333	.731	.624	.709	.914	.686	.204	.663	.493	.639	60							
230	.048	.751	.338	.730	.628	.709	.918	.686	.208	.663	.498	.638	50							
240	.053	.751	.343	.730	.633	.708	.923	.686	.213	.662	.503	.638	40							
250	.058	.751	.348	.730	.638	.708	.928	.685	.218	.662	.508	.637	30							
260	.063	.750	.353	.729	.643	.708	.933	.685	.223	.661	.513	.637	20							
270													10							
280	.07	.99	.07	.99	.07	.99	.07	.99	.08	.99	.08	.99	0							
290	.063	.750	.353	.729	.643	.708	.933	.685	.223	.661	.513	.637	60							
300	.068	.750	.358	.729	.648	.707	.938	.684	.228	.661	.518	.637	50							
310	.072	.750	.362	.729	.653	.707	.943	.684	.232	.661	.522	.636	40							
320	.077	.749	.367	.728	.657	.706	.947	.684	.237	.660	.527	.636	30							
330	.082	.749	.372	.728	.662	.706	.952	.683	.242	.660	.532	.635	20							
340	.087	.749	.377	.728	.667	.706	.957	.683	.247	.659	.537	.635	10							
350	.092	.748	.382	.727	.672	.705	.962	.683	.252	.659	.542	.635	0							
360													60							
370	.07	.99	.07	.99	.07	.99	.07	.99	.08	.99	.08	.99	50							
380	.092	.748	.382	.727	.672	.705	.962	.683	.252	.659	.542	.635	40							
390	.097	.748	.387	.727	.677	.705	.967	.682	.257	.659	.547	.634	30							
400	.101	.748	.392	.726	.682	.705	.972	.682	.262	.658	.551	.634	20							
410	.106	.747	.396	.726	.686	.704	.976	.681	.266	.658	.556	.633	10							
420	.111	.747	.401	.726	.691	.704	.981	.681	.271	.657	.561	.633	0							
430	.116	.746	.406	.725	.696	.703	.986	.681	.276	.657	.566	.632	60							
440	.121	.746	.411	.725	.701	.703	.991	.680	.281	.657	.571	.632	50							
450													40							
460	.07	.99	.07	.99	.07	.99	.07	.99	.08	.99	.08	.99	30							
470	.121	.746	.411	.725	.701	.703	.991	.680	.281	.657	.571	.632	20							
480	.126	.746	.416	.725	.706	.703	.996	.680	.286	.656	.576	.632	10							
490													0							
500	.07	.99	.07	.99	.07	.99	.07	.99	.08	.99	.08	.99	60							
510	.130	.745	.421	.724	.711	.702	.001	.679	.290	.656	.580	.631	50							
520	.135	.745	.425	.724	.715	.702	.005	.679	.295	.655	.585	.631	40							
530	.140	.745	.430	.724	.720	.702	.010	.679	.300	.655	.590	.630	30							
540	.145	.744	.435	.723	.725	.701	.015	.678	.305	.655	.595	.630	20							
550	.150	.744	.440	.723	.730	.701	.020	.678	.310	.654	.600	.630	10							
560													0							
570	.07	.99	.07	.99	.07	.99	.07	.99	.08	.99	.08	.99	60							
580	.150	.744	.440	.723	.730	.701	.020	.678	.310	.654	.600	.630	50							
590	.155	.744	.445	.722	.735	.700	.025	.678	.315	.654	.604	.629	40							
600	.159	.743	.450	.722	.740	.700	.030	.677	.319	.653	.609	.629	30							
610	.164	.743	.454	.722	.744	.700	.034	.677	.324	.653	.614	.628	20							
620	.169	.743	.459	.721	.749	.699	.039	.676	.329	.653	.619	.628	10							
630	.174	.742	.464	.721	.754	.699	.044	.676	.334	.652	.624	.627	0							
640	.179	.742	.469	.721	.759	.699	.049	.676	.339	.652	.629	.627	60							
650													50							
660	.07	.99	.07	.99	.07	.99	.07	.99	.08	.99	.08	.99	40							
670	.179	.742	.469	.721	.759	.699	.049	.676	.339	.652	.629	.627	30							
680	.184	.742	.474	.720	.764	.698	.054	.675	.344	.651	.633	.627	20							
690	.188	.741	.479	.720	.769	.698	.059	.675	.348	.651	.638	.626	10							
700	.193	.741	.483	.720	.773	.697	.063	.674	.353	.650	.643	.626	0							
710	.198	.741	.488	.719	.778	.697	.068	.674	.358	.650	.648	.625	60							
720	.203	.740	.493	.719	.783	.697	.073	.674	.363	.650	.653	.625	50							
730	.208	.740	.498	.719	.788	.696	.078	.673	.368	.649	.658	.625	40							
740													30							
750	.07	.99	.07	.99	.07	.99	.07	.99	.08	.99	.08	.99	20							
760	.208	.740	.498	.719	.788	.696	.078	.673	.368	.649	.658	.625	10							
770	.213	.740	.503	.718	.793	.696	.083	.673	.373	.649	.662	.624	0							
780	.217	.739	.508	.718	.798	.696	.088	.672	.377	.648	.667	.624	60							
790	.222	.739	.512	.717	.802	.695	.092	.672	.382	.648	.672	.623	50							
800	.227	.738	.517	.717	.807	.695	.097	.672	.387	.648	.677	.623	40							
810	.232	.738	.522	.717	.812	.694	.102	.671	.392	.647	.682	.622	30							
820	.237	.738	.527	.716	.817	.694	.107	.671	.397	.647	.687	.622	20							
830													10							
840	.07	.99	.07	.99	.07	.99	.07	.99	.08	.99	.08	.99	0							
850	.237	.738	.527	.716	.817	.694	.107	.671	.397	.647	.687	.622	60							
860	.242	.737	.532	.716	.822	.694	.112	.670	.402	.646	.691	.622	50							

6°															
°	Sin		Cos		Sin		Cos		Sin		Cos		Sin		Cos
	0'	10'	20'	30'	40'	50'	60'	70'	80'	90'	0'	10'	20'	30'	40'
0	.10	.99	.10	.99	.11	.99	.11	.99	.11	.99	.11	.99	.11	.99	.11
10	.453	.452	.742	.421	.031	.390	.320	.357	.609	.324	.898	.290	.60	.50	.40
20	.462	.451	.752	.420	.041	.389	.330	.356	.619	.323	.908	.288	40	30	20
30	.467	.451	.757	.420	.046	.388	.335	.356	.624	.322	.913	.288	30	20	10
40	.472	.450	.761	.419	.051	.388	.340	.355	.629	.322	.917	.287	20	10	0
50	.477	.450	.766	.419	.055	.387	.344	.354	.633	.321	.922	.287	10	0	
60	.482	.449	.771	.418	.060	.386	.349	.354	.638	.320	.927	.286	0		
70	.487	.449	.776	.418	.065	.386	.354	.353	.643	.320	.932	.286	60	50	40
80	.491	.448	.781	.417	.070	.385	.359	.353	.648	.319	.937	.285	40	30	20
90	.496	.448	.785	.417	.075	.385	.364	.352	.653	.319	.941	.284	30	20	10
100	.501	.447	.790	.416	.079	.384	.368	.352	.657	.318	.946	.284	20	10	0
110	.506	.447	.795	.416	.084	.384	.373	.351	.662	.318	.951	.283	10	0	
120	.511	.446	.800	.415	.089	.383	.378	.351	.667	.317	.956	.283	0		
130	.516	.446	.805	.415	.094	.383	.383	.350	.672	.316	.961	.282	60	50	40
140	.520	.445	.810	.414	.099	.382	.388	.349	.677	.316	.966	.282	40	30	20
150	.525	.445	.814	.414	.104	.382	.393	.349	.682	.315	.970	.281	30	20	10
160	.530	.444	.819	.413	.108	.381	.397	.348	.686	.315	.975	.280	20	10	0
170	.535	.444	.824	.412	.113	.381	.402	.348	.691	.314	.980	.280	10	0	
180	.540	.443	.829	.412	.118	.380	.407	.347	.696	.314	.985	.279	0		
190	.544	.443	.834	.411	.123	.379	.412	.347	.701	.313	.990	.279	60	50	40
200	.549	.442	.838	.411	.128	.379	.417	.346	.706	.313	.994	.278	40	30	20
210	.554	.442	.843	.410	.132	.378	.421	.346	.710	.312	.999	.277	30	20	10
220	.559	.441	.848	.410	.137	.378	.426	.345	.715	.311	.004	.277	20	10	0
230	.564	.440	.853	.409	.142	.377	.431	.344	.720	.311	.009	.276	10	0	
240	.569	.440	.858	.409	.147	.377	.436	.344	.725	.310	.014	.276	0		
250	.574	.439	.863	.408	.152	.376	.441	.343	.730	.310	.018	.275	60	50	40
260	.578	.439	.867	.408	.157	.376	.446	.343	.734	.309	.023	.275	40	30	20
270	.583	.438	.872	.407	.161	.375	.450	.342	.739	.309	.028	.274	30	20	10
280	.588	.438	.877	.407	.166	.375	.455	.342	.744	.308	.033	.273	20	10	0
290	.593	.437	.882	.406	.171	.374	.460	.341	.749	.307	.038	.273	10	0	
300	.597	.437	.887	.406	.176	.374	.465	.341	.754	.307	.043	.272	0		
310	.602	.436	.892	.405	.181	.373	.470	.340	.759	.306	.047	.272	60	50	40
320	.607	.436	.896	.405	.185	.372	.474	.340	.763	.306	.052	.271	40	30	20
330	.612	.435	.901	.404	.190	.372	.479	.339	.768	.305	.057	.270	30	20	10
340	.617	.435	.906	.404	.195	.371	.484	.338	.773	.305	.062	.270	20	10	0
350	.622	.434	.911	.403	.200	.371	.489	.337	.778	.304	.067	.269	10	0	
360	.626	.434	.916	.402	.205	.370	.494	.337	.783	.303	.071	.269	0		
370	.631	.433	.921	.402	.210	.370	.499	.337	.787	.303	.076	.268	60	50	40
380	.636	.433	.925	.401	.214	.369	.503	.336	.792	.302	.081	.268	40	30	20
390	.641	.432	.930	.401	.219	.369	.508	.336	.797	.302	.086	.267	30	20	10
400	.646	.432	.935	.400	.224	.368	.513	.335	.802	.301	.091	.266	20	10	0
410	.651	.431	.940	.400	.229	.368	.518	.334	.807	.301	.096	.266	10	0	
420	.655	.431	.945	.399	.234	.367	.523	.334	.812	.300	.100	.265	0		
430	.660	.430	.950	.399	.239	.366	.528	.333	.816	.299	.105	.265	60	50	40
440	.665	.430	.954	.398	.244	.366	.533	.333	.821	.299	.110	.264	40	30	20
450	.670	.429	.959	.398	.248	.365	.537	.332	.826	.298	.115	.263	30	20	10
460	.675	.429	.964	.397	.253	.365	.542	.332	.831	.298	.120	.263	20	10	0
470	.679	.428	.969	.397	.258	.364	.547	.331	.836	.297	.124	.262	10	0	
480	.684	.428	.973	.396	.263	.364	.552	.331	.840	.297	.129	.262	0		
490	.689	.427	.978	.396	.267	.363	.556	.330	.845	.296	.134	.261	60	50	40
500	.694	.427	.983	.395	.272	.363	.561	.329	.850	.295	.139	.261	40	30	20
510	.699	.426	.988	.394	.277	.362	.566	.329	.855	.295	.144	.260	30	20	10
520	.704	.426	.993	.394	.282	.362	.571	.328	.860	.294	.148	.259	20	10	0
530	.708	.425	.998	.393	.287	.361	.576	.328	.864	.294	.153	.259	10	0	
540	.713	.424	.002	.393	.291	.360	.580	.327	.869	.293	.158	.258	0		
550	.718	.424	.007	.392	.296	.360	.585	.327	.874	.293	.163	.258	60	50	40
560	.723	.423	.012	.392	.301	.359	.590	.326	.879	.292	.168	.257	40	30	20
570	.728	.423	.017	.391	.306	.359	.595	.326	.884	.291	.172	.256	30	20	10
580	.732	.422	.022	.391	.311	.358	.600	.325	.889	.291	.177	.256	20	10	0
590	.737	.422	.026	.390	.316	.358	.604	.324	.893	.290	.182	.255	10	0	
600	.742	.421	.031	.390	.320	.357	.609	.324	.898	.290	.187	.255	0		

7°																
°	Sin		Cos		Sin		Cos		Sin		Cos		Sin		Cos	
	0'	10'	20'	30'	40'	50'	60'	70'	80'	90'	0'	10'	20'	30'	40'	
0	.12	.99	.12	.99	.12	.99	.13	.99	.13	.99	.13	.99	.13	.99	.13	
10	.187	.255	.476	.219	.764	.182	.053	.144	.341	.106	.629	.067	60	50	40	
20	.192	.254	.480	.218	.769	.181	.057	.144	.346	.105	.634	.066	50	40	30	
30	.197	.253	.485	.218	.774	.181	.062	.143	.351	.105	.639	.066	40	30	20	
40	.201	.253	.490	.217	.779	.180	.067	.143	.355	.104	.644	.065	30	20	10	
50	.206	.252	.495	.216	.783	.180	.072	.142	.360	.104	.649	.064	20	10	0	
60	.211	.252	.500	.216	.788	.179	.077	.141	.365	.103	.653	.063	10	0		
70	.216	.251	.504	.215	.793	.178	.081	.141	.370	.102	.658	.063	0			
80	.221	.250	.509	.215	.798	.178	.086	.140	.375	.102	.663	.062	60	50	40	
90	.225	.250	.514	.214	.803	.177	.091	.139	.379	.101	.668	.062	40	30	20	
100	.230	.249	.519	.213	.807	.176	.096	.139	.384	.100	.672	.061	30	20	10	
110	.235	.249	.524	.213	.812	.176	.101	.138	.389	.100	.677	.060	20	10	0	
120	.240	.248	.529	.212	.817	.175	.105	.138	.394	.099	.682	.060	10	0		
130	.245	.248	.533	.211	.822	.175	.110	.137	.399	.098	.687	.059	0			
140	.249	.247	.538	.211	.827	.174	.115	.136	.403	.098	.692	.058	60	50	40	
150	.254	.246	.543	.210	.831	.173	.120	.136	.408	.097	.696	.058	40	30	20	
160	.259	.245	.548	.210	.836	.173	.125	.135	.413	.096	.701	.057	30	20	10	
170	.264	.245	.553	.209	.841	.172	.130	.134	.418	.096	.706	.056	20	10	0	
180	.269	.245	.557	.208	.846	.171	.134	.134	.423	.095	.711	.056	10	0		
190	.274	.244	.562	.208	.851	.171	.139	.133	.427	.094	.716	.055	0			
200	.278	.243	.567	.207	.856	.170	.144	.132	.432	.094	.721	.055	60	50	40	
210	.283	.243	.572	.207	.860	.170	.149	.132	.437	.093	.725	.054	40	30	20	
220	.288	.242	.577	.206	.865	.169	.154	.131	.442	.092	.730	.053	30	20	10	
230	.293	.242	.581	.205	.870	.168	.158	.131	.447	.092	.735	.052	20	10	0	
240	.298	.241	.586	.205	.875	.168	.163	.130	.451	.091	.740	.052	10	0		
250	.302	.240	.591	.204	.880	.167	.168	.129	.456	.091	.744	.051	0			
260	.307	.240	.596	.204	.884	.166	.173	.129	.461	.090	.749	.051	60	50	40	
270	.312	.239	.601	.203	.889	.166	.178	.128	.466	.089	.754	.050	40	30	20	
280	.317	.239	.605	.202	.894	.165	.182	.127	.471	.089	.759	.049	30	20	10	
290	.322	.238	.610	.202	.899	.165	.187	.127	.475	.088	.764	.048	20	10	0	
300	.326	.237	.615	.201	.904	.164	.192	.126	.480	.087	.768	.048	10	0		
310	.331	.237	.620	.200	.908	.163	.197	.125	.485	.087	.773	.047	0			
320	.336	.236	.625	.200	.913	.163	.202	.125	.490	.086	.778	.046	60	50	40	
330	.341	.236	.630	.199	.918	.162	.206	.124	.495	.085	.783	.046	40	30	20	
340	.346	.235	.634	.199	.923	.161	.211	.123	.500	.085	.788	.045	30	20	10	
350	.351	.234	.639	.198	.928	.161	.216	.123	.504	.084	.792	.044	20	10	0	
360	.355	.234	.644	.197	.932	.160	.221	.122	.509	.083	.797	.044	10	0		
370	.360	.233	.649	.197	.937	.160	.226	.122	.514	.083	.802	.043	0			
380	.365	.233	.654	.196	.942	.159	.230	.121	.519	.082	.807	.042	60	50	40	
390	.370	.232	.658	.196	.947	.158	.235	.120	.524	.081	.812	.042	40	30	20	
400	.375	.231	.663	.195	.952	.158	.240	.120	.528	.081	.816	.041	30	20	10	
410	.379	.231	.668	.194	.956	.157	.245	.119	.533	.080	.821	.040	20	10	0	
420	.384	.230	.673	.194	.961	.156	.250	.118	.538	.079	.826	.040	10	0		
430	.389	.230	.678	.193	.966	.156	.254	.118	.543	.079	.831	.039	0			
440	.393	.229	.683	.193	.971	.155	.259	.117	.548	.078	.836	.038	60	50	40	
450	.398	.228	.687	.192	.976	.155	.264	.116	.552	.077	.840	.038	40	30	20	
460	.403	.228	.692	.191	.981	.154	.269	.116	.557	.077	.845	.037	30	20	10	
470	.408	.227	.697	.191	.985	.153	.274	.115	.562	.076	.850	.036	20	10	0	
480	.413	.227	.702	.190	.990	.153	.278	.114	.567	.075	.855	.036	10	0		
490	.418	.226	.706	.189	.995	.152	.283	.114	.572	.075	.860	.035	0			
500	.423	.225	.711	.188	.000	.151	.288	.113	.576	.074	.864	.034	60	50	40	
510	.428	.225	.716	.188	.005	.151	.293	.113	.581	.073	.869	.034	40	30	20	
520	.432	.224	.721	.188	.009	.150	.298	.112	.586	.073	.874	.033	30	20	10	
530	.437	.224	.726	.187	.014	.150	.303	.111	.591	.072	.879	.032	20	10	0	
540	.442	.223	.730	.186	.019	.149	.307	.111	.596	.071	.884	.032	10	0		
550	.447	.222	.735	.186	.024	.148	.312	.110	.600	.071	.888	.031	0			
560	.452	.221	.740	.185	.029	.148	.317	.109	.605	.070	.893	.030	60	50	40	
570	.456	.221	.745	.185	.033	.147	.322	.109	.610	.070	.898	.030	40	30	20	
580	.461	.221	.750	.184	.038	.146	.327	.108	.615	.069	.903	.029	30	20	10	
590	.466	.220	.755	.183	.043	.146	.331	.107	.620	.068	.908	.028	20	10	0	
600	.471	.219	.759	.183	.048	.145	.336	.107	.624	.068	.913	.027	10	0		
610	.476	.219	.764	.182	.053	.144	.341	.106	.629	.067	.917	.027	0			
620	.481	.218	.769	.181	.057	.144	.346	.105	.634	.066	.922	.026	60	50	40	
630	.486	.217	.774	.181	.062	.143	.351	.105	.639	.066	.927	.025	40	30	20	
640	.491	.217	.779	.180	.067	.143	.355	.104	.644	.065	.932	.024	30	20	10	
650	.496	.216	.783	.180	.072	.142	.360	.104	.649	.064	.937	.023	20	10	0	
660	.501	.216	.788	.179	.077	.141	.365	.103	.653	.063	.942	.022	10	0		
670	.506	.215	.793	.178	.081	.141	.370	.102	.658	.063	.947	.021	0			
680	.511	.215	.798	.178	.086	.140	.375	.102	.663	.062	.952	.020	60	50	40	
690	.516	.214	.803	.177	.091	.139	.379	.101	.668	.062	.957	.019	40	30	20	
700	.521	.213	.807	.176	.096	.139	.384	.100	.672	.061	.962	.018	30	20	10	
710	.526	.213	.812	.176	.101	.138	.389	.100	.677	.060	.967	.017	20	10	0	
720	.531	.212	.817	.175	.105	.138	.394	.099	.682	.059	.972	.016	10	0		
730	.536	.211	.822	.175	.110	.137	.399	.098	.687	.059	.977	.015	0			
740	.541	.211	.827	.174	.115	.136	.403	.098	.692	.058	.982	.014	60	50	40	
750	.546	.210	.831	.173	.120	.136	.408	.097	.696	.058	.987	.013	40	30	20	
760	.551	.210	.836	.173	.125	.135	.413	.096	.701	.057	.992	.012	30	20	10	
770	.556	.209	.841	.172	.130	.134	.418	.096	.706	.056	.997	.011	20	10	0	
780	.561	.208	.846	.171	.134	.134	.423	.095	.711	.056	.1002	.010	10	0		
790	.566	.208	.851	.171	.139	.133	.427	.094	.716	.055	.1007	.009	0			
800	.571	.207	.856	.170	.144	.132	.432	.094	.721	.055	.1012	.008	60	50	40	
810	.576	.207	.860	.170	.149	.132	.437	.093	.725	.054	.1017	.007	40	30	20	
820	.581	.206	.865	.169	.154	.131	.442	.092	.730	.053	.1022	.006	30	20	10	
830	.586	.205	.870	.168	.158	.131	.447	.092	.735	.052	.1027	.005	20	10	0	
840	.591	.205	.875	.168	.163	.130	.451	.091	.740	.052	.1032	.004	10	0		
850	.596	.204	.880	.167	.168	.129	.456	.091	.744	.051	.1037	.003	0			
860	.601	.204	.884	.166	.173	.129	.461	.090	.749	.051	.1042	.002	60	50	40	
870	.606	.203	.889	.166	.178	.128	.466	.089	.754	.050	.1047	.001	40	30	20	
880	.611	.203	.894	.165	.182	.127	.471	.089	.759	.049	.1052	.000	30	20	10	
890	.616	.202	.899	.165	.187	.127	.475	.088	.764	.048	.1057	.000	20	10	0	
900	.621	.201	.904	.164	.192	.126	.480	.087	.768	.048	.1062	.000	10	0		
910	.626	.200	.908	.163	.197	.125	.485	.087	.773	.047	.1067	.000	0			
920	.631	.200	.913	.163	.202	.125	.490	.086	.778	.046	.1072	.000	60	50	40	
930	.636	.200	.918	.162	.206	.124	.495	.085	.783	.046	.1077	.000	40	30	20	
940	.641	.200	.923	.161	.211	.123	.500	.085	.788	.045	.1082	.000	30	20	10	
950	.646	.200	.928	.161	.216	.123	.504	.084	.792	.044	.1087	.000				

10°

°	Sine		Cosine		Sine		Cosine		Sine		Cosine		Sine		Cosine		Sine		Cosine		°
	0'	10'	20'	30'	40'	50'	60'	70'	80'	90'	0'	10'	20'	30'	40'	50'	60'	70'	80'	90'	
0	.17	.98	.17	.98	.17	.98	.18	.98	.18	.98	.18	.98	.18	.98	.18	.98	.18	.98	.18	.98	60
10	.365	.481	.651	.430	.937	.378	.224	.325	.509	.272	.795	.218	.365	.481	.651	.430	.937	.378	.224	.325	50
20	.374	.479	.661	.428	.947	.376	.235	.324	.519	.270	.805	.216	.374	.479	.661	.428	.947	.376	.235	.324	40
30	.379	.478	.666	.427	.952	.375	.236	.323	.524	.269	.810	.215	.379	.478	.666	.427	.952	.375	.236	.323	30
40	.384	.477	.670	.426	.957	.375	.243	.322	.529	.268	.814	.214	.384	.477	.670	.426	.957	.375	.243	.322	20
50	.389	.477	.675	.426	.961	.374	.247	.321	.533	.268	.819	.213	.389	.477	.675	.426	.961	.374	.247	.321	10
60	.393	.476	.680	.425	.966	.373	.252	.320	.538	.267	.824	.212	.393	.476	.680	.425	.966	.373	.252	.320	0
70	.397	.475	.685	.424	.971	.372	.257	.319	.543	.266	.829	.211	.397	.475	.685	.424	.971	.372	.257	.319	60
80	.403	.474	.689	.423	.976	.371	.262	.318	.548	.265	.833	.211	.403	.474	.689	.423	.976	.371	.262	.318	50
90	.408	.473	.694	.422	.980	.370	.266	.318	.552	.264	.838	.210	.408	.473	.694	.422	.980	.370	.266	.318	40
100	.413	.472	.699	.421	.985	.369	.271	.317	.557	.263	.843	.209	.413	.472	.699	.421	.985	.369	.271	.317	30
110	.417	.472	.704	.420	.990	.368	.276	.316	.562	.262	.848	.208	.417	.472	.704	.420	.990	.368	.276	.316	20
120	.422	.471	.708	.420	.995	.368	.281	.315	.567	.261	.852	.207	.422	.471	.708	.420	.995	.368	.281	.315	10
130	.427	.470	.713	.419	.999	.367	.286	.314	.571	.260	.857	.206	.427	.470	.713	.419	.999	.367	.286	.314	0
140	.432	.469	.718	.418	.004	.366	.290	.313	.576	.259	.862	.205	.432	.469	.718	.418	.004	.366	.290	.313	60
150	.436	.468	.723	.417	.009	.365	.295	.312	.581	.258	.867	.204	.436	.468	.723	.417	.009	.365	.295	.312	50
160	.441	.467	.728	.416	.014	.364	.300	.311	.586	.257	.871	.203	.441	.467	.728	.416	.014	.364	.300	.311	40
170	.446	.466	.732	.415	.019	.363	.305	.310	.590	.257	.876	.202	.446	.466	.732	.415	.019	.363	.305	.310	30
180	.451	.466	.737	.414	.023	.362	.309	.310	.595	.256	.881	.201	.451	.466	.737	.414	.023	.362	.309	.310	20
190	.455	.465	.742	.413	.028	.361	.314	.309	.600	.255	.886	.200	.455	.465	.742	.413	.028	.361	.314	.309	10
200	.460	.464	.747	.413	.033	.361	.319	.308	.605	.254	.890	.200	.460	.464	.747	.413	.033	.361	.319	.308	0
210	.465	.463	.751	.412	.038	.360	.324	.307	.610	.253	.895	.199	.465	.463	.751	.412	.038	.360	.324	.307	60
220	.470	.462	.756	.411	.042	.359	.328	.306	.614	.252	.900	.198	.470	.462	.756	.411	.042	.359	.328	.306	50
230	.475	.461	.761	.410	.047	.358	.333	.305	.619	.251	.905	.197	.475	.461	.761	.410	.047	.358	.333	.305	40
240	.479	.460	.766	.409	.052	.357	.338	.304	.624	.250	.910	.196	.479	.460	.766	.409	.052	.357	.338	.304	30
250	.484	.460	.770	.408	.057	.356	.343	.303	.629	.250	.914	.195	.484	.460	.770	.408	.057	.356	.343	.303	20
260	.489	.459	.775	.408	.061	.355	.347	.302	.633	.249	.919	.194	.489	.459	.775	.408	.061	.355	.347	.302	10
270	.494	.458	.780	.407	.066	.354	.352	.302	.638	.248	.924	.193	.494	.458	.780	.407	.066	.354	.352	.302	0
280	.498	.457	.785	.406	.071	.353	.357	.301	.643	.247	.929	.192	.498	.457	.785	.406	.071	.353	.357	.301	60
290	.503	.456	.790	.405	.076	.352	.362	.300	.648	.246	.933	.191	.503	.456	.790	.405	.076	.352	.362	.300	50
300	.508	.455	.794	.404	.081	.352	.367	.299	.652	.245	.938	.190	.508	.455	.794	.404	.081	.352	.367	.299	40
310	.513	.455	.799	.403	.085	.351	.371	.298	.657	.244	.943	.189	.513	.455	.799	.403	.085	.351	.371	.298	30
320	.518	.454	.804	.402	.090	.350	.376	.297	.662	.243	.948	.189	.518	.454	.804	.402	.090	.350	.376	.297	20
330	.522	.453	.809	.401	.095	.349	.381	.296	.667	.242	.952	.188	.522	.453	.809	.401	.095	.349	.381	.296	10
340	.527	.452	.813	.401	.100	.348	.386	.295	.671	.241	.957	.187	.527	.452	.813	.401	.100	.348	.386	.295	0
350	.532	.451	.818	.400	.104	.348	.390	.294	.676	.241	.962	.186	.532	.451	.818	.400	.104	.348	.390	.294	60
360	.537	.450	.823	.399	.109	.347	.395	.294	.681	.240	.967	.185	.537	.450	.823	.399	.109	.347	.395	.294	50
370	.542	.449	.828	.398	.114	.346	.400	.293	.686	.239	.971	.184	.542	.449	.828	.398	.114	.346	.400	.293	40
380	.546	.449	.833	.397	.119	.345	.405	.292	.691	.238	.976	.183	.546	.449	.833	.397	.119	.345	.405	.292	30
390	.551	.448	.837	.397	.123	.344	.409	.291	.695	.237	.981	.182	.551	.448	.837	.397	.123	.344	.409	.291	20
400	.556	.447	.842	.396	.128	.343	.414	.290	.700	.236	.986	.181	.556	.447	.842	.396	.128	.343	.414	.290	10
410	.561	.446	.847	.395	.133	.342	.419	.289	.705	.235	.990	.180	.561	.446	.847	.395	.133	.342	.419	.289	0
420	.565	.445	.852	.394	.138	.341	.424	.288	.710	.234	.995	.179	.565	.445	.852	.394	.138	.341	.424	.288	60
430	.570	.444	.856	.393	.143	.340	.428	.287	.714	.233	.000	.178	.570	.444	.856	.393	.143	.340	.428	.287	50
440	.575	.444	.861	.392	.147	.340	.433	.286	.719	.232	.005	.177	.575	.444	.861	.392	.147	.340	.433	.286	40
450	.580	.443	.866	.391	.152	.339	.438	.286	.724	.231	.010	.177	.580	.443	.866	.391	.152	.339	.438	.286	30
460	.584	.442	.871	.390	.157	.338	.443	.285	.729	.231	.014	.176	.584	.442	.871	.390	.157	.338	.443	.285	20
470	.589	.441	.875	.389	.162	.337	.448	.284	.733	.230	.019	.175	.589	.441	.875	.389	.162	.337	.448	.284	10
480	.594	.440	.880	.388	.166	.336	.452	.283	.738	.229	.024	.174	.594	.440	.880	.388	.166	.336	.452	.283	0
490	.599	.439	.885	.388	.171	.335	.457	.282	.743	.228	.029	.173	.599	.439	.885	.388	.171	.335	.457	.282	60
500	.603	.438	.890	.387	.176	.334	.462	.281	.748	.227	.033	.172	.603	.438	.890	.387	.176	.334	.462	.281	50
510	.608	.438	.895	.386	.181	.333	.467	.280	.752	.226	.038	.171	.608	.438	.895	.386	.181	.333	.467	.280	40
520	.613	.437	.899	.385	.185	.333	.471	.279	.757	.225	.043	.170	.613	.437	.899	.385	.185	.333	.471	.279	30
530	.618	.436	.904	.384	.190	.332	.476	.278	.762	.224	.048	.169	.618	.436	.904	.384	.190	.332	.476	.278	20
540	.623	.435	.909	.383	.195	.331	.481	.277	.767	.223	.052	.168	.623	.435	.909	.383	.195	.331	.481	.277	10
550	.628	.435	.914	.382	.200	.330	.486	.276	.771	.222	.057	.167	.628	.435	.914	.382	.200	.330	.486	.276	0
560	.632	.434	.918	.382	.204	.329	.490	.276	.776	.221	.062	.166	.632	.434	.918	.382	.204	.329	.490	.276	60
570	.637	.432	.923	.381	.209	.328	.495	.275	.781	.221	.067	.165	.637	.432	.923	.381	.209	.328	.495	.275	50
580	.642	.432	.928	.380	.214	.327	.500	.274	.786	.220	.071	.165	.642	.432	.928	.380	.214	.327	.500	.274	40
590	.646	.431	.933	.379	.219	.326	.505	.273	.791	.219	.076	.164	.646	.431	.933	.379	.219	.326	.505	.273	30
600	.651	.430	.937	.378	.224	.325	.509	.272	.795	.218	.081	.163	.651	.430	.937	.378	.224	.325	.509	.272	20
610	.656	.429	.942	.377	.228	.325	.514	.271	.800	.217	.086	.162	.656	.429	.942	.377	.228	.325	.514	.271	10
620	.661	.428	.947	.376	.233	.324	.519	.270	.805	.216	.091	.161	.661	.428	.947	.376	.233	.324	.519	.270	0
630	.666	.427	.952	.375	.236	.323	.524	.269	.810	.215	.096	.160	.666	.427	.952	.375	.236	.323	.524	.269	60
640	.670	.426	.957	.375	.243	.322	.529	.268	.814	.214	.101	.159	.670	.426	.957	.375	.243	.322	.529	.268	50
650	.675	.426	.961	.374	.247	.321	.533	.268	.819	.213	.106	.158	.675	.426	.961	.374	.247	.321	.533	.268	40
660	.680	.425	.966	.3																	

12°															
S		C		S		C		S		C		S		C	
0'	10'	20'	30'	40'	50'	60'	70'	80'	90'	0'	10'	20'	30'	40'	50'
0	20	97	21	97	21	97	21	97	21	97	21	97	21	97	21
10	791	815	076	754	360	692	644	630	928	566	212	502	60	50	50
20	796	814	080	753	365	691	649	629	933	565	216	501	40	40	40
30	801	813	085	752	369	690	653	628	937	564	221	500	30	30	30
40	805	812	090	751	374	689	658	626	942	563	226	499	20	20	20
50	810	811	095	750	379	688	663	625	947	562	230	498	10	10	10
60	815	810	099	749	384	687	668	624	952	561	235	497	0	0	0
70	820	809	104	748	388	686	672	623	956	560	240	496	60	60	60
80	825	808	109	747	393	685	677	622	961	559	245	495	50	50	50
90	829	807	114	746	398	684	682	621	966	558	249	494	40	40	40
100	834	806	118	745	402	683	687	620	970	557	254	493	30	30	30
110	839	805	123	744	407	682	691	619	975	556	259	492	20	20	20
120	843	804	128	743	412	681	696	618	980	555	264	491	10	10	10
130	848	803	132	742	417	680	701	617	985	554	268	489	0	0	0
140	853	802	137	741	421	679	705	616	989	553	273	488	60	60	60
150	858	801	142	740	426	678	710	615	994	552	278	487	50	50	50
160	862	800	147	739	431	677	715	614	999	550	282	486	40	40	40
170	867	799	151	737	436	676	720	613	004	549	287	485	30	30	30
180	872	798	156	736	440	675	724	612	008	548	292	484	20	20	20
190	877	797	161	735	445	673	729	611	013	547	297	483	10	10	10
200	882	796	166	734	450	672	734	610	018	546	301	482	0	0	0
210	886	795	170	733	455	671	739	609	022	545	306	481	60	60	60
220	891	794	175	732	459	670	743	608	027	544	311	479	50	50	50
230	895	793	180	731	464	669	748	606	032	543	316	478	40	40	40
240	900	792	185	730	469	668	753	605	037	542	320	477	30	30	30
250	905	790	189	729	474	667	758	604	041	541	325	476	20	20	20
260	910	789	194	728	478	666	762	603	046	540	330	475	10	10	10
270	914	788	199	727	483	665	767	602	051	539	334	474	0	0	0
280	919	787	204	726	488	664	772	601	056	537	339	473	60	60	60
290	924	786	208	725	492	663	776	600	060	536	344	472	50	50	50
300	929	785	213	724	497	662	781	599	065	535	349	471	40	40	40
310	933	784	218	723	502	661	786	598	070	534	353	470	30	30	30
320	938	783	222	722	507	660	791	597	074	533	358	469	20	20	20
330	943	782	227	721	511	659	795	596	079	532	363	468	10	10	10
340	948	781	232	720	516	658	800	595	084	531	368	467	0	0	0
350	952	780	237	719	521	657	805	594	089	530	372	466	60	60	60
360	957	779	241	718	526	656	810	593	093	529	377	465	50	50	50
370	962	778	246	717	530	655	814	592	098	528	382	464	40	40	40
380	967	777	251	716	535	654	819	591	103	527	386	463	30	30	30
390	971	776	256	715	540	653	824	590	108	526	391	462	20	20	20
400	976	775	260	714	545	652	829	589	112	525	396	461	10	10	10
410	981	774	265	713	549	651	833	588	117	524	401	459	0	0	0
420	986	773	270	712	554	650	838	586	122	522	405	458	60	60	60
430	990	772	275	711	559	648	843	585	126	521	410	457	50	50	50
440	995	771	279	710	563	647	847	584	131	520	415	456	40	40	40
450	000	770	284	709	568	646	852	583	136	519	420	455	30	30	30
460	005	769	289	708	573	645	857	582	141	518	424	454	20	20	20
470	009	768	294	707	578	644	862	581	145	517	429	453	10	10	10
480	014	767	298	706	582	643	866	580	150	516	434	452	0	0	0
490	019	766	303	705	587	642	871	579	155	515	438	451	60	60	60
500	024	765	308	704	592	641	876	578	160	514	443	449	50	50	50
510	028	764	313	703	597	640	881	577	164	513	448	448	40	40	40
520	033	763	317	702	601	639	885	576	169	512	453	447	30	30	30
530	038	762	322	701	606	638	890	575	174	511	457	446	20	20	20
540	042	761	327	700	611	637	895	574	178	510	462	445	10	10	10
550	047	760	331	699	616	636	899	573	183	508	467	444	0	0	0
560	052	759	336	698	621	635	904	572	188	507	471	443	60	60	60
570	057	758	341	697	625	634	909	570	193	506	476	442	50	50	50
580	061	757	346	696	630	633	914	569	197	505	481	441	40	40	40
590	066	756	350	695	634	632	918	568	202	504	486	439	30	30	30
600	071	755	355	693	639	631	923	567	207	503	490	438	20	20	20
610	076	754	360	692	644	630	928	566	212	502	495	437	10	10	10
620	081	753	365	691	649	629	933	565	216	501	499	436	0	0	0
630	086	752	369	690	653	628	937	564	221	500	503	435	60	60	60
640	091	751	374	689	658	626	942	563	226	499	507	434	50	50	50
650	096	750	379	688	663	625	947	562	230	498	511	433	40	40	40
660	101	749	384	687	668	624	952	561	235	497	515	432	30	30	30
670	106	748	388	686	672	623	956	560	240	496	519	431	20	20	20
680	111	747	393	685	677	622	961	559	245	495	523	430	10	10	10
690	116	746	398	684	682	621	966	558	249	494	527	429	0	0	0
700	121	745	402	683	687	620	970	557	254	493	531	428	60	60	60
710	126	744	407	682	691	619	975	556	259	492	535	427	50	50	50
720	131	743	412	681	696	618	980	555	264	491	539	426	40	40	40
730	136	742	417	680	701	617	985	554	268	489	543	425	30	30	30
740	141	741	421	679	705	616	989	553	273	488	547	424	20	20	20
750	146	740	426	678	710	615	994	552	278	487	551	423	10	10	10
760	151	739	431	677	715	614	999	550	282	486	555	422	0	0	0
770	156	738	436	676	720	613	004	549	287	485	559	421	60	60	60
780	161	737	440	675	724	612	008	548	292	484	563	420	50	50	50
790	166	736	445	673	729	611	013	547	297	483	567	419	40	40	40
800	171	735	450	672	734	610	018	546	301	482	571	418	30	30	30
810	176	734	455	671	739	609	022	545	306	481	575	417	20	20	20
820	181	733	459	670	743	608	027	544	311	479	579	416	10	10	10
830	186	732	464	669	748	606	032	543	316	478	583	415	0	0	0
840	191	731	469	668	753	605	037	542	320	477	587	414	60	60	60
850	196	730	474	667	758	604	041	541	325	476	591	413	50	50	50
860	201	729	478	666	762	603	046	540	330	475	595	412	40	40	40
870	206	728	483	665	767	602	051	539	334	474	599	411	30	30	30
880	211	727	488	664	772	601	056	537	339	473	603	410	20	20	20
890	216	726	492	663	776	600	060	536	344	472	607	409	10	10	10
900	221	725	497	662	781	599	065	535	349	471	611	408	0	0	0
910	226	724	502	6											

14°															
°	Sin		Cos		Tan		Cot		Sec		Csc		1/Sin		°
	0'	10'	20'	30'	40'	50'	60'	70'	80'	90'	0'	10'	20'	30'	
0	.24	.97	.24	.96	.24	.96	.25	.96	.25	.96	.25	.96	.25	.96	60
10	.192	.030	.474	.959	.756	.887	.038	.815	.320	.742	.601	.667	.601	.667	50
20	.197	.028	.479	.958	.761	.886	.043	.814	.324	.740	.606	.666	.606	.666	40
30	.202	.027	.484	.956	.766	.885	.047	.812	.329	.739	.610	.665	.610	.665	30
40	.206	.026	.488	.955	.770	.884	.052	.811	.334	.738	.615	.664	.615	.664	20
50	.211	.025	.493	.954	.775	.882	.057	.810	.338	.737	.620	.662	.620	.662	10
60	.216	.024	.498	.953	.780	.881	.061	.809	.343	.735	.624	.661	.624	.661	0
70	.220	.023	.503	.952	.784	.880	.066	.807	.348	.734	.629	.660	.629	.660	60
80	.224	.022	.507	.951	.788	.880	.071	.806	.352	.733	.634	.659	.634	.659	50
90	.228	.021	.512	.950	.794	.879	.076	.805	.357	.732	.638	.658	.638	.658	40
100	.233	.020	.517	.949	.799	.878	.080	.804	.362	.730	.643	.656	.643	.656	30
110	.239	.018	.521	.947	.803	.875	.085	.803	.366	.729	.648	.655	.648	.655	20
120	.244	.017	.526	.946	.808	.874	.090	.801	.371	.728	.652	.654	.652	.654	10
130	.249	.015	.531	.945	.813	.873	.094	.800	.376	.727	.657	.653	.657	.653	0
140	.253	.014	.535	.943	.817	.872	.099	.799	.380	.726	.662	.651	.662	.651	60
150	.258	.013	.540	.942	.822	.870	.104	.798	.385	.724	.666	.650	.666	.650	50
160	.263	.012	.545	.941	.827	.869	.108	.797	.390	.723	.671	.649	.671	.649	40
170	.267	.011	.550	.940	.831	.868	.113	.795	.395	.722	.676	.648	.676	.648	30
180	.272	.010	.554	.939	.836	.867	.118	.794	.399	.721	.680	.646	.680	.646	20
190	.277	.008	.559	.937	.841	.866	.122	.793	.404	.719	.685	.645	.685	.645	10
200	.282	.007	.564	.936	.846	.864	.127	.792	.409	.718	.690	.644	.690	.644	0
210	.286	.006	.568	.935	.850	.863	.132	.790	.413	.717	.695	.643	.695	.643	60
220	.291	.005	.573	.934	.855	.862	.137	.789	.418	.716	.699	.642	.699	.642	50
230	.296	.004	.578	.933	.860	.861	.141	.788	.423	.714	.704	.641	.704	.641	40
240	.300	.003	.582	.931	.864	.860	.146	.787	.427	.713	.709	.639	.709	.639	30
250	.305	.001	.587	.930	.869	.858	.151	.786	.432	.712	.713	.638	.713	.638	20
260	.310	.000	.592	.929	.874	.857	.155	.784	.437	.711	.718	.636	.718	.636	10
270	.314	.999	.597	.928	.878	.856	.160	.783	.441	.710	.723	.635	.723	.635	0
280	.319	.998	.601	.927	.883	.855	.165	.782	.446	.708	.727	.634	.727	.634	60
290	.324	.997	.606	.926	.888	.853	.169	.781	.451	.707	.732	.633	.732	.633	50
300	.329	.995	.611	.924	.892	.852	.174	.779	.456	.706	.737	.631	.737	.631	40
310	.333	.994	.615	.923	.897	.851	.179	.778	.460	.705	.741	.630	.741	.630	30
320	.338	.993	.620	.922	.902	.850	.183	.777	.465	.704	.746	.629	.746	.629	20
330	.343	.992	.625	.921	.907	.849	.188	.776	.470	.703	.751	.628	.751	.628	10
340	.347	.991	.629	.920	.911	.847	.193	.775	.474	.701	.755	.626	.755	.626	0
350	.352	.990	.634	.918	.916	.846	.198	.773	.479	.700	.760	.625	.760	.625	60
360	.357	.988	.639	.917	.921	.845	.202	.772	.484	.698	.765	.624	.765	.624	50
370	.362	.987	.644	.916	.925	.844	.207	.771	.488	.697	.770	.623	.770	.623	40
380	.366	.986	.648	.915	.930	.843	.212	.770	.493	.696	.774	.621	.774	.621	30
390	.371	.985	.653	.914	.935	.841	.216	.768	.498	.695	.779	.620	.779	.620	20
400	.376	.984	.658	.912	.939	.840	.221	.767	.502	.693	.784	.619	.784	.619	10
410	.380	.982	.662	.911	.944	.839	.226	.766	.507	.692	.788	.618	.788	.618	0
420	.385	.981	.667	.910	.949	.838	.230	.765	.512	.691	.793	.616	.793	.616	60
430	.390	.980	.672	.909	.954	.837	.235	.764	.516	.690	.798	.615	.798	.615	50
440	.394	.979	.676	.908	.958	.835	.240	.762	.521	.689	.802	.614	.802	.614	40
450	.399	.978	.681	.906	.963	.834	.244	.761	.526	.687	.807	.613	.807	.613	30
460	.404	.977	.686	.905	.968	.833	.249	.760	.531	.686	.812	.611	.812	.611	20
470	.409	.975	.691	.904	.972	.832	.254	.759	.535	.685	.816	.610	.816	.610	10
480	.413	.974	.695	.903	.977	.831	.259	.757	.540	.684	.821	.609	.821	.609	0
490	.418	.973	.700	.902	.982	.829	.263	.756	.545	.682	.826	.608	.826	.608	60
500	.424	.96	.704	.902	.982	.829	.263	.756	.545	.682	.826	.608	.826	.608	50
510	.429	.96	.709	.900	.986	.828	.268	.755	.549	.681	.830	.606	.830	.606	40
520	.432	.969	.714	.898	.996	.826	.277	.753	.559	.679	.840	.604	.840	.604	30
530	.437	.968	.719	.897	.990	.824	.282	.751	.563	.677	.844	.603	.844	.603	20
540	.441	.967	.723	.896	.995	.823	.287	.750	.568	.676	.849	.601	.849	.601	10
550	.446	.966	.728	.894	.990	.822	.291	.749	.573	.675	.854	.600	.854	.600	0
560	.451	.965	.733	.893	.995	.821	.296	.748	.577	.674	.858	.599	.858	.599	60
570	.456	.964	.737	.892	.990	.820	.301	.746	.582	.672	.863	.598	.863	.598	50
580	.460	.962	.742	.891	.994	.819	.305	.745	.587	.671	.868	.596	.868	.596	40
590	.465	.961	.747	.890	.999	.817	.310	.744	.591	.670	.873	.595	.873	.595	30
600	.470	.960	.752	.888	.993	.816	.315	.743	.596	.669	.877	.594	.877	.594	20
610	.474	.959	.756	.887	.998	.815	.320	.742	.601	.667	.882	.593	.882	.593	10
620	.479	.958	.761	.886	.993	.814	.324	.740	.606	.666	.887	.592	.887	.592	0
630	.483	.957	.765	.885	.998	.813	.329	.739	.610	.665	.892	.591	.892	.591	60
640	.488	.956	.770	.884	.993	.812	.334	.738	.615	.664	.897	.590	.897	.590	50
650	.492	.955	.774	.883	.998	.811	.338	.737	.620	.662	.902	.589	.902	.589	40
660	.497	.954	.779	.882	.993	.810	.343	.735	.624	.661	.907	.588	.907	.588	30
670	.501	.953	.783	.881	.998	.809	.348	.734	.629	.660	.912	.587	.912	.587	20
680	.506	.952	.788	.880	.993	.808	.352	.733	.634	.659	.917	.586	.917	.586	10
690	.510	.951	.792	.879	.998	.807	.357	.732	.638	.658	.922	.585	.922	.585	0
700	.515	.950	.797	.878	.993	.806	.362	.730	.643	.656	.927	.584	.927	.584	60
710	.519	.949	.801	.877	.998	.805	.366	.729	.648	.655	.932	.583	.932	.583	50
720	.524	.948	.806	.876	.993	.804	.371	.728	.652	.654	.937	.582	.937	.582	40
730	.528	.947	.810	.875	.998	.803	.376	.727	.657	.653	.942	.581	.942	.581	30
740	.533	.946	.815	.874	.993	.802	.380	.726	.662	.651	.947	.580	.947	.580	20
750	.537	.945	.819	.873	.998	.801	.385	.724	.666	.650	.952	.579	.952	.579	10
760	.542	.944	.824	.872	.993	.800	.389	.723	.671	.649	.957	.578	.957	.578	0
770	.546	.943	.828	.871	.998	.799	.394	.722	.676	.648	.962	.577	.962	.577	60
780	.551	.942	.833	.870	.993	.798	.399	.721	.680	.646	.967	.576	.967	.576	50
790	.555	.941	.837	.869	.998	.797	.404	.719	.685	.645	.972	.575	.972	.575	40
800	.560	.940	.842	.868	.993	.796	.409	.718	.690	.644	.977	.574	.977	.574	30
810	.564	.939	.846	.867	.998	.795	.413	.717	.695	.643	.982	.573	.982	.573	20
820	.569	.938	.851	.866	.993	.794	.418	.716	.699	.642	.987	.572	.987	.572	10
830	.573	.937	.855	.865	.998	.793	.423	.714	.704	.641	.992	.571	.992	.571	0
840	.578	.936	.860	.864	.993	.792	.427	.713	.709	.639	.997	.570	.997	.570	60
850	.582	.935	.864	.863	.998	.791	.432	.712	.713	.638	.992	.569	.992	.569	50
860	.587	.934	.869	.862	.993	.790	.437	.711	.718	.636	.997	.568	.997	.568	40
870	.591	.933	.873	.861	.998	.789	.441	.710	.723	.635	.992	.567	.992	.567	30
880	.596	.932	.878	.860	.993	.788	.446	.708	.727	.634	.997	.566	.997	.566	20
890	.600	.931	.882	.859	.998	.787	.451	.707	.732	.633	.992	.565	.992	.565	10
900	.605	.930	.887	.858											

16°															
Sin		Cos		Sin		Cos		Sin		Cos		Sin		Cos	
0'	10'	20'	30'	40'	50'	60'	70'	80'	90'	0'	10'	20'	30'	40'	50'
0	27	96	27	96	28	95	28	95	28	95	28	95	28	95	28
10	56	126	84	046	123	964	402	882	680	799	959	715	60		
20	56	125	84	044	123	963	406	881	685	798	964	714	50		
30	57	124	85	043	123	961	411	879	690	796	968	712	40		
40	57	122	85	042	136	960	415	878	694	795	973	711	30		
50	58	121	86	040	141	959	420	876	699	793	977	710	20		
60	58	119	86	039	146	957	425	875	704	792	982	708	10		
70	59	118	87	037	150	956	429	874	708	791	987	707	0		
80	59	117	87	036	155	955	434	872	713	789	991	705	60		
90	60	115	88	035	160	953	439	871	717	788	996	704	50		
100	27	96	27	96	28	95	28	95	28	95	28	95	28	95	28
110	59	118	87	037	150	956	429	874	708	791	987	707	60		
120	60	117	87	036	155	955	434	872	713	789	991	705	50		
130	61	115	88	035	160	953	439	871	717	788	996	704	40		
140	27	96	27	96	28	95	28	95	28	95	28	95	28	95	28
150	60	115	88	035	160	953	439	871	717	788	996	704	30		
160	61	113	89	033	169	951	448	868	727	785	005	701	20		
170	62	111	89	031	174	949	453	867	731	784	010	700	10		
180	63	110	89	029	178	948	457	865	736	782	015	698	0		
190	27	96	27	96	28	95	28	95	28	95	28	95	28	95	28
200	63	109	90	028	183	946	462	864	741	781	019	697	60		
210	64	107	90	027	188	945	467	863	745	779	024	695	50		
220	64	106	91	025	192	944	471	861	750	778	028	694	40		
230	65	105	91	024	197	942	476	860	755	777	033	693	30		
240	65	103	92	023	202	941	481	859	759	775	038	691	20		
250	66	102	92	021	206	940	485	857	764	774	042	690	10		
260	27	96	27	96	28	95	28	95	28	95	28	95	28	95	28
270	67	102	92	021	206	940	485	857	764	774	042	690	60		
280	68	101	93	020	211	938	490	856	769	772	047	688	50		
290	68	100	93	019	216	937	494	854	773	771	052	687	40		
300	69	098	94	017	220	936	499	853	778	770	056	686	30		
310	69	097	94	016	225	934	504	852	782	768	061	684	20		
320	70	095	95	014	229	933	508	850	787	767	066	683	10		
330	70	094	95	013	234	931	513	849	792	766	070	681	0		
340	27	96	27	96	28	95	28	95	28	95	28	95	28	95	28
350	71	093	95	013	239	930	518	847	796	764	075	680	60		
360	71	092	95	012	243	929	522	846	801	763	080	679	50		
370	72	091	96	010	248	927	527	845	806	761	084	677	40		
380	72	090	96	009	253	926	532	843	810	760	089	676	30		
390	73	089	97	008	257	925	536	842	815	759	093	674	20		
400	73	088	97	007	262	923	541	841	820	757	098	673	10		
410	74	086	98	005	266	922	545	839	824	756	103	671	0		
420	74	085	98	004	271	920	550	838	829	754	107	670	60		
430	75	083	99	002	276	919	555	836	834	753	112	669	50		
440	75	082	99	001	281	918	560	835	838	752	117	667	40		
450	27	96	27	96	28	95	28	95	28	95	28	95	28	95	28
460	76	081	002	000	286	918	565	834	843	750	121	666	30		
470	77	079	006	998	290	916	569	832	847	749	126	664	20		
480	77	078	011	997	295	915	573	831	852	747	131	663	10		
490	78	077	015	995	299	914	577	829	857	746	135	662	0		
500	78	076	020	994	304	913	582	828	861	745	140	660	60		
510	79	075	025	993	309	912	587	827	866	744	144	659	50		
520	79	074	030	991	313	910	592	825	871	742	149	657	40		
530	80	073	035	990	318	909	597	824	875	740	154	656	30		
540	80	072	040	989	323	907	602	823	880	739	158	655	20		
550	81	071	045	988	328	906	607	822	885	738	163	653	10		
560	81	070	050	987	333	905	611	820	889	736	168	652	0		
570	82	069	055	986	338	904	616	819	894	735	172	650	60		
580	82	068	060	985	343	903	621	818	899	733	177	649	50		
590	83	067	065	984	348	902	626	817	903	732	182	647	40		
600	83	066	070	983	353	901	631	816	908	731	186	646	30		
610	84	065	075	982	358	900	636	815	912	729	191	645	20		
620	84	064	080	981	363	899	641	814	917	728	195	643	10		
630	85	063	085	980	368	898	646	813	922	726	200	642	0		
640	85	062	090	979	373	897	651	812	926	725	205	640	60		
650	86	061	095	978	378	896	656	811	931	724	209	639	50		
660	86	060	100	977	383	895	661	810	935	723	214	638	40		
670	87	059	105	976	388	894	666	809	940	722	219	636	30		
680	87	058	110	975	393	893	671	808	945	721	223	635	20		
690	88	057	115	974	398	892	676	807	950	720	228	633	10		
700	88	056	120	973	403	891	681	806	955	719	233	632	0		
710	89	055	125	972	408	890	686	805	960	718	237	630	60		
720	89	054	130	971	413	889	691	804	965	717	242	629	50		
730	90	053	135	970	418	888	696	803	970	716	247	628	40		
740	90	052	140	969	423	887	701	802	975	715	252	627	30		
750	91	051	145	968	428	886	706	801	980	714	257	626	20		
760	91	050	150	967	433	885	711	800	985	713	262	625	10		
770	92	049	155	966	438	884	716	799	990	712	267	624	0		
780	92	048	160	965	443	883	721	798	995	711	272	623	60		
790	93	047	165	964	448	882	726	797	1000	710	277	622	50		
800	93	046	170	963	453	881	731	796	1005	709	282	621	40		
810	94	045	175	962	458	880	736	795	1010	708	287	620	30		
820	94	044	180	961	463	879	741	794	1015	707	292	619	20		
830	95	043	185	960	468	878	746	793	1020	706	297	618	10		
840	95	042	190	959	473	877	751	792	1025	705	302	617	0		
850	96	041	195	958	478	876	756	791	1030	704	307	616	60		
860	96	040	200	957	483	875	761	790	1035	703	312	615	50		
870	97	039	205	956	488	874	766	789	1040	702	317	614	40		
880	97	038	210	955	493	873	771	788	1045	701	322	613	30		
890	98	037	215	954	498	872	776	787	1050	700	327	612	20		
900	98	036	220	953	503	871	781	786	1055	699	332	611	10		
910	99	035	225	952	508	870	786	785	1060	698	337	610	0		
920	99	034	230	951	513	869	791	784	1065	697	342	609	60		
930	100	033	235	950	518	868	796	783	1070	696	347	608	50		
940	100	032	240	949	523	867	801	782	1075	695	352	607	40		
950	101	031	245	948	528	866	806	781	1080	694	357	606	30		
960	101	030	250	947	533	865	811	780	1085	693	362	605	20		
970	102	029	255	946</											

18°

"	0'		10'		20'		30'		40'		50'		"
	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	
0	.30	.95	.31	.95	.31	.94	.31	.94	.32	.94	.32	.94	60
10	.302	.96	.318	.95	.454	.924	.730	.832	.006	.740	.282	.646	50
20	.306	.96	.318	.95	.459	.923	.735	.831	.011	.738	.286	.645	40
30	.311	.96	.317	.95	.464	.921	.740	.829	.015	.737	.291	.643	30
40	.316	.96	.317	.95	.468	.920	.744	.828	.020	.735	.295	.641	20
50	.320	.96	.317	.95	.473	.918	.749	.826	.025	.733	.300	.640	10
60	.325	.96	.317	.95	.477	.917	.753	.825	.029	.732	.305	.638	0
70	.329	.97	.316	.95	.482	.915	.758	.823	.034	.730	.309	.637	0
80	.330	.95	.31	.95	.481	.94	.31	.94	.32	.94	.32	.94	60
90	.329	.97	.316	.95	.482	.915	.758	.823	.034	.730	.309	.637	50
100	.334	.95	.310	.95	.487	.914	.763	.822	.038	.729	.314	.635	40
110	.339	.94	.310	.95	.491	.912	.767	.820	.043	.727	.318	.634	30
120	.343	.92	.309	.95	.496	.911	.772	.819	.048	.726	.323	.632	20
130	.348	.91	.309	.95	.500	.909	.776	.817	.052	.724	.328	.630	10
140	.350	.95	.31	.94	.505	.907	.781	.815	.057	.723	.332	.629	0
150	.352	.98	.309	.94	.510	.906	.786	.814	.061	.721	.337	.627	0
160	.357	.98	.308	.94	.515	.905	.791	.813	.066	.719	.341	.626	60
170	.362	.98	.308	.94	.520	.904	.796	.812	.071	.718	.346	.624	50
180	.367	.98	.308	.94	.525	.903	.801	.811	.076	.717	.351	.622	40
190	.372	.98	.308	.94	.530	.902	.806	.810	.081	.716	.356	.620	30
200	.377	.98	.308	.94	.535	.901	.811	.809	.086	.715	.361	.618	20
210	.382	.98	.308	.94	.540	.900	.816	.808	.091	.714	.366	.616	10
220	.387	.98	.308	.94	.545	.899	.821	.807	.096	.713	.371	.614	0
230	.392	.98	.308	.94	.550	.898	.826	.806	.101	.712	.376	.612	60
240	.397	.98	.308	.94	.555	.897	.831	.805	.106	.711	.381	.610	50
250	.402	.98	.308	.94	.560	.896	.836	.804	.111	.710	.386	.608	40
260	.407	.98	.308	.94	.565	.895	.841	.803	.116	.709	.391	.606	30
270	.412	.98	.308	.94	.570	.894	.846	.802	.121	.708	.396	.604	20
280	.417	.98	.308	.94	.575	.893	.851	.801	.126	.707	.401	.602	10
290	.422	.98	.308	.94	.580	.892	.856	.800	.131	.706	.406	.600	0
300	.427	.98	.308	.94	.585	.891	.861	.799	.136	.705	.411	.598	60
310	.432	.98	.308	.94	.590	.890	.866	.798	.141	.704	.416	.596	50
320	.437	.98	.308	.94	.595	.889	.871	.797	.146	.703	.421	.594	40
330	.442	.98	.308	.94	.600	.888	.876	.796	.151	.702	.426	.592	30
340	.447	.98	.308	.94	.605	.887	.881	.795	.156	.701	.431	.590	20
350	.452	.98	.308	.94	.610	.886	.886	.794	.161	.700	.436	.588	10
360	.457	.98	.308	.94	.615	.885	.891	.793	.166	.699	.441	.586	0
370	.462	.98	.308	.94	.620	.884	.896	.792	.171	.698	.446	.584	60
380	.467	.98	.308	.94	.625	.883	.901	.791	.176	.697	.451	.582	50
390	.472	.98	.308	.94	.630	.882	.906	.790	.181	.696	.456	.580	40
400	.477	.98	.308	.94	.635	.881	.911	.789	.186	.695	.461	.578	30
410	.482	.98	.308	.94	.640	.880	.916	.788	.191	.694	.466	.576	20
420	.487	.98	.308	.94	.645	.879	.921	.787	.196	.693	.471	.574	10
430	.492	.98	.308	.94	.650	.878	.926	.786	.201	.692	.476	.572	0
440	.497	.98	.308	.94	.655	.877	.931	.785	.206	.691	.481	.570	60
450	.502	.98	.308	.94	.660	.876	.936	.784	.211	.690	.486	.568	50
460	.507	.98	.308	.94	.665	.875	.941	.783	.216	.689	.491	.566	40
470	.512	.98	.308	.94	.670	.874	.946	.782	.221	.688	.496	.564	30
480	.517	.98	.308	.94	.675	.873	.951	.781	.226	.687	.501	.562	20
490	.522	.98	.308	.94	.680	.872	.956	.780	.231	.686	.506	.560	10
500	.527	.98	.308	.94	.685	.871	.961	.779	.236	.685	.511	.558	0
510	.532	.98	.308	.94	.690	.870	.966	.778	.241	.684	.516	.556	60
520	.537	.98	.308	.94	.695	.869	.971	.777	.246	.683	.521	.554	50
530	.542	.98	.308	.94	.700	.868	.976	.776	.251	.682	.526	.552	40
540	.547	.98	.308	.94	.705	.867	.981	.775	.256	.681	.531	.550	30
550	.552	.98	.308	.94	.710	.866	.986	.774	.261	.680	.536	.548	20
560	.557	.98	.308	.94	.715	.865	.991	.773	.266	.679	.541	.546	10
570	.562	.98	.308	.94	.720	.864	.996	.772	.271	.678	.546	.544	0
580	.567	.98	.308	.94	.725	.863	.999	.771	.276	.677	.551	.542	60
590	.572	.98	.308	.94	.730	.862	.999	.770	.281	.676	.556	.540	50
600	.577	.98	.308	.94	.735	.861	.999	.769	.286	.675	.561	.538	40
610	.582	.98	.308	.94	.740	.860	.999	.768	.291	.674	.566	.536	30
620	.587	.98	.308	.94	.745	.859	.999	.767	.296	.673	.571	.534	20
630	.592	.98	.308	.94	.750	.858	.999	.766	.301	.672	.576	.532	10
640	.597	.98	.308	.94	.755	.857	.999	.765	.306	.671	.581	.530	0
650	.602	.98	.308	.94	.760	.856	.999	.764	.311	.670	.586	.528	60
660	.607	.98	.308	.94	.765	.855	.999	.763	.316	.669	.591	.526	50
670	.612	.98	.308	.94	.770	.854	.999	.762	.321	.668	.596	.524	40
680	.617	.98	.308	.94	.775	.853	.999	.761	.326	.667	.601	.522	30
690	.622	.98	.308	.94	.780	.852	.999	.760	.331	.666	.606	.520	20
700	.627	.98	.308	.94	.785	.851	.999	.759	.336	.665	.611	.518	10
710	.632	.98	.308	.94	.790	.850	.999	.758	.341	.664	.616	.516	0
720	.637	.98	.308	.94	.795	.849	.999	.757	.346	.663	.621	.514	60
730	.642	.98	.308	.94	.800	.848	.999	.756	.351	.662	.626	.512	50
740	.647	.98	.308	.94	.805	.847	.999	.755	.356	.661	.631	.510	40
750	.652	.98	.308	.94	.810	.846	.999	.754	.361	.660	.636	.508	30
760	.657	.98	.308	.94	.815	.845	.999	.753	.366	.659	.641	.506	20
770	.662	.98	.308	.94	.820	.844	.999	.752	.371	.658	.646	.504	10
780	.667	.98	.308	.94	.825	.843	.999	.751	.376	.657	.651	.502	0
790	.672	.98	.308	.94	.830	.842	.999	.750	.381	.656	.656	.500	60
800	.677	.98	.308	.94	.835	.841	.999	.749	.386	.655	.661	.498	50
810	.682	.98	.308	.94	.840	.840	.999	.748	.391	.654	.666	.496	40
820	.687	.98	.308	.94	.845	.839	.999	.747	.396	.653	.671	.494	30
830	.692	.98	.308	.94	.850	.838	.999	.746	.401	.652	.676	.492	20
840	.697	.98	.308	.94	.855	.837	.999	.745	.406	.651	.681	.490	10
850	.702	.98	.308	.94	.860	.836	.999	.744	.411	.650	.686	.488	0
860	.707	.98	.308	.94	.865	.835	.999	.743	.416	.649	.691	.486	60
870	.712	.98	.308	.94	.870	.834	.999	.742	.421	.648	.696	.484	50
880	.717	.98	.308	.94	.875	.833	.999	.741	.426	.647	.701	.482	40
890	.722	.98	.308	.94	.880	.832	.999	.740	.431	.646	.706	.480	30
900	.727	.98	.308	.94	.885	.831	.999	.739	.436	.645	.711	.478	20
910	.732	.98	.308	.94	.890	.830	.999	.738	.441	.644	.716	.476	10
920	.737	.98	.308	.94	.895	.829	.999	.737	.446	.643	.721	.474	0
930	.742	.98	.308	.94	.900	.828	.999	.736	.451	.642	.726	.472	60
940	.747	.98	.308	.94	.905	.827	.999	.735	.456	.641	.731	.470	50
950	.752	.98	.308	.94	.910	.826	.999	.734	.461	.640	.736	.468	40
960	.757	.98	.308	.94	.915	.825	.999	.733	.466	.639	.741	.466	30
970	.762	.98	.308	.94	.920	.824	.999	.732	.471	.638	.746	.464	20
980	.767	.98	.308	.94	.925	.823	.999	.731	.476	.637	.751	.462	10
990	.772	.98	.308	.94	.930	.822	.999	.730	.481	.636	.756	.460	0
1000	.777	.98	.308	.94	.935	.821	.999	.729	.486	.635	.761	.458	60
1010	.782	.98	.308	.94	.940	.820	.999	.728	.491	.634	.766	.456	50
1020	.787	.98	.308	.94	.945	.819	.999	.727	.496	.633	.771	.454	40
1030	.792	.98	.308	.94	.950	.818	.999	.726	.501	.632	.776	.452	30
1040	.797	.98	.308	.94	.955	.817	.999	.725	.506	.631	.781	.450	20
1050	.802	.98	.308	.94	.960	.816	.999	.724	.511	.630	.786	.448	10

24°															
°	Sin		Cos		Tan		Cot		Sec		Csc		Sin		Cos
	0'	1'	0'	1'	0'	1'	0'	1'	0'	1'	0'	1'	0'	1'	0'
0	.40	.91	.674	.355	.939	.236	.204	.116	.469	.996	.734	.875	.998	.753	60
10	.40	.91	.678	.353	.944	.234	.209	.114	.474	.994	.738	.873	.997	.751	50
20	.40	.91	.683	.351	.948	.232	.213	.112	.478	.992	.743	.871	.997	.749	40
30	.40	.91	.687	.349	.952	.230	.218	.110	.483	.990	.747	.869	.997	.747	30
40	.40	.91	.691	.347	.957	.228	.222	.108	.487	.988	.751	.867	.996	.745	20
50	.40	.91	.696	.345	.961	.226	.227	.106	.491	.986	.756	.865	.996	.743	10
60	.40	.91	.700	.343	.966	.224	.231	.104	.496	.984	.760	.863	.995	.741	0
1'	.40	.91	.705	.341	.970	.222	.235	.102	.500	.982	.765	.861	.995	.739	60
2'	.40	.91	.709	.339	.975	.220	.240	.100	.505	.980	.769	.859	.995	.737	50
3'	.40	.91	.714	.337	.979	.218	.244	.098	.509	.978	.773	.857	.995	.735	40
4'	.40	.91	.718	.335	.983	.216	.249	.096	.513	.976	.778	.855	.994	.733	30
5'	.40	.91	.722	.333	.988	.214	.253	.094	.518	.974	.782	.853	.994	.731	20
6'	.40	.91	.727	.331	.992	.212	.257	.092	.522	.972	.787	.851	.993	.729	10
7'	.40	.91	.731	.329	.997	.210	.262	.090	.527	.970	.791	.849	.993	.727	0
8'	.40	.91	.736	.327	.999	.208	.266	.088	.531	.968	.796	.847	.992	.725	60
9'	.40	.91	.740	.325	.999	.206	.271	.086	.535	.966	.800	.845	.992	.723	50
10'	.40	.91	.745	.323	.999	.204	.275	.084	.540	.964	.804	.843	.991	.721	40
20'	.40	.91	.749	.321	.999	.202	.280	.082	.544	.962	.809	.841	.991	.719	30
30'	.40	.91	.753	.319	.999	.200	.284	.080	.549	.960	.813	.839	.990	.717	20
40'	.40	.91	.758	.317	.999	.200	.288	.080	.549	.960	.813	.839	.990	.717	10
50'	.40	.91	.762	.315	.999	.200	.293	.078	.553	.958	.818	.837	.989	.715	0
60'	.40	.91	.767	.313	.999	.200	.297	.077	.558	.956	.822	.835	.989	.713	60
70'	.40	.91	.771	.311	.999	.200	.302	.076	.562	.954	.826	.833	.989	.711	50
80'	.40	.91	.776	.309	.999	.200	.306	.075	.566	.952	.831	.831	.988	.709	40
90'	.40	.91	.780	.307	.999	.200	.310	.075	.571	.950	.835	.829	.988	.707	30
100'	.40	.91	.785	.305	.999	.200	.314	.074	.575	.948	.840	.826	.987	.704	20
110'	.40	.91	.789	.303	.999	.200	.318	.074	.580	.946	.844	.824	.987	.702	10
120'	.40	.91	.793	.301	.999	.200	.322	.073	.584	.944	.848	.822	.986	.700	0
130'	.40	.91	.798	.299	.999	.200	.326	.072	.588	.942	.853	.820	.986	.698	60
140'	.40	.91	.802	.297	.999	.200	.330	.072	.593	.940	.857	.818	.985	.696	50
150'	.40	.91	.806	.295	.999	.200	.334	.071	.597	.938	.862	.816	.985	.694	40
160'	.40	.91	.810	.293	.999	.200	.338	.071	.602	.936	.866	.814	.984	.692	30
170'	.40	.91	.814	.291	.999	.200	.342	.070	.606	.934	.870	.812	.984	.690	20
180'	.40	.91	.818	.289	.999	.200	.346	.070	.610	.932	.875	.810	.983	.688	10
190'	.40	.91	.822	.287	.999	.200	.350	.069	.615	.930	.879	.808	.983	.686	0
200'	.40	.91	.826	.285	.999	.200	.354	.069	.619	.928	.884	.806	.982	.684	60
210'	.40	.91	.829	.283	.999	.200	.358	.068	.624	.926	.888	.804	.982	.682	50
220'	.40	.91	.833	.281	.999	.200	.362	.068	.628	.924	.892	.802	.981	.680	40
230'	.40	.91	.837	.279	.999	.200	.366	.067	.632	.922	.897	.800	.980	.678	30
240'	.40	.91	.841	.277	.999	.200	.370	.067	.636	.920	.901	.798	.980	.676	20
250'	.40	.91	.845	.275	.999	.200	.374	.066	.640	.918	.906	.796	.979	.674	10
260'	.40	.91	.849	.273	.999	.200	.378	.066	.644	.916	.910	.794	.978	.672	0
270'	.40	.91	.853	.271	.999	.200	.382	.065	.648	.914	.914	.792	.977	.670	60
280'	.40	.91	.857	.269	.999	.200	.386	.065	.652	.912	.919	.790	.976	.668	50
290'	.40	.91	.861	.267	.999	.200	.390	.064	.656	.910	.923	.788	.975	.666	40
300'	.40	.91	.865	.265	.999	.200	.394	.064	.660	.908	.927	.786	.974	.664	30
310'	.40	.91	.869	.263	.999	.200	.398	.063	.664	.906	.931	.784	.973	.662	20
320'	.40	.91	.873	.261	.999	.200	.402	.063	.668	.904	.935	.782	.972	.660	10
330'	.40	.91	.877	.259	.999	.200	.406	.062	.672	.902	.939	.780	.971	.658	0
340'	.40	.91	.881	.257	.999	.200	.410	.062	.676	.900	.943	.778	.970	.656	60
350'	.40	.91	.885	.255	.999	.200	.414	.061	.680	.898	.947	.776	.969	.654	50
360'	.40	.91	.889	.253	.999	.200	.418	.061	.684	.896	.951	.774	.968	.652	40
370'	.40	.91	.893	.251	.999	.200	.422	.060	.688	.894	.955	.772	.967	.650	30
380'	.40	.91	.897	.249	.999	.200	.426	.060	.692	.892	.959	.770	.966	.648	20
390'	.40	.91	.901	.247	.999	.200	.430	.059	.696	.890	.963	.768	.965	.646	10
400'	.40	.91	.905	.245	.999	.200	.434	.059	.700	.888	.967	.766	.964	.644	0
410'	.40	.91	.909	.243	.999	.200	.438	.058	.704	.886	.971	.764	.963	.642	60
420'	.40	.91	.913	.241	.999	.200	.442	.058	.708	.884	.975	.762	.962	.640	50
430'	.40	.91	.917	.239	.999	.200	.446	.057	.712	.882	.979	.760	.961	.638	40
440'	.40	.91	.921	.237	.999	.200	.450	.057	.716	.880	.983	.758	.960	.636	30
450'	.40	.91	.925	.235	.999	.200	.454	.056	.720	.878	.987	.756	.959	.634	20
460'	.40	.91	.929	.233	.999	.200	.458	.056	.724	.876	.991	.754	.958	.632	10
470'	.40	.91	.933	.231	.999	.200	.462	.055	.728	.874	.995	.752	.957	.630	0
480'	.40	.91	.937	.229	.999	.200	.466	.055	.732	.872	.999	.750	.956	.628	60
490'	.40	.91	.941	.227	.999	.200	.470	.054	.736	.870	.999	.748	.955	.626	50
500'	.40	.91	.945	.225	.999	.200	.474	.054	.740	.868	.999	.746	.954	.624	40
510'	.40	.91	.949	.223	.999	.200	.478	.053	.744	.866	.999	.744	.953	.622	30
520'	.40	.91	.953	.221	.999	.200	.482	.053	.748	.864	.999	.742	.952	.620	20
530'	.40	.91	.957	.219	.999	.200	.486	.052	.752	.862	.999	.740	.951	.618	10
540'	.40	.91	.961	.217	.999	.200	.490	.052	.756	.860	.999	.738	.950	.616	0
550'	.40	.91	.965	.215	.999	.200	.494	.051	.760	.858	.999	.736	.949	.614	60
560'	.40	.91	.969	.213	.999	.200	.498	.051	.764	.856	.999	.734	.948	.612	50
570'	.40	.91	.973	.211	.999	.200	.502	.050	.768	.854	.999	.732	.947	.610	40
580'	.40	.91	.977	.209	.999	.200	.506	.050	.772	.852	.999	.730	.946	.608	30
590'	.40	.91	.981	.207	.999	.200	.510	.049	.776	.850	.999	.728	.945	.606	20
600'	.40	.91	.985	.205	.999	.200	.514	.049	.780	.848	.999	.726	.944	.604	10
610'	.40	.91	.989	.203	.999	.200	.518	.048	.784	.846	.999	.724	.943	.602	0
620'	.40	.91	.993	.201	.999	.200	.522	.048	.788	.844	.999	.722	.942	.600	60
630'	.40	.91	.997	.199	.999	.200	.526	.047	.792	.842	.999	.720	.941	.598	50
640'	.40	.91	.999	.197	.999	.200	.530	.047	.796	.840	.999	.718	.940	.596	40
650'	.40	.91	.999	.195	.999	.200	.534	.046	.800	.838	.999	.716	.939	.594	30
660'	.40	.91	.999	.193	.999	.200	.538	.046	.804	.836	.999	.714	.938	.592	20
670'	.40	.91	.999	.191	.999	.200	.542	.045	.808	.834	.999	.712	.937	.590	10
680'	.40	.91	.999	.189	.999	.200	.546	.045	.812	.832	.999	.710	.936	.588	0
690'	.40	.91	.999	.187	.999	.200	.550	.044	.816	.830	.999	.708	.935	.586	60
700'	.40	.91	.999	.185	.999	.200	.554	.044	.820	.828	.999	.706	.934	.584	50
710'	.40	.91	.999	.183	.999	.200	.558	.043	.824	.826	.999	.704	.933	.582	40
720'	.40	.91	.999	.181	.999	.200	.562	.043	.828	.824	.999	.702	.932	.580	30
730'	.40	.91	.999	.179	.999	.200	.566	.042	.832	.822	.999	.700	.931	.578	20
740'	.40	.91	.999	.177	.999	.200	.570	.042	.836	.820	.999	.698	.930	.576	10
750'	.40	.91	.999	.175	.999	.200	.574	.041	.840	.818	.999	.696	.929	.574	0
760'	.40	.91	.999	.173	.999	.200	.578	.041	.844	.816	.999	.694	.928	.572	

26°																
"	0'		10'		20'		30'		40'		50'		60'		70'	
	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos
0	.43	.89	.44	.89	.44	.89	.44	.89	.44	.89	.45	.89	.45	.89	.45	.89
1	.837	.879	.098	.752	.359	.623	.620	.493	.880	.363	.140	.232	.50			
2	.841	.877	.103	.749	.364	.621	.624	.491	.884	.361	.144	.230	50			
3	.846	.875	.107	.747	.368	.619	.628	.489	.889	.359	.148	.228	40			
4	.850	.873	.111	.745	.372	.616	.633	.487	.893	.357	.153	.226	30			
5	.855	.871	.116	.743	.377	.614	.637	.485	.897	.355	.157	.224	20			
6	.859	.869	.120	.741	.381	.612	.641	.483	.902	.352	.161	.221	10			
7	.863	.867	.124	.739	.385	.610	.646	.480	.906	.350	.166	.219	0			
8	.43	.89	.44	.89	.44	.89	.44	.89	.44	.89	.45	.89	.45	.89	.45	.89
9	.863	.867	.124	.739	.385	.610	.646	.480	.906	.350	.166	.219	60			
10	.868	.865	.129	.737	.390	.608	.650	.478	.910	.348	.170	.217	50			
11	.872	.862	.133	.734	.394	.606	.654	.476	.915	.346	.174	.215	40			
12	.876	.860	.138	.732	.398	.603	.659	.474	.919	.344	.179	.213	30			
13	.881	.858	.142	.730	.403	.601	.663	.472	.923	.342	.183	.210	20			
14	.885	.856	.146	.728	.407	.599	.668	.470	.928	.339	.187	.208	10			
15	.889	.854	.151	.726	.411	.597	.672	.467	.932	.337	.192	.206	0			
16	.43	.89	.44	.89	.44	.89	.44	.89	.44	.89	.45	.89	.45	.89	.45	.89
17	.889	.854	.151	.726	.411	.597	.672	.467	.932	.337	.192	.206	60			
18	.894	.852	.155	.724	.416	.595	.676	.465	.936	.335	.196	.204	50			
19	.898	.850	.159	.722	.420	.593	.681	.463	.941	.333	.200	.202	40			
20	.902	.848	.164	.719	.424	.591	.685	.461	.945	.331	.205	.199	30			
21	.907	.845	.168	.717	.429	.588	.689	.459	.949	.329	.209	.197	20			
22	.911	.843	.172	.715	.433	.586	.694	.457	.954	.326	.213	.195	10			
23	.916	.841	.177	.713	.437	.584	.698	.454	.958	.324	.218	.193	0			
24	.43	.89	.44	.89	.44	.89	.44	.89	.44	.89	.45	.89	.45	.89	.45	.89
25	.916	.841	.177	.713	.437	.584	.698	.454	.958	.324	.218	.193	60			
26	.920	.839	.181	.711	.442	.582	.702	.452	.962	.322	.222	.191	50			
27	.924	.837	.185	.709	.446	.580	.707	.450	.967	.320	.226	.189	40			
28	.929	.835	.190	.707	.450	.578	.711	.448	.971	.318	.230	.186	30			
29	.933	.833	.194	.704	.455	.575	.715	.446	.975	.315	.235	.184	20			
30	.937	.831	.198	.702	.459	.573	.720	.444	.980	.313	.239	.182	10			
31	.942	.828	.203	.700	.464	.571	.724	.441	.984	.311	.243	.180	0			
32	.43	.89	.44	.89	.44	.89	.44	.89	.44	.89	.45	.89	.45	.89	.45	.89
33	.942	.828	.203	.700	.464	.571	.724	.441	.984	.311	.243	.180	60			
34	.946	.826	.207	.698	.468	.569	.728	.439	.988	.309	.248	.178	50			
35	.950	.824	.211	.696	.472	.567	.733	.437	.993	.307	.252	.175	40			
36	.955	.822	.216	.694	.477	.565	.737	.435	.997	.304	.256	.173	30			
37	.43	.89	.44	.89	.44	.89	.44	.89	.44	.89	.45	.89	.45	.89	.45	.89
38	.959	.820	.220	.692	.481	.563	.741	.433	.001	.302	.261	.171	20			
39	.963	.818	.225	.689	.485	.560	.746	.431	.006	.300	.265	.169	10			
40	.968	.816	.229	.687	.490	.558	.750	.428	.010	.298	.269	.167	0			
41	.43	.89	.44	.89	.44	.89	.44	.89	.44	.89	.45	.89	.45	.89	.45	.89
42	.968	.816	.229	.687	.490	.558	.750	.428	.010	.298	.269	.167	60			
43	.972	.813	.233	.685	.494	.556	.754	.426	.014	.296	.274	.164	50			
44	.976	.811	.238	.683	.498	.554	.759	.424	.018	.294	.278	.162	40			
45	.981	.809	.242	.681	.503	.552	.763	.422	.023	.291	.282	.160	30			
46	.985	.807	.246	.679	.507	.550	.767	.420	.027	.289	.287	.158	20			
47	.990	.805	.251	.677	.511	.547	.772	.418	.031	.287	.291	.156	10			
48	.994	.803	.255	.674	.516	.545	.776	.415	.036	.285	.295	.153	0			
49	.43	.89	.44	.89	.44	.89	.44	.89	.44	.89	.45	.89	.45	.89	.45	.89
50	.994	.803	.255	.674	.516	.545	.776	.415	.036	.285	.295	.153	60			
51	.998	.801	.259	.672	.520	.543	.780	.413	.040	.283	.300	.151	50			
52	.43	.89	.44	.89	.44	.89	.44	.89	.44	.89	.45	.89	.45	.89	.45	.89
53	.003	.798	.264	.670	.524	.541	.785	.411	.044	.280	.304	.149	40			
54	.007	.796	.268	.668	.529	.539	.789	.409	.049	.278	.308	.147	30			
55	.011	.794	.272	.666	.533	.537	.793	.407	.053	.276	.313	.145	20			
56	.016	.792	.277	.664	.537	.534	.798	.405	.057	.274	.317	.142	10			
57	.020	.790	.281	.662	.542	.532	.802	.402	.062	.272	.321	.140	0			
58	.43	.89	.44	.89	.44	.89	.44	.89	.44	.89	.45	.89	.45	.89	.45	.89
59	.020	.790	.281	.662	.542	.532	.802	.402	.062	.272	.321	.140	60			
60	.024	.788	.285	.659	.546	.530	.806	.400	.066	.270	.326	.138	50			
61	.029	.786	.290	.657	.550	.528	.811	.398	.070	.267	.330	.136	40			
62	.033	.784	.294	.655	.555	.526	.815	.396	.075	.265	.334	.134	30			
63	.037	.781	.298	.653	.559	.524	.819	.394	.079	.263	.339	.131	20			
64	.042	.779	.303	.651	.563	.522	.824	.392	.083	.261	.343	.129	10			
65	.046	.777	.307	.649	.568	.519	.828	.389	.088	.259	.347	.127	0			
66	.43	.89	.44	.89	.44	.89	.44	.89	.44	.89	.45	.89	.45	.89	.45	.89
67	.046	.777	.307	.649	.568	.519	.828	.389	.088	.259	.347	.127	60			
68	.051	.775	.311	.646	.572	.517	.832	.387	.092	.256	.352	.125	50			
69	.055	.773	.316	.644	.576	.515	.837	.385	.096	.254	.356	.123	40			
70	.059	.771	.320	.642	.581	.513	.841	.383	.101	.252	.360	.120	30			
71	.064	.769	.324	.640	.585	.511	.845	.381	.105	.250	.364	.118	20			
72	.068	.766	.329	.638	.589	.509	.850	.378	.109	.248	.369	.116	10			
73	.072	.764	.333	.636	.594	.506	.854	.376	.114	.245	.373	.114	0			
74	.43	.89	.44	.89	.44	.89	.44	.89	.44	.89	.45	.89	.45	.89	.45	.89
75	.072	.764	.333	.636	.594	.506	.854	.376	.114	.245	.373	.114	60			
76	.077	.762	.338	.634	.598	.504	.858	.374	.118	.243	.377	.112	50			
77	.081	.760	.342	.631	.602	.502	.863	.372	.122	.241	.382	.109	40			
78	.085	.758	.346	.629	.607	.500	.867	.370	.127	.239	.386	.107	30			
79	.090	.756	.351	.627	.611	.498	.871	.368	.131	.237	.390	.105	20			
80	.094	.754	.355	.625	.615	.496	.876	.365	.135	.235	.395	.103	10			
81	.098	.752	.359	.623	.620	.493	.880	.363	.140	.232	.399	.101	0			
82	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin

27°													
	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	
0'	0'		10'		20'		30'		40'		50'		
0	.45	.89	.45	.88	.45	.88	.46	.88	.46	.88	.46	.88	60
1	.399	1.01	.658	968	917	835	175	701	433	.566	.690	431	50
2	.403	.998	.662	966	921	833	179	699	437	.564	.694	429	40
3	.408	.996	.667	964	925	831	183	697	441	.562	.699	426	30
4	.412	.994	.671	962	930	828	188	694	446	.560	.703	424	20
5	.416	.992	.675	959	934	826	192	692	450	.557	.707	422	10
6	.421	.990	.680	957	938	824	196	690	454	.555	.712	420	0
	.425	.987	.684	955	942	822	201	688	458	.553	.715	417	
	1'	59'	11'	49'	21'	39'	31'	29'	41'	19'	51'	9'	
0	.45	.89	.45	.88	.45	.88	.46	.88	.46	.88	.46	.88	60
1	.425	.987	.684	955	942	822	201	688	459	.555	.716	417	50
2	.429	.985	.688	953	947	813	205	685	463	.551	.720	415	40
3	.434	.983	.693	950	951	817	209	683	467	.546	.724	413	30
4	.438	.981	.697	948	955	815	214	681	471	.546	.729	411	20
5	.442	.979	.701	946	960	813	218	679	476	.544	.733	408	10
6	.447	.976	.705	944	964	811	222	676	480	.542	.737	406	0
	.451	.974	.710	942	.968	808	226	674	484	.539	.742	404	
	2'	58'	12'	48'	22'	38'	32'	28'	42'	18'	52'	8'	
0	.45	.89	.45	.88	.45	.88	.46	.88	.46	.88	.46	.88	60
1	.451	.974	.710	942	.968	808	226	674	484	.539	.742	404	50
2	.455	.972	.714	939	.973	806	231	672	488	.537	.746	402	40
3	.460	.970	.718	937	.977	804	235	670	493	.535	.750	399	30
4	.464	.968	.723	935	.981	802	239	667	497	.533	.754	397	20
5	.468	.965	.727	933	.986	799	244	665	501	.530	.759	395	10
6	.472	.963	.731	931	.990	797	248	663	506	.528	.763	392	0
	.477	.961	.736	928	.994	795	252	661	510	.526	.767	390	
	3'	57'	13'	47'	23'	37'	33'	27'	43'	17'	53'	7'	
0	.45	.89	.45	.88	.45	.88	.46	.88	.46	.88	.46	.88	60
1	.477	.961	.736	928	.994	795	252	661	510	.526	.767	390	50
2	.481	.959	.740	926	.998	793	257	659	514	.524	.772	388	40
	.45	.89	.45	.88	.46	.88	.46	.88	.46	.88	.46	.88	
0	.485	.957	.744	924	.003	790	261	656	.519	.521	.776	386	60
1	.490	.954	.749	922	.007	788	265	654	.523	.519	.780	383	50
2	.494	.952	.753	919	.011	786	269	652	.527	.517	.784	381	40
3	.499	.950	.757	917	.016	784	274	650	.531	.515	.789	379	30
4	.503	.948	.762	915	.020	782	278	647	.536	.512	.793	377	20
	.45	.89	.45	.88	.46	.88	.46	.88	.46	.88	.46	.88	
0	.503	.948	.762	915	.020	782	278	647	.536	.512	.793	377	60
1	.507	.946	.766	913	.024	779	282	645	.540	.510	.797	374	50
2	.511	.943	.770	911	.029	777	287	643	.544	.508	.802	372	40
3	.516	.941	.774	908	.033	775	291	641	.549	.506	.806	370	30
4	.520	.939	.779	906	.037	773	295	638	.553	.503	.810	367	20
5	.524	.937	.783	904	.042	770	300	636	.557	.501	.814	365	10
6	.529	.935	.787	902	.046	768	304	634	.561	.499	.819	363	0
	.45	.89	.45	.88	.46	.88	.46	.88	.46	.88	.46	.88	
0	.529	.935	.787	902	.046	768	304	634	.561	.499	.819	363	60
1	.533	.932	.792	899	.050	766	308	632	.566	.497	.823	361	50
2	.537	.930	.796	897	.054	764	312	629	.570	.494	.827	358	40
3	.542	.928	.800	895	.059	761	317	627	.574	.492	.832	356	30
4	.546	.926	.805	893	.063	759	321	625	.579	.490	.836	354	20
5	.550	.923	.809	891	.067	757	325	623	.583	.487	.840	352	10
6	.554	.921	.813	888	.072	755	330	620	.587	.485	.844	349	0
	.45	.89	.45	.88	.46	.88	.46	.88	.46	.88	.46	.88	
0	.554	.921	.813	888	.072	755	330	620	.587	.485	.844	349	60
1	.559	.919	.818	886	.076	753	334	618	.591	.483	.849	347	50
2	.563	.917	.822	884	.080	750	338	616	.596	.481	.853	345	40
3	.567	.915	.826	882	.085	748	342	614	.600	.478	.857	343	30
4	.572	.912	.830	880	.089	746	347	611	.604	.476	.862	340	20
5	.576	.910	.835	877	.093	744	351	609	.609	.474	.866	338	10
6	.580	.908	.839	875	.097	741	355	607	.613	.472	.870	336	0
	.45	.89	.45	.88	.46	.88	.46	.88	.46	.88	.46	.88	
0	.580	.908	.839	875	.097	741	355	607	.613	.472	.870	336	60
1	.585	.906	.843	873	.102	739	360	605	.617	.469	.874	333	50
2	.589	.904	.848	871	.106	737	364	602	.622	.467	.879	331	40
3	.593	.901	.852	868	.110	735	368	600	.626	.465	.883	329	30
	.45	.89	.45	.88	.46	.88	.46	.88	.46	.88	.46	.88	
0	.599	.900	.856	866	.115	732	373	598	.630	.463	.887	327	60
1	.602	.907	.861	864	.119	730	377	596	.634	.460	.892	324	50
2	.606	.905	.865	862	.123	728	381	593	.639	.458	.896	322	40
	.45	.89	.45	.88	.46	.88	.46	.88	.46	.88	.46	.88	
0	.606	.905	.865	862	.123	728	381	593	.639	.458	.896	322	60
1	.611	.903	.869	860	.128	726	385	591	.643	.456	.900	320	50
2	.615	.900	.874	857	.132	723	390	589	.647	.454	.904	318	40
3	.619	.898	.878	855	.136	721	394	587	.652	.451	.909	315	30
4	.624	.896	.882	853	.140	719	398	584	.656	.449	.913	313	20
5	.628	.894	.886	851	.145	717	403	582	.660	.447	.917	311	10
6	.632	.891	.891	848	.149	715	407	580	.664	.445	.921	308	0
	.45	.89	.45	.88	.46	.88	.46	.88	.46	.88	.46	.88	
0	.632	.891	.891	848	.149	715	407	580	.664	.445	.921	308	60
1	.636	.979	.895	846	.153	712	411	578	.669	.442	.926	306	50
2	.641	.977	.899	844	.158	710	416	575	.673	.440	.930	304	40
3	.645	.975	.904	842	.162	708	420	573	.677	.438	.934	302	30
4	.649	.973	.908	839	.166	706	424	571	.682	.435	.939	299	20
5	.654	.970	.912	837	.171	703	428	569	.686	.433	.943	297	10
6	.658	.968	.917	835	.175	701	433	566	.690	.431	.947	295	0
	50'		40'		30'		20'		10'		0'		
	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	

62°													
-----	--	--	--	--	--	--	--	--	--	--	--	--	--

30°															
Sine		Cosine		Sine		Cosine		Sine		Cosine		Sine		Cosine	
0'	10'	20'	30'	40'	50'	60'	70'	80'	90'	0'	10'	20'	30'	40'	50'
.50	.86	.50	.86	.50	.86	.50	.86	.51	.85	.51	.85	.51	.85	.51	.85
0	000	603	252	457	503	310	754	163	004	015	254	866	60	0	0
10	004	600	256	454	507	308	759	160	008	012	258	864	50	10	10
20	008	598	260	452	511	305	762	158	013	010	263	861	40	20	20
30	013	595	264	449	516	303	766	156	017	008	267	859	30	30	30
40	017	593	268	447	520	300	771	153	021	005	271	856	20	40	40
50	021	590	273	445	524	298	775	151	025	003	275	854	10	50	50
60	025	588	277	442	528	295	779	148	029	000	279	851	0	60	60
70	029	585	281	440	532	293	783	146	033	998	283	849	60	70	70
80	034	583	285	437	536	291	787	143	038	995	288	846	50	80	80
90	038	581	289	435	541	288	791	141	042	993	292	844	40	90	90
100	042	578	294	432	545	286	796	138	046	990	296	841	30	100	100
110	046	576	298	430	549	283	800	136	050	988	300	839	20	110	110
120	050	573	302	427	553	281	804	133	054	985	304	836	10	120	120
130	054	569	306	425	557	278	808	131	058	983	308	834	0	130	130
140	059	567	310	423	562	276	812	128	063	980	313	831	60	140	140
150	063	566	315	420	566	273	816	126	067	978	317	829	50	150	150
160	067	564	319	418	570	271	821	124	071	975	321	826	40	160	160
170	071	561	323	415	574	269	825	121	075	973	325	824	30	170	170
180	076	559	327	413	578	266	829	119	079	970	329	821	20	180	180
190	080	556	331	410	582	264	833	116	083	968	333	819	10	190	190
200	084	554	336	408	587	261	837	114	088	965	337	816	0	200	200
210	088	552	340	406	591	259	842	111	092	963	342	814	60	210	210
220	092	549	344	403	595	256	846	109	096	960	346	811	50	220	220
230	097	547	348	401	599	254	850	106	100	958	350	809	40	230	230
240	101	544	352	398	603	251	854	104	104	956	354	806	30	240	240
250	105	542	356	396	608	249	858	101	108	953	358	804	20	250	250
260	109	539	361	393	612	246	862	99	113	951	362	802	10	260	260
270	113	537	365	391	616	244	867	96	117	948	367	799	0	270	270
280	118	535	369	388	620	242	871	94	121	946	371	797	60	280	280
290	122	532	373	386	624	239	875	91	125	943	375	794	50	290	290
300	126	530	377	384	628	237	879	89	129	941	379	792	40	300	300
310	130	527	382	381	633	234	883	87	133	938	383	789	30	310	310
320	134	525	386	379	637	232	887	84	138	936	387	787	20	320	320
330	138	522	390	376	641	229	892	82	142	933	392	784	10	330	330
340	143	520	394	374	645	227	896	79	146	931	396	782	0	340	340
350	147	518	398	371	649	224	900	77	150	928	400	779	60	350	350
360	151	515	403	369	654	222	904	74	154	926	404	777	50	360	360
370	155	513	407	366	658	219	908	72	158	923	408	774	40	370	370
380	159	510	411	364	662	217	912	69	163	921	412	772	30	380	380
390	163	508	415	362	666	215	917	67	167	918	417	769	20	390	390
400	168	505	419	359	670	212	921	64	171	916	421	767	10	400	400
410	172	503	423	357	674	210	925	62	175	913	425	764	0	410	410
420	176	501	428	354	679	207	929	59	179	911	429	762	60	420	420
430	180	498	432	352	683	205	933	57	183	908	433	759	50	430	430
440	185	496	436	349	687	202	938	54	188	906	437	757	40	440	440
450	189	493	440	347	691	200	942	52	192	903	441	754	30	450	450
460	193	491	444	344	695	197	946	50	196	901	446	752	20	460	460
470	197	488	449	342	700	195	950	47	200	898	450	749	10	470	470
480	201	486	453	340	704	192	954	45	204	896	454	747	0	480	480
490	206	484	457	337	708	190	958	42	208	894	458	744	60	490	490
500	210	481	461	335	712	188	963	40	213	891	462	742	50	500	500
510	214	479	465	332	716	185	967	37	217	889	466	739	40	510	510
520	218	476	470	330	720	183	971	35	221	886	471	737	30	520	520
530	222	474	474	327	725	180	975	32	225	884	475	734	20	530	530
540	227	471	478	325	729	178	979	30	229	881	479	732	10	540	540
550	231	469	482	322	733	175	983	27	233	879	483	729	0	550	550
560	235	466	486	320	737	173	988	25	238	876	487	727	60	560	560
570	239	464	490	318	741	170	992	22	242	874	491	724	50	570	570
580	243	462	495	315	745	168	996	20	246	871	496	722	40	580	580
590	248	459	499	313	750	165	000	17	250	869	500	719	30	590	590
600	252	457	503	310	754	163	004	15	254	866	504	717	20	600	600
610	256	455	507	308	759	160	008	12	258	864	508	715	10	610	610
620	260	452	511	305	762	158	013	10	263	861	512	713	0	620	620
630	264	449	516	303	766	156	017	08	267	859	516	711	60	630	630
640	268	447	520	300	771	153	021	05	271	856	520	709	50	640	640
650	273	445	524	298	775	151	025	03	275	854	524	707	40	650	650
660	277	442	528	295	779	148	029	00	279	851	528	705	30	660	660
670	281	440	532	293	783	146	033	99	283	849	532	703	20	670	670
680	285	437	536	291	787	143	038	95	288	846	536	701	10	680	680
690	289	435	541	288	791	141	042	93	292	844	541	699	0	690	690
700	294	432	545	286	796	138	046	90	296	841	545	697	60	700	700
710	298	430	549	283	800	136	050	88	300	839	549	695	50	710	710
720	302	427	553	281	804	133	054	85	304	836	553	693	40	720	720
730	306	425	557	278	808	131	058	83	308	834	557	691	30	730	730
740	310	423	562	276	812	128	063	80	313	831	562	689	20	740	740
750	315	420	566	273	816	126	067	78	317	829	566	687	10	750	750
760	319	418	570	271	821	124	071	75	321	826	570	685	0	760	760
770	323	415	574	269	825	121	075	73	325	824	574	683	60	770	770
780	327	413	578	266	829	119	079	70	329	821	578	681	50	780	780
790	331	410	582	264	833	116	083	68	333	819	582	679	40	790	790
800	336	408	587	261	837	114	088	65	337	816	587	677	30	800	800
810	340	406	591	259	842	111	092	63	342	814	591	675	20	810	810
820	344	403	595	256	846	109	096	60	346	811	595	673	10	820	820
830	348	401	599	254	850	106	100	58	350	809	599	671	0	830	830
840	352	398	603	251	854	104	104	56	354	806	603	669	60	840	840
850	356	396	608	249	858	101	108	53	358	804	608	667	50	850	850
860	361	393	612	246	862	99	113	51	362	802	612	665	40	860	860
870	365	391	616	244	867	96	117	48	367	799	616	663	30	870	870
880	369	388	620	242	871	94	121	46	371	797	620	661	20	880	880
890	373	386	624	239	875	91	125	43	375	794	624	659	10	890	890

32°												
"	0'		10'		20'		30'		40'		50'	
	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos
0	.52	.84	.53	.84	.53	.84	.53	.84	.53	.84	.54	.84
10	.992	.805	.238	.650	.484	.495	.730	.339	.975	.182	.220	.025
	.996	.802	.242	.648	.488	.492	.734	.337	.979	.180	.224	.022
20	.53	.84	.53	.84	.53	.84	.53	.84	.53	.84	.54	.84
30	.000	.800	.247	.645	.493	.490	.738	.334	.983	.177	.228	.020
40	.004	.797	.251	.643	.497	.487	.742	.331	.987	.175	.232	.017
50	.008	.795	.255	.640	.501	.485	.746	.329	.991	.172	.236	.015
	.012	.792	.259	.637	.505	.482	.750	.326	.995	.169	.240	.012
60	.53	.84	.53	.84	.53	.84	.53	.84	.54	.84	.54	.84
	.017	.789	.263	.635	.509	.480	.754	.324	.000	.167	.244	.009
	.53	.84	.53	.84	.53	.84	.53	.84	.54	.84	.54	.84
	.017	.789	.263	.635	.509	.480	.754	.324	.000	.167	.244	.009
10	.021	.787	.267	.632	.513	.477	.759	.321	.004	.164	.248	.007
20	.025	.784	.271	.630	.517	.474	.763	.318	.008	.162	.252	.004
30	.029	.782	.275	.627	.521	.472	.767	.316	.012	.159	.256	.001
40	.53	.84	.53	.84	.53	.84	.53	.84	.54	.84	.54	.83
	.033	.779	.279	.624	.525	.469	.771	.313	.016	.156	.260	.999
50	.037	.777	.284	.622	.529	.467	.775	.310	.020	.154	.265	.996
60	.041	.774	.288	.619	.534	.464	.779	.308	.024	.151	.269	.994
	.53	.84	.53	.84	.53	.84	.53	.84	.54	.84	.54	.83
	.041	.774	.288	.619	.534	.464	.779	.308	.024	.151	.269	.994
10	.045	.771	.292	.617	.538	.461	.783	.305	.028	.148	.273	.991
20	.049	.769	.296	.614	.542	.459	.787	.303	.032	.146	.277	.988
30	.054	.766	.300	.612	.546	.456	.791	.300	.036	.143	.281	.986
40	.058	.764	.304	.609	.550	.454	.795	.297	.040	.141	.285	.983
50	.062	.761	.308	.606	.554	.451	.799	.295	.044	.138	.289	.980
60	.066	.759	.312	.604	.558	.448	.804	.292	.049	.135	.293	.978
	.53	.84	.53	.84	.53	.84	.53	.84	.54	.84	.54	.83
	.066	.759	.312	.604	.558	.448	.804	.292	.049	.135	.293	.978
10	.070	.756	.316	.601	.562	.446	.808	.290	.053	.133	.297	.975
20	.074	.753	.320	.599	.566	.443	.812	.287	.057	.130	.301	.973
30	.078	.751	.325	.596	.570	.441	.816	.284	.061	.128	.305	.970
40	.082	.748	.329	.593	.574	.438	.820	.282	.065	.125	.309	.967
50	.086	.746	.333	.591	.579	.435	.824	.279	.069	.122	.313	.965
60	.091	.743	.337	.588	.583	.433	.828	.277	.073	.120	.317	.962
	.53	.84	.53	.84	.53	.84	.53	.84	.54	.84	.54	.83
	.091	.743	.337	.588	.583	.433	.828	.277	.073	.120	.317	.962
10	.095	.741	.341	.586	.587	.430	.832	.274	.077	.117	.321	.959
20	.099	.738	.345	.583	.591	.428	.836	.271	.081	.114	.325	.957
30	.103	.735	.349	.581	.595	.425	.840	.269	.085	.112	.330	.954
40	.107	.733	.353	.578	.599	.422	.844	.266	.089	.109	.334	.951
50	.111	.730	.357	.575	.603	.420	.848	.264	.093	.107	.338	.949
60	.115	.728	.361	.573	.607	.417	.853	.261	.097	.104	.342	.946
	.53	.84	.53	.84	.53	.84	.53	.84	.54	.84	.54	.83
	.115	.728	.361	.573	.607	.417	.853	.261	.097	.104	.342	.946
10	.119	.725	.366	.570	.611	.415	.857	.258	.102	.101	.346	.944
20	.123	.722	.370	.568	.615	.412	.861	.256	.106	.099	.350	.941
30	.128	.720	.374	.565	.620	.409	.865	.253	.110	.096	.354	.938
40	.132	.717	.378	.562	.624	.407	.869	.250	.114	.093	.358	.936
50	.136	.715	.382	.560	.628	.404	.873	.248	.118	.091	.362	.933
60	.140	.712	.386	.557	.632	.402	.877	.245	.122	.089	.366	.930
	.53	.84	.53	.84	.53	.84	.53	.84	.54	.84	.54	.83
	.140	.712	.386	.557	.632	.402	.877	.245	.122	.089	.366	.930
10	.144	.710	.390	.555	.636	.399	.881	.243	.126	.086	.370	.928
20	.148	.707	.394	.552	.640	.396	.885	.240	.130	.083	.374	.925
30	.152	.704	.398	.549	.644	.394	.889	.237	.134	.080	.378	.922
40	.156	.702	.402	.547	.648	.391	.893	.235	.138	.078	.382	.920
50	.160	.699	.407	.544	.652	.389	.898	.232	.142	.075	.387	.917
60	.164	.697	.411	.542	.656	.386	.902	.230	.146	.072	.391	.915
	.53	.84	.53	.84	.53	.84	.53	.84	.54	.84	.54	.83
	.164	.697	.411	.542	.656	.386	.902	.230	.146	.072	.391	.915
10	.169	.694	.415	.539	.660	.383	.906	.227	.150	.070	.395	.912
20	.173	.692	.419	.537	.665	.381	.910	.224	.155	.067	.399	.909
30	.177	.689	.423	.534	.669	.378	.914	.222	.159	.065	.403	.907
40	.181	.686	.427	.531	.673	.376	.918	.219	.163	.062	.407	.904
50	.185	.684	.431	.529	.677	.373	.922	.216	.167	.059	.411	.901
60	.189	.681	.435	.526	.681	.370	.926	.214	.171	.057	.415	.899
	.53	.84	.53	.84	.53	.84	.53	.84	.54	.84	.54	.83
	.189	.681	.435	.526	.681	.370	.926	.214	.171	.057	.415	.899
10	.193	.679	.439	.524	.685	.368	.930	.211	.175	.054	.419	.896
20	.197	.676	.443	.521	.689	.365	.934	.209	.179	.051	.423	.893
30	.201	.674	.448	.518	.693	.363	.938	.206	.183	.049	.427	.891
40	.206	.671	.452	.516	.697	.360	.942	.203	.187	.046	.431	.888
50	.210	.668	.456	.513	.701	.357	.946	.201	.191	.044	.435	.886
60	.214	.666	.460	.511	.705	.355	.951	.198	.195	.041	.440	.883
	.53	.84	.53	.84	.53	.84	.53	.84	.54	.84	.54	.83
	.214	.666	.460	.511	.705	.355	.951	.198	.195	.041	.440	.883
10	.218	.663	.464	.508	.710	.352	.955	.196	.199	.038	.444	.880
20	.222	.661	.468	.505	.714	.350	.959	.193	.203	.036	.448	.878
30	.226	.659	.472	.503	.718	.347	.963	.190	.207	.033	.452	.875
40	.230	.655	.476	.500	.722	.344	.967	.188	.212	.030	.456	.872
50	.234	.653	.480	.498	.726	.342	.971	.185	.216	.028	.460	.870
60	.238	.650	.484	.495	.730	.339	.975	.182	.220	.025	.464	.867
	.50'	.80'	.50'	.80'	.50'	.80'	.50'	.80'	.50'	.80'	.50'	.80'
	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin

57°

33°													
"	0'		10'		20'		30'		40'		50'		"
	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	
0	.54	.83	.54	.83	.54	.83	.55	.83	.55	.83	.55	.83	60
10	.464	.867	.708	.708	.951	.549	.194	.389	.436	.228	.678	.066	50
20	.468	.864	.712	.706	.955	.546	.198	.386	.440	.225	.682	.063	40
30	.472	.862	.716	.703	.959	.543	.202	.383	.444	.222	.686	.061	30
40	.476	.859	.720	.700	.963	.541	.206	.381	.448	.220	.690	.058	20
50	.480	.856	.724	.698	.967	.538	.210	.378	.452	.217	.694	.055	10
60	.484	.854	.728	.695	.971	.535	.214	.375	.456	.214	.698	.053	0
	.488	.851	.732	.692	.975	.533	.218	.373	.460	.212	.702	.050	
	1'	53'	44'	49'	24'	39'	34'	29'	47'	19'	54'	9'	
0	.54	.83	.54	.83	.54	.83	.55	.83	.55	.83	.55	.83	60
10	.488	.851	.732	.692	.975	.533	.218	.373	.460	.212	.702	.050	50
20	.492	.849	.736	.690	.979	.530	.222	.370	.464	.209	.706	.047	40
30	.496	.846	.740	.687	.983	.527	.226	.367	.468	.206	.710	.044	30
40	.500	.843	.744	.684	.987	.525	.230	.364	.472	.203	.714	.042	20
50	.505	.841	.748	.682	.991	.522	.234	.362	.476	.201	.718	.039	10
60	.509	.838	.752	.679	.995	.519	.238	.359	.480	.198	.722	.036	0
	.54	.83	.54	.83	.55	.83	.55	.83	.55	.83	.55	.83	
60	.513	.835	.756	.676	.000	.517	.242	.356	.484	.195	.726	.034	0
	2'	58'	12'	46'	22'	38'	32'	28'	42'	18'	52'	8'	
0	.54	.83	.54	.83	.55	.83	.55	.83	.55	.83	.55	.83	60
10	.513	.835	.756	.676	.000	.517	.242	.356	.484	.195	.726	.034	50
20	.517	.833	.760	.674	.004	.514	.246	.354	.488	.193	.730	.031	40
30	.521	.830	.764	.671	.008	.511	.250	.351	.493	.190	.734	.028	30
40	.525	.827	.768	.668	.012	.509	.254	.348	.497	.187	.738	.026	20
50	.529	.825	.773	.666	.016	.506	.258	.346	.501	.185	.742	.023	10
60	.533	.822	.777	.663	.020	.503	.262	.343	.505	.182	.746	.020	0
	.537	.820	.781	.660	.024	.501	.266	.340	.509	.179	.750	.017	
	3'	57'	13'	47'	23'	37'	33'	27'	43'	17'	53'	7'	
0	.54	.83	.54	.83	.55	.83	.55	.83	.55	.83	.55	.83	60
10	.537	.820	.781	.660	.024	.501	.266	.340	.509	.179	.750	.017	50
20	.541	.817	.785	.658	.028	.498	.270	.338	.513	.177	.754	.015	40
30	.545	.814	.789	.655	.032	.495	.275	.335	.517	.174	.758	.012	30
40	.549	.812	.793	.653	.036	.493	.279	.332	.521	.171	.762	.009	20
50	.553	.809	.797	.650	.040	.490	.283	.330	.525	.168	.766	.007	10
60	.557	.806	.801	.647	.044	.487	.287	.327	.529	.166	.770	.004	0
	.561	.804	.805	.645	.048	.485	.291	.324	.533	.163	.775	.001	
	4'	56'	14'	46'	24'	36'	34'	28'	44'	16'	54'	6'	
0	.54	.83	.54	.83	.55	.83	.55	.83	.55	.83	.55	.83	60
10	.561	.804	.805	.645	.048	.485	.291	.324	.533	.163	.775	.001	50
	.54	.83	.54	.83	.55	.83	.55	.83	.55	.83	.55	.83	
10	.566	.803	.809	.642	.052	.482	.295	.322	.537	.160	.779	.999	50
20	.570	.798	.813	.639	.056	.479	.299	.319	.541	.158	.783	.996	40
30	.574	.796	.817	.637	.060	.477	.303	.316	.545	.155	.787	.993	30
40	.578	.793	.821	.634	.064	.474	.307	.314	.549	.152	.791	.990	20
50	.582	.790	.825	.631	.068	.471	.311	.311	.553	.150	.795	.988	10
60	.586	.788	.829	.629	.072	.469	.315	.308	.557	.147	.799	.985	0
	5'	55'	15'	45'	25'	35'	35'	25'	45'	15'	55'	5'	
0	.54	.83	.54	.83	.55	.83	.55	.83	.55	.83	.55	.83	60
10	.586	.788	.829	.629	.072	.469	.315	.308	.557	.147	.799	.985	50
20	.590	.785	.833	.626	.076	.466	.319	.306	.561	.144	.803	.982	40
30	.594	.782	.837	.623	.080	.463	.323	.303	.565	.142	.807	.980	30
40	.598	.780	.841	.621	.084	.461	.327	.300	.569	.139	.811	.977	20
50	.602	.777	.846	.618	.088	.458	.331	.297	.573	.136	.815	.974	10
60	.606	.775	.850	.615	.093	.455	.335	.295	.577	.133	.819	.971	0
	.610	.772	.854	.613	.097	.453	.339	.292	.581	.131	.823	.969	
	6'	54'	16'	44'	26'	34'	36'	24'	46'	14'	56'	4'	
0	.54	.83	.54	.83	.55	.83	.55	.83	.55	.83	.55	.83	60
10	.610	.772	.854	.613	.097	.453	.339	.292	.581	.131	.823	.969	50
20	.614	.769	.858	.610	.101	.450	.343	.290	.585	.128	.827	.966	40
30	.618	.767	.862	.607	.105	.447	.347	.287	.589	.125	.831	.963	30
40	.622	.764	.866	.605	.109	.445	.351	.284	.593	.123	.835	.961	20
50	.626	.761	.870	.602	.113	.442	.355	.281	.597	.120	.839	.958	10
60	.630	.759	.874	.599	.117	.439	.359	.279	.601	.117	.843	.955	0
	.635	.756	.878	.597	.121	.437	.363	.276	.605	.115	.847	.953	
	7'	53'	17'	43'	27'	33'	37'	23'	47'	13'	57'	3'	
0	.54	.83	.54	.83	.55	.83	.55	.83	.55	.83	.55	.83	60
10	.635	.756	.878	.597	.121	.437	.363	.276	.605	.115	.847	.953	50
20	.639	.753	.882	.594	.125	.434	.367	.273	.609	.112	.851	.950	40
30	.643	.751	.886	.591	.129	.431	.371	.271	.613	.109	.855	.947	30
40	.647	.748	.890	.589	.133	.429	.375	.268	.617	.107	.859	.944	20
50	.651	.745	.894	.586	.137	.426	.380	.265	.622	.104	.863	.942	10
60	.655	.743	.898	.583	.141	.423	.384	.263	.626	.101	.867	.939	0
	.659	.740	.902	.581	.145	.421	.388	.260	.630	.098	.871	.936	
	8'	52'	18'	42'	28'	32'	38'	22'	48'	12'	58'	2'	
0	.54	.83	.54	.83	.55	.83	.55	.83	.55	.83	.55	.83	60
10	.659	.740	.902	.581	.145	.421	.388	.260	.630	.098	.871	.936	50
20	.663	.737	.906	.578	.149	.418	.392	.257	.634	.096	.875	.934	40
30	.667	.735	.910	.575	.153	.415	.396	.255	.638	.093	.879	.931	30
40	.671	.732	.914	.573	.157	.413	.400	.252	.642	.090	.883	.928	20
50	.675	.729	.918	.570	.161	.410	.404	.249	.646	.088	.887	.925	10
60	.679	.727	.923	.567	.165	.407	.408	.246	.650	.085	.891	.923	0
	.683	.724	.927	.565	.169	.405	.412	.244	.654	.082	.895	.920	
	9'	51'	19'	41'	29'	31'	39'	21'	49'	11'	59'	1'	
0	.54	.83	.54	.83	.55	.83	.55	.83	.55	.83	.55	.83	60
10	.683	.724	.927	.565	.169	.405	.412	.244	.654	.082	.895	.920	50
20	.687	.722	.931	.562	.173	.402	.416	.241	.658	.080	.899	.917	40
30	.691	.719	.935	.559	.176	.399	.420	.238	.662	.077	.903	.915	30
40	.695	.716	.939	.557	.180	.397	.424	.236	.666	.074	.907	.912	20
50	.699	.714	.943	.554	.184	.394	.428	.233	.670	.071	.911	.909	10
60	.704	.711	.947	.551	.188	.391	.432	.230	.674	.069	.915	.906	0
	.708	.708	.951	.548	.192	.389	.436	.228	.678	.066	.919	.904	
	50'		40'		30'		20'		10'		0'		
	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	"
56°													

34°															
	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	
"	0'		10'		20'		30'		40'		50'				
0	.55	.82	.56	.82	.56	.82	.56	.82	.56	.82	.57	.82			
10	919	904	160	741	401	577	641	413	880	249	119	082			60
20	923	901	164	738	405	574	645	410	884	245	123	079			50
30	927	898	168	735	409	572	649	407	888	242	127	076			40
40	931	896	172	733	413	569	653	404	892	239	131	073			30
50	935	893	176	730	417	566	657	402	896	236	135	071			20
60	939	890	180	727	421	563	661	399	900	234	139	068			10
	943	887	184	724	425	561	665	396	904	231	143	065			0
		39'		49'		39'		29'		19'		9'			
0	.55	.82	.56	.82	.56	.82	.56	.82	.56	.82	.57	.82			
10	943	887	184	724	425	561	665	396	904	231	143	065			60
20	947	885	188	722	429	558	669	393	908	228	147	062			50
30	951	882	192	719	433	555	673	391	912	225	151	060			40
40	955	879	196	716	437	552	677	388	916	223	155	057			30
50	959	877	200	714	441	550	681	385	920	220	159	054			20
60	963	874	204	711	445	547	685	382	924	217	163	051			10
	968	871	208	708	449	544	689	380	928	214	167	048			0
		58'		48'		38'		28'		18'		8'			
0	.55	.82	.56	.82	.56	.82	.56	.82	.56	.82	.57	.82			
10	968	871	208	708	449	544	689	380	928	214	167	048			60
20	972	868	212	705	453	541	693	377	932	212	171	046			50
30	976	866	216	703	457	539	697	374	936	209	175	043			40
40	980	863	220	700	461	536	701	371	940	206	179	040			30
50	984	860	224	697	465	533	705	369	944	203	183	037			20
60	988	858	228	694	469	531	709	366	948	201	187	035			10
	992	855	232	692	473	528	713	363	952	198	191	032			0
		37'		47'		37'		27'		17'		7'			
0	.55	.82	.56	.82	.56	.82	.56	.82	.56	.82	.57	.82			
10	992	855	232	692	473	528	713	363	952	198	191	032			60
	996	852	236	689	477	525	717	360	956	195	195	029			50
		56'		46'		36'		26'		16'		6'			
0	.56	.82	.56	.82	.56	.82	.56	.82	.56	.82	.57	.82			
10	000	850	240	686	481	522	721	358	960	192	199	026			60
20	004	847	244	684	485	520	724	355	964	190	203	024			50
30	008	844	248	681	489	517	728	352	968	187	207	021			40
40	012	841	252	678	493	514	732	349	972	184	211	018			30
50	016	839	256	675	497	511	736	347	976	181	215	015			20
		56'		46'		36'		26'		16'		6'			
0	.56	.82	.56	.82	.56	.82	.56	.82	.56	.82	.57	.82			
10	016	839	256	675	497	511	736	347	976	181	215	015			60
20	020	836	260	673	501	509	740	344	980	179	219	012			50
30	024	833	264	670	505	506	744	341	984	176	223	010			40
40	028	830	268	667	509	503	748	338	988	173	227	007			30
50	032	828	272	664	513	500	752	336	992	170	231	004			20
60	036	825	276	662	517	498	756	333	996	167	235	001			10
		56'		46'		36'		26'		16'		6'			
0	.56	.82	.56	.82	.56	.82	.56	.82	.57	.82	.57	.81			
10	040	822	280	659	521	495	760	330	000	165	238	999			60
20	044	820	284	656	525	492	764	327	004	162	242	996			50
30	048	817	289	654	529	489	768	325	008	159	246	993			40
40	052	814	293	651	533	487	772	322	012	156	250	990			30
50	056	811	297	648	537	484	776	319	016	154	254	987			20
60	060	809	301	645	541	481	780	316	020	151	258	985			10
	064	806	305	643	545	478	784	314	024	148	262	982			0
		54'		44'		34'		24'		14'		4'			
0	.56	.82	.56	.82	.56	.82	.56	.82	.57	.82	.57	.81			
10	064	806	305	643	545	478	784	314	024	148	262	982			60
20	068	803	309	640	549	476	788	311	028	145	266	979			50
30	072	801	313	637	553	473	792	308	032	143	270	976			40
40	076	799	317	634	557	470	796	305	036	140	274	974			30
50	080	795	321	632	561	468	800	303	040	137	278	971			20
60	084	792	325	629	565	465	804	300	044	134	282	968			10
	088	790	329	626	569	462	808	297	048	132	286	965			0
		33'		43'		33'		23'		13'		3'			
0	.56	.82	.56	.82	.56	.82	.56	.82	.57	.82	.57	.81			
10	088	790	329	626	569	462	808	297	048	132	286	965			60
20	092	787	333	623	573	459	812	294	051	129	290	962			50
30	096	784	337	621	577	457	816	292	055	126	294	960			40
40	100	782	341	618	581	454	820	289	059	123	298	957			30
50	104	779	345	615	585	451	824	286	063	120	302	954			20
60	108	776	349	613	589	448	828	283	067	118	306	951			10
	112	773	353	610	593	446	832	281	071	115	310	949			0
		32'		42'		32'		22'		12'		2'			
0	.56	.82	.56	.82	.56	.82	.56	.82	.57	.82	.57	.81			
10	112	773	353	610	593	446	832	281	071	115	310	949			60
20	116	771	357	607	597	443	836	278	075	112	314	946			50
30	120	768	361	604	601	440	840	275	079	109	318	943			40
40	124	765	365	602	605	437	844	272	083	107	322	940			30
50	128	763	369	599	609	435	848	270	087	104	326	937			20
60	132	760	373	596	613	432	852	267	091	101	330	935			10
	136	757	377	593	617	429	856	264	095	098	334	932			0
		31'		41'		31'		21'		11'		1'			
0	.56	.82	.56	.82	.56	.82	.56	.82	.57	.82	.57	.81			
10	136	757	377	593	617	429	856	264	095	098	334	932			60
20	140	754	381	591	621	426	860	261	099	096	338	929			50
30	144	752	385	588	625	424	864	259	103	093	342	926			40
40	148	749	389	585	629	421	868	256	107	090	346	924			30
50	152	746	393	582	633	418	872	253	111	087	350	921			20
60	156	743	397	580	637	415	876	250	115	084	354	918			10
	160	741	401	577	641	413	880	248	119	082	358	915			0
		50'		40'		30'		20'		10'		0'			
	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin			"
55°															

36°											
°	Sin		Cos		Tan		Cot		Sec		°
	0'	10'	20'	30'	40'	50'	60'	70'	80'	90'	
0	.58	.80	.59	.80	.59	.80	.59	.80	.59	.80	60
10	.779	.902	.614	.730	.648	.558	.482	.386	.316	.212	50
20	.782	.899	.618	.728	.652	.556	.486	.383	.312	.209	40
30	.786	.896	.621	.725	.655	.553	.490	.380	.310	.207	30
40	.790	.893	.625	.722	.658	.550	.494	.377	.308	.204	20
50	.794	.890	.629	.719	.664	.547	.498	.374	.306	.201	10
60	.798	.887	.633	.716	.668	.544	.502	.371	.304	.198	0
70	.802	.885	.637	.713	.672	.541	.506	.368	.302	.195	10
80	.806	.883	.641	.710	.676	.538	.510	.365	.300	.192	20
90	.810	.882	.645	.707	.679	.535	.513	.363	.298	.189	30
100	.814	.879	.649	.705	.683	.533	.517	.360	.296	.186	40
110	.818	.877	.653	.702	.687	.530	.521	.357	.294	.183	50
120	.822	.875	.657	.699	.691	.527	.525	.354	.292	.180	60
130	.826	.873	.661	.696	.695	.524	.529	.351	.290	.178	70
140	.830	.871	.665	.693	.699	.521	.533	.348	.288	.175	80
150	.834	.869	.669	.690	.703	.518	.537	.345	.286	.172	90
160	.837	.867	.673	.687	.707	.515	.541	.342	.284	.169	0
170	.841	.865	.677	.685	.711	.512	.545	.340	.282	.166	10
180	.845	.863	.681	.682	.715	.510	.549	.337	.280	.163	20
190	.849	.861	.685	.679	.719	.507	.552	.334	.278	.160	30
200	.853	.859	.689	.676	.723	.504	.556	.331	.276	.157	40
210	.857	.857	.693	.673	.727	.501	.560	.328	.274	.154	50
220	.861	.854	.697	.670	.731	.498	.564	.325	.272	.151	60
230	.865	.852	.701	.667	.735	.495	.568	.322	.270	.149	70
240	.869	.850	.705	.664	.739	.492	.572	.319	.268	.146	80
250	.873	.848	.709	.662	.743	.489	.576	.316	.266	.143	90
260	.877	.846	.713	.659	.747	.486	.580	.313	.264	.140	0
270	.881	.844	.717	.656	.751	.483	.584	.310	.262	.137	10
280	.885	.842	.721	.653	.755	.480	.588	.307	.260	.134	20
290	.889	.840	.725	.650	.759	.477	.592	.304	.258	.131	30
300	.893	.838	.729	.647	.763	.474	.596	.301	.256	.128	40
310	.897	.836	.733	.644	.767	.471	.600	.298	.254	.125	50
320	.901	.834	.737	.641	.771	.468	.604	.295	.252	.122	60
330	.905	.832	.741	.638	.775	.465	.608	.292	.250	.119	70
340	.909	.830	.745	.635	.779	.462	.612	.289	.248	.116	80
350	.913	.828	.749	.632	.783	.459	.616	.286	.246	.113	90
360	.917	.826	.753	.629	.787	.456	.620	.283	.244	.110	0
370	.921	.824	.757	.626	.791	.453	.624	.280	.242	.107	10
380	.925	.822	.761	.623	.795	.450	.628	.277	.240	.104	20
390	.929	.820	.765	.620	.799	.447	.632	.274	.238	.101	30
400	.933	.818	.769	.617	.803	.444	.636	.271	.236	.098	40
410	.937	.816	.773	.614	.807	.441	.640	.268	.234	.095	50
420	.941	.814	.777	.611	.811	.438	.644	.265	.232	.092	60
430	.945	.812	.781	.608	.815	.435	.648	.262	.230	.089	70
440	.949	.810	.785	.605	.819	.432	.652	.259	.228	.086	80
450	.953	.808	.789	.602	.823	.429	.656	.256	.226	.083	90
460	.957	.806	.793	.599	.827	.426	.660	.253	.224	.080	0
470	.961	.804	.797	.596	.831	.423	.664	.250	.222	.077	10
480	.965	.802	.801	.593	.835	.420	.668	.247	.220	.074	20
490	.969	.800	.805	.590	.839	.417	.672	.244	.218	.071	30
500	.973	.798	.809	.587	.843	.414	.676	.241	.216	.068	40
510	.977	.796	.813	.584	.847	.411	.680	.238	.214	.065	50
520	.981	.794	.817	.581	.851	.408	.684	.235	.212	.062	60
530	.985	.792	.821	.578	.855	.405	.688	.232	.210	.059	70
540	.989	.790	.825	.575	.859	.402	.692	.229	.208	.056	80
550	.993	.788	.829	.572	.863	.399	.696	.226	.206	.053	90
560	.997	.786	.833	.569	.867	.396	.700	.223	.204	.050	0
570	.999	.784	.837	.566	.871	.393	.704	.220	.202	.047	10
580	.999	.782	.841	.563	.875	.390	.708	.217	.200	.044	20
590	.999	.780	.845	.560	.879	.387	.712	.214	.198	.041	30
600	.999	.778	.849	.557	.883	.384	.716	.211	.196	.038	40
610	.999	.776	.853	.554	.887	.381	.720	.208	.194	.035	50
620	.999	.774	.857	.551	.891	.378	.724	.205	.192	.032	60
630	.999	.772	.861	.548	.895	.375	.728	.202	.190	.029	70
640	.999	.770	.865	.545	.899	.372	.732	.199	.188	.026	80
650	.999	.768	.869	.542	.903	.369	.736	.196	.186	.023	90
660	.999	.766	.873	.539	.907	.366	.740	.193	.184	.020	0
670	.999	.764	.877	.536	.911	.363	.744	.190	.182	.017	10
680	.999	.762	.881	.533	.915	.360	.748	.187	.180	.014	20
690	.999	.760	.885	.530	.919	.357	.752	.184	.178	.011	30
700	.999	.758	.889	.527	.923	.354	.756	.181	.176	.008	40
710	.999	.756	.893	.524	.927	.351	.760	.178	.174	.005	50
720	.999	.754	.897	.521	.931	.348	.764	.175	.172	.002	60
730	.999	.752	.901	.518	.935	.345	.768	.172	.170	.000	70
740	.999	.750	.905	.515	.939	.342	.772	.169	.168	.000	80
750	.999	.748	.909	.512	.943	.339	.776	.166	.166	.000	90
760	.999	.746	.913	.509	.947	.336	.780	.163	.164	.000	0
770	.999	.744	.917	.506	.951	.333	.784	.160	.162	.000	10
780	.999	.742	.921	.503	.955	.330	.788	.157	.160	.000	20
790	.999	.740	.925	.500	.959	.327	.792	.154	.158	.000	30
800	.999	.738	.929	.497	.963	.324	.796	.151	.156	.000	40
810	.999	.736	.933	.494	.967	.321	.800	.148	.154	.000	50
820	.999	.734	.937	.491	.971	.318	.804	.145	.152	.000	60
830	.999	.732	.941	.488	.975	.315	.808	.142	.150	.000	70
840	.999	.730	.945	.485	.979	.312	.812	.139	.148	.000	80
850	.999	.728	.949	.482	.983	.309	.816	.136	.146	.000	90
860	.999	.726	.953	.479	.987	.306	.820	.133	.144	.000	0
870	.999	.724	.957	.476	.991	.303	.824	.130	.142	.000	10
880	.999	.722	.961	.473	.995	.300	.828	.127	.140	.000	20
890	.999	.720	.965	.470	.999	.297	.832	.124	.138	.000	30
900	.999	.718	.969	.467	1.000	.294	.836	.121	.136	.000	40
910	.999	.716	.973	.464	1.000	.291	.840	.118	.134	.000	50
920	.999	.714	.977	.461	1.000	.288	.844	.115	.132	.000	60
930	.999	.712	.981	.458	1.000	.285	.848	.112	.130	.000	70
940	.999	.710	.985	.455	1.000	.282	.852	.109	.128	.000	80
950	.999	.708	.989	.452	1.000	.279	.856	.106	.126	.000	90
960	.999	.706	.993	.449	1.000	.276	.860	.103	.124	.000	0
970	.999	.704	.997	.446	1.000	.273	.864	.100	.122	.000	10
980	.999	.702	.999	.443	1.000	.270	.868	.097	.120	.000	20
990	.999	.700	1.000	.440	1.000	.267	.872	.094	.118	.000	30
1000	.999	.698	1.000	.437	1.000	.264	.876	.091	.116	.000	40
1010	.999	.696	1.000	.434	1.000	.261	.880	.088	.114	.000	50
1020	.999	.694	1.000	.431	1.000	.258	.884	.085	.112	.000	60
1030	.999	.692	1.000	.428	1.000	.255	.888	.082	.110	.000	70
1040	.999	.690	1.000	.425	1.000	.252	.892	.079	.108	.000	80
1050	.999	.688	1.000	.422	1.000	.249	.896	.076	.106	.000	90
1060	.999	.686	1.000	.419	1.000	.246	.900	.073	.104	.000	0
1070	.999	.684	1.000	.416	1.000	.243	.904	.070	.102	.000	10
1080	.999	.682	1.000	.413	1.000	.240	.908	.067	.100	.000	20
1090	.999	.680	1.000	.410	1.000	.237	.912	.064	.098	.000	30
1100	.999	.678	1.000	.407	1.000	.234	.916	.061	.096	.000	40
1110	.999	.676	1.000	.404	1.000	.231	.920	.058	.094	.000	50
1120	.999	.674	1.000	.401	1.000	.228	.924	.055	.092	.000	60
1130	.999	.672	1.000	.398	1.000	.225	.928	.052	.090	.000	70
1140	.999	.670	1.000	.395	1.000	.222	.932	.049	.088	.000	80
1150	.999	.668	1.000	.392	1.000	.219	.936	.046	.086	.000	90
1160	.999	.666	1.000	.389	1.000	.216	.940	.043	.084	.000	0
1170	.999	.664	1.000	.386	1.000	.213	.944	.040	.082	.000	10
1180	.999	.662	1.000	.383	1.000	.210	.948	.037	.080	.000	20
1190</											

38°																
"	Sin		Cos		Sin		Cos		Sin		Cos		Sin		Cos	
	0'		10'		20'		30'		40'		50'		60'			
0	.61	.78	.61	.78	.62	.78	.62	.78	.62	.78	.62	.78	.62	.78	.62	.77
10	.566	.801	.795	.622	.624	.442	.251	.261	.479	.079	.706	.897	.60			
20	.570	.798	.799	.619	.627	.439	.255	.258	.483	.076	.709	.894	50			
30	.574	.795	.803	.616	.631	.436	.259	.255	.486	.073	.713	.891	40			
40	.578	.792	.807	.613	.635	.433	.263	.252	.490	.070	.717	.888	30			
50	.581	.789	.810	.610	.639	.430	.267	.249	.494	.067	.721	.885	20			
60	.585	.786	.814	.607	.643	.427	.270	.246	.498	.064	.725	.882	10			
	.589	.783	.818	.604	.646	.424	.274	.243	.502	.061	.728	.879	0			
	.593	.780	.822	.601	.650	.421	.278	.240	.505	.058	.732	.876	60			
0	.597	.777	.826	.598	.654	.418	.282	.237	.509	.055	.736	.873	50			
10	.601	.774	.829	.595	.658	.414	.286	.234	.513	.052	.740	.870	40			
20	.604	.771	.833	.592	.662	.411	.289	.231	.517	.049	.743	.867	30			
30	.608	.768	.837	.589	.665	.408	.293	.228	.520	.046	.747	.864	20			
40	.612	.765	.841	.586	.669	.405	.297	.225	.524	.043	.751	.861	10			
50	.616	.762	.845	.583	.673	.402	.301	.222	.528	.040	.755	.858	0			
60	.620	.759	.848	.580	.677	.399	.305	.219	.532	.037	.759	.855	60			
0	.623	.756	.852	.577	.681	.396	.308	.216	.536	.034	.762	.852	50			
10	.627	.753	.856	.574	.684	.393	.312	.212	.539	.031	.766	.849	40			
20	.631	.750	.860	.571	.688	.390	.316	.209	.543	.028	.770	.846	30			
30	.635	.747	.864	.568	.692	.387	.320	.206	.547	.025	.774	.843	20			
40	.639	.744	.868	.565	.696	.384	.324	.203	.551	.022	.777	.840	10			
50	.643	.741	.871	.562	.700	.381	.327	.200	.555	.019	.781	.836	0			
60	.646	.738	.875	.559	.703	.378	.331	.197	.558	.016	.785	.833	60			
0	.650	.735	.879	.556	.707	.375	.335	.194	.562	.013	.789	.830	50			
10	.654	.732	.883	.553	.711	.372	.339	.191	.566	.010	.793	.827	40			
20	.658	.729	.887	.550	.715	.369	.342	.188	.570	.007	.796	.824	30			
30	.662	.726	.890	.547	.719	.366	.346	.185	.573	.004	.800	.821	20			
40	.665	.723	.894	.544	.722	.363	.350	.182	.577	.001	.804	.818	10			
50	.669	.720	.898	.541	.726	.360	.354	.179	.581	.998	.808	.815	0			
60	.673	.717	.902	.538	.730	.357	.358	.176	.585	.995	.811	.812	60			
0	.677	.714	.906	.535	.734	.354	.361	.173	.589	.991	.815	.809	50			
10	.681	.711	.909	.532	.738	.351	.365	.170	.592	.988	.819	.806	40			
20	.685	.708	.913	.529	.742	.348	.369	.167	.596	.985	.823	.803	30			
30	.688	.705	.917	.526	.745	.345	.373	.164	.600	.982	.826	.800	20			
40	.692	.702	.921	.523	.749	.342	.377	.161	.604	.979	.830	.797	10			
50	.696	.699	.925	.520	.753	.339	.380	.158	.607	.976	.834	.794	0			
60	.700	.696	.928	.517	.757	.336	.384	.155	.611	.973	.838	.791	60			
0	.704	.694	.932	.514	.760	.333	.388	.152	.615	.970	.842	.788	50			
10	.707	.691	.936	.511	.764	.330	.392	.149	.619	.967	.845	.785	40			
20	.711	.688	.940	.508	.768	.327	.396	.146	.623	.964	.849	.782	30			
30	.715	.685	.944	.505	.772	.324	.399	.143	.626	.961	.853	.779	20			
40	.719	.682	.947	.502	.776	.321	.403	.140	.630	.958	.857	.776	10			
50	.723	.679	.951	.499	.779	.318	.407	.137	.634	.955	.860	.773	0			
60	.726	.676	.955	.496	.783	.315	.411	.134	.638	.952	.864	.769	60			
0	.730	.673	.959	.493	.787	.312	.414	.131	.641	.949	.868	.766	50			
10	.734	.670	.963	.490	.791	.309	.418	.128	.645	.946	.872	.763	40			
20	.738	.667	.966	.487	.795	.306	.422	.125	.649	.943	.876	.760	30			
30	.742	.664	.970	.484	.799	.303	.426	.122	.653	.940	.879	.757	20			
40	.746	.661	.974	.481	.803	.300	.430	.119	.657	.937	.883	.754	10			
50	.749	.658	.978	.478	.806	.297	.433	.116	.660	.934	.887	.751	0			
60	.753	.655	.982	.475	.810	.294	.437	.113	.664	.931	.891	.748	60			
0	.757	.652	.986	.472	.814	.291	.441	.110	.668	.928	.894	.745	50			
10	.761	.649	.989	.469	.818	.288	.445	.107	.672	.925	.898	.742	40			
20	.765	.646	.993	.466	.822	.285	.449	.104	.675	.922	.902	.739	30			
30	.768	.643	.997	.463	.825	.282	.452	.101	.679	.919	.906	.736	20			
40	.772	.640	.999	.460	.829	.279	.456	.098	.683	.916	.909	.733	10			
50	.776	.637	.999	.457	.833	.276	.460	.095	.687	.913	.913	.730	0			
60	.780	.634	.999	.454	.837	.273	.464	.092	.691	.909	.917	.727	60			
0	.784	.631	.999	.451	.841	.270	.467	.089	.694	.906	.921	.724	50			
10	.787	.628	.999	.448	.845	.267	.471	.085	.698	.903	.924	.721	40			
20	.791	.625	.999	.445	.849	.264	.475	.082	.702	.900	.928	.718	30			
30	.795	.622	.999	.442	.853	.261	.479	.079	.706	.897	.932	.715	20			
40	.799	.619	.999	.439	.857	.258	.483	.076	.710	.894	.936	.712	10			
50	.803	.616	.999	.436	.861	.255	.487	.073	.714	.891	.940	.709	0			
60	.807	.613	.999	.433	.865	.252	.491	.070	.718	.888	.944	.706	60			
0	.811	.610	.999	.430	.869	.249	.495	.067	.722	.885	.948	.703	50			
10	.815	.607	.999	.427	.873	.246	.499	.064	.726	.882	.952	.700	40			
20	.819	.604	.999	.424	.877	.243	.503	.061	.730	.879	.956	.697	30			
30	.823	.601	.999	.421	.881	.240	.507	.058	.734	.876	.960	.694	20			
40	.827	.598	.999	.418	.885	.237	.511	.055	.738	.873	.964	.691	10			
50	.831	.595	.999	.415	.889	.234	.515	.052	.742	.870	.968	.688	0			
60	.835	.592	.999	.412	.893	.231	.519	.049	.746	.867	.972	.685	60			
0	.839	.589	.999	.409	.897	.228	.523	.046	.750	.864	.976	.682	50			
10	.843	.586	.999	.406	.901	.225	.527	.043	.754	.861	.980	.679	40			
20	.847	.583	.999	.403	.905	.222	.531	.040	.758	.858	.984	.676	30			
30	.851	.580	.999	.400	.909	.219	.535	.037	.762	.855	.988	.673	20			
40	.855	.577	.999	.397	.913	.216	.539	.034	.766	.852	.992	.670	10			
50	.859	.574	.999	.394	.917	.213	.543	.031	.770	.849	.996	.667	0			
60	.863	.571	.999	.391	.921	.210	.547	.028	.774	.846	.999	.664	60			
0	.867	.568	.999	.388	.925	.207	.551	.025	.778	.843	.999	.661	50			
10	.871	.565	.999	.385	.929	.204	.555	.022	.782	.840	.999	.658	40			
20	.875	.562	.999	.382	.933	.201	.559	.019	.786	.837	.999	.655	30			
30	.879	.559	.999	.379	.937	.198	.563	.016	.790	.834	.999	.652	20			
40	.883	.556	.999	.376	.941	.195	.567	.013	.794	.831	.999	.649	10			
50	.887	.553	.999	.373	.945	.192	.571	.010	.798	.828	.999	.646	0			
60	.891	.550	.999	.370	.949	.189	.575	.007	.802	.825	.999	.643	60			
0	.895	.547	.999	.367	.953	.186	.579	.004	.806	.822	.999	.640	50			
10	.899	.544	.999	.3												

40°													
°	Sin		Cos		Sin		Cos		Sin		Cos		
	0'	10'	20'	30'	40'	50'	60'	70'	80'	90'	0'	10'	20'
0	.64	.76	.64	.76	.64	.76	.64	.76	.64	.76	.64	.76	.64
10	.279	.604	.501	.417	.723	.229	.945	.041	.166	.851	.386	.661	.60
20	.282	.601	.505	.414	.727	.226	.948	.037	.169	.848	.390	.658	50
30	.286	.598	.509	.411	.731	.223	.952	.034	.173	.845	.393	.655	40
40	.290	.595	.512	.408	.734	.220	.956	.031	.177	.842	.397	.652	30
50	.294	.592	.516	.405	.738	.217	.960	.028	.180	.839	.401	.649	20
60	.297	.589	.520	.402	.742	.214	.963	.025	.184	.836	.404	.646	10
70	.301	.586	.524	.398	.746	.210	.967	.022	.188	.832	.408	.642	0
80	.305	.583	.527	.395	.749	.207	.971	.019	.191	.829	.412	.639	60
90	.308	.580	.531	.392	.753	.204	.974	.015	.195	.826	.415	.636	50
100	.312	.576	.535	.389	.757	.201	.978	.012	.199	.823	.419	.633	40
110	.316	.573	.538	.386	.760	.198	.982	.009	.202	.820	.423	.630	30
120	.320	.570	.542	.383	.764	.195	.985	.006	.206	.817	.426	.627	20
130	.323	.567	.546	.380	.768	.192	.989	.003	.210	.813	.430	.623	10
140	.327	.564	.549	.376	.771	.188	.993	.000	.214	.810	.434	.620	0
150	.331	.561	.553	.373	.775	.185	.996	.996	.217	.807	.437	.617	60
160	.334	.558	.557	.370	.779	.182	.999	.993	.221	.804	.441	.614	50
170	.338	.555	.561	.367	.782	.179	.994	.990	.225	.801	.445	.611	40
180	.342	.551	.564	.364	.786	.176	.997	.987	.228	.798	.448	.608	30
190	.346	.548	.568	.361	.790	.173	.998	.984	.232	.794	.452	.604	20
200	.349	.545	.572	.358	.794	.170	.999	.981	.236	.791	.456	.601	10
210	.353	.542	.575	.355	.797	.166	.999	.978	.239	.788	.459	.598	0
220	.357	.539	.579	.351	.801	.163	.998	.974	.243	.785	.463	.595	60
230	.360	.536	.583	.348	.805	.160	.997	.971	.247	.782	.467	.592	50
240	.364	.533	.586	.345	.808	.157	.996	.968	.250	.779	.470	.589	40
250	.368	.530	.590	.342	.812	.154	.995	.965	.254	.775	.474	.585	30
260	.372	.526	.594	.339	.816	.151	.994	.962	.258	.772	.478	.582	20
270	.375	.523	.598	.336	.819	.148	.993	.959	.261	.769	.481	.579	10
280	.379	.520	.601	.333	.823	.144	.992	.956	.265	.766	.485	.576	0
290	.383	.517	.605	.330	.827	.141	.991	.953	.269	.763	.489	.573	60
300	.386	.514	.609	.326	.830	.138	.990	.950	.272	.760	.492	.569	50
310	.390	.511	.612	.323	.834	.135	.989	.947	.276	.756	.496	.566	40
320	.393	.508	.616	.320	.838	.132	.988	.944	.280	.753	.500	.563	30
330	.398	.505	.620	.317	.842	.129	.987	.941	.283	.750	.503	.560	20
340	.401	.502	.624	.314	.845	.126	.986	.938	.287	.747	.507	.557	10
350	.405	.498	.627	.311	.849	.122	.985	.935	.291	.744	.511	.554	0
360	.409	.495	.631	.308	.853	.119	.984	.932	.294	.741	.514	.551	60
370	.412	.492	.635	.304	.856	.116	.983	.929	.298	.738	.518	.547	50
380	.416	.489	.638	.301	.860	.113	.982	.926	.302	.734	.522	.544	40
390	.420	.486	.642	.298	.864	.110	.981	.923	.305	.731	.525	.541	30
400	.423	.483	.646	.295	.867	.107	.980	.920	.309	.728	.529	.538	20
410	.427	.480	.649	.292	.871	.104	.979	.917	.312	.725	.533	.535	10
420	.431	.477	.653	.289	.875	.101	.978	.914	.316	.722	.536	.532	0
430	.435	.473	.657	.286	.878	.097	.977	.911	.320	.719	.540	.528	60
440	.439	.470	.660	.283	.882	.094	.976	.908	.324	.715	.544	.525	50
450	.442	.467	.664	.279	.886	.091	.975	.905	.327	.712	.547	.522	40
460	.446	.464	.668	.276	.889	.088	.974	.902	.331	.709	.551	.519	30
470	.449	.461	.672	.273	.893	.085	.973	.900	.335	.706	.555	.515	20
480	.453	.458	.675	.270	.897	.082	.972	.897	.338	.703	.558	.512	10
490	.457	.455	.679	.267	.901	.078	.971	.894	.342	.700	.562	.509	0
500	.461	.452	.683	.264	.904	.075	.970	.891	.346	.696	.566	.506	60
510	.464	.448	.686	.261	.908	.072	.969	.888	.349	.693	.569	.503	50
520	.468	.445	.690	.257	.912	.069	.968	.885	.353	.690	.573	.500	40
530	.472	.442	.694	.254	.915	.066	.967	.882	.357	.687	.577	.496	30
540	.475	.439	.697	.251	.919	.063	.966	.879	.360	.684	.580	.493	20
550	.479	.436	.701	.248	.923	.059	.965	.876	.364	.680	.584	.490	10
560	.483	.433	.705	.245	.926	.056	.964	.873	.368	.677	.588	.487	0
570	.486	.430	.709	.242	.930	.053	.963	.870	.371	.674	.591	.484	60
580	.490	.427	.712	.239	.934	.050	.962	.867	.375	.671	.595	.480	50
590	.494	.423	.716	.235	.937	.047	.961	.864	.379	.668	.599	.477	40
600	.498	.420	.720	.232	.941	.044	.960	.861	.382	.665	.602	.474	30
610	.501	.417	.723	.229	.945	.041	.959	.858	.386	.661	.606	.471	20
620	.505	.414	.727	.226	.948	.037	.958	.855	.390	.658	.610	.468	10
630	.509	.411	.731	.223	.952	.034	.957	.852	.393	.655	.614	.465	0
640	.512	.408	.734	.220	.956	.031	.956	.849	.397	.652	.618	.462	60
650	.516	.405	.738	.217	.960	.028	.955	.846	.401	.649	.622	.459	50
660	.520	.402	.742	.214	.963	.025	.954	.843	.404	.646	.626	.456	40
670	.524	.398	.746	.210	.967	.022	.953	.840	.408	.642	.630	.453	30
680	.527	.395	.749	.207	.971	.019	.952	.837	.412	.639	.634	.450	20
690	.531	.392	.753	.204	.974	.015	.951	.834	.415	.636	.638	.447	10
700	.535	.389	.757	.201	.978	.012	.950	.831	.419	.633	.642	.444	0
710	.538	.386	.760	.198	.982	.009	.949	.828	.423	.630	.646	.441	60
720	.542	.383	.764	.195	.985	.006	.948	.825	.426	.627	.650	.438	50
730	.546	.380	.768	.192	.989	.003	.947	.822	.430	.623	.654	.435	40
740	.549	.376	.771	.188	.993	.000	.946	.819	.434	.620	.658	.432	30
750	.553	.373	.775	.185	.996	.996	.945	.816	.437	.617	.662	.429	20
760	.557	.370	.779	.182	.999	.993	.944	.813	.441	.614	.666	.426	10
770	.561	.367	.782	.179	.994	.990	.943	.810	.445	.611	.670	.423	0
780	.564	.364	.786	.176	.997	.987	.942	.807	.448	.608	.674	.420	60
790	.568	.361	.790	.173	.998	.984	.941	.804	.452	.604	.678	.417	50
800	.572	.358	.794	.170	.999	.981	.940	.801	.456	.601	.682	.414	40
810	.575	.355	.797	.166	.999	.978	.939	.798	.459	.598	.686	.411	30
820	.579	.351	.801	.163	.998	.974	.938	.795	.463	.595	.690	.408	20
830	.583	.348	.805	.160	.997	.971	.937	.792	.467	.592	.694	.405	10
840	.586	.345	.808	.157	.996	.968	.936	.789	.470	.589	.698	.402	0
850	.590	.342	.812	.154	.995	.965	.935	.786	.474	.585	.702	.399	60
860	.594	.339	.816	.151	.994	.962	.934	.783	.478	.582	.706	.396	50
870	.598	.336	.819	.148	.993	.959	.933	.780	.481	.579	.710	.393	40
880	.601	.333	.823	.144	.992	.956	.932	.777	.485	.576	.714	.390	30
890	.605	.330	.827	.141	.991	.953	.931	.774	.489	.573	.718	.387	20
900	.609	.326	.830	.138	.990	.950	.930	.771	.492	.569	.722	.384	10
910	.612	.323	.834	.135	.989	.947	.929	.768	.496	.566	.726	.381	0
920	.616	.320	.838	.132	.988	.944	.928	.765	.500	.563	.730	.378	60
930	.620	.317	.842	.129	.987	.941	.927	.762	.503	.560	.734	.375	50
940	.624	.314	.845	.126	.986	.938	.926	.759	.507	.557	.738	.372	40
950	.627	.311	.849	.122	.985	.935	.925	.756	.511	.554	.742	.369	30
960	.631	.308	.853	.119	.984	.932	.924	.753	.514	.551	.746	.366	20
970	.635	.304	.856	.116	.983	.929	.923	.750	.518	.547	.750	.363	10
980	.638	.301	.860	.113	.982	.926	.922	.747	.522	.544	.754	.360	0
990	.642	.298	.864	.110	.981	.923	.921	.744	.525	.541	.758	.357	60
1000	.646	.295	.867	.107	.980	.920	.920	.741	.529	.538	.762	.354	50
1010	.649	.292	.871	.104	.979	.917	.919	.738	.533	.535	.766	.351	40
1020	.653	.289	.875	.101	.978	.914	.918	.735	.536	.532	.770	.348	30
1030	.657	.286	.878										

42°															
0'		10'		20'		30'		40'		50'		60'		70'	
Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos	Sin	Cos
0	.66	.74	.67	.74	.67	.73	.67	.73	.67	.73	.67	.73	.67	.73	.67
10	917	311	133	116	349	921	563	724	777	528	990	330	50	917	311
20	920	308	136	113	351	917	566	721	780	524	994	327	40	920	308
30	924	305	140	110	355	914	570	718	784	521	997	324	30	924	305
40	927	302	143	107	359	911	573	715	787	518	1001	320	20	927	302
50	931	298	147	103	362	908	577	711	791	514	1005	317	10	931	298
60	935	295	151	100	366	904	580	708	795	511	1008	314	0	935	295
70	938	292	154	097	369	901	584	705	798	508	1012	310	60	938	292
80	942	289	158	093	373	898	588	702	802	505	1015	307	50	942	289
90	945	285	161	090	377	895	591	698	805	501	1019	304	40	945	285
100	949	282	165	087	380	891	595	695	809	498	1022	300	30	949	282
110	953	279	168	084	384	888	598	692	812	495	1026	297	20	953	279
120	956	276	172	080	387	885	602	688	816	491	1029	294	10	956	276
130	959	273	175	077	391	881	605	685	820	488	1033	291	0	959	273
140	963	269	179	074	394	878	609	682	823	485	1037	287	60	963	269
150	967	266	183	071	398	875	613	679	827	482	1040	284	50	967	266
160	971	263	186	067	402	872	616	675	830	478	1044	281	40	971	263
170	974	259	190	064	405	868	620	672	834	475	1047	277	30	974	259
180	978	256	194	061	409	865	623	669	837	472	1051	274	20	978	256
190	981	253	197	058	412	862	627	665	841	468	1054	271	10	981	253
200	985	250	201	054	416	859	630	662	844	465	1058	267	0	985	250
210	989	246	204	051	420	855	634	659	848	462	1061	264	60	989	246
220	992	243	208	048	423	852	638	656	852	459	1065	261	50	992	243
230	996	240	212	045	427	849	641	652	855	455	1069	258	40	996	240
240	999	237	215	041	430	846	645	649	859	452	1072	254	30	999	237
250	1003	233	219	038	434	842	648	646	862	449	1076	251	20	1003	233
260	1007	230	222	035	437	839	652	643	866	445	1079	248	10	1007	230
270	1010	227	226	032	441	836	655	639	869	442	1083	244	0	1010	227
280	1014	224	230	028	445	832	659	636	873	439	1086	241	60	1014	224
290	1017	220	233	025	448	829	663	633	877	436	1090	238	50	1017	220
300	1021	217	237	022	452	826	666	629	880	432	1093	234	40	1021	217
310	1025	214	240	019	455	823	670	626	884	429	1097	231	30	1025	214
320	1028	211	244	015	459	819	673	623	887	426	1100	228	20	1028	211
330	1032	207	247	012	462	816	677	620	891	422	1104	225	10	1032	207
340	1035	204	251	009	466	813	680	616	894	419	1108	221	0	1035	204
350	1039	201	255	006	470	810	684	613	898	416	1111	218	60	1039	201
360	1043	198	258	002	473	806	688	610	901	412	1115	215	50	1043	198
370	1046	194	262	999	477	803	691	606	905	409	1118	211	40	1046	194
380	1050	191	265	996	480	800	695	603	909	406	1122	208	30	1050	191
390	1053	188	269	992	484	796	698	600	912	403	1125	205	20	1053	188
400	1057	185	273	989	488	793	702	597	916	399	1129	201	10	1057	185
410	1061	181	276	986	491	790	705	593	919	396	1132	198	0	1061	181
420	1064	178	280	983	495	787	709	590	923	393	1136	195	60	1064	178
430	1067	175	283	979	498	783	713	587	926	389	1140	192	50	1067	175
440	1071	172	287	976	502	780	716	583	930	386	1143	188	40	1071	172
450	1075	168	290	973	505	777	720	580	933	383	1147	185	30	1075	168
460	1079	165	294	970	509	774	723	577	937	380	1150	182	20	1079	165
470	1082	162	298	966	513	770	727	574	941	376	1154	178	10	1082	162
480	1086	159	301	963	516	767	730	570	944	373	1157	175	0	1086	159
490	1089	155	305	960	520	764	734	567	948	370	1161	172	60	1089	155
500	1093	152	308	957	523	760	738	564	951	366	1164	168	50	1093	152
510	1097	149	312	953	527	757	741	560	955	363	1168	165	40	1097	149
520	1100	146	316	950	530	754	745	557	958	360	1171	162	30	1100	146
530	1104	142	319	947	534	751	748	554	962	357	1175	159	20	1104	142
540	1107	139	323	944	538	747	752	551	965	353	1179	155	10	1107	139
550	1111	136	326	940	541	744	755	547	969	350	1182	152	0	1111	136
560	1115	133	330	937	545	741	759	544	973	347	1186	149	60	1115	133
570	1118	129	334	934	548	738	762	541	976	343	1189	145	50	1118	129
580	1122	126	337	930	552	734	766	537	980	340	1193	142	40	1122	126
590	1125	123	341	927	555	731	770	534	983	337	1196	139	30	1125	123
600	1129	120	344	924	559	728	773	531	987	333	1200	135	20	1129	120
610	1133	117	348	921	562	725	777	528	990	330	1204	132	10	1133	117
620	1137	114	351	918	566	721	780	524	994	327	1208	129	0	1137	114
630	1141	111	355	914	570	718	784	521	997	324	1212	126	60	1141	111
640	1145	108	359	911	573	715	787	518	1001	320	1216	123	50	1145	108
650	1149	105	363	908	577	711	791	514	1005	317	1220	120	40	1149	105
660	1153	102	366	904	580	708	795	511	1008	314	1224	117	30	1153	102
670	1157	99	370	901	584	705	798	508	1012	310	1228	114	20	1157	99
680	1161	96	373	898	588	702	802	505	1015	307	1232	111	10	1161	96
690	1165	93	377	895	591	698	805	501	1019	304	1236	108	0	1165	93
700	1169	90	380	891	595	695	809	498	1022	300	1240	105	60	1169	90
710	1173	87	384	888	598	692	812	495	1026	297	1244	102	50	1173	87
720	1177	84	387	885	602	688	816	491	1029	294	1248	99	40	1177	84
730	1181	81	391	881	605	685	820	488	1033	291	1252	96	30	1181	81
740	1185	78	394	878	609	682	823	485	1037	287	1256	93	20	1185	78
750	1189	75	398	875	613	679	827	482	1040	284	1260	90	10	1189	75
760	1193	72	402	872	616	675	830	478	1044	281	1264	87	0	1193	72
770	1197	69	405	868	620	672	834	475	1047	277	1268	84	60	1197	69
780	1201	66	409	865	623	669	837	472	1051	274	1272	81	50	1201	66
790	1205	63	412	862	627	665	841	468	1054	271	1276	78	40	1205	63
800	1209	60	416	859	630	662	844	465	1058	267	1280	75	30	1209	60
810	1213	57	419	855	634	659	848	462	1061	264	1284	72	20	1213	57
820	1217	54	423	852	638	656	852	459	1065	261	1288	69	10	1217	54
830	1221	51	427	849	641	652	855	455	1069	258	1292	66	0	1221	51
840	1225	48	430	846	645	649	859	452	1072	254	1296	63	60	1225	48
850	1229	45	434	842	648	646	862	449	1076	251	1300	60	50	1229	45
860	1233	42	437	839	652	643	866	445	1079	248	1304	57	40	1233	42
870	1237	39	441	836	655	639	869	442	1083	244	1308	54	30	1237	39
880	1241	36	445	832	659	636	873	439	1086	241	1312	51	20	1241	36
890	124														

44°																
"	Sin		Cos		Sin		Cos		Sin		Cos		Sin		Cos	
	0'	10'	20'	30'	40'	50'	60'	70'	80'	90'	0'	10'	20'	30'	40'	50'
0	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71
10	466	934	675	732	883	529	091	325	298	121	505	916	60	50	50	916
20	473	927	682	725	890	522	098	318	305	114	512	909	40	40	40	909
30	476	924	685	721	894	518	101	315	308	111	515	906	30	30	30	906
40	480	921	689	719	897	515	105	311	312	107	518	902	20	20	20	902
50	483	917	692	715	900	512	108	308	315	104	522	899	10	10	10	899
60	487	914	696	711	904	508	112	305	319	100	525	896	0	0	0	896
1	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71
10	487	914	696	711	904	508	112	305	319	100	525	896	60	60	60	896
20	490	910	699	708	907	505	115	301	322	097	529	892	50	50	50	892
30	494	907	703	705	911	502	119	298	326	094	532	889	40	40	40	889
40	497	904	706	701	914	498	122	294	329	090	536	885	30	30	30	885
50	501	900	710	698	916	495	126	291	333	087	539	882	20	20	20	882
60	504	897	713	694	921	491	129	288	336	083	542	878	10	10	10	878
1	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71
10	508	894	717	691	925	488	132	284	339	080	546	875	60	60	60	875
20	511	890	720	688	928	485	136	281	343	077	549	872	50	50	50	872
30	515	887	723	684	932	481	139	277	346	073	553	868	40	40	40	868
40	518	883	727	681	935	478	143	274	350	070	556	865	30	30	30	865
50	522	880	730	678	939	474	146	271	353	066	560	861	20	20	20	861
60	525	877	734	674	942	471	150	267	357	063	563	858	10	10	10	858
1	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71
10	529	873	737	671	946	468	153	264	360	059	567	855	0	0	0	855
20	532	870	741	667	949	464	157	260	364	056	570	851	60	60	60	851
30	536	867	744	664	952	461	160	257	367	053	573	848	50	50	50	848
40	539	863	748	661	956	457	164	254	370	049	577	844	40	40	40	844
50	543	860	751	657	959	454	167	250	374	046	580	841	30	30	30	841
60	546	856	755	654	963	451	170	247	377	042	584	837	20	20	20	837
1	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71
10	549	853	758	650	966	447	174	243	381	039	587	834	10	10	10	834
20	553	850	762	647	970	444	177	240	384	036	591	831	0	0	0	831
30	556	846	765	644	973	440	181	237	388	032	594	827	60	60	60	827
40	560	843	769	640	977	437	184	233	391	029	597	824	50	50	50	824
50	563	840	772	637	980	434	188	230	395	025	601	820	40	40	40	820
60	567	836	776	634	984	430	191	226	398	022	604	817	30	30	30	817
1	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71
10	570	833	779	630	987	427	195	223	401	019	608	813	20	20	20	813
20	574	830	783	627	991	424	198	220	405	015	611	810	10	10	10	810
30	577	826	786	623	994	420	202	216	408	012	615	807	0	0	0	807
40	581	823	789	620	998	417	205	213	412	008	618	803	60	60	60	803
50	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71
60	584	819	793	617	001	413	208	209	415	005	621	800	50	50	50	800
1	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71
10	588	816	796	613	004	410	212	206	419	001	625	796	40	40	40	796
20	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71
30	591	813	800	610	008	407	215	203	422	998	628	793	30	30	30	793
40	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71
50	595	809	803	607	011	403	219	199	426	995	632	789	20	20	20	789
60	598	806	807	603	015	400	222	196	429	991	635	786	10	10	10	786
1	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71
10	602	803	810	600	018	396	226	192	432	988	639	783	0	0	0	783
20	605	799	814	596	022	393	229	189	436	984	642	779	60	60	60	779
30	609	796	817	593	025	390	233	186	439	981	646	776	50	50	50	776
40	612	792	821	590	029	386	236	182	443	978	649	772	40	40	40	772
50	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71
60	616	789	824	586	032	383	239	179	446	974	652	769	30	30	30	769
1	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71
10	619	786	828	583	036	379	243	175	450	971	656	766	20	20	20	766
20	623	782	831	579	039	376	246	172	453	967	659	762	10	10	10	762
30	626	779	835	576	042	373	250	169	457	964	663	759	0	0	0	759
40	630	776	838	573	046	369	253	165	460	960	666	755	60	60	60	755
50	633	772	842	569	049	366	257	162	463	957	670	752	50	50	50	752
60	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71
1	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71
10	637	769	845	566	053	362	260	158	467	954	673	748	60	60	60	748
20	640	765	848	562	056	359	264	155	470	950	676	745	50	50	50	745
30	643	762	852	559	060	356	267	152	474	947	680	742	40	40	40	742
40	647	759	855	556	063	352	271	148	477	943	683	738	30	30	30	738
50	650	755	859	552	067	349	274	145	481	940	687	735	20	20	20	735
60	654	752	862	549	070	345	277	141	484	937	690	731	10	10	10	731
1	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71
10	657	748	866	546	074	342	281	138	488	933	694	728	0	0	0	728
20	661	745	869	542	077	339	284	134	491	930	697	724	60	60	60	724
30	664	742	873	539	081	335	288	131	494	926	700	721	50	50	50	721
40	668	738	876	535	084	332	291	128	498	923	704	718	40	40	40	718
50	671	735	880	532	087	328	295	124	501	919	707	714	30	30	30	714
60	675	732	883	529	091	325	298	121	505	916	711	711	20	20	20	711
1	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71
10	678	729	886	526	094	322	302	117	508	913	715	715	10	10	10	715
20	682	725	890	522	098	318	305	114	512	909	719	719	0	0	0	719
30	685	721	894	518	101	315	308	111	515	906	723	723	60	60	60	723
40	689	719	897	515	105	311	312	107	518	902	727	727	50	50	50	727
50	692	715	900	512	108	308	315	104	522	899	731	731	40	40	40	731
60	696	711	904	508	112	305	319	100	525	896	735	735	30	30	30	735
1	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71	.69	.71
10	699	708	907	505	115	301	322	097	529	892	739	739	20	20	20	739
20	703	705	911	502	119	298	326	094	532	889	743	743	10	10	10	743
30	706	701	914	498	122	294	329	090	536	885	747	747	0	0	0	747
40	710	698	916	495	126	291	333	087	539	882						

4670

CENA ZŁ 28