



# 附 錄



垂直線



## 附錄 A：三角函數表

$x^\circ$	$\sin x \approx$	$\cos x \approx$	$\tan x \approx$	$\cot x \approx$	$\sec x \approx$	$\csc x \approx$	$x^\circ$
0	0.0000	1.0000	0.0000	$\infty$	1.0000	$\infty$	0
0.5	0.0087	1.0000	0.0087	114.5887	1.0000	114.5930	0.5
1	0.0175	0.9998	0.0175	57.2900	1.0002	57.2987	1
1.5	0.0262	0.9997	0.0262	38.1885	1.0003	38.2016	1.5
2	0.0349	0.9994	0.0349	28.6363	1.0006	28.6537	2
2.5	0.0436	0.9990	0.0437	22.9038	1.0010	22.9256	2.5
3	0.0523	0.9986	0.0524	19.0811	1.0014	19.1073	3
3.5	0.0610	0.9981	0.0612	16.3499	1.0019	16.3804	3.5
4	0.0698	0.9976	0.0699	14.3007	1.0024	14.3356	4
4.5	0.0785	0.9969	0.0787	12.7062	1.0031	12.7455	4.5
5	0.0872	0.9962	0.0875	11.4301	1.0038	11.4737	5
5.5	0.0958	0.9954	0.0963	10.3854	1.0046	10.4334	5.5
6	0.1045	0.9945	0.1051	9.5144	1.0055	9.5668	6
6.5	0.1132	0.9936	0.1139	8.7769	1.0065	8.8337	6.5
7	0.1219	0.9925	0.1228	8.1443	1.0075	8.2055	7
7.5	0.1305	0.9914	0.1317	7.5958	1.0086	7.6613	7.5
8	0.1392	0.9903	0.1405	7.1154	1.0098	7.1853	8
8.5	0.1478	0.9890	0.1495	6.6912	1.0111	6.7655	8.5
9	0.1564	0.9877	0.1584	6.3138	1.0125	6.3925	9
9.5	0.1650	0.9863	0.1673	5.9758	1.0139	6.0589	9.5

$x^\circ$	$\sin x \approx$	$\cos x \approx$	$\tan x \approx$	$\cot x \approx$	$\sec x \approx$	$\csc x \approx$	$x^\circ$
10	0.1736	0.9848	0.1763	5.6713	1.0154	5.7588	10
10.5	0.1822	0.9833	0.1853	5.3955	1.0170	5.4874	10.5
11	0.1908	0.9816	0.1944	5.1446	1.0187	5.2408	11
11.5	0.1994	0.9799	0.2035	4.9152	1.0205	5.0159	11.5
12	0.2079	0.9781	0.2126	4.7046	1.0223	4.8097	12
12.5	0.2164	0.9763	0.2217	4.5107	1.0243	4.6202	12.5
13	0.2250	0.9744	0.2309	4.3315	1.0263	4.4454	13
13.5	0.2334	0.9724	0.2401	4.1653	1.0284	4.2837	13.5
14	0.2419	0.9703	0.2493	4.0108	1.0306	4.1336	14
14.5	0.2504	0.9681	0.2586	3.8667	1.0329	3.9939	14.5
15	0.2588	0.9659	0.2679	3.7321	1.0353	3.8637	15
15.5	0.2672	0.9636	0.2773	3.6059	1.0377	3.7420	15.5
16	0.2756	0.9613	0.2867	3.4874	1.0403	3.6280	16
16.5	0.2840	0.9588	0.2962	3.3759	1.0429	3.5209	16.5
17	0.2924	0.9563	0.3057	3.2709	1.0457	3.4203	17
17.5	0.3007	0.9537	0.3153	3.1716	1.0485	3.3255	17.5
18	0.3090	0.9511	0.3249	3.0777	1.0515	3.2361	18
18.5	0.3173	0.9483	0.3346	2.9887	1.0545	3.1515	18.5
19	0.3256	0.9455	0.3443	2.9042	1.0576	3.0716	19
19.5	0.3338	0.9426	0.3541	2.8239	1.0608	2.9957	19.5
20	0.3420	0.9397	0.3640	2.7475	1.0642	2.9238	20
20.5	0.3502	0.9367	0.3739	2.6746	1.0676	2.8555	20.5
21	0.3584	0.9336	0.3839	2.6051	1.0711	2.7904	21
21.5	0.3665	0.9304	0.3939	2.5386	1.0748	2.7285	21.5

$x^\circ$	$\sin x \approx$	$\cos x \approx$	$\tan x \approx$	$\cot x \approx$	$\sec x \approx$	$\csc x \approx$	$x^\circ$
22	0.3746	0.9272	0.4040	2.4751	1.0785	2.6695	22
22.5	0.3827	0.9239	0.4142	2.4142	1.0824	2.6131	22.5
23	0.3907	0.9205	0.4245	2.3559	1.0864	2.5593	23
23.5	0.3987	0.9171	0.4348	2.2998	1.0904	2.5078	23.5
24	0.4067	0.9135	0.4452	2.2460	1.0946	2.4586	24
24.5	0.4147	0.9100	0.4557	2.1943	1.0989	2.4114	24.5
25	0.4226	0.9063	0.4663	2.1445	1.1034	2.3662	25
25.5	0.4305	0.9026	0.4770	2.0965	1.1079	2.3228	25.5
26	0.4384	0.8988	0.4877	2.0503	1.1126	2.2812	26
26.5	0.4462	0.8949	0.4986	2.0057	1.1174	2.2412	26.5
27	0.4540	0.8910	0.5095	1.9626	1.1223	2.2027	27
27.5	0.4617	0.8870	0.5206	1.9210	1.1274	2.1657	27.5
28	0.4695	0.8829	0.5317	1.8807	1.1326	2.1301	28
28.5	0.4772	0.8788	0.5430	1.8418	1.1379	2.0957	28.5
29	0.4848	0.8746	0.5543	1.8040	1.1434	2.0627	29
29.5	0.4924	0.8704	0.5658	1.7675	1.1490	2.0308	29.5
30	0.5000	0.8660	0.5774	1.7321	1.1547	2.0000	30
30.5	0.5075	0.8616	0.5890	1.6977	1.1606	1.9703	30.5
31	0.5150	0.8572	0.6009	1.6643	1.1666	1.9416	31
31.5	0.5225	0.8526	0.6128	1.6319	1.1728	1.9139	31.5
32	0.5299	0.8480	0.6249	1.6003	1.1792	1.8871	32
32.5	0.5373	0.8434	0.6371	1.5697	1.1857	1.8612	32.5
33	0.5446	0.8387	0.6494	1.5399	1.1924	1.8361	33
33.5	0.5519	0.8339	0.6619	1.5108	1.1992	1.8118	33.5

$x^\circ$	$\sin x \approx$	$\cos x \approx$	$\tan x \approx$	$\cot x \approx$	$\sec x \approx$	$\csc x \approx$	$x^\circ$
34	0.5592	0.8290	0.6745	1.4826	1.2062	1.7883	34
34.5	0.5664	0.8241	0.6873	1.4550	1.2134	1.7655	34.5
35	0.5736	0.8192	0.7002	1.4281	1.2208	1.7434	35
35.5	0.5807	0.8141	0.7133	1.4019	1.2283	1.7221	35.5
36	0.5878	0.8090	0.7265	1.3764	1.2361	1.7013	36
36.5	0.5948	0.8039	0.7400	1.3514	1.2440	1.6812	36.5
37	0.6018	0.7986	0.7536	1.3270	1.2521	1.6616	37
37.5	0.6088	0.7934	0.7673	1.3032	1.2605	1.6427	37.5
38	0.6157	0.7880	0.7813	1.2799	1.2690	1.6243	38
38.5	0.6225	0.7826	0.7954	1.2572	1.2778	1.6064	38.5
39	0.6293	0.7771	0.8098	1.2349	1.2868	1.5890	39
39.5	0.6361	0.7716	0.8243	1.2131	1.2960	1.5721	39.5
40	0.6428	0.7660	0.8391	1.1918	1.3054	1.5557	40
40.5	0.6494	0.7604	0.8541	1.1708	1.3151	1.5398	40.5
41	0.6561	0.7547	0.8693	1.1504	1.3250	1.5243	41
41.5	0.6626	0.7490	0.8847	1.1303	1.3352	1.5092	41.5
42	0.6691	0.7431	0.9004	1.1106	1.3456	1.4945	42
42.5	0.6756	0.7373	0.9163	1.0913	1.3563	1.4802	42.5
43	0.6820	0.7314	0.9325	1.0724	1.3673	1.4663	43
43.5	0.6884	0.7254	0.9490	1.0538	1.3786	1.4527	43.5
44	0.6947	0.7193	0.9657	1.0355	1.3902	1.4396	44
44.5	0.7009	0.7133	0.9827	1.0176	1.4020	1.4267	44.5
45	0.7071	0.7071	1.0000	1.0000	1.4142	1.4142	45
45.5	0.7133	0.7009	1.0176	0.9827	1.4267	1.4020	45.5



$x^\circ$	$\sin x \approx$	$\cos x \approx$	$\tan x \approx$	$\cot x \approx$	$\sec x \approx$	$\csc x \approx$	$x^\circ$
46	0.7193	0.6947	1.0355	0.9657	1.4396	1.3902	46
46.5	0.7254	0.6884	1.0538	0.9490	1.4527	1.3786	46.5
47	0.7314	0.6820	1.0724	0.9325	1.4663	1.3673	47
47.5	0.7373	0.6756	1.0913	0.9163	1.4802	1.3563	47.5
48	0.7431	0.6691	1.1106	0.9004	1.4945	1.3456	48
48.5	0.7490	0.6626	1.1303	0.8847	1.5092	1.3352	48.5
49	0.7547	0.6561	1.1504	0.8693	1.5243	1.3250	49
49.5	0.7604	0.6494	1.1708	0.8541	1.5398	1.3151	49.5
50	0.7660	0.6428	1.1918	0.8391	1.5557	1.3054	50
50.5	0.7716	0.6361	1.2131	0.8243	1.5721	1.2960	50.5
51	0.7771	0.6293	1.2349	0.8098	1.5890	1.2868	51
51.5	0.7826	0.6225	1.2572	0.7954	1.6064	1.2778	51.5
52	0.7880	0.6157	1.2799	0.7813	1.6243	1.2690	52
52.5	0.7934	0.6088	1.3032	0.7673	1.6427	1.2605	52.5
53	0.7986	0.6018	1.3270	0.7536	1.6616	1.2521	53
53.5	0.8039	0.5948	1.3514	0.7400	1.6812	1.2440	53.5
54	0.8090	0.5878	1.3764	0.7265	1.7013	1.2361	54
54.5	0.8141	0.5807	1.4019	0.7133	1.7221	1.2283	54.5
55	0.8192	0.5736	1.4281	0.7002	1.7434	1.2208	55
55.5	0.8241	0.5664	1.4550	0.6873	1.7655	1.2134	55.5
56	0.8290	0.5592	1.4826	0.6745	1.7883	1.2062	56
56.5	0.8339	0.5519	1.5108	0.6619	1.8118	1.1992	56.5
57	0.8387	0.5446	1.5399	0.6494	1.8361	1.1924	57
57.5	0.8434	0.5373	1.5697	0.6371	1.8612	1.1857	57.5

$x^\circ$	$\sin x \approx$	$\cos x \approx$	$\tan x \approx$	$\cot x \approx$	$\sec x \approx$	$\csc x \approx$	$x^\circ$
58	0.8480	0.5299	1.6003	0.6249	1.8871	1.1792	58
58.5	0.8526	0.5225	1.6319	0.6128	1.9139	1.1728	58.5
59	0.8572	0.5150	1.6643	0.6009	1.9416	1.1666	59
59.5	0.8616	0.5075	1.6977	0.5890	1.9703	1.1606	59.5
60	0.8660	0.5000	1.7321	0.5774	2.0000	1.1547	60
60.5	0.8704	0.4924	1.7675	0.5658	2.0308	1.1490	60.5
61	0.8746	0.4848	1.8040	0.5543	2.0627	1.1434	61
61.5	0.8788	0.4772	1.8418	0.5430	2.0957	1.1379	61.5
62	0.8829	0.4695	1.8807	0.5317	2.1301	1.1326	62
62.5	0.8870	0.4617	1.9210	0.5206	2.1657	1.1274	62.5
63	0.8910	0.4540	1.9626	0.5095	2.2027	1.1223	63
63.5	0.8949	0.4462	2.0057	0.4986	2.2412	1.1174	63.5
64	0.8988	0.4384	2.0503	0.4877	2.2812	1.1126	64
64.5	0.9026	0.4305	2.0965	0.4770	2.3228	1.1079	64.5
65	0.9063	0.4226	2.1445	0.4663	2.3662	1.1034	65
65.5	0.9100	0.4147	2.1943	0.4557	2.4114	1.0989	65.5
66	0.9135	0.4067	2.2460	0.4452	2.4586	1.0946	66
66.5	0.9171	0.3987	2.2998	0.4348	2.5078	1.0904	66.5
67	0.9205	0.3907	2.3559	0.4245	2.5593	1.0864	67
67.5	0.9239	0.3827	2.4142	0.4142	2.6131	1.0824	67.5
68	0.9272	0.3746	2.4751	0.4040	2.6695	1.0785	68
68.5	0.9304	0.3665	2.5386	0.3939	2.7285	1.0748	68.5
69	0.9336	0.3584	2.6051	0.3839	2.7904	1.0711	69
69.5	0.9367	0.3502	2.6746	0.3739	2.8555	1.0676	69.5

$x^\circ$	$\sin x \approx$	$\cos x \approx$	$\tan x \approx$	$\cot x \approx$	$\sec x \approx$	$\csc x \approx$	$x^\circ$
70	0.9397	0.3420	2.7475	0.3640	2.9238	1.0642	70
70.5	0.9426	0.3338	2.8239	0.3541	2.9957	1.0608	70.5
71	0.9455	0.3256	2.9042	0.3443	3.0716	1.0576	71
71.5	0.9483	0.3173	2.9887	0.3346	3.1515	1.0545	71.5
72	0.9511	0.3090	3.0777	0.3249	3.2361	1.0515	72
72.5	0.9537	0.3007	3.1716	0.3153	3.3255	1.0485	72.5
73	0.9563	0.2924	3.2709	0.3057	3.4203	1.0457	73
73.5	0.9588	0.2840	3.3759	0.2962	3.5209	1.0429	73.5
74	0.9613	0.2756	3.4874	0.2867	3.6280	1.0403	74
74.5	0.9636	0.2672	3.6059	0.2773	3.7420	1.0377	74.5
75	0.9659	0.2588	3.7321	0.2679	3.8637	1.0353	75
75.5	0.9681	0.2504	3.8667	0.2586	3.9939	1.0329	75.5
76	0.9703	0.2419	4.0108	0.2493	4.1336	1.0306	76
76.5	0.9724	0.2334	4.1653	0.2401	4.2837	1.0284	76.5
77	0.9744	0.2250	4.3315	0.2309	4.4454	1.0263	77
77.5	0.9763	0.2164	4.5107	0.2217	4.6202	1.0243	77.5
78	0.9781	0.2079	4.7046	0.2126	4.8097	1.0223	79
78.5	0.9799	0.1994	4.9152	0.2035	5.0159	1.0205	78.5
79	0.9816	0.1908	5.1446	0.1944	5.2408	1.0187	79
79.5	0.9833	0.1822	5.3955	0.1853	5.4874	1.0170	79.5
80	0.9848	0.1736	5.6713	0.1763	5.7588	1.0154	80
80.5	0.9863	0.1650	5.9758	0.1673	6.0589	1.0139	80.5
81	0.9877	0.1564	6.3138	0.1584	6.3925	1.0125	81
81.5	0.9890	0.1478	6.6912	0.1495	6.7655	1.0111	81.5



$x^\circ$	$\sin x \approx$	$\cos x \approx$	$\tan x \approx$	$\cot x \approx$	$\sec x \approx$	$\csc x \approx$	$x^\circ$
82	0.9903	0.1392	7.1154	0.1405	7.1853	1.0098	82
82.5	0.9914	0.1305	7.5958	0.1317	7.6613	1.0086	82.5
83	0.9925	0.1219	8.1443	0.1228	8.2055	1.0075	83
83.5	0.9936	0.1132	8.7769	0.1139	8.8337	1.0065	83.5
84	0.9945	0.1045	9.5144	0.1051	9.5668	1.0055	84
84.5	0.9954	0.0958	10.385	0.0963	10.433	1.0046	84.5
85	0.9962	0.0872	11.430	0.0875	11.473	1.0038	85
85.5	0.9969	0.0785	12.706	0.0787	12.745	1.0031	85.5
86	0.9976	0.0698	14.300	0.0699	14.335	1.0024	86
86.5	0.9981	0.0610	16.349	0.0612	16.380	1.0019	86.5
87	0.9986	0.0523	19.081	0.0524	19.107	1.0014	87
87.5	0.9990	0.0436	22.903	0.0437	22.925	1.0010	87.5
88	0.9994	0.0349	28.636	0.0349	28.653	1.0006	88
88.5	0.9997	0.0262	38.188	0.0262	38.201	1.0003	88.5
89	0.9998	0.0175	57.289	0.0175	57.298	1.0002	89
89.5	1.0000	0.0087	114.58	0.0087	114.59	1.0000	89.5
90	1.0000	0.0000	$\infty$	0.0000	$\infty$	1.0000	90