

FRESNEL INTEGRALS

Table 7.7

$$C(x) = \int_0^x \cos\left(\frac{\pi}{2}t^2\right) dt$$

$$S(x) = \int_0^x \sin\left(\frac{\pi}{2}t^2\right) dt$$

$$C_2(u) = \frac{1}{\sqrt{2\pi}} \int_0^u \frac{\cos t}{\sqrt{t}} dt = C\left(\sqrt{\frac{2u}{\pi}}\right)$$

$$S_2(u) = \frac{1}{\sqrt{2\pi}} \int_0^u \frac{\sin t}{\sqrt{t}} dt = S\left(\sqrt{\frac{2u}{\pi}}\right)$$

x	$u = \frac{\pi}{2}x^2$	$C(x) = C_2(u)$	$S(x) = S_2(u)$	x	$u = \frac{\pi}{2}x^2$	$C(x) = C_2(u)$	$S(x) = S_2(u)$
0.00	0.00000 00	0.00000 00	0.00000 00	1.00	1.57079 63	0.77989 34	0.43825 91
0.02	0.00062 83	0.02000 00	0.00000 42	1.02	1.63425 65	0.77926 11	0.45824 58
0.04	0.00251 33	0.04000 00	0.00003 35	1.04	1.69897 33	0.77735 01	0.47815 08
0.06	0.00565 49	0.05999 98	0.00011 31	1.06	1.76494 68	0.77414 34	0.49788 84
0.08	0.01005 31	0.07999 92	0.00026 81	1.08	1.83217 68	0.76963 03	0.51736 86
0.10	0.01570 80	0.09999 75	0.00052 36	1.10	1.90066 36	0.76380 67	0.53649 79
0.12	0.02261 95	0.11999 39	0.00090 47	1.12	1.97040 69	0.75667 60	0.55517 92
0.14	0.03078 76	0.13998 67	0.00143 67	1.14	2.04140 69	0.74824 94	0.57331 28
0.16	0.04021 24	0.15997 41	0.00214 44	1.16	2.11366 35	0.73854 68	0.59079 66
0.18	0.05089 38	0.17995 34	0.00305 31	1.18	2.18717 68	0.72759 68	0.60752 74
0.20	0.06283 19	0.19992 11	0.00418 76	1.20	2.26194 67	0.71543 77	0.62340 09
0.22	0.07602 65	0.21987 29	0.00557 30	1.22	2.33797 33	0.70211 76	0.63831 34
0.24	0.09047 79	0.23980 36	0.00723 40	1.24	2.41525 64	0.68769 47	0.65216 19
0.26	0.10618 58	0.25970 70	0.00919 54	1.26	2.49379 62	0.67223 78	0.66484 56
0.28	0.12315 04	0.27957 56	0.01148 16	1.28	2.57359 27	0.65582 63	0.67626 72
0.30	0.14137 17	0.29940 10	0.01411 70	1.30	2.65464 58	0.63855 05	0.68633 33
0.32	0.16084 95	0.31917 31	0.01712 56	1.32	2.73695 55	0.62051 11	0.69495 62
0.34	0.18158 41	0.33888 06	0.02053 11	1.34	2.82052 19	0.60181 95	0.70205 50
0.36	0.20357 52	0.35851 09	0.02435 68	1.36	2.90534 49	0.58259 73	0.70755 67
0.38	0.22682 30	0.37804 96	0.02862 55	1.38	2.99142 45	0.56297 59	0.71139 77
0.40	0.25132 74	0.39748 08	0.03335 94	1.40	3.07876 08	0.54309 58	0.71352 51
0.42	0.27708 85	0.41678 68	0.03858 02	1.42	3.16735 37	0.52310 58	0.71389 77
0.44	0.30410 62	0.43594 82	0.04430 85	1.44	3.25720 33	0.50316 23	0.71248 78
0.46	0.33238 05	0.45494 40	0.05056 42	1.46	3.34830 95	0.48342 80	0.70928 16
0.48	0.36191 15	0.47375 10	0.05736 63	1.48	3.44067 23	0.46407 05	0.70428 12
0.50	0.39269 91	0.49234 42	0.06473 24	1.50	3.53429 17	0.44526 12	0.69750 50
0.52	0.42474 33	0.51069 69	0.07267 89	1.52	3.62916 78	0.42717 32	0.68898 88
0.54	0.45804 42	0.52878 01	0.08122 06	1.54	3.72530 06	0.40997 99	0.67878 67
0.56	0.49260 17	0.54656 30	0.09037 08	1.56	3.82268 99	0.39385 29	0.66697 13
0.58	0.52841 59	0.56401 31	0.10014 09	1.58	3.92133 60	0.37895 96	0.65363 46
0.60	0.56548 67	0.58109 54	0.11054 02	1.60	4.02123 86	0.36546 17	0.63888 77
0.62	0.60381 41	0.59777 37	0.12157 59	1.62	4.12239 79	0.35351 20	0.62286 07
0.64	0.64339 82	0.61400 94	0.13325 28	1.64	4.22481 38	0.34325 29	0.60570 26
0.66	0.68423 89	0.62976 25	0.14557 29	1.66	4.32848 64	0.33481 32	0.58758 04
0.68	0.72633 62	0.64499 12	0.15853 54	1.68	4.43341 56	0.32830 61	0.56867 83
0.70	0.76969 02	0.65965 24	0.17213 65	1.70	4.53960 14	0.32382 69	0.54919 60
0.72	0.81430 08	0.67370 12	0.18636 89	1.72	4.64704 39	0.32145 02	0.52934 73
0.74	0.86016 81	0.68709 20	0.20122 21	1.74	4.75574 30	0.32122 83	0.50935 84
0.76	0.90729 20	0.69977 79	0.21668 16	1.76	4.86569 87	0.32318 87	0.48946 49
0.78	0.95567 25	0.71171 13	0.23272 88	1.78	4.97691 11	0.32733 25	0.46990 94
0.80	1.00530 96	0.72284 42	0.24934 14	1.80	5.08938 01	0.33363 29	0.45093 88
0.82	1.05620 35	0.73312 83	0.26649 22	1.82	5.20310 58	0.34203 39	0.43280 06
0.84	1.10835 39	0.74251 54	0.28414 98	1.84	5.31808 80	0.35244 96	0.41573 97
0.86	1.16176 10	0.75095 79	0.30227 80	1.86	5.43432 70	0.36476 35	0.39999 44
0.88	1.21642 47	0.75840 90	0.32083 55	1.88	5.55182 25	0.37882 93	0.38579 25
0.90	1.27234 50	0.76482 30	0.33977 63	1.90	5.67057 47	0.39447 05	0.37334 73
0.92	1.32952 20	0.77015 63	0.35904 93	1.92	5.79058 36	0.41148 24	0.36285 37
0.94	1.38795 56	0.77436 72	0.37859 81	1.94	5.91184 91	0.42963 33	0.35448 37
0.96	1.44764 59	0.77741 68	0.39836 12	1.96	6.03437 12	0.44866 69	0.34838 30
0.98	1.50859 28	0.77926 95	0.41827 21	1.98	6.15814 99	0.46830 56	0.34466 65
1.00	1.57079 63	0.77989 34	0.43825 91	2.00	6.28318 53	0.48825 34	0.34341 57
	$\left[\begin{smallmatrix} (-4)2 \\ 3 \end{smallmatrix} \right]$	$\left[\begin{smallmatrix} (-4)2 \\ 5 \end{smallmatrix} \right]$	$\left[\begin{smallmatrix} (-5)3 \\ 5 \end{smallmatrix} \right]$		$\left[\begin{smallmatrix} (-4)2 \\ 3 \end{smallmatrix} \right]$	$\left[\begin{smallmatrix} (-4)3 \\ 5 \end{smallmatrix} \right]$	$\left[\begin{smallmatrix} (-4)3 \\ 6 \end{smallmatrix} \right]$

See Example 8.

For $x \rightarrow 0: C(x) \approx x - \frac{\pi^2}{40} x^5 \quad S(x) \approx \frac{\pi}{6} x^3 - \frac{\pi^3}{336} x^7$