

## GAMMA, DIGAMMA AND TRIGAMMA FUNCTIONS

Table 6.1

$x$	$\Gamma(x)$	$\ln \Gamma(x)$	$\psi(x)$	$\psi'(x)$	
1.000	1.00000 00000	0.00000 00000	-0.57721 56649	1.64493 40668	0.000
1.005	0.99713 85354	-0.00286 55666	-0.56902 09113	1.63299 41567	0.005
1.010	0.99432 58512	-0.00569 03079	-0.56088 54579	1.62121 35283	0.010
1.015	0.99156 12888	-0.00847 45187	-0.55280 85156	1.60958 91824	0.015
1.020	0.98884 42033	-0.01121 84893	-0.54478 93105	1.59811 81919	0.020
1.025	0.98617 39633	-0.01392 25067	-0.53682 70828	1.58679 76993	0.025
1.030	0.98354 99506	-0.01658 68539	-0.52892 10873	1.57562 49154	0.030
1.035	0.98097 15606	-0.01921 18101	-0.52107 05921	1.56459 71163	0.035
1.040	0.97843 82009	-0.02179 76511	-0.51327 48789	1.55371 16426	0.040
1.045	0.97594 92919	-0.02434 46490	-0.50553 32428	1.54296 58968	0.045
1.050	0.97350 42656	-0.02685 30725	-0.49784 49913	1.53235 73421	0.050
1.055	0.97110 25663	-0.02932 31868	-0.49020 94448	1.52188 35001	0.055
1.060	0.96874 36495	-0.03175 52537	-0.48262 59358	1.51154 19500	0.060
1.065	0.96642 69823	-0.03414 95318	-0.47509 38088	1.50133 03259	0.065
1.070	0.96415 20425	-0.03650 62763	-0.46761 24199	1.49124 63164	0.070
1.075	0.96191 83189	-0.03882 57395	-0.46018 11367	1.48128 76622	0.075
1.080	0.95972 53107	-0.04110 81702	-0.45279 93380	1.47145 21556	0.080
1.085	0.95757 25273	-0.04335 38143	-0.44546 64135	1.46173 76377	0.085
1.090	0.95545 94882	-0.04556 29148	-0.43818 17635	1.45214 19988	0.090
1.095	0.95338 57227	-0.04773 57114	-0.43094 47988	1.44266 31755	0.095
1.100	0.95135 07699	-0.04987 24413	-0.42375 49404	1.43329 91508	0.100
1.105	0.94935 41778	-0.05197 33384	-0.41661 16193	1.42404 79514	0.105
1.110	0.94739 55040	-0.05403 86341	-0.40951 42761	1.41490 76482	0.110
1.115	0.94547 43149	-0.05606 85568	-0.40246 23611	1.40587 63535	0.115
1.120	0.94359 01856	-0.05806 33325	-0.39545 53339	1.39695 22213	0.120
1.125	0.94174 26997	-0.06002 31841	-0.38849 26633	1.38813 34449	0.125
1.130	0.93993 14497	-0.06194 83322	-0.38157 38268	1.37941 82573	0.130
1.135	0.93815 60356	-0.06383 89946	-0.37469 83110	1.37080 49288	0.135
1.140	0.93641 60657	-0.06569 53867	-0.36786 56106	1.36229 17670	0.140
1.145	0.93471 11562	-0.06751 77212	-0.36107 52291	1.35387 71152	0.145
1.150	0.93304 09311	-0.06930 62087	-0.35432 66780	1.34555 93520	0.150
1.155	0.93140 50217	-0.07106 10569	-0.34761 94768	1.33733 68900	0.155
1.160	0.92980 30666	-0.07278 24716	-0.34095 31528	1.32920 81752	0.160
1.165	0.92823 47120	-0.07447 06558	-0.33432 72413	1.32117 16859	0.165
1.170	0.92669 96106	-0.07612 58106	-0.32774 12847	1.31322 59322	0.170
1.175	0.92519 74225	-0.07774 81345	-0.32119 48332	1.30536 94548	0.175
1.180	0.92372 78143	-0.07933 78240	-0.31468 74438	1.29760 08248	0.180
1.185	0.92229 04591	-0.08089 50733	-0.30821 86809	1.28991 86421	0.185
1.190	0.92088 50371	-0.08242 00745	-0.30178 81156	1.28232 15358	0.190
1.195	0.91951 12341	-0.08391 30174	-0.29539 53259	1.27480 81622	0.195
1.200	0.91816 87424	-0.08537 40900	-0.28903 98966	1.26737 72054	0.200
1.205	0.91685 72606	-0.08680 34780	-0.28272 14187	1.26002 73755	0.205
1.210	0.91557 64930	-0.08820 13651	-0.27643 94897	1.25275 74090	0.210
1.215	0.91432 61500	-0.08956 79331	-0.27019 37135	1.24556 60671	0.215
1.220	0.91310 59475	-0.09090 33619	-0.26398 37000	1.23845 21360	0.220
1.225	0.91191 56071	-0.09220 78291	-0.25780 90652	1.23141 44258	0.225
1.230	0.91075 48564	-0.09348 15108	-0.25166 94307	1.22445 17702	0.230
1.235	0.90962 34274	-0.09472 45811	-0.24556 44243	1.21756 30254	0.235
1.240	0.90852 10583	-0.09593 72122	-0.23949 36791	1.21074 70707	0.240
1.245	0.90744 74922	-0.09711 95744	-0.23345 68341	1.20400 28063	0.245
1.250	0.90640 24771	-0.09827 18364	-0.22745 35334	1.19732 91545	0.250

 $y!$  $\ln y!$  $\frac{d}{dy} \ln y!$  $\frac{d^2}{dy^2} \ln y!$  $y$ 

$$\left[ \begin{smallmatrix} (-6)6 \\ 5 \end{smallmatrix} \right]$$

$$\left[ \begin{smallmatrix} (-6)5 \\ 5 \end{smallmatrix} \right]$$

$$\left[ \begin{smallmatrix} (-6)7 \\ 5 \end{smallmatrix} \right]$$

$$\left[ \begin{smallmatrix} (-5)2 \\ 5 \end{smallmatrix} \right]$$

$$\log_{10} e = 0.43429 \quad 44819$$

For  $x > 2$  see Examples 1-4.

Compiled from H. T. Davis, Tables of the higher mathematical functions, 2 vols. (Principia Press, Bloomington, Ind., 1933, 1935) (with permission). Known error has been corrected.

Table 6.1

## GAMMA, DIGAMMA AND TRIGAMMA FUNCTIONS

$x$	$\Gamma(x)$	$\ln \Gamma(x)$	$\psi(x)$	$\psi'(x)$	
1.250	0.90640 24771	-0.09827 18364	-0.22745 35334	1.19732 91545	0.250
1.255	0.90538 57663	-0.09939 41651	-0.22148 34266	1.19072 50579	0.255
1.260	0.90439 71178	-0.10048 67254	-0.21554 61686	1.18418 94799	0.260
1.265	0.90343 62946	-0.10154 96809	-0.20964 14193	1.17772 14030	0.265
1.270	0.90250 30645	-0.10258 31932	-0.20376 88437	1.17131 98301	0.270
1.275	0.90159 71994	-0.10358 74224	-0.19792 81118	1.16498 37821	0.275
1.280	0.90071 84765	-0.10456 25269	-0.19211 88983	1.15871 22990	0.280
1.285	0.89986 66769	-0.10550 86634	-0.18634 08828	1.15250 44385	0.285
1.290	0.89904 15863	-0.10642 59872	-0.18059 37494	1.14635 92764	0.290
1.295	0.89824 29947	-0.10731 46519	-0.17487 71870	1.14027 59053	0.295
1.300	0.89747 06963	-0.10817 48095	-0.16919 08889	1.13425 34350	0.300
1.305	0.89672 44895	-0.10900 66107	-0.16353 45526	1.12829 09915	0.305
1.310	0.89600 41767	-0.10981 02045	-0.15790 78803	1.12238 77175	0.310
1.315	0.89530 95644	-0.11058 57384	-0.15231 05782	1.11654 27706	0.315
1.320	0.89464 04630	-0.11133 33587	-0.14674 23568	1.11075 53246	0.320
1.325	0.89399 66866	-0.11205 32100	-0.14120 29305	1.10502 45678	0.325
1.330	0.89337 80535	-0.11274 54356	-0.13569 20180	1.09934 97037	0.330
1.335	0.89278 43850	-0.11341 01772	-0.13020 93416	1.09372 99497	0.335
1.340	0.89221 55072	-0.11404 75756	-0.12475 46279	1.08816 45379	0.340
1.345	0.89167 12485	-0.11465 77697	-0.11932 76069	1.08265 27136	0.345
1.350	0.89115 14420	-0.11524 08974	-0.11392 80127	1.07719 37361	0.350
1.355	0.89065 59235	-0.11579 70951	-0.10855 55827	1.07178 68773	0.355
1.360	0.89018 45324	-0.11632 64980	-0.10321 00582	1.06643 14226	0.360
1.365	0.88973 71116	-0.11682 92401	-0.09789 11840	1.06112 66696	0.365
1.370	0.88931 35074	-0.11730 54539	-0.09259 87082	1.05587 19286	0.370
1.375	0.88891 35692	-0.11775 52707	-0.08733 23825	1.05066 65216	0.375
1.380	0.88853 71494	-0.11817 88209	-0.08209 19619	1.04550 97829	0.380
1.385	0.88818 41041	-0.11857 62331	-0.07687 72046	1.04040 10578	0.385
1.390	0.88785 42918	-0.11894 76353	-0.07168 78723	1.03533 97036	0.390
1.395	0.88754 75748	-0.11929 31538	-0.06652 37297	1.03032 50881	0.395
1.400	0.88726 38175	-0.11961 29142	-0.06138 45446	1.02535 65905	0.400
1.405	0.88700 28884	-0.11990 70405	-0.05627 00879	1.02043 36002	0.405
1.410	0.88676 46576	-0.12017 56559	-0.05118 01337	1.01555 55173	0.410
1.415	0.88654 89993	-0.12041 88823	-0.04611 44589	1.01072 17518	0.415
1.420	0.88635 57896	-0.12063 68406	-0.04107 28433	1.00593 17241	0.420
1.425	0.88618 49081	-0.12082 96505	-0.03605 50697	1.00118 48640	0.425
1.430	0.88603 62361	-0.12099 74307	-0.03106 09237	0.99648 06113	0.430
1.435	0.88590 96587	-0.12114 02987	-0.02609 01935	0.99181 84147	0.435
1.440	0.88580 50635	-0.12125 83713	-0.02114 26703	0.98719 77326	0.440
1.445	0.88572 23397	-0.12135 17638	-0.01621 81479	0.98261 80318	0.445
1.450	0.88566 13803	-0.12142 05907	-0.01131 64226	0.97807 87886	0.450
1.455	0.88562 20800	-0.12146 49657	-0.00643 72934	0.97357 94874	0.455
1.460	0.88560 43364	-0.12148 50010	-0.00158 05620	0.96911 96215	0.460
1.465	0.88560 80495	-0.12148 08083	+0.00325 39677	0.96469 86921	0.465
1.470	0.88563 31217	-0.12145 24980	0.00806 64890	0.96031 62091	0.470
1.475	0.88567 94575	-0.12140 01797	0.01285 71930	0.95597 16896	0.475
1.480	0.88574 69646	-0.12132 39621	0.01762 62684	0.95166 46592	0.480
1.485	0.88583 55520	-0.12122 39528	0.02237 39013	0.94739 46509	0.485
1.490	0.88594 51316	-0.12110 02585	0.02710 02758	0.94316 12052	0.490
1.495	0.88607 56174	-0.12095 29852	0.03180 55736	0.93896 38700	0.495
1.500	0.88622 69255	-0.12078 22376	0.03648 99740	0.93480 22005	0.500
	$y!$	$\ln y!$	$* \frac{d}{dy} \ln y!$	$* \frac{d^2}{dy^2} \ln y!$	$y$
	$\left[ \begin{smallmatrix} (-6)4 \\ 5 \end{smallmatrix} \right]$	$\left[ \begin{smallmatrix} (-6)4 \\ 4 \end{smallmatrix} \right]$	$\left[ \begin{smallmatrix} (-6)4 \\ 5 \end{smallmatrix} \right]$	$\left[ \begin{smallmatrix} (-6)9 \\ 5 \end{smallmatrix} \right]$	
	$\log_{10} e = 0.43429 \ 44819$				

\*See page ii.

## GAMMA, DIGAMMA AND TRIGAMMA FUNCTIONS

Table 6.1

$x$	$\Gamma(x)$	$\ln \Gamma(x)$	$\psi(x)$	$\psi'(x)$	
1.500	0.88622 69255	-0.12078 22376	0.03648 99740	0.93480 22005	0.500
1.505	0.88639 89744	-0.12058 81200	0.04115 36543	0.93067 57588	0.505
1.510	0.88659 16850	-0.12037 07353	0.04579 67896	0.92658 41142	0.510
1.515	0.88680 49797	-0.12013 01860	0.05041 95527	0.92252 68425	0.515
1.520	0.88703 87833	-0.11986 65735	0.05502 21146	0.91850 35265	0.520
1.525	0.88729 30231	-0.11957 99983	0.05960 46439	0.91451 37552	0.525
1.530	0.88756 76278	-0.11927 05601	0.06416 73074	0.91055 71245	0.530
1.535	0.88786 25287	-0.11893 83580	0.06871 02697	0.90663 32361	0.535
1.540	0.88817 76586	-0.11858 34900	0.07323 36936	0.90274 16984	0.540
1.545	0.88851 29527	-0.11820 60534	0.07773 77400	0.89888 21253	0.545
1.550	0.88886 83478	-0.11780 61446	0.08222 25675	0.89505 41371	0.550
1.555	0.88924 37830	-0.11738 38595	0.08668 83334	0.89125 73596	0.555
1.560	0.88963 91990	-0.11693 92928	0.09113 51925	0.88749 14249	0.560
1.565	0.89005 45387	-0.11647 25388	0.09556 32984	0.88375 59699	0.565
1.570	0.89048 97463	-0.11598 36908	0.09997 28024	0.88005 06378	0.570
1.575	0.89094 47686	-0.11547 28415	0.10436 38544	0.87637 50766	0.575
1.580	0.89141 95537	-0.11494 00828	0.10873 66023	0.87272 89402	0.580
1.585	0.89191 40515	-0.11438 55058	0.11309 11923	0.86911 18871	0.585
1.590	0.89242 82141	-0.11380 92009	0.11742 77690	0.86552 35815	0.590
1.595	0.89296 19949	-0.11321 12579	0.12174 64754	0.86196 36921	0.595
1.600	0.89351 53493	-0.11259 17657	0.12604 74528	0.85843 18931	0.600
1.605	0.89408 82342	-0.11195 08127	0.13033 08407	0.85492 78630	0.605
1.610	0.89468 06085	-0.11128 84864	0.13459 67772	0.85145 12856	0.610
1.615	0.89529 24327	-0.11060 48737	0.13884 53988	0.84800 18488	0.615
1.620	0.89592 36685	-0.10990 00610	0.14307 68404	0.84457 92455	0.620
1.625	0.89657 42800	-0.10917 41338	0.14729 12354	0.84118 31730	0.625
1.630	0.89724 42326	-0.10842 71769	0.15148 87158	0.83781 33330	0.630
1.635	0.89793 34930	-0.10765 92746	0.15566 94120	0.83446 94315	0.635
1.640	0.89864 20302	-0.10687 05105	0.15983 34529	0.83115 11790	0.640
1.645	0.89936 98138	-0.10606 09676	0.16398 09660	0.82785 82897	0.645
1.650	0.90011 68163	-0.10523 07282	0.16811 20776	0.82459 04826	0.650
1.655	0.90088 30104	-0.10437 98739	0.17222 69122	0.82134 74802	0.655
1.660	0.90166 83712	-0.10350 84860	0.17632 55933	0.81812 90092	0.660
1.665	0.90247 28748	-0.10261 66447	0.18040 82427	0.81493 48001	0.665
1.670	0.90329 64995	-0.10170 44301	0.18447 49813	0.81176 45875	0.670
1.675	0.90413 92243	-0.10077 19212	0.18852 59282	0.80861 81094	0.675
1.680	0.90500 10302	-0.09981 91969	0.19256 12015	0.80549 51079	0.680
1.685	0.90588 18996	-0.09884 63351	0.19658 09180	0.80239 53282	0.685
1.690	0.90678 18160	-0.09785 34135	0.20058 51931	0.79931 85198	0.690
1.695	0.90770 07650	-0.09684 05088	0.20457 41410	0.79626 44350	0.695
1.700	0.90863 87329	-0.09580 76974	0.20854 78749	0.79323 28302	0.700
1.705	0.90959 57079	-0.09475 50552	0.21250 65064	0.79022 34645	0.705
1.710	0.91057 16796	-0.09368 26573	0.21645 01462	0.78723 61012	0.710
1.715	0.91156 66390	-0.09259 05785	0.22037 89037	0.78427 05060	0.715
1.720	0.91258 05779	-0.09147 88929	0.22429 28871	0.78132 64486	0.720
1.725	0.91361 34904	-0.09034 76741	0.22819 22037	0.77840 37011	0.725
1.730	0.91466 53712	-0.08919 69951	0.23207 69593	0.77550 20396	0.730
1.735	0.91573 62171	-0.08802 69286	0.23594 72589	0.77262 12424	0.735
1.740	0.91682 60252	-0.08683 75466	0.23980 32061	0.76976 10915	0.740
1.745	0.91793 47950	-0.08562 89203	0.24364 49038	0.76692 13714	0.745
1.750	0.91906 25268	-0.08440 11210	0.24747 24535	0.76410 18699	0.750
	$y!$	$\ln y!$	$\frac{d}{dy} \ln y!$	$\frac{d^2}{dy^2} \ln y!$	$y$
	$\left[ \begin{smallmatrix} (-6)^3 \\ 4 \end{smallmatrix} \right]$	$\left[ \begin{smallmatrix} (-6)^3 \\ 4 \end{smallmatrix} \right]$	$\left[ \begin{smallmatrix} (-6)^3 \\ 4 \end{smallmatrix} \right]$	$\left[ \begin{smallmatrix} (-6)^4 \\ 5 \end{smallmatrix} \right]$	
	$\log_{10} e = 0.43429 \quad 44819$				

Table 6.1 GAMMA, DIGAMMA AND TRIGAMMA FUNCTIONS

$x$	$\Gamma(x)$	$\ln \Gamma(x)$	$\psi(x)$	$\psi'(x)$	
1.750	0.91906 25268	-0.08440 11210	0.24747 24535	0.76410 18699	0.750
1.755	0.92020 92224	-0.08315 42192	0.25128 59559	0.76130 23773	0.755
1.760	0.92137 48846	-0.08188 82847	0.25508 55103	0.75852 26870	0.760
1.765	0.92255 95178	-0.08060 33871	0.25887 12154	0.75576 25950	0.765
1.770	0.92376 31277	-0.07929 95955	0.26264 31686	0.75302 19003	0.770
1.775	0.92498 57211	-0.07797 69782	0.26640 14664	0.75030 04040	0.775
1.780	0.92622 73062	-0.07663 56034	0.27014 62043	0.74759 79107	0.780
1.785	0.92748 78926	-0.07527 55386	0.27387 74769	0.74491 42268	0.785
1.790	0.92876 74904	-0.07389 68509	0.27759 53776	0.74224 91617	0.790
1.795	0.93006 61123	-0.07249 96070	0.28129 99992	0.73960 25271	0.795
1.800	0.93138 37710	-0.07108 38729	0.28499 14333	0.73697 41375	0.800
1.805	0.93272 04811	-0.06964 97145	0.28866 97707	0.73436 38093	0.805
1.810	0.93407 62585	-0.06819 71969	0.29233 51012	0.73177 13620	0.810
1.815	0.93545 11198	-0.06672 63850	0.29598 75138	0.72919 66166	0.815
1.820	0.93684 50832	-0.06523 73431	0.29962 70966	0.72663 93972	0.820
1.825	0.93825 81682	-0.06373 01353	0.30325 39367	0.72409 95297	0.825
1.830	0.93969 03951	-0.06220 48248	0.30686 81205	0.72157 68426	0.830
1.835	0.94114 17859	-0.06066 14750	0.31046 97335	0.71907 11662	0.835
1.840	0.94261 23634	-0.05910 01483	0.31405 88602	0.71658 23333	0.840
1.845	0.94410 21519	-0.05752 09071	0.31763 55846	0.71411 01788	0.845
1.850	0.94561 11764	-0.05592 38130	0.32119 99895	0.71165 45396	0.850
1.855	0.94713 94637	-0.05430 89276	0.32475 21572	0.70921 52546	0.855
1.860	0.94868 70417	-0.05267 63117	0.32829 21691	0.70679 21650	0.860
1.865	0.95025 39389	-0.05102 60260	0.33182 01056	0.70438 51138	0.865
1.870	0.95184 01855	-0.04935 81307	0.33533 60467	0.70199 39461	0.870
1.875	0.95344 58127	-0.04767 26854	0.33884 00713	0.69961 85089	0.875
1.880	0.95507 08530	-0.04596 97497	0.34233 22577	0.69725 86512	0.880
1.885	0.95671 53398	-0.04424 93824	0.34581 26835	0.69491 42236	0.885
1.890	0.95837 93077	-0.04251 16423	0.34928 14255	0.69258 50790	0.890
1.895	0.96006 27927	-0.04075 65875	0.35273 85596	0.69027 10717	0.895
1.900	0.96176 58319	-0.03898 42759	0.35618 41612	0.68797 20582	0.900
1.905	0.96348 84632	-0.03719 47650	0.35961 83049	0.68568 78965	0.905
1.910	0.96523 07261	-0.03538 81118	0.36304 10646	0.68341 84465	0.910
1.915	0.96699 26608	-0.03356 43732	0.36645 25136	0.68116 35696	0.915
1.920	0.96877 43090	-0.03172 36054	0.36985 27244	0.67892 31293	0.920
1.925	0.97057 57134	-0.02986 58646	0.37324 17688	0.67669 69903	0.925
1.930	0.97239 69178	-0.02799 12062	0.37661 97179	0.67448 50194	0.930
1.935	0.97423 79672	-0.02609 96858	0.37998 66424	0.67228 70846	0.935
1.940	0.97609 89075	-0.02419 13581	0.38334 26119	0.67010 30559	0.940
1.945	0.97779 97861	-0.02226 62778	0.38668 76959	0.66793 28044	0.945
1.950	0.97988 06513	-0.02032 44991	0.39002 19627	0.66577 62034	0.950
1.955	0.98180 15524	-0.01836 60761	0.39334 54805	0.66363 31270	0.955
1.960	0.98374 25404	-0.01639 10621	0.39665 83163	0.66150 34514	0.960
1.965	0.98570 36664	-0.01439 95106	0.39996 05371	0.65938 70538	0.965
1.970	0.98768 49838	-0.01239 14744	0.40325 22088	0.65728 38134	0.970
1.975	0.98968 65462	-0.01036 70060	0.40653 33970	0.65519 36104	0.975
1.980	0.99170 84087	-0.00832 61578	0.40980 41664	0.65311 63266	0.980
1.985	0.99375 06274	-0.00626 89816	0.41306 45816	0.65105 18450	0.985
1.990	0.99581 32598	-0.00419 55291	0.41631 47060	0.64900 00505	0.990
1.995	0.99789 63643	-0.00210 58516	0.41955 46030	0.64696 08286	0.995
2.000	1.00000 00000	0.00000 00000	0.42278 43351	0.64493 40668	1.000
	$y!$	$\ln y!$	$\frac{d}{dy} \ln y!$	$\frac{d^2}{dy^2} \ln y!$	$y$
	$\left[ \begin{smallmatrix} (-6) & 2 \\ 4 & \end{smallmatrix} \right]$	$\left[ \begin{smallmatrix} (-6) & 2 \\ 4 & \end{smallmatrix} \right]$	$\left[ \begin{smallmatrix} (-6) & 2 \\ 4 & \end{smallmatrix} \right]$	$\left[ \begin{smallmatrix} (-6) & 2 \\ 4 & \end{smallmatrix} \right]$	
		$\log_{10} e = 0.43429$	44819		