

# Tables for Statisticians



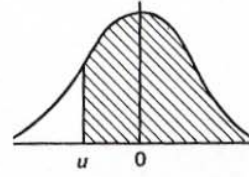
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3rd Edition

Table 4 AREAS OF THE STANDARDISED NORMAL DISTRIBUTION

The function tabulated is  $\frac{1}{\sqrt{2\pi}} \int_u^{\infty} e^{-x^2/2} dx$ ,

the probability that  $U > u$ , where  $U \sim N(0,1)$ .

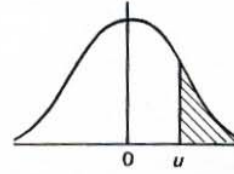


-0.09	-0.08	-0.07	-0.06	-0.05	-0.04	-0.03	-0.02	-0.01	-0.00	<i>u</i>
0.99997	0.99997	0.99996	0.99996	0.99996	0.99996	0.99996	0.99996	0.99995	0.99995	-3.9
0.99995	0.99995	0.99995	0.99994	0.99994	0.99994	0.99994	0.99993	0.99993	0.99993	-3.8
0.99992	0.99992	0.99992	0.99992	0.99991	0.99991	0.99990	0.99990	0.99990	0.99989	-3.7
0.99989	0.99988	0.99988	0.99987	0.99987	0.99986	0.99986	0.99985	0.99985	0.99984	-3.6
0.99983	0.99983	0.99982	0.99981	0.99981	0.99980	0.99979	0.99978	0.99978	0.99977	-3.5
0.99976	0.99975	0.99974	0.99973	0.99972	0.99971	0.99970	0.99969	0.99968	0.99966	-3.4
0.99965	0.99964	0.99962	0.99961	0.99960	0.99958	0.99957	0.99955	0.99953	0.99952	-3.3
0.99950	0.99948	0.99946	0.99944	0.99942	0.99940	0.99938	0.99936	0.99934	0.99931	-3.2
0.99929	0.99926	0.99924	0.99921	0.99918	0.99916	0.99913	0.99910	0.99906	0.99903	-3.1
0.99900	0.99896	0.99893	0.99889	0.99886	0.99882	0.99878	0.99874	0.99869	0.99865	-3.0
0.99861	0.99856	0.99851	0.99846	0.99841	0.99836	0.99831	0.99825	0.99819	0.99813	-2.9
0.99807	0.99801	0.99795	0.99788	0.99781	0.99774	0.99767	0.99760	0.99752	0.99744	-2.8
0.99736	0.99728	0.99720	0.99711	0.99702	0.99693	0.99683	0.99674	0.99664	0.99653	-2.7
0.99643	0.99632	0.99621	0.99609	0.99598	0.99585	0.99573	0.99560	0.99547	0.99534	-2.6
0.99520	0.99506	0.99492	0.99477	0.99461	0.99446	0.99430	0.99413	0.99396	0.99379	-2.5
0.99361	0.99343	0.99324	0.99305	0.99286	0.99266	0.99245	0.99224	0.99202	0.99180	-2.4
0.99158	0.99134	0.99111	0.99086	0.99061	0.99036	0.99010	0.98983	0.98956	0.98928	-2.3
0.98899	0.98870	0.98840	0.98809	0.98778	0.98745	0.98713	0.98679	0.98645	0.98610	-2.2
0.98574	0.98537	0.98500	0.98461	0.98422	0.98382	0.98341	0.98300	0.98257	0.98214	-2.1
0.98169	0.98124	0.98077	0.98030	0.97982	0.97932	0.97882	0.97831	0.97778	0.97725	-2.0
0.97670	0.97615	0.97558	0.97500	0.97441	0.97381	0.97320	0.97257	0.97193	0.97128	-1.9
0.97062	0.96995	0.96926	0.96856	0.96784	0.96712	0.96638	0.96562	0.96485	0.96407	-1.8
0.96327	0.96246	0.96164	0.96080	0.95994	0.95907	0.95818	0.95728	0.95637	0.95543	-1.7
0.95449	0.95352	0.95254	0.95154	0.95053	0.94950	0.94845	0.94738	0.94630	0.94520	-1.6
0.94408	0.94295	0.94179	0.94062	0.93943	0.93822	0.93699	0.93574	0.93448	0.93319	-1.5
0.93189	0.93056	0.92922	0.92785	0.92647	0.92507	0.92364	0.92220	0.92073	0.91924	-1.4
0.91774	0.91621	0.91466	0.91308	0.91149	0.90988	0.90824	0.90658	0.90490	0.90320	-1.3
0.90147	0.89973	0.89796	0.89617	0.89435	0.89251	0.89065	0.88877	0.88686	0.88493	-1.2
0.88298	0.88100	0.87900	0.87698	0.87493	0.87286	0.87076	0.86864	0.86650	0.86433	-1.1
0.86214	0.85993	0.85769	0.85543	0.85314	0.85083	0.84850	0.84614	0.84375	0.84134	-1.0
0.83891	0.83646	0.83398	0.83147	0.82894	0.82639	0.82381	0.82121	0.81859	0.81594	-0.9
0.81327	0.81057	0.80785	0.80511	0.80234	0.79955	0.79673	0.79389	0.79103	0.78814	-0.8
0.78524	0.78230	0.77935	0.77637	0.77337	0.77035	0.76731	0.76424	0.76115	0.75804	-0.7
0.75490	0.75175	0.74857	0.74537	0.74215	0.73891	0.73565	0.73237	0.72907	0.72575	-0.6
0.72240	0.71904	0.71566	0.71226	0.70884	0.70540	0.70194	0.69847	0.69497	0.69146	-0.5
0.68793	0.68439	0.68082	0.67724	0.67364	0.67003	0.66640	0.66276	0.65910	0.65542	-0.4
0.65173	0.64803	0.64431	0.64058	0.63683	0.63307	0.62930	0.62552	0.62172	0.61791	-0.3
0.61409	0.61026	0.60642	0.60257	0.59871	0.59483	0.59095	0.58706	0.58317	0.57926	-0.2
0.57535	0.57142	0.56750	0.56356	0.55962	0.55567	0.55172	0.54776	0.54380	0.53983	-0.1
0.53586	0.53188	0.52790	0.52392	0.51994	0.51595	0.51197	0.50798	0.50399	0.50000	-0.0

Table 4 Areas of the Standardised Normal Distribution.

The function tabulated is  $\frac{1}{\sqrt{2\pi}} \int_u^{\infty} e^{-x^2/2} dx$ ,

the probability that  $U > u$ , where  $U \sim N(0,1)$ .

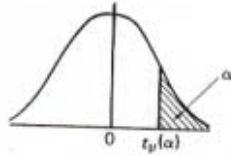


$u$	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.50000	0.49601	0.49202	0.48803	0.48405	0.48006	0.47608	0.47210	0.46812	0.46414
0.1	0.46017	0.45620	0.45224	0.44828	0.44433	0.44038	0.43644	0.43250	0.42858	0.42465
0.2	0.42074	0.41683	0.41294	0.40905	0.40517	0.40129	0.39743	0.39358	0.38974	0.38591
0.3	0.38209	0.37828	0.37448	0.37070	0.36693	0.36317	0.35942	0.35569	0.35197	0.34827
0.4	0.34458	0.34090	0.33724	0.33360	0.32997	0.32636	0.32276	0.31918	0.31561	0.31207
0.5	0.30854	0.30503	0.30153	0.29806	0.29460	0.29116	0.28774	0.28434	0.28096	0.27760
0.6	0.27425	0.27093	0.26763	0.26435	0.26109	0.25785	0.25463	0.25143	0.24825	0.24510
0.7	0.24196	0.23885	0.23576	0.23269	0.22965	0.22663	0.22363	0.22065	0.21770	0.21476
0.8	0.21186	0.20897	0.20611	0.20327	0.20045	0.19766	0.19489	0.19215	0.18943	0.18673
0.9	0.18406	0.18141	0.17879	0.17619	0.17361	0.17106	0.16853	0.16602	0.16354	0.16109
1.0	0.15866	0.15625	0.15386	0.15150	0.14917	0.14686	0.14457	0.14231	0.14007	0.13786
1.1	0.13567	0.13350	0.13136	0.12924	0.12714	0.12507	0.12302	0.12100	0.11900	0.11702
1.2	0.11507	0.11314	0.11123	0.10935	0.10749	0.10565	0.10383	0.10204	0.10027	0.09853
1.3	0.09680	0.09510	0.09342	0.09176	0.09012	0.08851	0.08692	0.08534	0.08379	0.08226
1.4	0.08076	0.07927	0.07780	0.07636	0.07493	0.07353	0.07215	0.07078	0.06944	0.06811
1.5	0.06681	0.06552	0.06426	0.06301	0.06178	0.06057	0.05938	0.05821	0.05705	0.05592
1.6	0.05480	0.05370	0.05262	0.05155	0.05050	0.04947	0.04846	0.04746	0.04648	0.04551
1.7	0.04457	0.04363	0.04272	0.04182	0.04093	0.04006	0.03920	0.03836	0.03754	0.03673
1.8	0.03593	0.03515	0.03438	0.03362	0.03288	0.03216	0.03144	0.03074	0.03005	0.02938
1.9	0.02872	0.02807	0.02743	0.02680	0.02619	0.02559	0.02500	0.02442	0.02385	0.02330
2.0	0.02275	0.02222	0.02169	0.02118	0.02068	0.02018	0.01970	0.01923	0.01876	0.01831
2.1	0.01786	0.01743	0.01700	0.01659	0.01618	0.01578	0.01539	0.01500	0.01463	0.01426
2.2	0.01390	0.01355	0.01321	0.01287	0.01255	0.01222	0.01191	0.01160	0.01130	0.01101
2.3	0.01072	0.01044	0.01017	0.00990	0.00964	0.00939	0.00914	0.00889	0.00866	0.00842
2.4	0.00820	0.00798	0.00776	0.00755	0.00734	0.00714	0.00695	0.00676	0.00657	0.00639
2.5	0.00621	0.00604	0.00587	0.00570	0.00554	0.00539	0.00523	0.00508	0.00494	0.00480
2.6	0.00466	0.00453	0.00440	0.00427	0.00415	0.00402	0.00391	0.00379	0.00368	0.00357
2.7	0.00347	0.00336	0.00326	0.00317	0.00307	0.00298	0.00289	0.00280	0.00272	0.00264
2.8	0.00256	0.00248	0.00240	0.00233	0.00226	0.00219	0.00212	0.00205	0.00199	0.00193
2.9	0.00187	0.00181	0.00175	0.00169	0.00164	0.00159	0.00154	0.00149	0.00144	0.00139
3.0	0.00135	0.00131	0.00126	0.00122	0.00118	0.00114	0.00111	0.00107	0.00104	0.00100
3.1	0.00097	0.00094	0.00090	0.00087	0.00084	0.00082	0.00079	0.00076	0.00074	0.00071
3.2	0.00069	0.00066	0.00064	0.00062	0.00060	0.00058	0.00056	0.00054	0.00052	0.00050
3.3	0.00048	0.00047	0.00045	0.00043	0.00042	0.00040	0.00039	0.00038	0.00036	0.00035
3.4	0.00034	0.00032	0.00031	0.00030	0.00029	0.00028	0.00027	0.00026	0.00025	0.00024
3.5	0.00023	0.00022	0.00022	0.00021	0.00020	0.00019	0.00019	0.00018	0.00017	0.00017
3.6	0.00016	0.00015	0.00015	0.00014	0.00014	0.00013	0.00013	0.00012	0.00012	0.00011
3.7	0.00011	0.00010	0.00010	0.00010	0.00009	0.00009	0.00008	0.00008	0.00008	0.00008
3.8	0.00007	0.00007	0.00007	0.00006	0.00006	0.00006	0.00006	0.00005	0.00005	0.00005
3.9	0.00005	0.00005	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004	0.00003	0.00003



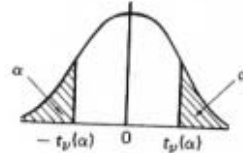
Table 7 PERCENTAGE POINTS OF THE  $t$  DISTRIBUTION

ONE-SIDED TEST



$\Pr(T_{\nu} > t_{\nu}(\alpha)) = \alpha$ ,  
for  $\nu$  degrees of freedom.

TWO-SIDED TEST

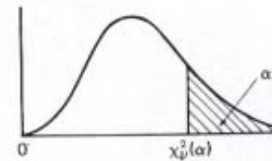


$\Pr(T_{\nu} > t_{\nu}(\alpha) \text{ or } T_{\nu} < -t_{\nu}(\alpha)) = 2\alpha$ ,  
for  $\nu$  degrees of freedom.

$\nu$	$\alpha = 0.4$ $2\alpha = 0.8$	0.25 0.5	0.1 0.2	0.05 0.1	0.025 0.05	0.01 0.02	0.005 0.01	0.0025 0.005	0.001 0.002	0.0005 0.001
1	0.325	1.000	3.078	6.314	12.706	31.821	63.657	127.321	318.309	636.619
2	0.289	0.816	1.886	2.920	4.303	6.965	9.925	14.089	22.327	31.599
3	0.277	0.765	1.638	2.353	3.182	4.541	5.841	7.453	10.215	12.924
4	0.271	0.741	1.533	2.132	2.776	3.747	4.604	5.598	7.173	8.610
5	0.267	0.727	1.476	2.015	2.571	3.365	4.032	4.773	5.893	6.869
6	0.265	0.718	1.440	1.943	2.447	3.143	3.707	4.317	5.208	5.959
7	0.263	0.711	1.415	1.895	2.365	2.998	3.499	4.029	4.785	5.408
8	0.262	0.706	1.397	1.860	2.306	2.896	3.355	3.833	4.501	5.041
9	0.261	0.703	1.383	1.833	2.262	2.821	3.250	3.690	4.297	4.781
10	0.260	0.700	1.372	1.812	2.228	2.764	3.169	3.581	4.144	4.587
11	0.260	0.697	1.363	1.796	2.201	2.718	3.106	3.497	4.025	4.437
12	0.259	0.695	1.356	1.782	2.179	2.681	3.055	3.428	3.930	4.318
13	0.259	0.694	1.350	1.771	2.160	2.650	3.012	3.372	3.852	4.221
14	0.258	0.692	1.345	1.761	2.145	2.624	2.977	3.326	3.787	4.140
15	0.258	0.691	1.341	1.753	2.131	2.602	2.947	3.286	3.733	4.073
16	0.258	0.690	1.337	1.746	2.120	2.583	2.921	3.252	3.686	4.015
17	0.257	0.689	1.333	1.740	2.110	2.567	2.898	3.222	3.646	3.965
18	0.257	0.688	1.330	1.734	2.101	2.552	2.878	3.197	3.610	3.922
19	0.257	0.688	1.328	1.729	2.093	2.539	2.861	3.174	3.579	3.883
20	0.257	0.687	1.325	1.725	2.086	2.528	2.845	3.153	3.552	3.850
21	0.257	0.686	1.323	1.721	2.080	2.518	2.831	3.135	3.527	3.819
22	0.256	0.686	1.321	1.717	2.074	2.508	2.819	3.119	3.505	3.792
23	0.256	0.685	1.319	1.714	2.069	2.500	2.807	3.104	3.485	3.768
24	0.256	0.685	1.318	1.711	2.064	2.492	2.797	3.091	3.467	3.745
25	0.256	0.684	1.316	1.708	2.060	2.485	2.787	3.078	3.450	3.725
26	0.256	0.684	1.315	1.706	2.056	2.479	2.779	3.067	3.435	3.707
27	0.256	0.684	1.314	1.703	2.052	2.473	2.771	3.057	3.421	3.690
28	0.256	0.683	1.313	1.701	2.048	2.467	2.763	3.047	3.408	3.674
29	0.256	0.683	1.311	1.699	2.045	2.462	2.756	3.038	3.396	3.659
30	0.256	0.683	1.310	1.697	2.042	2.457	2.750	3.030	3.385	3.646
40	0.255	0.681	1.303	1.684	2.021	2.423	2.704	2.971	3.307	3.551
60	0.254	0.679	1.296	1.671	2.000	2.390	2.660	2.915	3.232	3.460
120	0.254	0.677	1.289	1.658	1.980	2.358	2.617	2.860	3.160	3.373
$\infty$	0.253	0.674	1.282	1.645	1.960	2.326	2.576	2.807	3.090	3.291

Table 8 PERCENTAGE POINTS OF THE  $\chi^2$  DISTRIBUTION

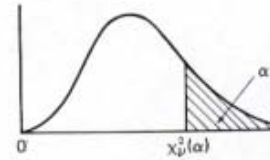
The values tabulated are  $\chi^2_{\nu}(\alpha)$ , where  
 $\Pr(\chi^2_{\nu} > \chi^2_{\nu}(\alpha)) = \alpha$ , for  $\nu$  degrees of freedom.



0.995	0.990	0.975	0.950	0.900	0.750	0.500	$\alpha$ $\nu$
392704 . 10 <sup>-10</sup>	157088 . 10 <sup>-9</sup>	982069 . 10 <sup>-9</sup>	393214 . 10 <sup>-8</sup>	0.0157908	0.1015308	0.454936	1
0.0100251	0.0201007	0.0506356	0.102587	0.210721	0.575364	1.38629	2
0.0717218	0.114832	0.215795	0.351846	0.584374	1.212534	2.36597	3
0.206989	0.297109	0.484419	0.710723	1.063623	1.92256	3.35669	4
0.411742	0.554298	0.831212	1.145476	1.61031	2.67460	4.35146	5
0.675727	0.872090	1.23734	1.63538	2.20413	3.45460	5.34812	6
0.989256	1.239043	1.68987	2.16735	2.83311	4.25485	6.34581	7
1.34441	1.64650	2.17973	2.73264	3.48954	5.07064	7.34412	8
1.73493	2.08790	2.70039	3.32511	4.16816	5.89883	8.34283	9
2.15586	2.55821	3.24697	3.94030	4.86518	6.73720	9.34182	10
2.60322	3.05348	3.81575	4.57481	5.57778	7.58414	10.3410	11
3.07382	3.57057	4.40379	5.22603	6.30380	8.43842	11.3403	12
3.56503	4.10692	5.00875	5.89186	7.04150	9.29907	12.3398	13
4.07467	4.66043	5.62873	6.57063	7.78953	10.1653	13.3393	14
4.60092	5.22935	6.26214	7.26094	8.54676	11.0365	14.3389	15
5.14221	5.81221	6.90766	7.96165	9.31224	11.9122	15.3385	16
5.69722	6.40776	7.56419	8.67176	10.0852	12.7919	16.3382	17
6.26480	7.01491	8.23075	9.39046	10.8649	13.6753	17.3379	18
6.84397	7.63273	8.90652	10.1170	11.6509	14.5620	18.3377	19
7.43384	8.26040	9.59078	10.8508	12.4426	15.4518	19.3374	20
8.03365	8.89720	10.28293	11.5913	13.2396	16.3444	20.3372	21
8.64272	9.54249	10.9823	12.3380	14.0415	17.2396	21.3370	22
9.26043	10.19567	11.6886	13.0905	14.8480	18.1373	22.3369	23
9.88623	10.8564	12.4012	13.8484	15.6587	19.0373	23.3367	24
10.5197	11.5240	13.1197	14.6114	16.4734	19.9393	24.3366	25
11.1602	12.1981	13.8439	15.3792	17.2919	20.8434	25.3365	26
11.8076	12.8785	14.5734	16.1514	18.1139	21.7494	26.3363	27
12.4613	13.5647	15.3079	16.9279	18.9392	22.6572	27.3362	28
13.1211	14.2565	16.0471	17.7084	19.7677	23.5666	28.3361	29
13.7867	14.9535	16.7908	18.4927	20.5992	24.4776	29.3360	30
20.7065	22.1643	24.4330	26.5093	29.0505	33.6603	39.3353	40
27.9907	29.7067	32.3574	34.7643	37.6886	42.9421	49.3349	50
35.5345	37.4849	40.4817	43.1880	46.4589	52.2938	59.3347	60
43.2752	45.4417	48.7576	51.7393	55.3289	61.6983	69.3345	70
51.1719	53.5401	57.1532	60.3915	64.2778	71.1445	79.3343	80
59.1963	61.7541	65.6466	69.1260	73.2911	80.6247	89.3342	90
67.3276	70.0649	74.2219	77.9295	82.3581	90.1332	99.3341	100

Table 8 PERCENTAGE POINTS OF THE  $\chi^2$  DISTRIBUTION

The values tabulated are  $\chi^2_{\nu}(\alpha)$ , where  
 $\Pr(\chi^2_{\nu} > \chi^2_{\nu}(\alpha)) = \alpha$ , for  $\nu$  degrees of freedom.



0.995	0.990	0.975	0.950	0.900	0.750	0.500	$\alpha$ $\nu$
392704 . 10 <sup>-16</sup>	157088 . 10 <sup>-9</sup>	982069 . 10 <sup>-9</sup>	393214 . 10 <sup>-8</sup>	0.0157908	0.1015308	0.454936	1
0.0100251	0.0201007	0.0506356	0.102587	0.210721	0.575364	1.38629	2
0.0717218	0.114832	0.215795	0.351846	0.584374	1.212534	2.36597	3
0.206989	0.297109	0.484419	0.710723	1.063623	1.92256	3.35669	4
0.411742	0.554298	0.831212	1.145476	1.61031	2.67460	4.35146	5
0.675727	0.872090	1.23734	1.63538	2.20413	3.45460	5.34812	6
0.989256	1.239043	1.68987	2.16735	2.83311	4.25485	6.34581	7
1.34441	1.64650	2.17973	2.73264	3.48954	5.07064	7.34412	8
1.73493	2.08790	2.70039	3.32511	4.16816	5.89883	8.34283	9
2.15586	2.55821	3.24697	3.94030	4.86518	6.73720	9.34182	10
2.60322	3.05348	3.81575	4.57481	5.57778	7.58414	10.3410	11
3.07382	3.57057	4.40379	5.22603	6.30380	8.43842	11.3403	12
3.56503	4.10692	5.00875	5.89186	7.04150	9.29907	12.3398	13
4.07467	4.66043	5.62873	6.57063	7.78953	10.1653	13.3393	14
4.60092	5.22935	6.26214	7.26094	8.54676	11.0365	14.3389	15
5.14221	5.81221	6.90766	7.96165	9.31224	11.9122	15.3385	16
5.69722	6.40776	7.56419	8.67176	10.0852	12.7919	16.3382	17
6.26480	7.01491	8.23075	9.39046	10.8649	13.6753	17.3379	18
6.84397	7.63273	8.90652	10.1170	11.6509	14.5620	18.3377	19
7.43384	8.26040	9.59078	10.8508	12.4426	15.4518	19.3374	20
8.03365	8.89720	10.28293	11.5913	13.2396	16.3444	20.3372	21
8.64272	9.54249	10.9823	12.3380	14.0415	17.2396	21.3370	22
9.26043	10.19567	11.6886	13.0905	14.8480	18.1373	22.3369	23
9.88623	10.8564	12.4012	13.8484	15.6587	19.0373	23.3367	24
10.5197	11.5240	13.1197	14.6114	16.4734	19.9393	24.3366	25
11.1602	12.1981	13.8439	15.3792	17.2919	20.8434	25.3365	26
11.8076	12.8785	14.5734	16.1514	18.1139	21.7494	26.3363	27
12.4613	13.5647	15.3079	16.9279	18.9392	22.6572	27.3362	28
13.1211	14.2565	16.0471	17.7084	19.7677	23.5666	28.3361	29
13.7867	14.9535	16.7908	18.4927	20.5992	24.4776	29.3360	30
20.7065	22.1643	24.4330	26.5093	29.0505	33.6603	39.3353	40
27.9907	29.7067	32.3574	34.7643	37.6886	42.9421	49.3349	50
35.5345	37.4849	40.4817	43.1880	46.4589	52.2938	59.3347	60
43.2752	45.4417	48.7576	51.7393	55.3289	61.6983	69.3345	70
51.1719	53.5401	57.1532	60.3915	64.2778	71.1445	79.3343	80
59.1963	61.7541	65.6466	69.1260	73.2911	80.6247	89.3342	90
67.3276	70.0649	74.2219	77.9295	82.3581	90.1332	99.3341	100

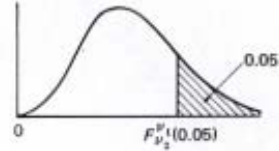


Table 9 Percentage Points of the F Distribution  
UPPER 5 PER CENT POINTS

The values tabulated are  $F_{\nu_1, \nu_2}^{0.05}$  such that  $\Pr(F_{\nu_1, \nu_2}^{0.05} > F_{\nu_1, \nu_2}^{0.05}) = 0.05$ , where  $\nu_1$  is the degrees of freedom in the numerator and  $\nu_2$  is the degrees of freedom in the denominator.

The lower percentage points of the distribution are obtained using the relationship

$$F_{\nu_1, \nu_2}^{0.95} = 1/F_{\nu_2, \nu_1}^{0.05}$$



$\nu_2 \backslash \nu_1$	1	2	3	4	5	6	7	8	9	10	15	20	40	60	120	$\infty$
1	161.4	199.5	215.7	224.6	230.2	234.0	236.8	238.9	240.5	241.9	245.9	248.0	251.1	252.2	253.3	254.3
2	18.51	19.00	19.16	19.25	19.30	19.33	19.35	19.37	19.38	19.40	19.43	19.45	19.47	19.48	19.49	19.50
3	10.13	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81	8.79	8.70	8.66	8.59	8.57	8.55	8.53
4	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00	5.96	5.86	5.80	5.72	5.69	5.66	5.63
5	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77	4.74	4.62	4.56	4.46	4.43	4.40	4.36
6	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10	4.06	3.94	3.87	3.77	3.74	3.70	3.67
7	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68	3.64	3.51	3.44	3.34	3.30	3.27	3.23
8	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39	3.35	3.22	3.15	3.04	3.01	2.97	2.93
9	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18	3.14	3.01	2.94	2.83	2.79	2.75	2.71
10	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02	2.98	2.85	2.77	2.66	2.62	2.58	2.54
11	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.90	2.85	2.72	2.65	2.53	2.49	2.45	2.40
12	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80	2.75	2.62	2.54	2.43	2.38	2.34	2.30
13	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77	2.71	2.67	2.53	2.46	2.34	2.30	2.25	2.21
14	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.65	2.60	2.46	2.39	2.27	2.22	2.18	2.13
15	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59	2.54	2.40	2.33	2.20	2.16	2.11	2.07
16	4.49	3.63	3.24	3.01	2.85	2.74	2.66	2.59	2.54	2.49	2.35	2.28	2.15	2.11	2.06	2.01
17	4.45	3.59	3.20	2.96	2.81	2.70	2.61	2.55	2.49	2.45	2.31	2.23	2.10	2.06	2.01	1.96
18	4.41	3.55	3.16	2.93	2.77	2.66	2.58	2.51	2.46	2.41	2.27	2.19	2.06	2.02	1.97	1.92
19	4.38	3.52	3.13	2.90	2.74	2.63	2.54	2.48	2.42	2.38	2.23	2.16	2.03	1.98	1.93	1.88
20	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39	2.35	2.20	2.12	1.99	1.95	1.90	1.84
21	4.32	3.47	3.07	2.84	2.68	2.57	2.49	2.42	2.37	2.32	2.18	2.10	1.96	1.92	1.87	1.81
22	4.30	3.44	3.05	2.82	2.66	2.55	2.46	2.40	2.34	2.30	2.15	2.07	1.94	1.89	1.84	1.78
23	4.28	3.42	3.03	2.80	2.64	2.53	2.44	2.37	2.32	2.27	2.13	2.05	1.91	1.86	1.81	1.76
24	4.26	3.40	3.01	2.78	2.62	2.51	2.42	2.36	2.30	2.25	2.11	2.03	1.89	1.84	1.79	1.73
25	4.24	3.39	2.99	2.76	2.60	2.49	2.40	2.34	2.28	2.24	2.09	2.01	1.87	1.82	1.77	1.71
26	4.23	3.37	2.98	2.74	2.59	2.47	2.39	2.32	2.27	2.22	2.07	1.99	1.85	1.80	1.75	1.69
27	4.21	3.35	2.96	2.73	2.57	2.46	2.37	2.31	2.25	2.20	2.06	1.97	1.84	1.79	1.73	1.67
28	4.20	3.34	2.95	2.71	2.56	2.45	2.36	2.29	2.24	2.19	2.04	1.96	1.82	1.77	1.71	1.65
29	4.18	3.33	2.93	2.70	2.55	2.43	2.35	2.28	2.22	2.18	2.03	1.94	1.81	1.75	1.70	1.64
30	4.17	3.32	2.92	2.69	2.53	2.42	2.33	2.27	2.21	2.16	2.01	1.93	1.79	1.74	1.68	1.62
40	4.08	3.23	2.84	2.61	2.45	2.34	2.25	2.18	2.12	2.08	1.92	1.84	1.69	1.64	1.58	1.51
60	4.00	3.15	2.76	2.53	2.37	2.25	2.17	2.10	2.04	1.99	1.84	1.75	1.59	1.53	1.47	1.39
120	3.92	3.07	2.68	2.45	2.29	2.17	2.09	2.02	1.96	1.91	1.75	1.66	1.50	1.43	1.35	1.25
$\infty$	3.84	3.00	2.60	2.37	2.21	2.10	2.01	1.94	1.88	1.83	1.67	1.57	1.39	1.32	1.22	1.00

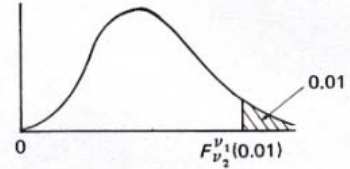
Table 9 Percentage Points of the F Distribution

UPPER 1 PER CENT POINTS

The values tabulated are  $F_{\nu_2}^{\nu_1}(0.01)$ , such that  $\Pr(F_{\nu_2}^{\nu_1} > F_{\nu_2}^{\nu_1}(0.01)) = 0.01$ , where  $\nu_1$  is the degrees of freedom in the numerator and  $\nu_2$  is the degrees of freedom in the denominator.

The lower percentage points of the distribution are obtained using the relationship

$$F_{\nu_2}^{\nu_1}(0.99) = 1/F_{\nu_1}^{\nu_2}(0.01)$$



$\nu_1 \backslash \nu_2$	1	2	3	4	5	6	7	8	9	10	15	20	40	60	120	$\infty$
1	4052	4999.5	5403	5625	5764	5859	5928	5981	6022	6056	6157	6209	6287	6313	6339	6366
2	98.50	99.00	99.17	99.25	99.30	99.33	99.36	99.37	99.39	99.40	99.43	99.45	99.47	99.48	99.49	99.50
3	34.12	30.82	29.46	28.71	28.24	27.91	27.67	27.49	27.35	27.23	26.87	26.69	26.41	26.32	26.22	26.13
4	21.20	18.00	16.69	15.98	15.52	15.21	14.98	14.80	14.66	14.55	14.20	14.02	13.75	13.66	13.56	13.46
5	16.26	13.27	12.06	11.39	10.97	10.67	10.46	10.29	10.16	10.05	9.72	9.55	9.29	9.20	9.11	9.02
6	13.75	10.92	9.78	9.15	8.75	8.47	8.26	8.10	7.98	7.87	7.56	7.40	7.14	7.06	6.97	6.88
7	12.25	9.55	8.45	7.85	7.46	7.19	6.99	6.84	6.72	6.62	6.31	6.16	5.91	5.82	5.74	5.65
8	11.26	8.65	7.59	7.01	6.63	6.37	6.18	6.03	5.91	5.81	5.52	5.36	5.12	5.03	4.95	4.86
9	10.56	8.02	6.99	6.42	6.06	5.80	5.61	5.47	5.35	5.26	4.96	4.81	4.57	4.48	4.40	4.31
10	10.04	7.56	6.55	5.99	5.64	5.39	5.20	5.06	4.94	4.85	4.56	4.41	4.17	4.08	4.00	3.91
11	9.65	7.21	6.22	5.67	5.32	5.07	4.89	4.74	4.63	4.54	4.25	4.10	3.86	3.78	3.69	3.60
12	9.33	6.93	5.95	5.41	5.06	4.82	4.64	4.50	4.39	4.30	4.01	3.86	3.62	3.54	3.45	3.36
13	9.07	6.70	5.74	5.21	4.86	4.62	4.44	4.30	4.19	4.10	3.82	3.66	3.43	3.34	3.25	3.17
14	8.86	6.51	5.56	5.04	4.69	4.46	4.28	4.14	4.03	3.94	3.66	3.51	3.27	3.18	3.09	3.00
15	8.68	6.36	5.42	4.89	4.56	4.32	4.14	4.00	3.89	3.80	3.52	3.37	3.13	3.05	2.96	2.87
16	8.53	6.23	5.29	4.77	4.44	4.20	4.03	3.89	3.78	3.69	3.41	3.26	3.02	2.93	2.84	2.75
17	8.40	6.11	5.18	4.67	4.34	4.10	3.93	3.79	3.68	3.59	3.31	3.16	2.92	2.83	2.75	2.65
18	8.29	6.01	5.09	4.58	4.25	4.01	3.84	3.71	3.60	3.51	3.23	3.08	2.84	2.75	2.66	2.57
19	8.18	5.93	5.01	4.50	4.17	3.94	3.77	3.63	3.52	3.43	3.15	3.00	2.76	2.67	2.58	2.49
20	8.10	5.85	4.94	4.43	4.10	3.87	3.70	3.56	3.46	3.37	3.09	2.94	2.69	2.61	2.52	2.42
21	8.02	5.78	4.87	4.37	4.04	3.81	3.64	3.51	3.40	3.31	3.03	2.88	2.64	2.55	2.46	2.36
22	7.95	5.72	4.82	4.31	3.99	3.76	3.59	3.46	3.35	3.26	2.98	2.83	2.58	2.50	2.40	2.31
23	7.88	5.66	4.76	4.26	3.94	3.71	3.54	3.41	3.30	3.21	2.93	2.78	2.54	2.45	2.35	2.26
24	7.82	5.61	4.72	4.22	3.90	3.67	3.50	3.36	3.26	3.17	2.89	2.74	2.49	2.40	2.31	2.21
25	7.77	5.57	4.68	4.18	3.85	3.63	3.46	3.32	3.22	3.13	2.85	2.70	2.45	2.36	2.27	2.17
26	7.72	5.53	4.64	4.14	3.82	3.59	3.42	3.29	3.18	3.09	2.81	2.66	2.42	2.33	2.23	2.13
27	7.68	5.49	4.60	4.11	3.78	3.56	3.39	3.26	3.15	3.06	2.78	2.63	2.38	2.29	2.20	2.10
28	7.64	5.45	4.57	4.07	3.75	3.53	3.36	3.23	3.12	3.03	2.75	2.60	2.35	2.26	2.17	2.06
29	7.60	5.42	4.54	4.04	3.73	3.50	3.33	3.20	3.09	3.00	2.73	2.57	2.33	2.23	2.14	2.03
30	7.56	5.39	4.51	4.02	3.70	3.47	3.30	3.17	3.07	2.98	2.70	2.55	2.30	2.21	2.11	2.01
40	7.31	5.18	4.31	3.83	3.51	3.29	3.12	2.99	2.89	2.80	2.52	2.37	2.11	2.02	1.92	1.80
60	7.08	4.98	4.13	3.65	3.34	3.12	2.95	2.82	2.72	2.63	2.36	2.20	1.94	1.84	1.73	1.60
120	6.85	4.79	3.95	3.48	3.17	2.96	2.79	2.66	2.56	2.47	2.19	2.03	1.76	1.66	1.53	1.38
$\infty$	6.63	4.61	3.78	3.32	3.02	2.80	2.64	2.51	2.41	2.32	2.04	1.88	1.59	1.47	1.32	1.00