

Appendix A1 Random Number Table

8571 7683 5118 7669 6126 3663 3059 7807 9219 4383 9021 7013 0233 3348 4077
0864 5055 8631 5770 0505 0386 9792 1690 4874 3084 0228 8539 9375 5046 8635
4753 1992 8182 2658 2914 4005 1577 1714 7862 7009 0252 3070 1563 3008 3716
1267 1063 4415 8496 6779 1563 7833 5351 2278 0674 1252 6813 4016 3961 6890

9497 0105 5626 0529 0602 4573 1499 7772 7759 9405 9502 3408 6931 7946 4655
6823 7365 6140 0357 7069 7715 9083 6180 1131 7059 9808 9803 7883 5943 6649
6532 4048 3044 8035 1045 8349 5422 0315 7470 7679 1726 1390 4997 5632 9033
8184 8336 5684 5846 7056 2847 4715 2869 2576 5373 8175 0384 5348 8232 8186

5605 0939 9380 1647 7307 5893 7569 7092 4437 2722 7807 5908 5425 9679 2348
4926 1561 7299 2195 5374 3664 8269 5241 4436 5265 7571 8299 6006 2142 2273
0933 6131 2406 0715 5069 1663 8015 9120 0667 4884 8601 3370 3449 7158 8950
7413 9526 9670 3075 8321 8295 6327 5475 5650 9061 7687 3849 2207 6910 4166

3524 0391 0011 2902 6086 9175 8937 1054 4177 1002 7659 6069 6695 1899 8423
9099 6929 5171 3603 0309 2960 8108 2014 5500 8512 0451 0204 4869 9462 6754
4961 7681 8636 4583 6453 0333 9236 5420 4256 3231 3328 6992 9315 2294 6170
2312 9345 9720 1558 8466 4249 3588 6247 4845 4879 2728 1671 3618 0372 3266

0742 9329 8322 7469 8016 9216 7906 6843 4292 9025 8674 7876 9461 1858 0283
2482 9716 3579 9833 8203 7797 4774 8519 0434 2947 4297 6655 3095 3201 6348
6586 8113 9021 7435 9787 9556 7908 5485 7687 8669 4090 5778 1883 6891 0130
6963 9222 4465 8470 9249 1335 8562 1369 6375 6279 6268 2142 8492 8936 3154

8831 5710 6027 3773 1724 8168 6115 6682 5679 9614 0500 4508 3117 3809 2350
0960 6811 2422 1696 2594 4241 0126 9381 3345 3474 0870 0703 9612 5310 9086
3361 6816 0174 3764 1629 0315 7142 9111 6406 8670 6962 5227 0131 4840 9763
3882 9474 1221 0442 2806 5339 3759 1009 7707 7947 9256 1182 5287 1139 1051

6231 1917 5078 0988 5342 4621 7635 2995 6003 9101 3197 3603 8250 3186 8770
6614 0786 6289 7457 8601 0031 2680 5920 1620 9055 8155 4750 0504 4463 4092
4835 5507 9718 1984 6173 8422 0164 8501 7153 5260 3830 3447 0353 2479 6739
2317 4042 7768 5107 3149 7006 3980 1278 4596 6445 0784 3671 8905 6612 9496

0807 9132 6407 1073 0861 3777 5771 1538 0105 4441 9735 8257 7178 4898 5284
2309 5153 4227 7466 6825 0689 5636 0260 4063 2244 1778 3591 6547 2875 4542
4259 1236 4855 4409 8242 0092 2768 0535 8420 1898 9266 1035 9708 7266 7494
0607 4686 9335 9420 9850 0565 3454 2224 4629 0608 1006 7466 1882 8405 5852

1294 8595 1771 2951 6191 3463 7988 5287 8665 1181 9560 7669 4802 7673 8085
1083 4661 1699 9025 4690 3315 0767 9289 6569 9583 2749 5528 6276 6891 7661
5022 7785 1414 5903 7317 4743 7060 3984 9744 3350 5504 4925 0096 7563 8293
2568 3788 1984 5109 0836 5828 1955 3279 5438 4272 0599 4915 4794 4855 5009

3707 9487 0521 3291 4398 0271 7904 7835 5024 9735 7955 5618 6819 1242 1124
3366 7510 0149 5370 3451 1229 1670 5582 7083 1840 7251 7477 4405 7483 5836
7099 0130 1538 5004 7973 2835 2247 8981 5815 2365 2929 1981 5400 5350 2526
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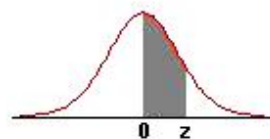
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5073 4180 9863 8411 4815 5400 7476 4435 0629 4566 1352 4577 1601 2354 0042
4048 4106 0210 2403 8104 1970 4276 9047 6203 5188 2107 2375 7163 9850 3875
9163 1314 2494 9875 5727 1085 4145 9252 9314 8385 8744 8543 5620 0626 5342

7255 7156 5869 6706 4178 9361 0389 7822 9259 0115 2020 0272 1554 3735 9082

Appendix A2¹

Cumulative Standard Normal Distribution

$$\Phi(z) = P(Z \leq z) = \int_0^z \frac{1}{\sqrt{2\pi}} e^{-\frac{u^2}{2}} du$$

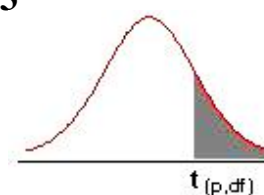


z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
0.7	0.2580	0.2611	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852
0.8	0.2881	0.2910	0.2939	0.2967	0.2995	0.3023	0.3051	0.3078	0.3106	0.3133
0.9	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.4	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
2.6	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
2.7	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
2.8	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
2.9	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
3.0	0.4987	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990

¹ www.statsoftinc.com/textbook/sttable.html

Appendix A3

***t* Table with Right Tail Probabilities**

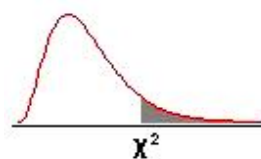


α ν	0.4	0.25	0.1	0.05	0.025	0.01	0.005	0.0005
1	0.325	1.000	3.078	6.314	12.706	31.821	63.657	636.62
2	0.289	0.816	1.886	2.920	4.303	6.965	9.925	31.599
3	0.277	0.765	1.638	2.353	3.182	4.541	5.841	12.924
4	0.271	0.741	1.533	2.132	2.776	3.747	4.604	8.610
5	0.267	0.727	1.476	2.015	2.571	3.365	4.032	6.869
6	0.265	0.718	1.440	1.943	2.447	3.143	3.707	5.959
7	0.263	0.711	1.415	1.895	2.365	2.998	3.499	5.408
8	0.262	0.706	1.397	1.860	2.306	2.896	3.355	5.041
9	0.261	0.703	1.383	1.833	2.262	2.821	3.250	4.781
10	0.260	0.700	1.372	1.812	2.228	2.764	3.169	4.587
11	0.260	0.697	1.363	1.796	2.201	2.718	3.106	4.437
12	0.259	0.695	1.356	1.782	2.179	2.681	3.055	4.318
13	0.259	0.694	1.350	1.771	2.160	2.650	3.012	4.221
14	0.258	0.692	1.345	1.761	2.145	2.624	2.977	4.141
15	0.258	0.691	1.341	1.753	2.131	2.602	2.947	4.073
16	0.258	0.690	1.337	1.746	2.120	2.583	2.921	4.015
17	0.257	0.689	1.333	1.740	2.110	2.567	2.898	3.965
18	0.257	0.688	1.330	1.734	2.101	2.552	2.878	3.922
19	0.257	0.688	1.328	1.729	2.093	2.539	2.861	3.883
20	0.257	0.687	1.325	1.725	2.086	2.528	2.845	3.850
21	0.257	0.686	1.323	1.721	2.080	2.518	2.831	3.819
22	0.256	0.686	1.321	1.717	2.074	2.508	2.819	3.792
23	0.256	0.685	1.319	1.714	2.069	2.500	2.807	3.768
24	0.256	0.685	1.318	1.711	2.064	2.492	2.797	3.745
25	0.256	0.684	1.316	1.708	2.060	2.485	2.787	3.725
26	0.256	0.684	1.315	1.706	2.056	2.479	2.779	3.707
27	0.256	0.684	1.314	1.703	2.052	2.473	2.771	3.690
28	0.256	0.683	1.313	1.701	2.048	2.467	2.763	3.674
29	0.256	0.683	1.311	1.699	2.045	2.462	2.756	3.659
30	0.256	0.683	1.310	1.697	2.042	2.457	2.750	3.646
∞	0.253	0.674	1.282	1.645	1.960	2.326	2.576	3.291

ν = degrees of freedom

Appendix A4

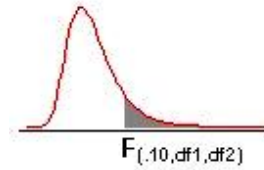
Right Tail Areas for the *Chi-square* Distribution



α ν	0.995	0.99	0.975	0.95	0.9	0.75	0.5	0.25	0.1	0.05	0.025	0.01	0.005
1	0.00	0.00	0.00	0.00	0.02	0.10	0.45	1.32	2.71	3.84	5.02	6.63	7.88
2	0.01	0.02	0.05	0.10	0.21	0.58	1.39	2.77	4.61	5.99	7.38	9.21	10.60
3	0.07	0.11	0.22	0.35	0.58	1.21	2.37	4.11	6.25	7.81	9.35	11.34	12.84
4	0.21	0.30	0.48	0.71	1.06	1.92	3.36	5.39	7.78	9.49	11.14	13.28	14.86
5	0.41	0.55	0.83	1.15	1.61	2.67	4.35	6.63	9.24	11.07	12.83	15.09	16.75
6	0.68	0.87	1.24	1.64	2.20	3.45	5.35	7.84	10.64	12.59	14.45	16.81	18.55
7	0.99	1.24	1.69	2.17	2.83	4.25	6.35	9.04	12.02	14.07	16.01	18.48	20.28
8	1.34	1.65	2.18	2.73	3.49	5.07	7.34	10.22	13.36	15.51	17.53	20.09	21.95
9	1.73	2.09	2.70	3.33	4.17	5.90	8.34	11.39	14.68	16.92	19.02	21.67	23.59
10	2.16	2.56	3.25	3.94	4.87	6.74	9.34	12.55	15.99	18.31	20.48	23.21	25.19
11	2.60	3.05	3.82	4.57	5.58	7.58	10.34	13.70	17.28	19.68	21.92	24.72	26.76
12	3.07	3.57	4.40	5.23	6.30	8.44	11.34	14.85	18.55	21.03	23.34	26.22	28.30
13	3.57	4.11	5.01	5.89	7.04	9.30	12.34	15.98	19.81	22.36	24.74	27.69	29.82
14	4.07	4.66	5.63	6.57	7.79	10.17	13.34	17.12	21.06	23.68	26.12	29.14	31.32
15	4.60	5.23	6.26	7.26	8.55	11.04	14.34	18.25	22.31	25.00	27.49	30.58	32.80
16	5.14	5.81	6.91	7.96	9.31	11.91	15.34	19.37	23.54	26.30	28.85	32.00	34.27
17	5.70	6.41	7.56	8.67	10.09	12.79	16.34	20.49	24.77	27.59	30.19	33.41	35.72
18	6.26	7.01	8.23	9.39	10.86	13.68	17.34	21.60	25.99	28.87	31.53	34.81	37.16
19	6.84	7.63	8.91	10.12	11.65	14.56	18.34	22.72	27.20	30.14	32.85	36.19	38.58
20	7.43	8.26	9.59	10.85	12.44	15.45	19.34	23.83	28.41	31.41	34.17	37.57	40.00
21	8.03	8.90	10.28	11.59	13.24	16.34	20.34	24.93	29.62	32.67	35.48	38.93	41.40
22	8.64	9.54	10.98	12.34	14.04	17.24	21.34	26.04	30.81	33.92	36.78	40.29	42.80
23	9.26	10.20	11.69	13.09	14.85	18.14	22.34	27.14	32.01	35.17	38.08	41.64	44.18
24	9.89	10.86	12.40	13.85	15.66	19.04	23.34	28.24	33.20	36.42	39.36	42.98	45.56
25	10.52	11.52	13.12	14.61	16.47	19.94	24.34	29.34	34.38	37.65	40.65	44.31	46.93
26	11.16	12.20	13.84	15.38	17.29	20.84	25.34	30.43	35.56	38.89	41.92	45.64	48.29
27	11.81	12.88	14.57	16.15	18.11	21.75	26.34	31.53	36.74	40.11	43.19	46.96	49.64
28	12.46	13.56	15.31	16.93	18.94	22.66	27.34	32.62	37.92	41.34	44.46	48.28	50.99
29	13.12	14.26	16.05	17.71	19.77	23.57	28.34	33.71	39.09	42.56	45.72	49.59	52.34
30	13.79	14.95	16.79	18.49	20.60	24.48	29.34	34.80	40.26	43.77	46.98	50.89	53.67

ν = degrees of freedom

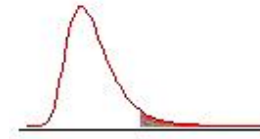
Appendix A5



F Table for alpha=.10

df2/df1	1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40	60	120	INF
1	39.86	49.5	53.59	55.83	57.24	58.2	58.91	59.44	59.86	60.19	60.71	61.22	61.74	62	62.26	62.53	62.79	63.06	63.33
2	8.526	9	9.162	9.243	9.293	9.326	9.349	9.367	9.381	9.392	9.408	9.425	9.441	9.45	9.458	9.466	9.475	9.483	9.491
3	5.538	5.462	5.391	5.343	5.309	5.285	5.266	5.252	5.24	5.23	5.216	5.2	5.184	5.176	5.168	5.16	5.151	5.143	5.134
4	4.545	4.325	4.191	4.107	4.051	4.01	3.979	3.955	3.936	3.92	3.896	3.87	3.844	3.831	3.817	3.804	3.79	3.775	3.761
5	4.06	3.78	3.619	3.52	3.453	3.405	3.368	3.339	3.316	3.297	3.268	3.238	3.207	3.191	3.174	3.157	3.14	3.123	3.105
6	3.776	3.463	3.289	3.181	3.108	3.055	3.014	2.983	2.958	2.937	2.905	2.871	2.836	2.818	2.8	2.781	2.762	2.742	2.722
7	3.589	3.257	3.074	2.961	2.883	2.827	2.785	2.752	2.725	2.703	2.668	2.632	2.595	2.575	2.555	2.535	2.514	2.493	2.471
8	3.458	3.113	2.924	2.806	2.726	2.668	2.624	2.589	2.561	2.538	2.502	2.464	2.425	2.404	2.383	2.361	2.339	2.316	2.293
9	3.36	3.006	2.813	2.693	2.611	2.551	2.505	2.469	2.44	2.416	2.379	2.34	2.298	2.277	2.255	2.232	2.208	2.184	2.159
10	3.285	2.924	2.728	2.605	2.522	2.461	2.414	2.377	2.347	2.323	2.284	2.244	2.201	2.178	2.155	2.132	2.107	2.082	2.055
11	3.225	2.86	2.66	2.536	2.451	2.389	2.342	2.304	2.274	2.248	2.209	2.167	2.123	2.1	2.076	2.052	2.026	2	1.972
12	3.177	2.807	2.606	2.48	2.394	2.331	2.283	2.245	2.214	2.188	2.147	2.105	2.06	2.036	2.011	1.986	1.96	1.932	1.904
13	3.136	2.763	2.56	2.434	2.347	2.283	2.234	2.195	2.164	2.138	2.097	2.053	2.007	1.983	1.958	1.931	1.904	1.876	1.846
14	3.102	2.726	2.522	2.395	2.307	2.243	2.193	2.154	2.122	2.095	2.054	2.01	1.962	1.938	1.912	1.885	1.857	1.828	1.797
15	3.073	2.695	2.49	2.361	2.273	2.208	2.158	2.119	2.086	2.059	2.017	1.972	1.924	1.899	1.873	1.845	1.817	1.787	1.755
16	3.048	2.668	2.462	2.333	2.244	2.178	2.128	2.088	2.055	2.028	1.985	1.94	1.891	1.866	1.839	1.811	1.782	1.751	1.718
17	3.026	2.645	2.437	2.308	2.218	2.152	2.102	2.061	2.028	2.001	1.958	1.912	1.862	1.836	1.809	1.781	1.751	1.719	1.686
18	3.007	2.624	2.416	2.286	2.196	2.13	2.079	2.038	2.005	1.977	1.933	1.887	1.837	1.81	1.783	1.754	1.723	1.691	1.657
19	2.99	2.606	2.397	2.266	2.176	2.109	2.058	2.017	1.984	1.956	1.912	1.865	1.814	1.787	1.759	1.73	1.699	1.666	1.631
20	2.975	2.589	2.38	2.249	2.158	2.091	2.04	1.999	1.965	1.937	1.892	1.845	1.794	1.767	1.738	1.708	1.677	1.643	1.607
21	2.961	2.575	2.365	2.233	2.142	2.075	2.023	1.982	1.948	1.92	1.875	1.827	1.776	1.748	1.719	1.689	1.657	1.623	1.586
22	2.949	2.561	2.351	2.219	2.128	2.061	2.008	1.967	1.933	1.904	1.859	1.811	1.759	1.731	1.702	1.671	1.639	1.604	1.567
23	2.937	2.549	2.339	2.207	2.115	2.047	1.995	1.953	1.919	1.89	1.845	1.796	1.744	1.716	1.686	1.655	1.622	1.587	1.549
24	2.927	2.538	2.327	2.195	2.103	2.035	1.983	1.941	1.906	1.877	1.832	1.783	1.73	1.702	1.672	1.641	1.607	1.571	1.533
25	2.918	2.528	2.317	2.184	2.092	2.024	1.971	1.929	1.895	1.866	1.82	1.771	1.718	1.689	1.659	1.627	1.593	1.557	1.518
26	2.909	2.519	2.307	2.174	2.082	2.014	1.961	1.919	1.884	1.855	1.809	1.76	1.706	1.677	1.647	1.615	1.581	1.544	1.504
27	2.901	2.511	2.299	2.165	2.073	2.005	1.952	1.909	1.874	1.845	1.799	1.749	1.695	1.666	1.636	1.603	1.569	1.531	1.491
28	2.894	2.503	2.291	2.157	2.064	1.996	1.943	1.9	1.865	1.836	1.79	1.74	1.685	1.656	1.625	1.593	1.558	1.52	1.478
29	2.887	2.495	2.283	2.149	2.057	1.988	1.935	1.892	1.857	1.827	1.781	1.731	1.676	1.647	1.616	1.583	1.547	1.509	1.467
30	2.881	2.489	2.276	2.142	2.049	1.98	1.927	1.884	1.849	1.819	1.773	1.722	1.667	1.638	1.606	1.573	1.538	1.499	1.456
40	2.835	2.44	2.226	2.091	1.997	1.927	1.873	1.829	1.793	1.763	1.715	1.662	1.605	1.574	1.541	1.506	1.467	1.425	1.377
60	2.791	2.393	2.177	2.041	1.946	1.875	1.819	1.775	1.738	1.707	1.657	1.603	1.543	1.511	1.476	1.437	1.395	1.348	1.291
120	2.748	2.347	2.13	1.992	1.896	1.824	1.767	1.722	1.684	1.652	1.601	1.545	1.482	1.447	1.409	1.368	1.32	1.265	1.193
inf	2.706	2.303	2.084	1.945	1.847	1.774	1.717	1.67	1.632	1.599	1.546	1.487	1.421	1.383	1.342	1.295	1.24	1.169	1

Appendix A5 Continued

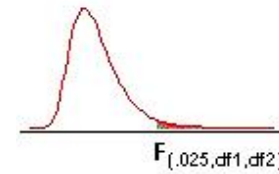


F_(.05,df1,df2)

F Table for alpha=.05

df2/df1	1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40	60	120	INF
1	161.4	199.5	215.7	224.6	230.2	234	236.8	238.9	240.5	241.9	243.9	245.9	248	249.1	250.1	251.1	252.2	253.3	254.3
2	18.51	19	19.16	19.25	19.3	19.33	19.35	19.37	19.38	19.4	19.41	19.43	19.45	19.45	19.46	19.47	19.48	19.49	19.5
3	10.13	9.552	9.277	9.117	9.014	8.941	8.887	8.845	8.812	8.786	8.745	8.703	8.66	8.639	8.617	8.594	8.572	8.549	8.526
4	7.709	6.944	6.591	6.388	6.256	6.163	6.094	6.041	5.999	5.964	5.912	5.858	5.803	5.774	5.746	5.717	5.688	5.658	5.628
5	6.608	5.786	5.41	5.192	5.05	4.95	4.876	4.818	4.773	4.735	4.678	4.619	4.558	4.527	4.496	4.464	4.431	4.399	4.365
6	5.987	5.143	4.757	4.534	4.387	4.284	4.207	4.147	4.099	4.06	4	3.938	3.874	3.842	3.808	3.774	3.74	3.705	3.669
7	5.591	4.737	4.347	4.12	3.972	3.866	3.787	3.726	3.677	3.637	3.575	3.511	3.445	3.411	3.376	3.34	3.304	3.267	3.23
8	5.318	4.459	4.066	3.838	3.688	3.581	3.501	3.438	3.388	3.347	3.284	3.218	3.15	3.115	3.079	3.043	3.005	2.967	2.928
9	5.117	4.257	3.863	3.633	3.482	3.374	3.293	3.23	3.179	3.137	3.073	3.006	2.937	2.901	2.864	2.826	2.787	2.748	2.707
10	4.965	4.103	3.708	3.478	3.326	3.217	3.136	3.072	3.02	2.978	2.913	2.845	2.774	2.737	2.7	2.661	2.621	2.58	2.538
11	4.844	3.982	3.587	3.357	3.204	3.095	3.012	2.948	2.896	2.854	2.788	2.719	2.646	2.609	2.571	2.531	2.49	2.448	2.405
12	4.747	3.885	3.49	3.259	3.106	2.996	2.913	2.849	2.796	2.753	2.687	2.617	2.544	2.506	2.466	2.426	2.384	2.341	2.296
13	4.667	3.806	3.411	3.179	3.025	2.915	2.832	2.767	2.714	2.671	2.604	2.533	2.459	2.42	2.38	2.339	2.297	2.252	2.206
14	4.6	3.739	3.344	3.112	2.958	2.848	2.764	2.699	2.646	2.602	2.534	2.463	2.388	2.349	2.308	2.266	2.223	2.178	2.131
15	4.543	3.682	3.287	3.056	2.901	2.791	2.707	2.641	2.588	2.544	2.475	2.403	2.328	2.288	2.247	2.204	2.16	2.114	2.066
16	4.494	3.634	3.239	3.007	2.852	2.741	2.657	2.591	2.538	2.494	2.425	2.352	2.276	2.235	2.194	2.151	2.106	2.059	2.01
17	4.451	3.592	3.197	2.965	2.81	2.699	2.614	2.548	2.494	2.45	2.381	2.308	2.23	2.19	2.148	2.104	2.058	2.011	1.96
18	4.414	3.555	3.16	2.928	2.773	2.661	2.577	2.51	2.456	2.412	2.342	2.269	2.191	2.15	2.107	2.063	2.017	1.968	1.917
19	4.381	3.522	3.127	2.895	2.74	2.628	2.544	2.477	2.423	2.378	2.308	2.234	2.156	2.114	2.071	2.026	1.98	1.93	1.878
20	4.351	3.493	3.098	2.866	2.711	2.599	2.514	2.447	2.393	2.348	2.278	2.203	2.124	2.083	2.039	1.994	1.946	1.896	1.843
21	4.325	3.467	3.073	2.84	2.685	2.573	2.488	2.421	2.366	2.321	2.25	2.176	2.096	2.054	2.01	1.965	1.917	1.866	1.812
22	4.301	3.443	3.049	2.817	2.661	2.549	2.464	2.397	2.342	2.297	2.226	2.151	2.071	2.028	1.984	1.938	1.889	1.838	1.783
23	4.279	3.422	3.028	2.796	2.64	2.528	2.442	2.375	2.32	2.275	2.204	2.128	2.048	2.005	1.961	1.914	1.865	1.813	1.757
24	4.26	3.403	3.009	2.776	2.621	2.508	2.423	2.355	2.3	2.255	2.183	2.108	2.027	1.984	1.939	1.892	1.842	1.79	1.733
25	4.242	3.385	2.991	2.759	2.603	2.49	2.405	2.337	2.282	2.237	2.165	2.089	2.008	1.964	1.919	1.872	1.822	1.768	1.711
26	4.225	3.369	2.975	2.743	2.587	2.474	2.388	2.321	2.266	2.22	2.148	2.072	1.99	1.946	1.901	1.853	1.803	1.749	1.691
27	4.21	3.354	2.96	2.728	2.572	2.459	2.373	2.305	2.25	2.204	2.132	2.056	1.974	1.93	1.884	1.836	1.785	1.731	1.672
28	4.196	3.34	2.947	2.714	2.558	2.445	2.359	2.291	2.236	2.19	2.118	2.041	1.959	1.915	1.869	1.82	1.769	1.714	1.654
29	4.183	3.328	2.934	2.701	2.545	2.432	2.346	2.278	2.223	2.177	2.105	2.028	1.945	1.901	1.854	1.806	1.754	1.698	1.638
30	4.171	3.316	2.922	2.69	2.534	2.421	2.334	2.266	2.211	2.165	2.092	2.015	1.932	1.887	1.841	1.792	1.74	1.684	1.622
40	4.085	3.232	2.839	2.606	2.45	2.336	2.249	2.18	2.124	2.077	2.004	1.925	1.839	1.793	1.744	1.693	1.637	1.577	1.509
60	4.001	3.15	2.758	2.525	2.368	2.254	2.167	2.097	2.04	1.993	1.917	1.836	1.748	1.7	1.649	1.594	1.534	1.467	1.389
120	3.92	3.072	2.68	2.447	2.29	2.175	2.087	2.016	1.959	1.911	1.834	1.751	1.659	1.608	1.554	1.495	1.429	1.352	1.254
inf	3.842	2.996	2.605	2.372	2.214	2.099	2.01	1.938	1.88	1.831	1.752	1.666	1.571	1.517	1.459	1.394	1.318	1.221	1

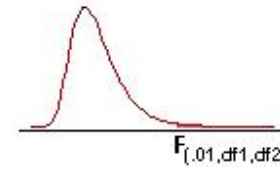
Appendix A5 Continued



F Table for alpha=.025

df2/df1	1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40	60	120	INF
1	647.8	799.5	864.2	899.6	921.8	937.1	948.2	956.7	963.3	968.6	976.7	984.9	993.1	997.2	1001	1006	1010	1014	1018
2	38.51	39	39.17	39.25	39.3	39.33	39.36	39.37	39.39	39.4	39.41	39.43	39.45	39.46	39.47	39.47	39.48	39.49	39.5
3	17.44	16.04	15.44	15.1	14.88	14.73	14.62	14.54	14.47	14.42	14.34	14.25	14.17	14.12	14.08	14.04	13.99	13.95	13.9
4	12.22	10.65	9.979	9.605	9.365	9.197	9.074	8.98	8.905	8.844	8.751	8.657	8.56	8.511	8.461	8.411	8.36	8.309	8.257
5	10.01	8.434	7.764	7.388	7.146	6.978	6.853	6.757	6.681	6.619	6.525	6.428	6.329	6.278	6.227	6.175	6.123	6.069	6.015
6	8.813	7.26	6.599	6.227	5.988	5.82	5.696	5.6	5.523	5.461	5.366	5.269	5.168	5.117	5.065	5.012	4.959	4.904	4.849
7	8.073	6.542	5.89	5.523	5.285	5.119	4.995	4.899	4.823	4.761	4.666	4.568	4.467	4.415	4.362	4.309	4.254	4.199	4.142
8	7.571	6.06	5.416	5.053	4.817	4.652	4.529	4.433	4.357	4.295	4.2	4.101	4	3.947	3.894	3.84	3.784	3.728	3.67
9	7.209	5.715	5.078	4.718	4.484	4.32	4.197	4.102	4.026	3.964	3.868	3.769	3.667	3.614	3.56	3.505	3.449	3.392	3.333
10	6.937	5.456	4.826	4.468	4.236	4.072	3.95	3.855	3.779	3.717	3.621	3.522	3.419	3.365	3.311	3.255	3.198	3.14	3.08
11	6.724	5.256	4.63	4.275	4.044	3.881	3.759	3.664	3.588	3.526	3.43	3.33	3.226	3.173	3.118	3.061	3.004	2.944	2.883
12	6.554	5.096	4.474	4.121	3.891	3.728	3.607	3.512	3.436	3.374	3.277	3.177	3.073	3.019	2.963	2.906	2.848	2.787	2.725
13	6.414	4.965	4.347	3.996	3.767	3.604	3.483	3.388	3.312	3.25	3.153	3.053	2.948	2.893	2.837	2.78	2.72	2.659	2.595
14	6.298	4.857	4.242	3.892	3.663	3.501	3.38	3.285	3.209	3.147	3.05	2.949	2.844	2.789	2.732	2.674	2.614	2.552	2.487
15	6.2	4.765	4.153	3.804	3.576	3.415	3.293	3.199	3.123	3.06	2.963	2.862	2.756	2.701	2.644	2.585	2.524	2.461	2.395
16	6.115	4.687	4.077	3.729	3.502	3.341	3.219	3.125	3.049	2.986	2.889	2.788	2.681	2.625	2.568	2.509	2.447	2.383	2.316
17	6.042	4.619	4.011	3.665	3.438	3.277	3.156	3.061	2.985	2.922	2.825	2.723	2.616	2.56	2.502	2.442	2.38	2.315	2.247
18	5.978	4.56	3.954	3.608	3.382	3.221	3.1	3.005	2.929	2.866	2.769	2.667	2.559	2.503	2.445	2.384	2.321	2.256	2.187
19	5.922	4.508	3.903	3.559	3.333	3.172	3.051	2.956	2.88	2.817	2.72	2.617	2.509	2.452	2.394	2.333	2.27	2.203	2.133
20	5.872	4.461	3.859	3.515	3.289	3.128	3.007	2.913	2.837	2.774	2.676	2.573	2.465	2.408	2.349	2.287	2.223	2.156	2.085
21	5.827	4.42	3.819	3.475	3.25	3.09	2.969	2.874	2.798	2.735	2.637	2.534	2.425	2.368	2.308	2.246	2.182	2.114	2.042
22	5.786	4.383	3.783	3.44	3.215	3.055	2.934	2.839	2.763	2.7	2.602	2.498	2.389	2.332	2.272	2.21	2.145	2.076	2.003
23	5.75	4.349	3.751	3.408	3.184	3.023	2.902	2.808	2.731	2.668	2.57	2.467	2.357	2.299	2.239	2.176	2.111	2.041	1.968
24	5.717	4.319	3.721	3.379	3.155	2.995	2.874	2.779	2.703	2.64	2.541	2.437	2.327	2.269	2.209	2.146	2.08	2.01	1.935
25	5.686	4.291	3.694	3.353	3.129	2.969	2.848	2.753	2.677	2.614	2.515	2.411	2.301	2.242	2.182	2.118	2.052	1.981	1.906
26	5.659	4.266	3.67	3.329	3.105	2.945	2.824	2.729	2.653	2.59	2.491	2.387	2.276	2.217	2.157	2.093	2.026	1.954	1.878
27	5.633	4.242	3.647	3.307	3.083	2.923	2.802	2.707	2.631	2.568	2.469	2.364	2.253	2.195	2.133	2.069	2.002	1.93	1.853
28	5.61	4.221	3.626	3.286	3.063	2.903	2.782	2.687	2.611	2.547	2.448	2.344	2.232	2.174	2.112	2.048	1.98	1.907	1.829
29	5.588	4.201	3.607	3.267	3.044	2.884	2.763	2.669	2.592	2.529	2.43	2.325	2.213	2.154	2.092	2.028	1.959	1.886	1.807
30	5.568	4.182	3.589	3.25	3.027	2.867	2.746	2.651	2.575	2.511	2.412	2.307	2.195	2.136	2.074	2.009	1.94	1.866	1.787
40	5.424	4.051	3.463	3.126	2.904	2.744	2.624	2.529	2.452	2.388	2.288	2.182	2.068	2.007	1.943	1.875	1.803	1.724	1.637
60	5.286	3.925	3.343	3.008	2.786	2.627	2.507	2.412	2.334	2.27	2.169	2.061	1.945	1.882	1.815	1.744	1.667	1.581	1.482
120	5.152	3.805	3.227	2.894	2.674	2.515	2.395	2.299	2.222	2.157	2.055	1.945	1.825	1.76	1.69	1.614	1.53	1.433	1.31
inf	5.024	3.689	3.116	2.786	2.567	2.408	2.288	2.192	2.114	2.048	1.945	1.833	1.709	1.64	1.566	1.484	1.388	1.268	1

Appendix A5 Continued



F Table for alpha=.01

df2/df1	1	2	3	4	5	6	7	8	9	10	12	15	20	24	30	40	60	120	INF
1	4052	5000	5403	5625	5764	5859	5928	5981	6022	6056	6106	6157	6209	6235	6261	6287	6313	6339	6366
2	98.5	99	99.17	99.25	99.3	99.33	99.36	99.37	99.39	99.4	99.42	99.43	99.45	99.46	99.47	99.47	99.48	99.49	99.5
3	34.12	30.82	29.46	28.71	28.24	27.91	27.67	27.49	27.35	27.23	27.05	26.87	26.69	26.6	26.51	26.41	26.32	26.22	26.13
4	21.2	18	16.69	15.98	15.52	15.21	14.98	14.8	14.66	14.55	14.37	14.2	14.02	13.93	13.84	13.75	13.65	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	9.888	9.722	9.553	9.466	9.379	9.291	9.202	9.112	9.02
6	13.75	10.93	9.78	9.148	8.746	8.466	8.26	8.102	7.976	7.874	7.718	7.559	7.396	7.313	7.229	7.143	7.057	6.969	6.88
7	12.25	9.547	8.451	7.847	7.46	7.191	6.993	6.84	6.719	6.62	6.469	6.314	6.155	6.074	5.992	5.908	5.824	5.737	5.65
8	11.26	8.649	7.591	7.006	6.632	6.371	6.178	6.029	5.911	5.814	5.667	5.515	5.359	5.279	5.198	5.116	5.032	4.946	4.859
9	10.56	8.022	6.992	6.422	6.057	5.802	5.613	5.467	5.351	5.257	5.111	4.962	4.808	4.729	4.649	4.567	4.483	4.398	4.311
10	10.04	7.559	6.552	5.994	5.636	5.386	5.2	5.057	4.942	4.849	4.706	4.558	4.405	4.327	4.247	4.165	4.082	3.996	3.909
11	9.646	7.206	6.217	5.668	5.316	5.069	4.886	4.744	4.632	4.539	4.397	4.251	4.099	4.021	3.941	3.86	3.776	3.69	3.602
12	9.33	6.927	5.953	5.412	5.064	4.821	4.64	4.499	4.388	4.296	4.155	4.01	3.858	3.78	3.701	3.619	3.535	3.449	3.361
13	9.074	6.701	5.739	5.205	4.862	4.62	4.441	4.302	4.191	4.1	3.96	3.815	3.665	3.587	3.507	3.425	3.341	3.255	3.165
14	8.862	6.515	5.564	5.035	4.695	4.456	4.278	4.14	4.03	3.939	3.8	3.656	3.505	3.427	3.348	3.266	3.181	3.094	3.004
15	8.683	6.359	5.417	4.893	4.556	4.318	4.142	4.004	3.895	3.805	3.666	3.522	3.372	3.294	3.214	3.132	3.047	2.959	2.868
16	8.531	6.226	5.292	4.773	4.437	4.202	4.026	3.89	3.78	3.691	3.553	3.409	3.259	3.181	3.101	3.018	2.933	2.845	2.753
17	8.4	6.112	5.185	4.669	4.336	4.102	3.927	3.791	3.682	3.593	3.455	3.312	3.162	3.084	3.003	2.92	2.835	2.746	2.653
18	8.285	6.013	5.092	4.579	4.248	4.015	3.841	3.705	3.597	3.508	3.371	3.227	3.077	2.999	2.919	2.835	2.749	2.66	2.566
19	8.185	5.926	5.01	4.5	4.171	3.939	3.765	3.631	3.523	3.434	3.297	3.153	3.003	2.925	2.844	2.761	2.674	2.584	2.489
20	8.096	5.849	4.938	4.431	4.103	3.871	3.699	3.564	3.457	3.368	3.231	3.088	2.938	2.859	2.778	2.695	2.608	2.517	2.421
21	8.017	5.78	4.874	4.369	4.042	3.812	3.64	3.506	3.398	3.31	3.173	3.03	2.88	2.801	2.72	2.636	2.548	2.457	2.36
22	7.945	5.719	4.817	4.313	3.988	3.758	3.587	3.453	3.346	3.258	3.121	2.978	2.827	2.749	2.667	2.583	2.495	2.403	2.305
23	7.881	5.664	4.765	4.264	3.939	3.71	3.539	3.406	3.299	3.211	3.074	2.931	2.781	2.702	2.62	2.535	2.447	2.354	2.256
24	7.823	5.614	4.718	4.218	3.895	3.667	3.496	3.363	3.256	3.168	3.032	2.889	2.738	2.659	2.577	2.492	2.403	2.31	2.211
25	7.77	5.568	4.675	4.177	3.855	3.627	3.457	3.324	3.217	3.129	2.993	2.85	2.699	2.62	2.538	2.453	2.364	2.27	2.169
26	7.721	5.526	4.637	4.14	3.818	3.591	3.421	3.288	3.182	3.094	2.958	2.815	2.664	2.585	2.503	2.417	2.327	2.233	2.131
27	7.677	5.488	4.601	4.106	3.785	3.558	3.388	3.256	3.149	3.062	2.926	2.783	2.632	2.552	2.47	2.384	2.294	2.198	2.097
28	7.636	5.453	4.568	4.074	3.754	3.528	3.358	3.226	3.12	3.032	2.896	2.753	2.602	2.522	2.44	2.354	2.263	2.167	2.064
29	7.598	5.42	4.538	4.045	3.725	3.499	3.33	3.198	3.092	3.005	2.868	2.726	2.574	2.495	2.412	2.325	2.234	2.138	2.034
30	7.562	5.39	4.51	4.018	3.699	3.473	3.304	3.173	3.067	2.979	2.843	2.7	2.549	2.469	2.386	2.299	2.208	2.111	2.006
40	7.314	5.179	4.313	3.828	3.514	3.291	3.124	2.993	2.888	2.801	2.665	2.522	2.369	2.288	2.203	2.114	2.019	1.917	1.805
60	7.077	4.977	4.126	3.649	3.339	3.119	2.953	2.823	2.718	2.632	2.496	2.352	2.198	2.115	2.028	1.936	1.836	1.726	1.601
120	6.851	4.787	3.949	3.48	3.174	2.956	2.792	2.663	2.559	2.472	2.336	2.192	2.035	1.95	1.86	1.763	1.656	1.533	1.381
Inf	6.635	4.605	3.782	3.319	3.017	2.802	2.639	2.511	2.407	2.321	2.185	2.039	1.878	1.791	1.696	1.592	1.473	1.325	1