## Appendix A

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TABLE A.1 A Binomial Probability Table:
Binomial Probabilities (*n* between 2 and 6)

n = 2					ļ	,					
<b>x</b> ↓	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	
0	.9025	.8100	.7225	.6400	.5625	.4900	.4225	.3600	.3025	.2500	2
1	.0950	.1800	.2550	.3200	.3750	.4200	.4550	.4800	.4950	.5000	1
2	.0025	.0100	.0225	.0400	.0625	.0900	.1225	.1600	.2025	.2500	0
	.95	.90	.85	.80	.75	.70	.65	.60	.55	.50	<b>x</b> ↑
n = 3					ŗ	,					
↓	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	
0	.8574	.7290	.6141	.5120	.4219	.3430	.2746	.2160	.1664	.1250	3
1	.1354	.2430	.3251	.3840	.4219	.4410	.4436	.4320	.4084	.3750	2
2	.0071	.0270	.0574	.0960	.1406	.1890	.2389	.2880	.3341	.3750	1
3	.0001	.0010	.0034	.0080	.0156	.0270	.0429	.0640	.0911	.1250	0
	.95	.90	.85	.80	.75	.70	.65	.60	.55	.50	<b>x</b> ↑
n = 4					F	)					
↓	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	
0	.8145	.6561	.5220	.4096	.3164	.2401	.1785	.1296	.0915	.0625	4
1	.1715	.2916	.3685	.4096	.4219	.4116	.3845	.3456	.2995	.2500	3
2	.0135	.0486	.0975	.1536	.2109	.2646	.3105	.3456	.3675	.3750	2
3	.0005	.0036	.0115	.0256	.0469	.0756	.1115	.1536	.2005	.2500	1
4	.0000	.0001	.0005	.0016	.0039	.0081	.0150	.0256	.0410	.0625	0
	.95	.90	.85	.80	.75	.70	.65	.60	.55	.50	<b>x</b> ↑
n = 5					F	)					
↓	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	
0	.7738	.5905	.4437	.3277	.2373	.1681	.1160	.0778	.0503	.0313	5
1	.2036	.3281	.3915	.4096	.3955	.3602	.3124	.2592	.2059	.1563	4
2	.0214	.0729	.1382	.2048	.2637	.3087	.3364	.3456	.3369	.3125	3
3	.0011	.0081	.0244	.0512	.0879	.1323	.1811	.2304	.2757	.3125	2
4	.0000	.0005	.0022	.0064	.0146	.0284	.0488	.0768	.1128	.1563	1
5	.0000	.0000	.0001	.0003	.0010	.0024	.0053	.0102	.0185	.0313	0
	.95	.90	.85	.80	.75	.70	.65	.60	.55	.50	<b>x</b> ↑
n = 6					ŗ	)					
<b>x</b> ↓	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	
0	.7351	.5314	.3771	.2621	.1780	.1176	.0754	.0467	.0277	.0156	6
1	.2321	.3543	.3993	.3932	.3560	.3025	.2437	.1866	.1359	.0938	5
2	.0305	.0984	.1762	.2458	.2966	.3241	.3280	.3110	.2780	.2344	4
3	.0021	.0146	.0415	.0819	.1318	.1852	.2355	.2765	.3032	.3125	3
4	.0001	.0012	.0055	.0154	.0330	.0595	.0951	.1382	.1861	.2344	2
5	.0000	.0001	.0004	.0015	.0044	.0102	.0205	.0369	.0609	.0938	1
6	.0000	.0000	.0000	.0001	.0002	.0007	.0018	.0041	.0083	.0156	0
	.95	.90	.85	.80	.75	.70	.65	.60	.55	.50	<b>x</b> ↑
									(tabl	e contin	ued)

TABLE A.1 (continued)
Binomial Probabilities (n between 7 and 10)

n = 7					ı	)					
↓	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	
0	.6983	.4783	.3206	.2097	.1335	.0824	.0490	.0280	.0152	.0078	7
1	.2573	.3720	.3960	.3670	.3115	.2471	.1848	.1306	.0872	.0547	6
2	.0406	.1240	.2097	.2753	.3115	.3177	.2985	.2613	.2140	.1641	5
3	.0036	.0230	.0617	.1147	.1730	.2269	.2679	.2903	.2918	.2734	4
4	.0002	.0026	.0109	.0287	.0577	.0972	.1442	.1935	.2388	.2734	3
5	.0000	.0002	.0012	.0043	.0115	.0250	.0466	.0774	.1172	.1641	2
6	.0000	.0000	.0001	.0004	.0013	.0036	.0084	.0172	.0320	.0547	1
7	.0000	.0000	.0000	.0000	.0001	.0002	.0006	.0016	.0037	.0078	0
	.95	.90	.85	.80	.75	.70	.65	.60	.55	.50	<b>x</b> ↑
n = 8					ı	)					
<b>x</b> ↓	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	
0	.6634	.4305	.2725	.1678	.1001	.0576	.0319	.0168	.0084	.0039	8
1	.2793	.3826	.3847	.3355	.2670	.1977	.1373	.0896	.0548	.0313	7
2	.0515	.1488	.2376	.2936	.3115	.2965	.2587	.2090	.1569	.1094	6
3	.0054	.0331	.0839	.1468	.2076	.2541	.2786	.2787	.2568	.2188	5
4	.0004	.0046	.0185	.0459	.0865	.1361	.1875	.2322	.2627	.2734	4
5	.0000	.0004	.0026	.0092	.0231	.0467	.0808	.1239	.1719	.2188	3
6	.0000	.0000	.0002	.0011	.0038	.0100	.0217	.0413	.0703	.1094	2
7	.0000	.0000	.0000	.0001	.0004	.0012	.0033	.0079	.0164	.0313	1
8	.0000	.0000	.0000	.0000	.0000	.0001	.0002	.0007	.0017	.0039	0
	.95	.90	.85	.80	.75	.70	.65	.60	.55	.50	<b>x</b> ↑
<i>n</i> = 9					ı	)					
$oldsymbol{\chi}\!\!\downarrow$	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	
0	.6302	.3874	.2316	.1342	.0751	.0404	.0207	.0101	.0046	.0020	9
0 1	.6302 .2985	.3874	.2316 .3679	.1342	.0751 .2253	.0404	.0207	.0101 .0605	.0046	.0020	9
1	.2985	.3874	.3679	.3020	.2253	.1556	.1004	.0605	.0339	.0176	8
1 2	.2985 .0629	.3874 .1722	.3679 .2597	.3020 .3020	.2253 .3003	.1556 .2668	.1004 .2162	.0605 .1612	.0339 .1110	.0176 .0703	8 7
1 2 3	.2985 .0629 .0077	.3874 .1722 .0446	.3679 .2597 .1069	.3020 .3020 .1762	.2253 .3003 .2336	.1556 .2668 .2668	.1004 .2162 .2716	.0605 .1612 .2508	.0339 .1110 .2119	.0176 .0703 .1641	8 7 6
1 2 3 4	.2985 .0629 .0077 .0006	.3874 .1722 .0446 .0074	.3679 .2597 .1069 .0283	.3020 .3020 .1762 .0661	.2253 .3003 .2336 .1168	.1556 .2668 .2668 .1715	.1004 .2162 .2716 .2194	.0605 .1612 .2508 .2508	.0339 .1110 .2119 .2600	.0176 .0703 .1641 .2461	8 7 6 5
1 2 3 4 5	.2985 .0629 .0077 .0006	.3874 .1722 .0446 .0074 .0008	.3679 .2597 .1069 .0283 .0050	.3020 .3020 .1762 .0661 .0165	.2253 .3003 .2336 .1168 .0389	.1556 .2668 .2668 .1715 .0735	.1004 .2162 .2716 .2194 .1181	.0605 .1612 .2508 .2508 .1672	.0339 .1110 .2119 .2600 .2128	.0176 .0703 .1641 .2461	8 7 6 5 4
1 2 3 4 5 6	.2985 .0629 .0077 .0006 .0000	.3874 .1722 .0446 .0074 .0008	.3679 .2597 .1069 .0283 .0050	.3020 .3020 .1762 .0661 .0165	.2253 .3003 .2336 .1168 .0389	.1556 .2668 .2668 .1715 .0735	.1004 .2162 .2716 .2194 .1181 .0424	.0605 .1612 .2508 .2508 .1672 .0743	.0339 .1110 .2119 .2600 .2128 .1160	.0176 .0703 .1641 .2461 .2461 .1641	8 7 6 5 4 3 2
1 2 3 4 5 6 7	.2985 .0629 .0077 .0006 .0000 .0000 .0000	.3874 .1722 .0446 .0074 .0008 .0001 .0000 .0000	.3679 .2597 .1069 .0283 .0050 .0006 .0000	.3020 .3020 .1762 .0661 .0165 .0028 .0003 .0000	.2253 .3003 .2336 .1168 .0389 .0087 .0012 .0001	.1556 .2668 .2668 .1715 .0735 .0210 .0039 .0004	.1004 .2162 .2716 .2194 .1181 .0424 .0098 .0013	.0605 .1612 .2508 .2508 .1672 .0743 .0212 .0035 .0003	.0339 .1110 .2119 .2600 .2128 .1160 .0407 .0083	.0176 .0703 .1641 .2461 .2461 .1641 .0703 .0176	8 7 6 5 4 3 2 1 0
1 2 3 4 5 6 7 8	.2985 .0629 .0077 .0006 .0000 .0000	.3874 .1722 .0446 .0074 .0008 .0001 .0000	.3679 .2597 .1069 .0283 .0050 .0006	.3020 .3020 .1762 .0661 .0165 .0028 .0003	.2253 .3003 .2336 .1168 .0389 .0087 .0012	.1556 .2668 .2668 .1715 .0735 .0210 .0039	.1004 .2162 .2716 .2194 .1181 .0424 .0098	.0605 .1612 .2508 .2508 .1672 .0743 .0212	.0339 .1110 .2119 .2600 .2128 .1160 .0407	.0176 .0703 .1641 .2461 .2461 .1641 .0703	8 7 6 5 4 3 2 1 0
1 2 3 4 5 6 7 8	.2985 .0629 .0077 .0006 .0000 .0000 .0000	.3874 .1722 .0446 .0074 .0008 .0001 .0000 .0000	.3679 .2597 .1069 .0283 .0050 .0006 .0000	.3020 .3020 .1762 .0661 .0165 .0028 .0003 .0000	.2253 .3003 .2336 .1168 .0389 .0087 .0012 .0001	.1556 .2668 .2668 .1715 .0735 .0210 .0039 .0004 .0000	.1004 .2162 .2716 .2194 .1181 .0424 .0098 .0013	.0605 .1612 .2508 .2508 .1672 .0743 .0212 .0035 .0003	.0339 .1110 .2119 .2600 .2128 .1160 .0407 .0083	.0176 .0703 .1641 .2461 .2461 .1641 .0703 .0176	8 7 6 5 4 3 2 1 0
1 2 3 4 5 6 7 8 9	.2985 .0629 .0077 .0006 .0000 .0000 .0000	.3874 .1722 .0446 .0074 .0008 .0001 .0000 .0000	.3679 .2597 .1069 .0283 .0050 .0006 .0000	.3020 .3020 .1762 .0661 .0165 .0028 .0003 .0000	.2253 .3003 .2336 .1168 .0389 .0087 .0012 .0001	.1556 .2668 .2668 .1715 .0735 .0210 .0039 .0004 .0000	.1004 .2162 .2716 .2194 .1181 .0424 .0098 .0013	.0605 .1612 .2508 .2508 .1672 .0743 .0212 .0035 .0003	.0339 .1110 .2119 .2600 .2128 .1160 .0407 .0083	.0176 .0703 .1641 .2461 .2461 .1641 .0703 .0176	8 7 6 5 4 3 2 1 0
1 2 3 4 5 6 7 8 9	.2985 .0629 .0077 .0006 .0000 .0000 .0000 .0000	.3874 .1722 .0446 .0074 .0008 .0001 .0000 .0000	.3679 .2597 .1069 .0283 .0050 .0006 .0000 .0000	.3020 .3020 .1762 .0661 .0165 .0028 .0003 .0000	.2253 .3003 .2336 .1168 .0389 .0087 .0012 .0001 .0000	.1556 .2668 .2668 .1715 .0735 .0210 .0039 .0004 .0000	.1004 .2162 .2716 .2194 .1181 .0424 .0098 .0013 .0001	.0605 .1612 .2508 .2508 .1672 .0743 .0212 .0035 .0003	.0339 .1110 .2119 .2600 .2128 .1160 .0407 .0083 .0008	.0176 .0703 .1641 .2461 .2461 .1641 .0703 .0176 .0020	8 7 6 5 4 3 2 1 0
$ \begin{array}{c} 1 \\ 2 \\ 3 \\ 4 \\ 5 \\ 6 \\ 7 \\ 8 \\ 9 \end{array} $ $ \underline{n = 10} $	.2985 .0629 .0077 .0006 .0000 .0000 .0000 .0000 .0000	.3874 .1722 .0446 .0074 .0008 .0001 .0000 .0000 .0000	.3679 .2597 .1069 .0283 .0050 .0006 .0000 .0000 .0000	.3020 .3020 .1762 .0661 .0165 .0028 .0003 .0000 .0000	.2253 .3003 .2336 .1168 .0389 .0087 .0012 .0001 .0000	.1556 .2668 .2668 .1715 .0735 .0210 .0039 .0004 .0000 .70	.1004 .2162 .2716 .2194 .1181 .0424 .0098 .0013 .0001	.0605 .1612 .2508 .2508 .2508 .1672 .0743 .0212 .0035 .0003	.0339 .1110 .2119 .2600 .2128 .1160 .0407 .0083 .0008	.0176 .0703 .1641 .2461 .2461 .0703 .0176 .0020 .50	8 7 6 5 4 3 2 1 0 <b>x</b> ↑
$ \begin{array}{cccc}  & 1 & & & \\  & 2 & & & \\  & 3 & & & \\  & 4 & & & \\  & 5 & & & \\  & 6 & & & \\  & 7 & & & & \\  & 8 & & & & \\  & 9 & & & & \\  & & & & & \\  & & & & & \\  & & & &$	.2985 .0629 .0077 .0006 .0000 .0000 .0000 .0000 .0000 .95	.3874 .1722 .0446 .0074 .0008 .0001 .0000 .0000 .0000 .900	.3679 .2597 .1069 .0283 .0050 .0006 .0000 .0000 .0000 .85	.3020 .3020 .1762 .0661 .0165 .0028 .0003 .0000 .0000 .80	.2253 .3003 .2336 .1168 .0389 .0087 .0012 .0001 .0000 .75	.1556 .2668 .2668 .1715 .0735 .0210 .0039 .0004 .0000 .70	.1004 .2162 .2716 .2194 .1181 .0424 .0098 .0013 .0001 .65	.0605 .1612 .2508 .2508 .1672 .0743 .0212 .0035 .0003 .60	.0339 .1110 .2119 .2600 .2128 .1160 .0407 .0083 .0008 .55	.0176 .0703 .1641 .2461 .1641 .0703 .0176 .0020 .50	8 7 6 5 4 3 2 1 0 <b>x</b> 10 9 8
$ \begin{array}{cccc}                                  $	.2985 .0629 .0077 .0006 .0000 .0000 .0000 .0000 .0000 .95	.3874 .1722 .0446 .0074 .0008 .0001 .0000 .0000 .0000 .900 .3487 .3874 .1937 .0574	.3679 .2597 .1069 .0283 .0050 .0006 .0000 .0000 .0000 .85 .15 .1969 .3474 .2759 .1298	.3020 .3020 .1762 .0661 .0165 .0028 .0003 .0000 .0000 .80	.2253 .3003 .2336 .1168 .0389 .0087 .0012 .0001 .0000 .75	.1556 .2668 .2668 .2668 .1715 .0735 .0210 .0039 .0004 .0000 .70 .30 .0282 .1211 .2335 .2668	.1004 .2162 .2716 .2194 .1181 .0424 .0098 .0013 .0001 .65	.0605 .1612 .2508 .2508 .1672 .0743 .0212 .0035 .0003 .60	.0339 .1110 .2119 .2600 .2128 .1160 .0407 .0083 .0008 .55	.0176 .0703 .1641 .2461 .2461 .0703 .0176 .0020 .50 .50	8 7 6 5 4 3 2 1 0 <b>x</b> ↑ 10 9 8 7
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	.2985 .0629 .0077 .0006 .0000 .0000 .0000 .0000 .0000 .95	.3874 .1722 .0446 .0074 .0008 .0001 .0000 .0000 .0000 .900 .3487 .3874 .1937 .0574	.3679 .2597 .1069 .0283 .0050 .0006 .0000 .0000 .0000 .85 .15 .1969 .3474 .2759 .1298 .0401	.3020 .3020 .1762 .0661 .0165 .0028 .0003 .0000 .0000 .80	.2253 .3003 .2336 .1168 .0389 .0087 .0001 .0000 .75 .25 .0563 .1877 .2816 .2503 .1460	.1556 .2668 .2668 .1715 .0735 .0210 .0039 .0004 .0000 .70 .30 .0282 .1211 .2335 .2668 .2001	.1004 .2162 .2716 .2194 .1181 .0424 .0098 .0013 .0001 .65	.0605 .1612 .2508 .2508 .1672 .0743 .0212 .0035 .0003 .60	.0339 .1110 .2119 .2600 .2128 .1160 .0407 .0083 .0008 .55	.0176 .0703 .1641 .2461 .2461 .0703 .0176 .0020 .50 .50 .0010 .0098 .0439 .1172 .2051	8 8 7 6 6 5 4 3 2 1 0 x ↑ ↑ 10 9 8 8 7 6
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	.2985 .0629 .0077 .0006 .0000 .0000 .0000 .0000 .0000 .95	.3874 .1722 .0446 .0074 .0008 .0001 .0000 .0000 .0000 .900 .90	.3679 .2597 .1069 .0283 .0050 .0006 .0000 .0000 .0000 .85 .15 .1969 .3474 .2759 .1298 .0401 .0085	.3020 .3020 .1762 .0661 .0165 .0028 .0003 .0000 .0000 .80	.2253 .3003 .2336 .1168 .0389 .0087 .0012 .0001 .0000 .75	.1556 .2668 .2668 .1715 .0735 .0210 .0039 .0004 .0000 .70 .30 .0282 .1211 .2335 .2668 .2001 .1029	.1004 .2162 .2716 .2194 .1181 .0424 .0098 .0013 .0001 .65	.0605 .1612 .2508 .2508 .1672 .0743 .0212 .0035 .0003 .60 .40 .0403 .1209 .2150 .2508 .2007	.0339 .1110 .2119 .2600 .2128 .1160 .0407 .0083 .0008 .55	.0176 .0703 .1641 .2461 .2461 .0703 .0176 .0020 .50 .50 .0010 .0098 .0439 .1172 .2051 .2461	8 7 6 5 4 3 2 1 0 x ↑ ↑ 10 9 8 8 7 6 5 5
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	.2985 .0629 .0077 .0006 .0000 .0000 .0000 .0000 .0000 .95 .5987 .3151 .0746 .0105 .0010 .0001	.3874 .1722 .0446 .0074 .0008 .0001 .0000 .0000 .0000 .900 .10	.3679 .2597 .1069 .0283 .0050 .0006 .0000 .0000 .0000 .85 .15 .1969 .3474 .2759 .1298 .0401 .0085 .0012	.3020 .3020 .1762 .0661 .0165 .0028 .0003 .0000 .0000 .80 .20 .1074 .2684 .3020 .2013 .0881 .0264 .0055	.2253 .3003 .2336 .1168 .0389 .0087 .0012 .0001 .0000 .75 .25 .0563 .1877 .2816 .2503 .1460 .0584 .0162	.1556 .2668 .2668 .1715 .0735 .0210 .0039 .0004 .0000 .70 .30 .0282 .1211 .2335 .2668 .2001 .1029 .0368	.1004 .2162 .2716 .2194 .1181 .0424 .0098 .0013 .0001 .65	.0605 .1612 .2508 .2508 .1672 .0743 .0212 .0035 .0003 .60 .40 .0403 .1209 .2150 .2508 .2007 .1115	.0339 .1110 .2119 .2600 .2128 .1160 .0407 .0083 .0008 .55	.0176 .0703 .1641 .2461 .2461 .0703 .0176 .0020 .50 .50 .0010 .0098 .0439 .1172 .2051 .2461 .2051	8 7 6 5 4 3 2 1 0 x ↑ ↑ 10 9 8 8 7 6 5 4
1 2 3 4 5 6 7 8 9    n = 10    x    0   1   2   3   4   5   6   7   8   9	.2985 .0629 .0077 .0006 .0000 .0000 .0000 .0000 .0000 .95 .5987 .3151 .0746 .0105 .0010 .0001	.3874 .1722 .0446 .0074 .0008 .0001 .0000 .0000 .0000 .900 .3487 .3874 .1937 .0574 .0112 .0015 .0001	.3679 .2597 .1069 .0283 .0050 .0006 .0000 .0000 .0000 .85 .15 .1969 .3474 .2759 .1298 .0401 .0085 .0012	.3020 .3020 .1762 .0661 .0165 .0028 .0003 .0000 .0000 .80 .20 .1074 .2684 .3020 .2013 .0881 .0264 .0055 .0008	.2253 .3003 .2336 .1168 .0389 .0087 .0012 .0001 .0000 .75 .25 .0563 .1877 .2816 .2503 .1460 .0584 .0162 .0031	.1556 .2668 .2668 .1715 .0735 .0210 .0039 .0004 .0000 .70 .30 .0282 .1211 .2335 .2668 .2001 .1029 .0368 .0090	.1004 .2162 .2716 .2194 .1181 .0424 .0098 .0013 .0001 .65	.0605 .1612 .2508 .2508 .1672 .0743 .0212 .0035 .0003 .60 .40 .0403 .1209 .2150 .2508 .2007 .1115 .0425	.0339 .1110 .2119 .2600 .2128 .1160 .0407 .0083 .0008 .55	.0176 .0703 .1641 .2461 .2461 .0703 .0176 .0020 .50 .50 .0010 .0098 .0439 .1172 .2051 .2461 .2051 .1172	8 7 6 5 4 3 2 1 0 0 x ↑ ↑ 6 5 4 4 3 7 6 6 5 4 4 3
1 2 3 4 5 6 7 8 9 n = 10 x↓ 0 1 2 3 4 5 6 7 8 9	.2985 .0629 .0077 .0006 .0000 .0000 .0000 .0000 .0000 .95 .5987 .3151 .0746 .0105 .0010 .0001 .0000	.3874 .1722 .0446 .0074 .0008 .0001 .0000 .0000 .900  .10  .3487 .3874 .1937 .0574 .0112 .0015 .0001 .0000 .0000	.3679 .2597 .1069 .0283 .0050 .0006 .0000 .0000 .0000 .85  .15 .1969 .3474 .2759 .1298 .0401 .0085 .0012 .0001	.3020 .3020 .1762 .0661 .0165 .0028 .0003 .0000 .0000 .80 .20 .1074 .2684 .3020 .2013 .0881 .0264 .0055 .0008	.2253 .3003 .2336 .1168 .0389 .0087 .0012 .0001 .0000 .75 .25 .0563 .1877 .2816 .2503 .1460 .0584 .0162 .0031 .0004	.1556 .2668 .2668 .1715 .0735 .0210 .0039 .0004 .0000 .70 .30 .0282 .1211 .2335 .2668 .2001 .1029 .0368 .0090 .0014	.1004 .2162 .2716 .2194 .1181 .0424 .0098 .0013 .0001 .65	.0605 .1612 .2508 .2508 .1672 .0743 .0212 .0035 .0003 .60 .40 .0403 .1209 .2150 .2508 .2007 .1115 .0425 .0106	.0339 .1110 .2119 .2600 .2128 .1160 .0407 .0083 .0008 .55 .45 .0025 .0207 .0763 .1665 .2384 .2340 .1596 .0746 .0229	.0176 .0703 .1641 .2461 .2461 .0703 .0176 .0020 .50 .50 .0010 .0098 .0439 .1172 .2051 .2461 .2051 .1172 .0439	8 7 6 5 4 3 2 1 0 x ↑ 10 9 8 7 6 5 4 3 2 2
1 2 3 4 5 6 7 8 9 <i>n</i> = 10 <i>x</i> ↓ 0 1 2 3 4 5 6 7 8 9	.2985 .0629 .0077 .0006 .0000 .0000 .0000 .0000 .95 .5987 .3151 .0746 .0105 .0010 .0001 .0000 .0000	.3874 .1722 .0446 .0074 .0008 .0001 .0000 .0000 .900  .10  .3487 .3874 .1937 .0574 .0112 .0001 .0000 .0000 .0000	.3679 .2597 .1069 .0283 .0050 .0006 .0000 .0000 .85  .15 .1969 .3474 .2759 .1298 .0401 .0085 .0012 .0001 .0000 .0000	.3020 .3020 .3020 .1762 .0661 .0165 .0028 .0003 .0000 .0000 .80 .20 .1074 .2684 .3020 .2013 .0881 .0264 .0055 .0008 .0001	.2253 .3003 .2336 .1168 .0389 .0087 .0012 .0001 .0000 .75 .25 .0563 .1877 .2816 .2503 .1460 .0584 .0162 .0031 .0004 .0000	.1556 .2668 .2668 .2668 .1715 .0735 .0210 .0039 .0004 .0000 .70 .30 .0282 .1211 .2335 .2668 .2001 .1029 .0368 .0090 .0014 .0001	.1004 .2162 .2716 .2194 .1181 .0424 .0098 .0013 .0001 .65	.0605 .1612 .2508 .2508 .1672 .0743 .0212 .0035 .0003 .60 .40 .0403 .1209 .2150 .2508 .2007 .1115 .0425 .0106 .0016	.0339 .1110 .2119 .2600 .2128 .1160 .0407 .0083 .0008 .55 .45 .0025 .0207 .0763 .1665 .2384 .2340 .1596 .0746 .0229 .0042	.0176 .0703 .1641 .2461 .2461 .0703 .0176 .0020 .50 .50 .0010 .0098 .0439 .1172 .2051 .2461 .2051 .1172 .0439 .0098	8 7 6 5 4 3 2 1 0 x ↑ 6 5 4 3 2 1 1 0 9 8 7 6 5 4 4 3 2 1 1
1 2 3 4 5 6 7 8 9 <i>n</i> = 10 <i>x</i> ↓ 0 1 2 3 4 5 6 7	.2985 .0629 .0077 .0006 .0000 .0000 .0000 .0000 .0000 .95 .5987 .3151 .0746 .0105 .0010 .0001 .0000	.3874 .1722 .0446 .0074 .0008 .0001 .0000 .0000 .900  .10  .3487 .3874 .1937 .0574 .0112 .0015 .0001 .0000 .0000	.3679 .2597 .1069 .0283 .0050 .0006 .0000 .0000 .0000 .85  .15 .1969 .3474 .2759 .1298 .0401 .0085 .0012 .0001	.3020 .3020 .1762 .0661 .0165 .0028 .0003 .0000 .0000 .80 .20 .1074 .2684 .3020 .2013 .0881 .0264 .0055 .0008	.2253 .3003 .2336 .1168 .0389 .0087 .0012 .0001 .0000 .75 .25 .0563 .1877 .2816 .2503 .1460 .0584 .0162 .0031 .0004	.1556 .2668 .2668 .1715 .0735 .0210 .0039 .0004 .0000 .70 .30 .0282 .1211 .2335 .2668 .2001 .1029 .0368 .0090 .0014	.1004 .2162 .2716 .2194 .1181 .0424 .0098 .0013 .0001 .65	.0605 .1612 .2508 .2508 .1672 .0743 .0212 .0035 .0003 .60 .40 .0403 .1209 .2150 .2508 .2007 .1115 .0425 .0106	.0339 .1110 .2119 .2600 .2128 .1160 .0407 .0083 .0008 .55 .45 .0025 .0207 .0763 .1665 .2384 .2340 .1596 .0746 .0229	.0176 .0703 .1641 .2461 .2461 .0703 .0176 .0020 .50 .50 .0010 .0098 .0439 .1172 .2051 .2461 .2051 .1172 .0439	8 7 6 5 4 3 2 1 0 x ↑ 10 9 8 7 6 5 4 3 2 2

TABLE A.1 (continued)

Binomial Probabilities (n equal to 12, 14, and 15)

<i>n</i> = 12					ŀ	)					
↓	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	
0	.5404	.2824	.1422	.0687	.0317	.0138	.0057	.0022	.0008	.0002	12
1	.3413	.3766	.3012	.2062	.1267	.0712	.0368	.0174	.0075	.0029	11
2	.0988	.2301	.2924	.2835	.2323	.1678	.1088	.0639	.0339	.0161	10
3	.0173	.0852	.1720	.2362	.2581	.2397	.1954	.1419	.0923	.0537	9
4	.0021	.0213	.0683	.1329	.1936	.2311	.2367	.2128	.1700	.1208	8
5	.0002	.0038	.0193	.0532	.1032	.1585	.2039	.2270	.2225	.1934	7
6	.0000	.0005	.0040	.0155	.0401	.0792	.1281	.1766	.2124	.2256	6
7	.0000	.0000	.0006	.0033	.0115	.0291	.0591	.1009	.1489	.1934	5
8	.0000	.0000	.0001	.0005	.0024	.0078	.0199	.0420	.0762	.1208	4
9	.0000	.0000	.0000	.0001	.0004	.0015	.0048	.0125	.0277	.0537	3
10	.0000	.0000	.0000	.0000	.0000	.0002	.0008	.0025	.0068	.0161	2
11	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0003	.0010	.0029	1
12	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0002	0
	.95	.90	.85	.80	.75	.70	.65	.60	.55	.50	<b>x</b> ↑
n = 14					ŀ	)					
<b>x</b> ↓	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	
0	.4877	.2288	.1028	.0440	.0178	.0068	.0024	.0008	.0002	.0001	14
1	.3593	.3559	.2539	.1539	.0832	.0407	.0181	.0073	.0027	.0009	13
2	.1229	.2570	.2912	.2501	.1802	.1134	.0634	.0317	.0141	.0056	12
3	.0259	.1142	.2056	.2501	.2402	.1943	.1366	.0845	.0462	.0222	11
4	.0037	.0349	.0998	.1720	.2202	.2290	.2022	.1549	.1040	.0611	10
5	.0004	.0078	.0352	.0860	.1468	.1963	.2178	.2066	.1701	.1222	9
6	.0000	.0013	.0093	.0322	.0734	.1262	.1759	.2066	.2088	.1833	8
7	.0000	.0002	.0019	.0092	.0280	.0618	.1082	.1574	.1952	.2095	7
8	.0000	.0000	.0003	.0020	.0082	.0232	.0510	.0918	.1398	.1833	6
9	.0000	.0000	.0000	.0003	.0018	.0066	.0183	.0408	.0762	.1222	5
10	.0000	.0000	.0000	.0000	.0003	.0014	.0049	.0136	.0312	.0611	4
11	.0000	.0000	.0000	.0000	.0000	.0002	.0010	.0033	.0093	.0222	3
12	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0005	.0019	.0056	2
13	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0002	.0009	1
14	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	0
45	.95	.90	.85	.80	.75	.70	.65	.60	.55	.50	<b>x</b> ↑
n = 15					ŀ						
<b>x</b> ↓	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	
0	.4633	.2059	.0874	.0352	.0134	.0047	.0016	.0005	.0001	.0000	15
1	.3658	.3432	.2312	.1319	.0668	.0305	.0126	.0047	.0016	.0005	14
2	.1348	.2669	.2856	.2309	.1559	.0916	.0476	.0219	.0090	.0032	13
3	.0307	.1285	.2184	.2501	.2252	.1700	.1110	.0634	.0318	.0139	12
4	.0049	.0428	.1156	.1876	.2252	.2186	.1792	.1268	.0780	.0417	11
5	.0006	.0105	.0449	.1032	.1651	.2061	.2123	.1859	.1404	.0916	10
6	.0000	.0019	.0132	.0430	.0917	.1472	.1906	.2066	.1914	.1527	9
7	.0000	.0003	.0030	.0138	.0393	.0811	.1319	.1771	.2013	.1964	8
8	.0000	.0000	.0005	.0035	.0131	.0348	.0710	.1181	.1647	.1964	7
9	.0000	.0000	.0001	.0007	.0034	.0116	.0298	.0612	.1048	.1527	6
10	.0000	.0000	.0000	.0001	.0007	.0030	.0096	.0245	.0515	.0916	5
11	.0000	.0000	.0000	.0000	.0001	.0006	.0024	.0074	.0191	.0417	4
12	.0000	.0000	.0000	.0000	.0000	.0001	.0004	.0016	.0052	.0139	3
13	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0003	.0010	.0032	2
14	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0005	1
15	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	0 ↑
	.95	.90	.85	.80	.75	.70	.65	.60	.55	.50	<b>x</b> ↑
									(tabl	e contin	ued)

TABLE A.1 (continued)
Binomial Probabilities (n equal to 16 and 18)

n = 16					ŀ	)					
<b>x</b> ↓	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	
0	.4401	.1853	.0743	.0281	.0100	.0033	.0010	.0003	.0001	.0000	16
1	.3706	.3294	.2097	.1126	.0535	.0228	.0087	.0030	.0009	.0002	15
2	.1463	.2745	.2775	.2111	.1336	.0732	.0353	.0150	.0056	.0018	14
3	.0359	.1423	.2285	.2463	.2079	.1465	.0888	.0468	.0215	.0085	13
4	.0061	.0514	.1311	.2001	.2252	.2040	.1553	.1014	.0572	.0278	12
5	.0008	.0137	.0555	.1201	.1802	.2099	.2008	.1623	.1123	.0667	11
6	.0001	.0028	.0180	.0550	.1101	.1649	.1982	.1983	.1684	.1222	10
7	.0000	.0004	.0045	.0197	.0524	.1010	.1524	.1889	.1969	.1746	9
8	.0000	.0001	.0009	.0055	.0197	.0487	.0923	.1417	.1812	.1964	8
9	.0000	.0000	.0001	.0012	.0058	.0185	.0442	.0840	.1318	.1746	7
10	.0000	.0000	.0000	.0002	.0014	.0056	.0167	.0392	.0755	.1222	6
11	.0000	.0000	.0000	.0000	.0002	.0013	.0049	.0142	.0337	.0667	5
12	.0000	.0000	.0000	.0000	.0000	.0002	.0011	.0040	.0115	.0278	4
13	.0000	.0000	.0000	.0000	.0000	.0000	.0002	.0008	.0029	.0085	3
14	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0005	.0018	2
15	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0002	1
	.95	.90	.85	.80	.75	.70	.65	.60	.55	.50	x
n = 18					ı	)					
√x	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	
0	.3972	.1501	.0536	.0180	.0056	.0016	.0004	.0001	.0000	.0000	18
1	.3763	.3002	.1704	.0811	.0338	.0126	.0042	.0012	.0003	.0001	17
2	.1683	.2835	.2556	.1723	.0958	.0458	.0190	.0069	.0022	.0006	16
3	.0473	.1680	.2406	.2297	.1704	.1046	.0547	.0246	.0095	.0031	15
4	.0093	.0700	.1592	.2153	.2130	.1681	.1104	.0614	.0291	.0117	14
5	.0014	.0218	.0787	.1507	.1988	.2017	.1664	.1146	.0666	.0327	13
6	.0002	.0052	.0301	.0816	.1436	.1873	.1941	.1655	.1181	.0708	12
7	.0000	.0010	.0091	.0350	.0820	.1376	.1792	.1892	.1657	.1214	11
8	.0000	.0002	.0022	.0120	.0376	.0811	.1327	.1734	.1864	.1669	10
9	.0000	.0000	.0004	.0033	.0139	.0386	.0794	.1284	.1694	.1855	9
10	.0000	.0000	.0001	.0008	.0042	.0149	.0385	.0771	.1248	.1669	8
11	.0000	.0000	.0000	.0001	.0010	.0046	.0151	.0374	.0742	.1214	7
12	.0000	.0000	.0000	.0000	.0002	.0012	.0047	.0145	.0354	.0708	6
13	.0000	.0000	.0000	.0000	.0000	.0002	.0012	.0045	.0134	.0327	5
14	.0000	.0000	.0000	.0000	.0000	.0000	.0002	.0011	.0039	.0117	4
15	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0002	.0009	.0031	3
16	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0006	2
17	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	1
	.95	.90	.85	.80	.75	.70	.65	.60	.55	.50	<b>x</b> 1

TABLE A.1 (concluded)

Binomial Probabilities (n equal to 20)

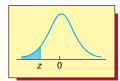
<i>n</i> = 20					ŀ	)					
<b>x</b> ↓	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	
0	.3585	.1216	.0388	.0115	.0032	.0008	.0002	.0000	.0000	.0000	20
1	.3774	.2702	.1368	.0576	.0211	.0068	.0020	.0005	.0001	.0000	19
2	.1887	.2852	.2293	.1369	.0669	.0278	.0100	.0031	.0008	.0002	18
3	.0596	.1901	.2428	.2054	.1339	.0716	.0323	.0123	.0040	.0011	17
4	.0133	.0898	.1821	.2182	.1897	.1304	.0738	.0350	.0139	.0046	16
5	.0022	.0319	.1028	.1746	.2023	.1789	.1272	.0746	.0365	.0148	15
6	.0003	.0089	.0454	.1091	.1686	.1916	.1712	.1244	.0746	.0370	14
7	.0000	.0020	.0160	.0545	.1124	.1643	.1844	.1659	.1221	.0739	13
8	.0000	.0004	.0046	.0222	.0609	.1144	.1614	.1797	.1623	.1201	12
9	.0000	.0001	.0011	.0074	.0271	.0654	.1158	.1597	.1771	.1602	11
10	.0000	.0000	.0002	.0020	.0099	.0308	.0686	.1171	.1593	.1762	10
11	.0000	.0000	.0000	.0005	.0030	.0120	.0336	.0710	.1185	.1602	9
12	.0000	.0000	.0000	.0001	.0008	.0039	.0136	.0355	.0727	.1201	8
13	.0000	.0000	.0000	.0000	.0002	.0010	.0045	.0146	.0366	.0739	7
14	.0000	.0000	.0000	.0000	.0000	.0002	.0012	.0049	.0150	.0370	6
15	.0000	.0000	.0000	.0000	.0000	.0000	.0003	.0013	.0049	.0148	5
16	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0003	.0013	.0046	4
17	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0002	.0011	3
18	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0002	2
	.95	.90	.85	.80	.75	.70	.65	.60	.55	.50	<b>x</b> ↑

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TA	BLE A.2			bility Tabl		and 2.0)				
					μ					
х	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
0	.9048	.8187	.7408	.6703	.6065	.5488	.4966	.4493	.4066	.3679
1	.0905	.1637	.2222	.2681	.3033	.3293	.3476	.3595	.3659	.3679
2	.0045	.0164	.0333	.0536	.0758	.0988	.1217	.1438	.1647	.1839
3	.0002	.0011	.0033	.0072	.0126	.0198	.0284	.0383	.0494	.0613
4	.0000	.0001	.0003	.0007	.0016	.0030	.0050	.0077	.0111	.0153
5	.0000	.0000	.0000	.0001	.0002	.0004	.0007	.0012	.0020	.0031
6	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0002	.0003	.0005
					μ					
х	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
0	.3329	.3012	.2725	.2466	.2231	.2019	.1827	.1653	.1496	.1353
1	.3662	.3614	.3543	.3452	.3347	.3230	.3106	.2975	.2842	.2707
2	.2014	.2169	.2303	.2417	.2510	.2584	.2640	.2678	.2700	.2707
3	.0738	.0867	.0998	.1128	.1255	.1378	.1496	.1607	.1710	.1804
4	.0203	.0260	.0324	.0395	.0471	.0551	.0636	.0723	.0812	.0902
5	.0045	.0062	.0084	.0111	.0141	.0176	.0216	.0260	.0309	.0361
6	.0008	.0012	.0018	.0026	.0035	.0047	.0061	.0078	.0098	.0120
7	.0001	.0002	.0003	.0005	.0008	.0011	.0015	.0020	.0027	.0034
8	.0000	.0000	.0001	.0001	.0001	.0002	.0003	.0005	.0006	.0009

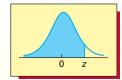
(table continued)

TABLE A.3 Cumulative Areas under the Standard Normal Curve



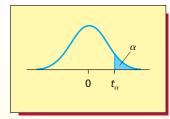
z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
-3.9	0.00005	0.00005	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004	0.00003	0.00003
-3.8	0.00007	0.00007	0.00007	0.00006	0.00006	0.00006	0.00006	0.00005	0.00005	0.00005
-3.7	0.00011	0.00010	0.00010	0.00010	0.00009	0.00009	0.00008	0.00008	0.00008	0.00008
-3.6	0.00016	0.00015	0.00015	0.00014	0.00014	0.00013	0.00013	0.00012	0.00012	0.00011
-3.5	0.00023	0.00022	0.00022	0.00021	0.00020	0.00019	0.00019	0.00018	0.00017	0.00017
-3.4	0.00034	0.00032	0.00031	0.00030	0.00029	0.00028	0.00027	0.00026	0.00025	0.00024
-3.3	0.00048	0.00047	0.00045	0.00043	0.00042	0.00040	0.00039	0.00038	0.00036	0.00035
-3.2	0.00069	0.00066	0.00064	0.00062	0.00060	0.00058	0.00056	0.00054	0.00052	0.00050
-3.1	0.00097	0.00094	0.00090	0.00087	0.00084	0.00082	0.00079	0.00076	0.00074	0.00071
-3.0	0.00135	0.00131	0.00126	0.00122	0.00118	0.00114	0.00111	0.00107	0.00103	0.00100
-2.9	0.0019	0.0018	0.0018	0.0017	0.0016	0.0016	0.0015	0.0015	0.0014	0.0014
-2.8	0.0026	0.0025	0.0024	0.0023	0.0023	0.0022	0.0021	0.0021	0.0020	0.0019
-2.7	0.0035	0.0034	0.0033	0.0032	0.0031	0.0030	0.0029	0.0028	0.0027	0.0026
-2.6	0.0047	0.0045	0.0044	0.0043	0.0041	0.0040	0.0039	0.0038	0.0037	0.0036
-2.5	0.0062	0.0060	0.0059	0.0057	0.0055	0.0054	0.0052	0.0051	0.0049	0.0048
-2.4	0.0082	0.0080	0.0078	0.0075	0.0073	0.0071	0.0069	0.0068	0.0066	0.0064
-2.3	0.0107	0.0104	0.0102	0.0099	0.0096	0.0094	0.0091	0.0089	0.0087	0.0084
-2.2	0.0139	0.0136	0.0132	0.0129	0.0125	0.0122	0.0119	0.0116	0.0113	0.0110
-2.1	0.0179	0.0174	0.0170	0.0166	0.0162	0.0158	0.0154	0.0150	0.0146	0.0143
-2.0	0.0228	0.0222	0.0217	0.0212	0.0207	0.0202	0.0197	0.0192	0.0188	0.0183
-1.9	0.0287	0.0281	0.0274	0.0268	0.0262	0.0256	0.0250	0.0244	0.0239	0.0233
-1.8	0.0359	0.0351	0.0344	0.0336	0.0329	0.0322	0.0314	0.0307	0.0301	0.0294
-1.7	0.0446	0.0436	0.0427	0.0418	0.0409	0.0401	0.0392	0.0384	0.0375	0.0367
-1.6	0.0548	0.0537	0.0526	0.0516	0.0505	0.0495	0.0485	0.0475	0.0465	0.0455
-1.5	0.0668	0.0655	0.0643	0.0630	0.0618	0.0606	0.0594	0.0582	0.0571	0.0559
-1.4	0.0808	0.0793	0.0778	0.0764	0.0749	0.0735	0.0721	0.0708	0.0694	0.0681
-1.3	0.0968	0.0951	0.0934	0.0918	0.0901	0.0885	0.0869	0.0853	0.0838	0.0823
-1.2	0.1151	0.1131	0.1112	0.1093	0.1075	0.1056	0.1038	0.1020	0.1003	0.0985
-1.1	0.1357	0.1335	0.1314	0.1292	0.1271	0.1251	0.1230	0.1210	0.1190	0.1170
-1.0	0.1587	0.1562	0.1539	0.1515	0.1492	0.1469	0.1446	0.1423	0.1401	0.1379
-0.9	0.1841	0.1814	0.1788	0.1762	0.1736	0.1711	0.1685	0.1660	0.1635	0.1611
-0.8	0.2119	0.2090	0.2061	0.2033	0.2005	0.1977	0.1949	0.1922	0.1894	0.1867
-0.7	0.2420	0.2389	0.2358	0.2327	0.2296	0.2266	0.2236	0.2206	0.2177	0.2148
-0.6	0.2743	0.2709	0.2676	0.2643	0.2611	0.2578	0.2546	0.2514	0.2482	0.2451
-0.5	0.3085	0.3050	0.3015	0.2981	0.2946	0.2912	0.2877	0.2843	0.2810	0.2776
-0.4	0.3446	0.3409	0.3372	0.3336	0.3300	0.3264	0.3228	0.3192	0.3156	0.3121
-0.3	0.3821	0.3783	0.3745	0.3707	0.3669	0.3632	0.3594	0.3557	0.3520	0.3483
-0.2	0.4207	0.4168	0.4129	0.4090	0.4052	0.4013	0.3974	0.3936	0.3897	0.3859
-0.1	0.4602	0.4562	0.4522	0.4483	0.4443	0.4404	0.4364	0.4325	0.4286	0.4247
-0.0	0.5000	0.4960	0.4920	0.4880	0.4840	0.4801	0.4761	0.4721	0.4681	0.4641

TABLE A.3 Cumulative Areas under the Standard Normal Curve (continued)



Z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7518	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
8.0	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.99865	0.99869	0.99874	0.99878	0.99882	0.99886	0.99889	0.99893	0.99897	0.99900
3.1	0.99903	0.99906	0.99910	0.99913	0.99916	0.99918	0.99921	0.99924	0.99926	0.99929
3.2	0.99931	0.99934	0.99936	0.99938	0.99940	0.99942	0.99944	0.99946	0.99948	0.99950
3.3	0.99952	0.99953	0.99955	0.99957	0.99958	0.99960	0.99961	0.99962	0.99964	0.99965
3.4	0.99966	0.99968	0.99969	0.99970	0.99971	0.99972	0.99973	0.99974	0.99975	0.99976
3.5	0.99977	0.99978	0.99978	0.99979	0.99980	0.99981	0.99981	0.99982	0.99983	0.99983
3.6	0.99984	0.99985	0.99985	0.99986	0.99986	0.99987	0.99987	0.99988	0.99988	0.99989
3.7	0.99989	0.99990	0.99990	0.99990	0.99991	0.99991	0.99992	0.99992	0.99992	0.99992
3.8	0.99993	0.99993	0.99993	0.99994	0.99994	0.99994	0.99994	0.99995	0.99995	0.99995
3.9	0.99995	0.99995	0.99996	0.99996	0.99996	0.99996	0.99996	0.99996	0.99997	0.99997

**TABLE A.4** A *t* Table: Values of  $t_{\alpha}$  for df = 1 through 48



df	t <sub>.100</sub>	t <sub>.05</sub>	t <sub>.025</sub>	t <sub>.01</sub>	t <sub>.005</sub>	t <sub>.001</sub>	t <sub>.0005</sub>
1	3.078	6.314	12.706	31.821	63.657	318.309	636.619
2	1.886	2.920	4.303	6.965	9.925	22.327	31.599
3	1.638	2.353	3.182	4.541	5.841	10.215	12.924
4	1.533	2.132	2.776	3.747	4.604	7.173	8.610
5	1.476	2.015	2.571	3.365	4.032	5.893	6.869
6	1.440	1.943	2.447	3.143	3.707	5.208	5.959
7	1.415	1.895	2.365	2.998	3.499	4.785	5.408
8	1.397	1.860	2.306	2.896	3.355	4.501	5.041
9	1.383	1.833	2.262	2.821	3.250	4.297	4.781
10	1.372	1.812	2.228	2.764	3.169	4.144	4.587
11	1.363	1.796	2.201	2.718	3.106	4.025	4.437
12	1.356	1.782	2.179	2.681	3.055	3.930	4.318
13	1.350	1.771	2.160	2.650	3.012	3.852	4.221
14	1.345	1.761	2.145	2.624	2.977	3.787	4.140
15	1.341	1.753	2.131	2.602	2.947	3.733	4.073
16	1.337	1.746	2.120	2.583	2.921	3.686	4.015
17	1.333	1.740	2.110	2.567	2.898	3.646	3.965
18	1.330	1.734	2.101	2.552	2.878	3.610	3.922
19	1.328	1.729	2.093	2.539	2.861	3.579	3.883
20	1.325	1.725	2.086	2.528	2.845	3.552	3.850
21	1.323	1.721	2.080	2.518	2.831	3.527	3.819
22	1.321	1.717	2.074	2.508	2.819	3.505	3.792
23	1.319	1.714	2.069	2.500	2.807	3.485	3.768
24	1.318	1.711	2.064	2.492	2.797	3.467	3.745
25	1.316	1.708	2.060	2.485	2.787	3.450	3.725
26	1.315	1.706	2.056	2.479	2.779	3.435	3.707
27	1.314	1.703	2.052	2.473	2.771	3.421	3.690
28	1.313	1.701	2.048	2.467	2.763	3.408	3.674
29	1.311	1.699	2.045	2.462	2.756	3.396	3.659
30	1.310	1.697	2.042	2.457	2.750	3.385	3.646
31	1.309	1.696	2.040	2.453	2.744	3.375	3.633
32	1.309	1.694	2.037	2.449	2.738	3.365	3.622
33	1.308	1.692	2.035	2.445	2.733	3.356	3.611
34	1.307	1.691	2.032	2.441	2.728	3.348	3.601
35 36	1.306 1.306	1.690 1.688	2.030 2.028	2.438 2.434	2.724 2.719	3.340	3.591
37	1.305	1.687	2.026	2.434	2.715	3.333 3.326	3.582 3.574
38	1.303	1.686	2.026	2.431	2.713	3.319	3.566
39	1.304	1.685	2.024	2.429	2.712	3.313	3.558
40	1.303	1.684	2.023	2.423	2.704	3.307	3.551
41	1.303	1.683	2.021	2.423	2.704	3.301	3.544
42	1.302	1.682	2.020	2.421	2.698	3.296	3.538
43	1.302	1.681	2.017	2.416	2.695	3.291	3.532
44	1.301	1.680	2.017	2.414	2.692	3.286	3.526
45	1.301	1.679	2.014	2.412	2.690	3.281	3.520
46	1.300	1.679	2.013	2.410	2.687	3.277	3.515
47	1.300	1.678	2.012	2.408	2.685	3.273	3.510
48	1.299	1.677	2.011	2.407	2.682	3.269	3.505
	55		2.011	107	2.002	5.205	3.303

TABLE A.4 (concluded)
A t Table: Values of  $t_{\alpha}$  for df=49 through 100, 120, and  $\infty$ 

df	t <sub>.100</sub>	t <sub>.05</sub>	t <sub>.025</sub>	t <sub>.01</sub>	t <sub>.005</sub>	t <sub>.001</sub>	t <sub>.0005</sub>
49	1.299	1.677	2.010	2.405	2.680	3.265	3.500
50	1.299	1.676	2.009	2.403	2.678	3.261	3.496
51	1.298	1.675	2.008	2.402	2.676	3.258	3.492
52	1.298	1.675	2.007	2.400	2.674	3.255	3.488
53	1.298	1.674	2.006	2.399	2.672	3.251	3.484
54	1.297	1.674	2.005	2.397	2.670	3.248	3.480
55	1.297	1.673	2.004	2.396	2.668	3.245	3.476
56	1.297	1.673	2.003	2.395	2.667	3.242	3.473
57	1.297	1.672	2.002	2.394	2.665	3.239	3.470
58	1.296	1.672	2.002	2.392	2.663	3.237	3.466
59	1.296	1.671	2.001	2.391	2.662	3.234	3.463
60	1.296	1.671	2.000	2.390	2.660	3.232	3.460
61	1.296	1.670	2.000	2.389	2.659	3.229	3.457
62	1.295	1.670	1.999	2.388	2.657	3.227	3.454
63	1.295	1.669	1.998	2.387	2.656	3.225	3.452
64	1.295	1.669	1.998	2.386	2.655	3.223	3.449
65	1.295	1.669	1.997	2.385	2.654	3.220	3.447
66	1.295	1.668	1.997	2.384	2.652	3.218	3.444
67	1.294	1.668	1.996	2.383	2.651	3.216	3.442
68	1.294	1.668	1.995	2.382	2.650	3.214	3.439
69	1.294 1.294	1.667	1.995	2.382	2.649	3.213 3.211	3.437
70 71	1.294	1.667 1.667	1.994 1.994	2.381 2.380	2.648 2.647	3.211	3.435 3.433
72	1.294	1.666	1.993	2.379	2.646	3.209	3.433
73	1.293	1.666	1.993	2.379	2.645	3.207	3.429
74	1.293	1.666	1.993	2.378	2.644	3.204	3.427
75	1.293	1.665	1.992	2.377	2.643	3.202	3.425
76	1.293	1.665	1.992	2.376	2.642	3.201	3.423
77	1.293	1.665	1.991	2.376	2.641	3.199	3.421
78	1.292	1.665	1.991	2.375	2.640	3.198	3.420
79	1.292	1.664	1.990	2.374	2.640	3.197	3.418
80	1.292	1.664	1.990	2.374	2.639	3.195	3.416
81	1.292	1.664	1.990	2.373	2.638	3.194	3.415
82	1.292	1.664	1.989	2.373	2.637	3.193	3.413
83	1.292	1.663	1.989	2.372	2.636	3.191	3.412
84	1.292	1.663	1.989	2.372	2.636	3.190	3.410
85	1.292	1.663	1.988	2.371	2.635	3.189	3.409
86	1.291	1.663	1.988	2.370	2.634	3.188	3.407
87	1.291	1.663	1.988	2.370	2.634	3.187	3.406
88	1.291	1.662	1.987	2.369	2.633	3.185	3.405
89	1.291	1.662	1.987	2.369	2.632	3.184	3.403
90	1.291	1.662	1.987	2.368	2.632	3.183	3.402
91	1.291	1.662	1.986	2.368	2.631	3.182	3.401
92	1.291	1.662	1.986	2.368	2.630	3.181	3.399
93 94	1.291 1.291	1.661 1.661	1.986 1.986	2.367 2.367	2.630 2.629	3.180 3.179	3.398 3.397
95	1.291	1.661	1.985	2.366	2.629		3.396
96	1.291	1.661	1.985	2.366	2.628	3.178 3.177	3.395
97	1.290	1.661	1.985	2.365	2.627	3.177	3.394
98	1.290	1.661	1.984	2.365	2.627	3.175	3.393
99	1.290	1.660	1.984	2.365	2.626	3.175	3.392
100	1.290	1.660	1.984	2.364	2.626	3.173	3.390
120	1.289	1.658	1.980	2.358	2.617	3.160	3.373
∞	1.282	1.645	1.960	2.326	2.576	3.090	3.291
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Source: Provided by J. B. Orris using Excel.

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5944         5986         60.19         60.71         61.22         61.74         62.00         62.26         62.53         62.79         63.06         63.36           937         938         941         942         945         946         947         947         948         949           352         524         523         520         520         518         518         516         516         516         516         516         516         518         394           334         334         332         320         327         324         321         316         316         316         516         516         516         516         516         516         516         516         516         517         518         317         316         317         316         318         317         316         318         316         316         316         317         316         318         316         318         316         318         316         318         316         318         316         318         316         318         316         318         316         316         318         316         318         316         318	1 2 3 4 5 6	3 4 5	4 5	5		9		7	Numer 8	rator Deg 9	Numerator Degrees of Freedom $(d f_1)$	reedom (	( <i>df</i> <sub>1</sub> ) 15	20	24	30	40	09	120	8
9.38         9.43         9.44         9.45         9.46         9.47         9.47         9.47         9.47         9.47         9.48         9.48         9.49         9.44         9.45         9.47         9.47         9.47         9.48         9.43         9.43         9.43         9.43         9.47         9.47         9.44         9.48         3.33         3.34         3.35         3.34         3.38         3.82         3.89         3.89         3.89         3.89         3.79         3.79         3.74         3.14         3.15         3.14         3.15         3.14         3.17         3.16         3.14         3.17         3.16         3.14         3.17         3.18         3.19         3.19         3.14         3.17         3.16         3.14         3.17         3.16         3.14         3.17         3.16         3.17         3.16         3.17         3.17         3.16         3.17         3.17         3.16         3.17         3.17         3.16         3.17         3.17         3.17         3.17         3.17         3.17         3.17         3.16         3.17         3.16         3.17         3.16         3.17         3.14         3.17         3.12         3.14 <th< th=""><th>49.50 53.59 55.83 57.24 58.20 58.91</th><th>53.59 55.83 57.24 58.20 58.91</th><th>55.83 57.24 58.20 58.91</th><th>57.24 58.20 58.91 5</th><th>58.20 58.91 5</th><th>58.91</th><th>  "</th><th>59.4</th><th>4</th><th>59.86</th><th>60.19</th><th>60.71</th><th>61.22</th><th>61.74</th><th>62.00</th><th>62.26</th><th>62.53</th><th>62.79</th><th>63.06</th><th>63.33</th></th<>	49.50 53.59 55.83 57.24 58.20 58.91	53.59 55.83 57.24 58.20 58.91	55.83 57.24 58.20 58.91	57.24 58.20 58.91 5	58.20 58.91 5	58.91	"	59.4	4	59.86	60.19	60.71	61.22	61.74	62.00	62.26	62.53	62.79	63.06	63.33
5.24         5.23         5.22         5.20         5.18         5.17         5.16         5.15         5.14           3.34         3.32         3.30         3.87         3.84         3.83         3.80         3.79         3.78           3.36         2.39         3.87         3.84         3.83         3.80         3.79         3.78           2.36         2.34         2.90         2.87         2.84         2.82         2.80         2.76         2.74           2.72         2.70         2.67         2.63         2.59         2.58         2.54         2.76         2.78         2.76         2.78         2.78         2.78         2.78         2.78         2.78         2.78         2.78         2.78         2.78         2.78         2.78         2.78         2.78         2.78         2.78         2.78         2.78         2.78         2.79         2.78         2.78         2.78         2.79         2.78         2.79         2.78         2.79         2.78         2.79         2.78         2.79         2.78         2.79         2.78         2.79         2.78         2.79         2.78         2.72         2.78         2.79         2.78         2.79	8.53 9.00 9.16 9.24 9.29 9.33 9.35 9.3	9.16 9.24 9.29 9.33 9.35	9.24 9.29 9.33 9.35	9.29 9.33 9.35	9.33 9.35	9.35		9.3	37	9.38	9.39	9.41	9.42	9.44	9.45	9.46	9.47	9.47	9.48	9.49
3.94         3.95         3.90         3.87         3.84         3.83         3.80         3.79         3.78           3.32         3.30         3.27         3.24         3.81         3.81         3.14         3.15           2.96         2.94         2.82         2.86         2.54         2.57         2.49           2.72         2.70         2.67         2.63         2.59         2.88         2.36         2.74         2.74           2.56         2.54         2.50         2.40         2.88         2.36         2.53         2.26         2.74         2.74           2.44         2.42         2.88         2.34         2.30         2.78         2.23         2.21         2.71         2.10         2.08         2.28         2.26         2.24         2.27         2.21         2.17         2.10         2.06         2.08         2.05         2.03         2.09         2.08         2.05         2.01         1.09         1.09         1.09         1.09         1.09         1.09         1.09         1.09         1.09         1.09         1.09         1.09         1.09         1.09         1.09         1.09         1.09         1.09         1.09	5.46 5.39 5.34 5.31 5.28 5.27	5.39 5.34 5.31 5.28 5.27	5.34 5.31 5.28 5.27	5.31 5.28 5.27	5.28 5.27	5.27		.5	25	5.24	5.23	5.22	5.20	5.18	5.18	5.17	5.16	5.15	5.14	5.13
3.3.2         3.3.0         3.2.7         3.2.4         3.2.1         3.19         3.17         3.16         3.14         3.12           2.36         2.94         2.90         2.87         2.89         2.89         2.78         2.76         2.44           2.56         2.54         2.90         2.42         2.40         2.38         2.36         2.34         2.32           2.44         2.42         2.38         2.36         2.24         2.09         2.37         2.34         2.32           2.35         2.28         2.26         2.24         2.20         2.26         2.24         2.03         2.03         2.03         2.03         2.04         2.05         2.01         2.09         2.02         2.01         2.09         2.02         2.01         2.09         2.02         2.03 </td <th>4.32 4.19 4.11 4.05 4.01 3.98</th> <td>4.19 4.11 4.05 4.01 3.98</td> <td>4.11 4.05 4.01 3.98</td> <td>4.05 4.01 3.98</td> <td>4.01 3.98</td> <td>3.98</td> <td></td> <td>m</td> <td>.95</td> <td>3.94</td> <td>3.92</td> <td>3.90</td> <td>3.87</td> <td>3.84</td> <td>3.83</td> <td>3.82</td> <td>3.80</td> <td>3.79</td> <td>3.78</td> <td>3.76</td>	4.32 4.19 4.11 4.05 4.01 3.98	4.19 4.11 4.05 4.01 3.98	4.11 4.05 4.01 3.98	4.05 4.01 3.98	4.01 3.98	3.98		m	.95	3.94	3.92	3.90	3.87	3.84	3.83	3.82	3.80	3.79	3.78	3.76
2.96         2.94         2.90         2.87         2.84         2.82         2.80         2.78         2.76         2.74           2.72         2.70         2.64         2.63         2.58         2.56         2.54         2.71         2.46           2.45         2.54         2.50         2.46         2.42         2.28         2.24         2.31         2.49           2.35         2.23         2.24         2.20         2.46         2.26         2.25         2.23         2.34         2.30         2.38         2.34         2.00         2.38         2.34         2.00         2.38         2.34         2.00         2.88         2.36         2.36         2.36         2.34         2.30         2.38         2.34         2.00         2.38         2.34         2.00         2.08         2.05         2.01         2.09         2.09         2.06         2.07         2.09         2.06         2.03         1.99         1.99         1.99         1.90         1.90         1.89         1.89         1.81         1.81         1.89         1.81         1.81         1.79         1.79         1.79         1.79         1.79         1.79         1.79         1.79         1.79 <th>3.78 3.62 3.52 3.45 3.40 3.37</th> <td>3.62 3.52 3.45 3.40 3.37</td> <td>3.52 3.45 3.40 3.37</td> <td>3.45 3.40 3.37</td> <td>3.40 3.37</td> <td>3.37</td> <td></td> <td></td> <td>3.34</td> <td>3.32</td> <td>3.30</td> <td>3.27</td> <td>3.24</td> <td>3.21</td> <td>3.19</td> <td>3.17</td> <td>3.16</td> <td>3.14</td> <td>3.12</td> <td>3.10</td>	3.78 3.62 3.52 3.45 3.40 3.37	3.62 3.52 3.45 3.40 3.37	3.52 3.45 3.40 3.37	3.45 3.40 3.37	3.40 3.37	3.37			3.34	3.32	3.30	3.27	3.24	3.21	3.19	3.17	3.16	3.14	3.12	3.10
2.72         2.70         2.67         2.63         2.59         2.56         2.54         2.51         2.40         2.51         2.40         2.38         2.56         2.54         2.40         2.38         2.56         2.34         2.30         2.34         2.30         2.38         2.34         2.30         2.38         2.34         2.30         2.38         2.34         2.30         2.38         2.34         2.30         2.38         2.36         2.34         2.30         2.38         2.36         2.34         2.30         2.38         2.36         2.34         2.30         2.38         2.36         2.34         2.30         2.38         2.36         2.34         2.30         2.38         2.36         2.34         2.30         2.38         2.36         2.34         2.30         2.38         2.36         2.34         2.30         2.38         2.36         2.34         2.30         2.38         2.34         2.30         2.38         2.34         2.30         2.38         2.34         2.33         2.30         2.38         2.36         2.34         2.30         2.38         2.36         2.34         2.33         2.30         2.30         2.01         1.93         1.93 <th< td=""><th>3.46 3.29 3.18 3.11 3.05</th><td>3.29 3.18 3.11 3.05</td><td>3.18 3.11 3.05</td><td>3.11 3.05</td><td>3.05</td><td></td><td>3.01</td><td></td><td>2.98</td><td>2.96</td><td>2.94</td><td>2.90</td><td>2.87</td><td>2.84</td><td>2.82</td><td>2.80</td><td>2.78</td><td>2.76</td><td>2.74</td><td>2.72</td></th<>	3.46 3.29 3.18 3.11 3.05	3.29 3.18 3.11 3.05	3.18 3.11 3.05	3.11 3.05	3.05		3.01		2.98	2.96	2.94	2.90	2.87	2.84	2.82	2.80	2.78	2.76	2.74	2.72
2.56         2.54         2.50         2.46         2.42         2.49         2.38         2.36         2.34         2.32           2.44         2.42         2.32         2.24         2.25         2.23         2.21         2.13           2.34         2.39         2.24         2.20         2.24         2.23         2.21         2.13           2.27         2.28         2.24         2.20         2.24         2.01         1.98         1.96         1.93         1.90         1.98           2.10         2.10         2.05         2.01         1.98         1.96         1.93         1.90         1.88           2.10         2.05         2.01         1.98         1.96         1.93         1.90         1.88           2.10         2.05         2.01         1.96         1.94         1.91         1.89	3.26 3.07 2.96 2.88 2.83	3.07 2.96 2.88 2.83	2.96 2.88 2.83	2.88 2.83	2.83		2.78		2.75	2.72	2.70	2.67	2.63	2.59	2.58	2.56	2.54	2.51	2.49	2.47
2.44         2.42         2.38         2.34         2.30         2.28         2.25         2.23         2.21         2.18         2.24         2.26         2.28         2.24         2.20         2.18         2.16         2.13         2.11         2.18         2.21         2.11         2.18         2.16         2.19         2.11         2.00           2.21         2.19         2.11         2.10         2.01         2.01         2.01         2.01         2.01         2.01         2.01         2.01         2.01         2.01         2.01         2.01         2.01         2.01         2.01         2.01         1.02         2.01         1.02         2.01         1.02         2.01         1.02         2.01         1.02         2.01         1.02         2.01         1.02         2.01         1.02         2.01         1.02         2.01         1.02         2.01         1.02         2.01         1.02         2.01         1.02         2.01         1.02         2.01         1.02         2.01         1.02         2.01         1.02         1.02         1.02         1.02         1.02         1.02         1.02         1.02         1.02         1.02         1.02         1.02         1.	3.11 2.92 2.81 2.73 2.67	2.92 2.81 2.73 2.67	2.81 2.73 2.67	2.73 2.67	2.67		2.62		2.59	2.56	2.54	2.50	2.46	2.42	2.40	2.38	2.36	2.34	2.32	2.29
2.35         2.32         2.24         2.20         2.18         2.16         2.13         2.11         2.08           2.27         2.25         2.21         2.17         2.12         2.10         2.08         2.05         2.03         2.03           2.21         2.14         2.10         2.06         2.04         2.01         1.98         1.96         1.99         1.96         1.93         1.90         1.83           2.12         2.14         2.10         2.05         2.01         1.96         1.94         1.91         1.89         1.86         1.83           2.09         2.06         2.02         1.97         1.92         1.90         1.87         1.85         1.89	3.01 2.81 2.69 2.61 2.55	2.81 2.69 2.61 2.55	2.69 2.61 2.55	2.61 2.55	2.55		2.51		2.47	2.44	2.42	2.38	2.34	2.30	2.28	2.25	2.23	2.21	2.18	2.16
2.27         2.25         2.21         2.17         2.12         2.10         2.08         2.05         2.03         2.00           2.21         2.19         2.15         2.10         2.06         2.04         2.01         1.99         1.96         1.93         1.90         1.93         2.00         2.00         2.00         2.01         1.98         1.96         1.93         1.96         1.93         1.99         1.98         1.98         1.99         1.99         1.99         1.99         1.99         1.89         1.	2.92 2.73 2.61 2.52 2.46	2.73 2.61 2.52 2.46	2.61 2.52 2.46	2.52 2.46	2.46		2.41		2.38	2.35	2.32	2.28	2.24	2.20	2.18	2.16	2.13	2.11	2.08	5.06
2.21         2.19         2.15         2.10         2.06         2.04         2.01         1.99         1.96         1.93         1.99         1.99         1.93         1.99         1.93         1.90         1.83           2.16         2.14         2.10         2.05         2.01         1.96         1.94         1.91         1.89         1.86         1.83           2.02         2.06         2.02         1.97         1.92         1.94         1.91         1.89         1.86         1.83           2.06         2.03         1.99         1.94         1.89         1.84         1.81         1.78         1.75         1.79           2.06         2.00         1.96         1.91         1.86         1.84         1.81         1.78         1.78         1.79         1.77         1.74         1.73         1.70         1.67         1.69         1.69         1.69         1.69         1.69         1.69         1.89         1.89         1.89         1.89         1.89         1.89         1.89         1.89         1.79         1.70         1.69         1.69         1.69         1.69         1.69         1.69         1.69         1.69         1.69         1.89	2.86 2.66 2.54 2.45 2.39	2.66 2.54 2.45 2.39	2.54 2.45 2.39	2.45 2.39	2.39		2.34		2.30	2.27	2.25	2.21	2.17	2.12	2.10	2.08	2.05	2.03	2.00	1.97
2.16         2.14         2.10         2.05         2.01         1.98         1.96         1.93         1.90         1.88           2.12         2.10         2.05         2.01         1.96         1.94         1.91         1.89         1.86         1.83           2.09         2.06         2.02         1.97         1.92         1.90         1.87         1.85         1.89<	2.61 2.48 2.39 2.33	2.61 2.48 2.39 2.33	2.48 2.39 2.33	2.39 2.33	2.33		2.28		2.24	2.21	2.19	2.15	2.10	5.06	2.04	2.01	1.99	1.96	1.93	1.90
2.12         2.10         2.05         2.01         1.96         1.94         1.91         1.89         1.86         1.81           2.09         2.06         2.02         1.97         1.92         1.90         1.87         1.85         1.82         1.79           2.06         2.03         1.99         1.94         1.89         1.87         1.81         1.78         1.75         1.79         1.75           2.00         1.98         1.91         1.86         1.84         1.81         1.78         1.75         1.64         1.69         1.69         1.69         1.69         1.69         1.69         1.69         1.69         1.69         1.69         1.69         1.69         1.69         1.69 <th>2.76 2.56 2.43 2.35 2.28</th> <td>2.56 2.43 2.35 2.28</td> <td>2.43 2.35 2.28</td> <td>2.35 2.28</td> <td>2.28</td> <td></td> <td>2.23</td> <td></td> <td>2.20</td> <td>2.16</td> <td>2.14</td> <td>2.10</td> <td>2.05</td> <td>2.01</td> <td>1.98</td> <td>1.96</td> <td>1.93</td> <td>1.90</td> <td>1.88</td> <td>1.85</td>	2.76 2.56 2.43 2.35 2.28	2.56 2.43 2.35 2.28	2.43 2.35 2.28	2.35 2.28	2.28		2.23		2.20	2.16	2.14	2.10	2.05	2.01	1.98	1.96	1.93	1.90	1.88	1.85
2.09         2.06         2.02         1.97         1.92         1.90         1.87         1.85         1.82         1.79           2.06         2.03         1.99         1.94         1.89         1.87         1.84         1.81         1.78         1.75         1.75           2.00         1.98         1.99         1.94         1.89         1.84         1.81         1.78         1.75         1.75         1.75         1.75           2.00         1.98         1.99         1.94         1.89         1.84         1.81         1.78         1.75         1.75         1.75         1.75         1.75         1.75         1.75         1.75         1.70         1.67         1.69         1.66         1.66         1.66         1.66         1.66         1.66         1.66         1.66         1.66         1.66         1.66         1.67         1.64         1.60         1.56 <th>2.73 2.52 2.39 2.31 2.24</th> <td>2.52 2.39 2.31 2.24</td> <td>2.39 2.31 2.24</td> <td>2.31 2.24</td> <td>2.24</td> <td></td> <td>2.19</td> <td></td> <td>2.15</td> <td>2.12</td> <td>2.10</td> <td>2.05</td> <td>2.01</td> <td>1.96</td> <td>1.94</td> <td>1.91</td> <td>1.89</td> <td>1.86</td> <td>1.83</td> <td>1.80</td>	2.73 2.52 2.39 2.31 2.24	2.52 2.39 2.31 2.24	2.39 2.31 2.24	2.31 2.24	2.24		2.19		2.15	2.12	2.10	2.05	2.01	1.96	1.94	1.91	1.89	1.86	1.83	1.80
2.06         2.03         1.99         1.94         1.89         1.87         1.84         1.81         1.78         1.75         1.75           2.03         2.00         1.96         1.91         1.86         1.84         1.81         1.78         1.75         1.75         1.75           2.00         1.98         1.96         1.91         1.86         1.81         1.79         1.76         1.75         1.72         1.69           1.96         1.94         1.89         1.84         1.81         1.79         1.76         1.73         1.70         1.67           1.96         1.94         1.89         1.84         1.81         1.79         1.74         1.71         1.68         1.69         1.66         1.69           1.92         1.89         1.84         1.89         1.74         1.72         1.69         1.66         1.62         1.59           1.92         1.89         1.84         1.80         1.74         1.72         1.69         1.66         1.60         1.69         1.60         1.69         1.69         1.69         1.69         1.69         1.69         1.69         1.69         1.69         1.69         1.69	2.70 2.49 2.36 2.27 2.21	2.49 2.36 2.27 2.21	2.36 2.27 2.21	2.27 2.21	2.21		2.16		2.12	5.09	5.06	2.02	1.97	1.92	1.90	1.87	1.85	1.82	1.79	1.76
2.03         2.00         1.96         1.91         1.86         1.84         1.81         1.78         1.75         1.75         1.75           2.00         1.98         1.93         1.89         1.84         1.81         1.78         1.75         1.72         1.69           1.98         1.96         1.91         1.86         1.81         1.79         1.76         1.73         1.70         1.67           1.96         1.94         1.89         1.84         1.79         1.74         1.71         1.68         1.69           1.95         1.92         1.89         1.84         1.79         1.77         1.74         1.71         1.68         1.66         1.62         1.69           1.92         1.89         1.84         1.89         1.74         1.72         1.69         1.66         1.62         1.59         1.69         1.66         1.60         1.69         1.66         1.62         1.59         1.59         1.59         1.59         1.59         1.59         1.59         1.59         1.59         1.59         1.59         1.50         1.59         1.50         1.59         1.50         1.59         1.59         1.50         1.50	2.67 2.46 2.33 2.24 2.18	2.46 2.33 2.24 2.18	2.33 2.24 2.18	2.24 2.18	2.18		2.13		5.09	5.06	2.03	1.99	1.94	1.89	1.87	1.84	1.81	1.78	1.75	1.72
2.00         1.98         1.93         1.84         1.81         1.78         1.75         1.72         1.69           1.98         1.96         1.91         1.86         1.81         1.79         1.76         1.73         1.70         1.67           1.96         1.94         1.89         1.84         1.79         1.77         1.74         1.71         1.68         1.64           1.95         1.92         1.87         1.83         1.78         1.75         1.72         1.69         1.66         1.62         1.69           1.92         1.89         1.84         1.80         1.74         1.72         1.69         1.66         1.62         1.59           1.91         1.88         1.84         1.80         1.74         1.72         1.69         1.66         1.62         1.59         1.56           1.91         1.88         1.83         1.73         1.70         1.67         1.64         1.61         1.57         1.59         1.56         1.52           1.89         1.81         1.76         1.71         1.68         1.66         1.60         1.59         1.56         1.52           1.89         1.81         1	2.64 2.44 2.31 2.22 2.15	2.44 2.31 2.22 2.15	2.31 2.22 2.15	2.22 2.15	2.15		2.10		5.06	2.03	2.00	1.96	1.91	1.86	1.84	1.81	1.78	1.75	1.72	1.69
1.98       1.96       1.91       1.86       1.81       1.79       1.76       1.73       1.70       1.67         1.96       1.94       1.89       1.84       1.79       1.77       1.74       1.71       1.68       1.64         1.95       1.92       1.87       1.83       1.78       1.75       1.72       1.69       1.66       1.62       1.69         1.92       1.89       1.84       1.80       1.74       1.72       1.69       1.66       1.62       1.59         1.91       1.88       1.84       1.80       1.74       1.72       1.69       1.66       1.62       1.59         1.89       1.87       1.81       1.76       1.73       1.70       1.67       1.64       1.61       1.57         1.89       1.81       1.76       1.71       1.68       1.66       1.66       1.62       1.59       1.56         1.89       1.81       1.76       1.71       1.68       1.66       1.60       1.59       1.56       1.52         1.80       1.82       1.74       1.79       1.69       1.66       1.60       1.59       1.59       1.59         1.81       1.79	2.62 2.42 2.29 2.20 2.13	2.42 2.29 2.20 2.13	2.29 2.20 2.13	2.20 2.13	2.13		2.08		2.04	2.00	1.98	1.93	1.89	1.84	1.81	1.78	1.75	1.72	1.69	1.66
1.96       1.94       1.89       1.84       1.79       1.77       1.74       1.71       1.68       1.64         1.95       1.92       1.87       1.83       1.78       1.75       1.72       1.69       1.66       1.62         1.93       1.90       1.86       1.81       1.76       1.73       1.70       1.67       1.64       1.60       1.65       1.50         1.91       1.88       1.84       1.80       1.74       1.72       1.69       1.66       1.62       1.59         1.91       1.88       1.83       1.78       1.73       1.70       1.67       1.64       1.61       1.57         1.89       1.87       1.82       1.77       1.72       1.69       1.66       1.63       1.59       1.56         1.89       1.86       1.81       1.76       1.71       1.68       1.65       1.61       1.57       1.51         1.87       1.84       1.79       1.74       1.69       1.66       1.60       1.57       1.51         1.86       1.83       1.73       1.64       1.61       1.57       1.54       1.51         1.87       1.79       1.74       1.69	2.61 2.40 2.27 2.18 2.11	2.40 2.27 2.18 2.11	2.27 2.18 2.11	2.18 2.11	2.11		5.06		2.02	1.98	1.96	1.91	1.86	1.81	1.79	1.76	1.73	1.70	1.67	1.63
1.95       1.92       1.87       1.83       1.78       1.75       1.72       1.69       1.66       1.62         1.93       1.90       1.86       1.81       1.76       1.73       1.70       1.67       1.64       1.60       1.65         1.92       1.89       1.84       1.80       1.74       1.72       1.69       1.66       1.62       1.59         1.91       1.88       1.83       1.78       1.73       1.70       1.67       1.64       1.61       1.57         1.89       1.87       1.82       1.77       1.72       1.69       1.66       1.63       1.59       1.56         1.88       1.86       1.81       1.76       1.71       1.68       1.65       1.61       1.53       1.54       1.53         1.87       1.84       1.79       1.74       1.69       1.66       1.60       1.57       1.51       1.51       1.51       1.51       1.51       1.52       1.51       1.51       1.51       1.52       1.51       1.51       1.51       1.51       1.52       1.51       1.51       1.51       1.51       1.51       1.51       1.52       1.51       1.51       1.51       1	2.59 2.38 2.25 2.16 2.09	2.38 2.25 2.16 2.09	2.25 2.16 2.09	2.16 2.09	5.09		2.04		2.00	1.96	1.94	1.89	1.84	1.79	1.77	1.74	1.71	1.68	1.64	1.61
1.93       1.90       1.86       1.81       1.76       1.73       1.70       1.67       1.64       1.60         1.92       1.89       1.84       1.80       1.74       1.72       1.69       1.66       1.62       1.59         1.91       1.88       1.83       1.78       1.73       1.70       1.67       1.64       1.61       1.57         1.89       1.87       1.82       1.77       1.72       1.69       1.66       1.63       1.59       1.56       1.56         1.89       1.81       1.76       1.71       1.68       1.65       1.61       1.58       1.54       1.54       1.54       1.54       1.53       1.54       1.53       1.54       1.53       1.54       1.53       1.54       1.53       1.54       1.51       1.54 <td< td=""><th>2.57 2.36 2.23 2.14 2.08</th><td>2.36 2.23 2.14 2.08</td><td>2.23 2.14 2.08</td><td>2.14 2.08</td><td>2.08</td><td></td><td>2.02</td><td></td><td>1.98</td><td>1.95</td><td>1.92</td><td>1.87</td><td>1.83</td><td>1.78</td><td>1.75</td><td>1.72</td><td>1.69</td><td>1.66</td><td>1.62</td><td>1.59</td></td<>	2.57 2.36 2.23 2.14 2.08	2.36 2.23 2.14 2.08	2.23 2.14 2.08	2.14 2.08	2.08		2.02		1.98	1.95	1.92	1.87	1.83	1.78	1.75	1.72	1.69	1.66	1.62	1.59
1.92         1.89         1.84         1.80         1.74         1.72         1.69         1.66         1.62         1.59           1.91         1.88         1.83         1.78         1.73         1.70         1.67         1.64         1.61         1.57           1.89         1.87         1.82         1.77         1.72         1.69         1.66         1.63         1.59         1.56           1.88         1.86         1.81         1.76         1.71         1.68         1.65         1.61         1.58         1.54           1.87         1.84         1.79         1.74         1.69         1.66         1.63         1.59         1.56         1.51           1.85         1.82         1.77         1.72         1.67         1.64         1.61         1.57         1.54         1.51           1.86         1.83         1.78         1.72         1.67         1.64         1.61         1.57         1.54         1.54         1.51           1.79         1.76         1.71         1.66         1.61         1.57         1.54         1.54         1.42         1.54           1.74         1.76         1.71         1.78         1	2.56 2.35 2.22 2.13 2.06	2.35 2.22 2.13 2.06	2.22 2.13 2.06	2.13 2.06	5.06		2.01		1.97	1.93	1.90	1.86	1.81	1.76	1.73	1.70	1.67	1.64	1.60	1.57
1.91       1.88       1.83       1.78       1.73       1.70       1.67       1.64       1.61       1.57         1.89       1.87       1.82       1.77       1.72       1.69       1.66       1.63       1.59       1.56         1.88       1.86       1.81       1.76       1.71       1.68       1.65       1.61       1.59       1.59       1.59       1.59       1.59       1.59       1.59       1.59       1.51       1.53       1.53       1.83       1.83       1.73       1.68       1.65       1.62       1.59       1.56       1.51       1.51       1.51       1.51       1.51       1.51       1.51       1.51       1.51       1.51       1.51       1.51       1.51       1.51       1.52       1.51       1.42       1.50       1.52       1.51       1.42       1.51       1.42       1.52       1.51       1.42       1.52       1.54       1.52       1.51       1.42       1.52       1.54       1.52       1.54       1.52       1.52       1.52       1.52       1.52       1.52       1.52       1.52       1.52       1.52       1.52       1.54       1.42       1.42       1.43       1.44       1.40       <	2.55 2.34 2.21 2.11 2.05	2.34 2.21 2.11 2.05	2.21 2.11 2.05	2.11 2.05	2.05		1.99		1.95	1.92	1.89	1.84	1.80	1.74	1.72	1.69	1.66	1.62	1.59	1.55
1.89       1.87       1.82       1.77       1.72       1.69       1.66       1.63       1.59       1.56         1.88       1.86       1.81       1.76       1.71       1.68       1.65       1.61       1.58       1.54         1.87       1.84       1.89       1.75       1.70       1.67       1.64       1.60       1.57       1.53         1.86       1.83       1.78       1.74       1.69       1.66       1.62       1.59       1.56       1.55         1.85       1.82       1.77       1.72       1.67       1.64       1.61       1.57       1.54       1.50         1.79       1.76       1.71       1.66       1.61       1.57       1.54       1.47       1.42         1.74       1.71       1.66       1.61       1.57       1.54       1.41       1.47       1.42         1.74       1.71       1.66       1.60       1.54       1.51       1.44       1.40       1.35         1.68       1.65       1.65       1.41       1.37       1.32       1.26         1.63       1.55       1.49       1.45       1.41       1.77       1.74	2.54 2.33 2.19 2.10 2.04	2.33 2.19 2.10 2.04	2.19 2.10 2.04	2.10 2.04	2.04		1.98		1.94	1.91	1.88	1.83	1.78	1.73	1.70	1.67	1.64	1.61	1.57	1.53
1.88       1.86       1.81       1.76       1.71       1.68       1.65       1.61       1.58       1.54         1.87       1.87       1.89       1.75       1.70       1.67       1.64       1.60       1.57       1.53         1.87       1.84       1.79       1.74       1.69       1.66       1.63       1.59       1.56       1.52         1.85       1.82       1.73       1.68       1.65       1.62       1.58       1.55       1.51         1.85       1.82       1.77       1.72       1.67       1.64       1.61       1.57       1.54       1.50         1.79       1.76       1.71       1.66       1.61       1.57       1.54       1.47       1.42         1.74       1.71       1.66       1.60       1.54       1.51       1.44       1.40       1.35         1.68       1.65       1.60       1.55       1.48       1.44       1.30       1.24       1.71         1.63       1.60       1.55       1.49       1.36       1.34       1.30       1.24       1.17	2.53 2.32 2.18 2.09 2.02	2.32 2.18 2.09 2.02	2.18 2.09 2.02	2.09 2.02	2.02		1.97		1.93	1.89	1.87	1.82	1.77	1.72	1.69	1.66	1.63	1.59	1.56	1.52
1.87     1.85     1.80     1.75     1.70     1.67     1.64     1.60     1.57     1.53       1.87     1.84     1.79     1.74     1.69     1.66     1.63     1.59     1.56     1.55       1.86     1.83     1.78     1.73     1.68     1.65     1.62     1.58     1.55     1.51       1.85     1.82     1.77     1.72     1.67     1.64     1.61     1.57     1.54     1.54     1.50       1.79     1.76     1.71     1.66     1.61     1.57     1.54     1.51     1.47     1.42       1.74     1.71     1.66     1.60     1.54     1.51     1.48     1.44     1.40     1.35       1.63     1.63     1.60     1.55     1.48     1.45     1.37     1.24     1.71       1.63     1.63     1.60     1.55     1.49     1.36     1.34     1.30     1.24     1.17	2.52 2.31 2.17 2.08 2.01	2.31 2.17 2.08 2.01	2.17 2.08 2.01	2.08 2.01	2.01		1.96		1.92	1.88	1.86	1.81	1.76	1.71	1.68	1.65	1.61	1.58	1.54	1.50
1.87     1.84     1.79     1.74     1.69     1.66     1.63     1.59     1.56     1.52       1.86     1.82     1.73     1.68     1.65     1.62     1.58     1.55     1.51       1.85     1.82     1.77     1.72     1.67     1.64     1.61     1.57     1.54     1.54     1.50       1.79     1.76     1.71     1.66     1.61     1.57     1.54     1.51     1.47     1.42       1.74     1.71     1.66     1.60     1.54     1.51     1.48     1.44     1.40     1.35       1.63     1.63     1.60     1.55     1.48     1.45     1.31     1.24     1.71       1.63     1.63     1.60     1.55     1.49     1.36     1.34     1.30     1.24     1.17	2.51 2.30 2.17 2.07 2.00	2.30 2.17 2.07 2.00	2.17 2.07 2.00	2.07 2.00	2.00		1.95		1.91	1.87	1.85	1.80	1.75	1.70	1.67	1.64	1.60	1.57	1.53	1.49
1.86     1.83     1.78     1.73     1.68     1.65     1.62     1.58     1.55     1.51       1.85     1.82     1.77     1.72     1.67     1.64     1.61     1.57     1.54     1.54     1.50       1.79     1.76     1.71     1.66     1.61     1.57     1.54     1.51     1.47     1.42       1.74     1.71     1.66     1.60     1.54     1.51     1.48     1.44     1.40     1.35       1.68     1.65     1.60     1.55     1.48     1.45     1.41     1.37     1.24     1.71       1.63     1.60     1.55     1.49     1.42     1.38     1.34     1.30     1.24     1.17	2.50 2.29 2.16 2.06 2.00	2.29 2.16 2.06 2.00	2.16 2.06 2.00	2.06 2.00	2.00		1.94		1.90	1.87	1.84	1.79	1.74	1.69	1.66	1.63	1.59	1.56	1.52	1.48
1.85     1.82     1.77     1.72     1.67     1.64     1.61     1.57     1.54     1.50     1.50       1.79     1.76     1.71     1.66     1.61     1.57     1.54     1.51     1.47     1.42       1.74     1.71     1.66     1.60     1.54     1.51     1.48     1.44     1.40     1.35       1.68     1.65     1.60     1.55     1.48     1.45     1.41     1.37     1.32     1.26       1.63     1.60     1.55     1.49     1.42     1.38     1.34     1.34     1.17	2.50 2.28 2.15 2.06 1.99	2.28 2.15 2.06 1.99	2.15 2.06 1.99	2.06 1.99	1.99		1.93		1.89	1.86	1.83	1.78	1.73	1.68	1.65	1.62	1.58	1.55	1.51	1.47
1.79     1.76     1.71     1.66     1.61     1.57     1.54     1.51     1.42     1.42     1.42       1.74     1.71     1.66     1.60     1.54     1.51     1.48     1.44     1.40     1.35       1.68     1.65     1.60     1.55     1.48     1.45     1.41     1.37     1.32     1.26       1.63     1.60     1.55     1.49     1.42     1.38     1.34     1.30     1.24     1.17	2.49 2.28 2.14 2.05 1.98	2.28 2.14 2.05 1.98	2.14 2.05 1.98	2.05 1.98	1.98		1.93		1.88	1.85	1.82	1.77	1.72	1.67	1.64	1.61	1.57	1.54	1.50	1.46
1.74     1.71     1.66     1.60     1.54     1.51     1.48     1.44     1.40     1.35       1.68     1.65     1.60     1.55     1.48     1.45     1.41     1.37     1.32     1.26       1.63     1.60     1.55     1.49     1.42     1.38     1.34     1.30     1.24     1.17	2.44 2.23 2.09 2.00 1.93	2.23 2.09 2.00 1.93	2.09 2.00 1.93	2.00 1.93	1.93		1.87		1.83	1.79	1.76	1.71	1.66	1.61	1.57	1.54	1.51	1.47	1.42	1.38
1.68     1.60     1.55     1.48     1.45     1.41     1.37     1.32     1.26       1.63     1.60     1.55     1.49     1.42     1.38     1.34     1.30     1.24     1.17	2.39 2.18 2.04 1.95 1.87	2.18 2.04 1.95 1.87	2.04 1.95 1.87	1.95 1.87	1.87		1.82		1.77	1.74	1.71	1.66	1.60	1.54	1.51	1.48	1.44	1.40	1.35	1.29
1.63 1.60 1.55 1.49 1.42 1.38 1.34 1.30 1.24 1.17	2.35 2.13 1.99 1.90 1.82	2.13 1.99 1.90 1.82	1.99 1.90 1.82	1.90 1.82	1.82	01	1.77		1.72	1.68	1.65	1.60	1.55	1.48	1.45	1.41	1.37	1.32	1.26	1.19
	2.30 2.08 1.94 1.85 1.77	2.08 1.94 1.85 1.77	1.94 1.85 1.77	1.85 1.77	1.77	1.72	1.72		1.67	1.63	1.60	1.55	1.49	1.42	1.38	1.34	1.30	1.24	1.17	1.00

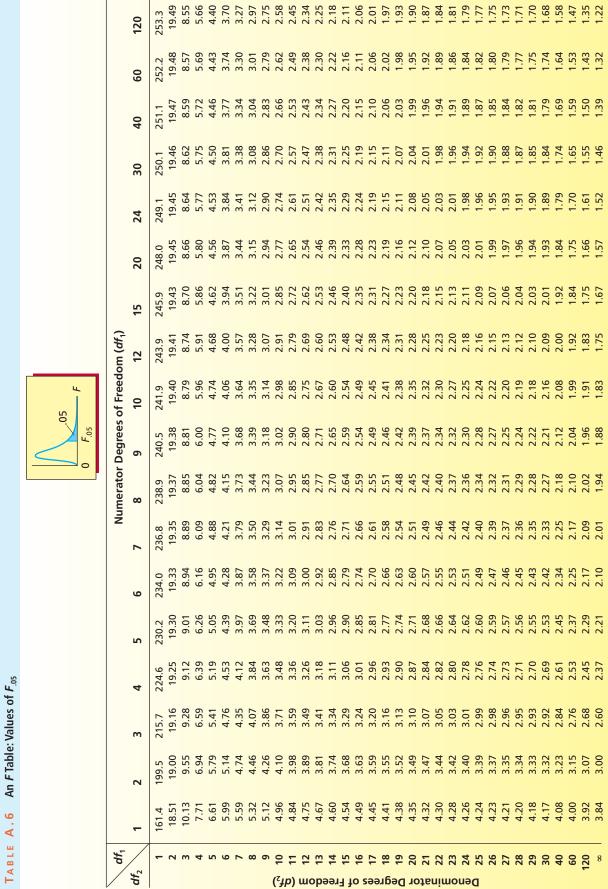
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2.07 2.01 1.96 .92

254.3 19.50 8.53 5.63

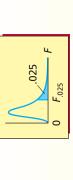
3.67 3.23 2.93 2.71

2.54 2.40 2.30 2.21



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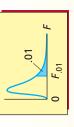
BLE A.7 An FTable: Values of F<sub>.025</sub>



df,								Z	Numerator Degrees of Freedom ( $df_\eta$ )	. Degrees	of Freed	$dom (df_1)$							
df <sub>2</sub>	-	7	m	4	2	9	7	œ	6	10	12	15	20	24	30	40	09	120	8
-	647.8	799.5	864.2	9.668	921.8	937.1	948.2	956.7	963.3	9.896	976.7	984.9	993.1	997.2	1,001	1,006	1,010	1,014	1,018
7	38.51	39.00	39.17	39.25	39.30	39.33	39.36	39.37	39.39	39.40	39.41	39.43	39.45	39.46	39.46	39.47	39.48	39.49	39.50
m	17.44	16.04	15.44	15.10	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	13.90
4	12.22	10.65	9.98	9.60	9.36	9.20	9.07	8.98	8.90	8.84	8.75	8.66	8.56	8.51	8.46	8.41	8.36	8.31	8.26
2	10.01	8.43	7.76	7.39	7.15	6.98	6.85	92.9	89.9	6.62	6.52	6.43	6.33	6.28	6.23	6.18	6.12	6.07	6.02
9	8.81	7.26	09.9	6.23	5.99	5.82	5.70	2.60	5.52	5.46	5.37	5.27	5.17	5.12	2.07	5.01	4.96	4.90	4.85
7	8.07	6.54	5.89	5.52	5.29	5.12	4.99	4.90	4.82	4.76	4.67	4.57	4.47	4.45	4.36	4.31	4.25	4.20	4.14
œ	7.57	90.9	5.45	5.05	4.82	4.65	4.53	4.43	4.36	4.30	4.20	4.10	4.00	3.95	3.89	3.84	3.78	3.73	3.67
6	7.21	5.71	2.08	4.72	4.48	4.32	4.20	4.10	4.03	3.96	3.87	3.77	3.67	3.61	3.56	3.51	3.45	3.39	3.33
2 ( <sup>∑</sup> ,	6.94	5.46	4.83	4.47	4.24	4.07	3.95	3.85	3.78	3.72	3.62	3.52	3.42	3.37	3.31	3.26	3.20	3.14	3.08
(q	6.72	5.26	4.63	4.28	4.04	3.88	3.76	3.66	3.59	3.53	3.43	3.33	3.23	3.17	3.12	3.06	3.00	2.94	2.88
m 2	6.55	5.10	4.47	4.12	3.89	3.73	3.61	3.51	3.44	3.37	3.28	3.18	3.07	3.02	2.96	2.91	2.85	2.79	2.72
pp;	6.41	4.97	4.35	4.00	3.77	3.60	3.48	3.39	3.31	3.25	3.15	3.05	2.95	2.89	2.84	2.78	2.72	2.66	2.60
99) 4	6.30	4.86	4.24	3.89	3.66	3.50	3.38	3.29	3.21	3.15	3.05	2.95	2.84	2.79	2.73	2.67	2.61	2.55	2.49
귀 1 5	6.20	4.77	4.15	3.80	3.58	3.41	3.29	3.20	3.12	3.06	2.96	2.86	2.76	2.70	2.64	2.59	2.52	2.46	2.40
9 19	6.12	4.69	4.08	3.73	3.50	3.34	3.22	3.12	3.05	2.99	2.89	2.79	2.68	2.63	2.57	2.51	2.45	2.38	2.32
568	6.04	4.62	4.01	3.66	3.44	3.28	3.16	3.06	2.98	2.92	2.82	2.72	2.62	2.56	2.50	2.44	2.38	2.32	2.25
gr 9	5.98	4.56	3.95	3.61	3.38	3.22	3.10	3.01	2.93	2.87	2.77	2.67	2.56	2.50	2.44	2.38	2.32	2.26	2.19
	5.92	4.51	3.90	3.56	3.33	3.17	3.05	2.96	2.88	2.82	2.72	2.62	2.51	2.45	2.39	2.33	2.27	2.20	2.13
	5.87	4.46	3.86	3.51	3.29	3.13	3.01	2.91	2.84	2.77	2.68	2.57	2.46	2.41	2.35	2.29	2.22	2.16	2.09
	5.83	4.45	3.82	3.48	3.25	3.09	2.97	2.87	2.80	2.73	2.64	2.53	2.42	2.37	2.31	2.25	2.18	2.11	2.04
	5.79	4.38	3.78	3.44	3.22	3.05	2.93	2.84	2.76	2.70	2.60	2.50	2.39	2.33	2.27	2.21	2.14	2.08	2.00
3 0u	5.75	4.35	3.75	3.41	3.18	3.02	2.90	2.81	2.73	2.67	2.57	2.47	2.36	2.30	2.24	2.18	2.11	2.04	1.97
	5.72	4.32	3.72	3.38	3.15	2.99	2.87	2.78	2.70	2.64	2.54	2.44	2.33	2.27	2.21	2.15	2.08	2.01	1.94
	5.69	4.29	3.69	3.35	3.13	2.97	2.85	2.75	2.68	2.61	2.51	2.41	2.30	2.24	2.18	2.12	2.05	1.98	1.91
56	99.5	4.27	3.67	3.33	3.10	2.94	2.82	2.73	2.65	2.59	2.49	2.39	2.28	2.22	2.16	2.09	2.03	1.95	1.88
27	5.63	4.24	3.65	3.31	3.08	2.92	2.80	2.71	2.63	2.57	2.47	2.36	2.25	2.19	2.13	2.07	2.00	1.93	1.85
28	5.61	4.22	3.63	3.29	3.06	2.90	2.78	5.69	2.61	2.55	2.45	2.34	2.23	2.17	2.11	2.05	1.98	1.91	1.83
53	5.59	4.20	3.61	3.27	3.04	2.88	2.76	2.67	2.59	2.53	2.43	2.32	2.21	2.15	5.09	2.03	1.96	1.89	1.81
30	5.57	4.18	3.59	3.25	3.03	2.87	2.75	2.65	2.57	2.51	2.41	2.31	2.20	2.14	2.07	2.01	1.94	1.87	1.79
40	5.45	4.05	3.46	3.13	2.90	2.74	2.62	2.53	2.45	2.39	2.29	2.18	2.07	2.01	1.94	1.88	1.80	1.72	1.64
09	5.29	3.93	3.34	3.01	2.79	2.63	2.51	2.41	2.33	2.27	2.17	5.06	1.94	1.88	1.82	1.74	1.67	1.58	1.48
120	5.15	3.80	3.23	2.89	2.67	2.52	2.39	2.30	2.22	2.16	2.05	1.94	1.82	1.76	1.69	1.61	1.53	1.43	1.31
8	5.02	3.69	3.12	2.79	2.57	2.41	2.29	2.19	2.11	2.05	1.94	1.83	1.71	1.64	1.57	1.48	1.39	1.27	1.00

Source: M. Merrington and C. M. Thompson, "Tables of Percentage Points of the Inverted Beta (F)-Distribution," Biometrika 33 (1943), pp. 73–88. Reproduced by permission of the Biometrika Trustees.

TABLE A.8 An FTable: Values of F<sub>.01</sub>



9.17         5.65         5.74         5.88         5.82         6.05         6.106         6.110         6.129         6.23         6.23         6.23         6.23         6.23         6.23         6.23         6.23         6.23         6.23         6.24         6.106         6.106         6.106         6.106         6.106         6.20	2		m	4	2	9	7	<b>co</b>	9 10 12 15	10	12	15	20	24	30	40	09		8
4.7.         5.2. <th< th=""><th>4,999.5</th><th>_</th><th>5,403</th><th>5,625</th><th>5,764</th><th>5,859</th><th>5,928</th><th>5,982</th><th>6,022</th><th>6,056</th><th>6,106</th><th>6,157</th><th>6,209</th><th>6,235</th><th>6,261</th><th>6,287</th><th>6,313</th><th></th><th>6,366</th></th<>	4,999.5	_	5,403	5,625	5,764	5,859	5,928	5,982	6,022	6,056	6,106	6,157	6,209	6,235	6,261	6,287	6,313		6,366
16.6         15.2         15.2         15.2         15.2         15.2         15.2         14.8         14.6         14.5         14.5         14.6         14.6         14.5         14.5         14.5         14.5         14.5         14.5         14.5         14.5         14.5         14.5         14.5         14.5         14.5         14.5         15.5         15.2         15.3         15.3         15.7         15.2 <th< td=""><td>n m</td><td>30.82</td><td>29.46</td><td>28.71</td><td>28.24</td><td>27.91</td><td>27.67</td><td>27.49</td><td>27.35</td><td>27.23</td><td>27.05</td><td>26.87</td><td>26.69</td><td>26.60</td><td>26.50</td><td>26.41</td><td>26.32</td><td>26.22</td><td>26.13</td></th<>	n m	30.82	29.46	28.71	28.24	27.91	27.67	27.49	27.35	27.23	27.05	26.87	26.69	26.60	26.50	26.41	26.32	26.22	26.13
12.0         11.39         10.57         10.64         10.29         10.06         10.05         9.89         9.72         9.47         9.38         9.29         9.40         9.30         9.91         9.20         9.91         9.92         9.91         9.38         9.20         9.91         9.91         9.92         9.91         9.92         9.91         9.92         9.91         9.92         9.91         9.92         9.91         9.92         9.91         9.92         9.91         9.92         9.91         9.92         9.91         9.92         9.91         9.92         9.91         9.92         9.91         9.92         9.91         9.92         9.91         9.92         9.91         9.92         9.91         9.92         9.91         9.92         9.91         9.92         9.93         9.93         9.93         9.93         9.93         9.93         9.93         9.93         9.93         9.93         9.93         9.93         9.94         9.93         9.94         9.93         9.94         9.93         9.93         9.93         9.93         9.93         9.93         9.93         9.93         9.93         9.93         9.93         9.93         9.93         9.93         9.93	_	18.00	16.69	15.98	15.52	15.21	14.98	14.80	14.66	14.55	14.37	14.20	14.02	13.93	13.84	13.75	13.65	13.56	13.46
978         9.15         8.47         8.47         8.47         8.47         8.47         8.47         8.47         8.47         8.47         8.47         8.47         9.18         9.18         9.18         9.18         9.18         9.18         9.18         9.18         9.18         9.18         9.18         9.18         9.18         9.18         6.03         6.03         6.03         5.21         5.26         5.26         5.28         5.26         5.21         5.26         5.29         5.20	`	13.27	12.06	11.39	10.97	10.67	10.46	10.29	10.16	10.05	68.6	9.72	9.55	9.47	9.38	9.29	9.20	9.11	9.05
8.45         7.88         7.46         7.19         6.99         6.84         6.72         6.47         6.31         6.16         6.07         5.93         5.91         5.82         5.74         6.99         6.84         6.72         6.47         6.51         6.74         6.93         6.94         6.87         6.54         6.14         6.35         6.20         5.61         5.74         5.35         5.26         5.11         4.96         4.81         4.73         4.62         4.73         4.63         4.74         4.96         4.75         4.41         4.73         4.62         4.71         4.73         4.62         4.71         4.78         4.70         4.70         4.75         4.41         4.73         4.76         4.70 <th< td=""><td>`</td><td>10.92</td><td>9.78</td><td>9.15</td><td>8.75</td><td>8.47</td><td>8.26</td><td>8.10</td><td>7.98</td><td>7.87</td><td>7.72</td><td>7.56</td><td>7.40</td><td>7.31</td><td>7.23</td><td>7.14</td><td>7.06</td><td>6.97</td><td>6.88</td></th<>	`	10.92	9.78	9.15	8.75	8.47	8.26	8.10	7.98	7.87	7.72	7.56	7.40	7.31	7.23	7.14	7.06	6.97	6.88
759         701         663         618         603         591         581         567         556         536         536         537         618         603         604 <td></td> <td>9.55</td> <td>8.45</td> <td>7.85</td> <td>7.46</td> <td>7.19</td> <td>6.99</td> <td>6.84</td> <td>6.72</td> <td>6.62</td> <td>6.47</td> <td>6.31</td> <td>6.16</td> <td>6.07</td> <td>5.99</td> <td>5.91</td> <td>5.82</td> <td>5.74</td> <td>5.65</td>		9.55	8.45	7.85	7.46	7.19	6.99	6.84	6.72	6.62	6.47	6.31	6.16	6.07	5.99	5.91	5.82	5.74	5.65
6.99         6.42         6.06         5.80         5.61         5.47         5.35         5.11         4.96         4.81         4.73         4.65         4.81         4.73         4.65         4.81         4.73         4.65         4.81         4.71         4.39         4.80           6.25         5.67         5.36         5.61         5.36         4.74         4.63         4.74         4.81         4.71         4.39         4.71         4.91         4.10         4.85         4.71         4.82         4.61         4.89         4.71         4.02         3.78         3.79         3.89         3.		8.65	7.59	7.01	6.63	6.37	6.18	6.03	5.91	5.81	2.67	5.52	5.36	5.28	5.20	5.12	5.03	4.95	4.86
655         559         564         539         520         506         434         485         471         456         440         457         440         450         440         450         440         450 <td></td> <td>8.02</td> <td>66.9</td> <td>6.45</td> <td>90.9</td> <td>5.80</td> <td>5.61</td> <td>5.47</td> <td>5.35</td> <td>5.26</td> <td>5.11</td> <td>4.96</td> <td>4.81</td> <td>4.73</td> <td>4.65</td> <td>4.57</td> <td>4.48</td> <td>4.40</td> <td>4.31</td>		8.02	66.9	6.45	90.9	5.80	5.61	5.47	5.35	5.26	5.11	4.96	4.81	4.73	4.65	4.57	4.48	4.40	4.31
6.22         5.67         5.32         5.07         4.89         4.74         4.63         4.40         4.25         4.10         4.02         3.94         3.86         3.78         3.89         3.78         3.69         3.78         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         4.30         3.94         3.86         3.78         3.79         3.89 <th< td=""><td></td><td>7.56</td><td>6.55</td><td>5.99</td><td>5.64</td><td>5.39</td><td>5.20</td><td>2.06</td><td>4.94</td><td>4.85</td><td>4.71</td><td>4.56</td><td>4.41</td><td>4.33</td><td>4.25</td><td>4.17</td><td>4.08</td><td>4.00</td><td>3.91</td></th<>		7.56	6.55	5.99	5.64	5.39	5.20	2.06	4.94	4.85	4.71	4.56	4.41	4.33	4.25	4.17	4.08	4.00	3.91
595         541         506         482         464         450         439         410         401         386         378         370         362         349         349           574         486         462         446         420         419         410         386         366         359         375         379         369         378         379		7.21	6.22	2.67	5.32	2.07	4.89	4.74	4.63	4.54	4.40	4.25	4.10	4.02	3.94	3.86	3.78	3.69	3.60
574         521         486         462         444         430         410         396         382         366         359         334         334         325           556         504         468         466         446         428         410         403         399         380         366         351         343         335         334         325           529         477         444         420         403         389         389         389         368         359         371         378         313         313         305         296           529         4.77         4.44         420         403         389         378         369         374         376         379         371         306         295         379         371         306         296         379         371         378         379         379         370         320         279         379		6.93	5.95	5.41	5.06	4.82	4.64	4.50	4.39	4.30	4.16	4.01	3.86	3.78	3.70	3.62	3.54	3.45	3.36
556         5.04         4.69         4.46         4.14         4.03         3.94         3.80         3.66         3.51         3.43         3.35         3.27         3.18         3.09           5.42         4.89         4.46         4.80         4.89         4.89         3.69         3.67         3.57         3.39         3.79         3.69         3.67         3.57         3.39         3.79         3.69         3.69         3.67         3.31         3.10         3.00         2.92         2.84         2.95         2.84           5.18         4.67         4.34         4.10         3.89         3.79         3.69         3.69         3.37         3.16         3.00         2.92         2.84         2.95         2.84         2.95         3.00         2.92         2.84         2.75         2.84         2.75         2.64         2.75         2.64         2.75         2.64         2.75         2.64         2.75         2.64         2.75         2.64         3.75         3.69         3.46         3.71         3.46         3.71         3.46         3.71         3.73         3.71         3.69         3.74         3.75         2.89         2.89         2.89         3.89 </td <td></td> <td>6.70</td> <td>5.74</td> <td>5.21</td> <td>4.86</td> <td>4.62</td> <td>4.44</td> <td>4.30</td> <td>4.19</td> <td>4.10</td> <td>3.96</td> <td>3.82</td> <td>3.66</td> <td>3.59</td> <td>3.51</td> <td>3.43</td> <td>3.34</td> <td>3.25</td> <td>3.17</td>		6.70	5.74	5.21	4.86	4.62	4.44	4.30	4.19	4.10	3.96	3.82	3.66	3.59	3.51	3.43	3.34	3.25	3.17
5.42         4.89         4.56         4.32         4.14         4.00         3.89         3.67         3.57         3.27         3.29         3.17         3.29         3.17         3.29         3.17         3.26         3.18         3.10         3.05         2.93         2.84           5.29         4.77         4.44         4.20         4.03         3.89         3.78         3.69         3.51         3.16         3.10         3.00         2.92         2.84         3.70         2.92         3.89         3.70         3.25         3.41         3.16         3.00         2.92         2.84         2.75         2.64         2.75         2.		6.51	5.56	5.04	4.69	4.46	4.28	4.14	4.03	3.94	3.80	3.66	3.51	3.43	3.35	3.27	3.18	3.09	3.00
5.29         4.77         4.44         4.20         4.03         3.89         3.78         3.69         3.55         3.41         3.26         3.18         3.10         3.26         3.18         3.10         3.26         3.18         3.10         3.26         3.18         3.69         3.69         3.46         3.51         3.46         3.51         3.46         3.51         3.46         3.51         3.46         3.51         3.46         3.51         3.70         3.09         3.08         3.00         2.92         2.84         2.75         2.84           5.09         4.50         4.75         4.40         3.81         3.76         3.46         3.37         3.29         3.29         3.08         3.09         2.92         2.84         2.76         2.89         2.89         2.78         2.99         2.86         2.79         2.84         2.75         2.64         2.55         2.84         2.78         3.09         3.71         3.09         3.89         3.89         3.89         3.89         3.89         3.89         3.89         3.89         3.89         3.89         3.72         3.69         3.80         3.10         3.09         2.99         2.89         2.89         2.		98.9	5.45	4.89	4.56	4.32	4.14	4.00	3.89	3.80	3.67	3.52	3.37	3.29	3.21	3.13	3.05	2.96	2.87
5.18         4.67         4.34         4.10         3.93         3.79         3.68         3.46         3.31         3.16         3.16         3.16         3.16         3.16         3.16         3.17         3.60         3.51         3.46         3.71         3.60         3.51         3.47         3.08         3.06         3.16         3.09         3.09         2.92         2.84         2.75         2.66           5.01         4.58         4.70         4.87         3.71         3.60         3.51         3.00         2.92         2.84         2.75         2.66         2.76         2.56         2.60         2.61         2.66         2.60         2.61         2.62         2.84         2.75         2.64         2.76         2.69         2.76         2.89         2.89         2.89         2.89         2.76         2.69         2.40         2.76         2.69         2.40         2.76         2.64         2.77         2.64         2.78         2.46         3.71         3.78         3.72         3.73         3.72         3.73         3.73         3.72         3.73         3.78         3.79         3.78         2.78         2.78         2.64         2.75         2.64         2.		6.23	5.29	4.77	4.44	4.20	4.03	3.89	3.78	3.69	3.55	3.41	3.26	3.18	3.10	3.02	2.93	2.84	2.75
5.09         4.58         4.25         4.01         3.84         3.71         3.60         3.51         3.30         3.03         2.92         2.84         2.75         2.66           4.94         4.43         4.17         3.94         3.77         3.63         3.30         3.92         2.84         2.75         2.67         2.57           4.94         4.43         4.10         3.87         3.70         3.65         3.46         3.31         3.17         3.09         2.94         2.86         2.75         2.64         2.57         2.64         2.56         2.64         2.64         2.64         2.69         2.64         2.69         2.64         2.69         2.64         2.69         2.64         2.69         2.64         2.69         2.64         2.69         2.64         2.69         2.64         2.69         2.64         2.69         2.64         2.69         2.64         2.69         2.64         2.69         2.64         2.69         2.64         2.69         2.64         2.69         2.64         2.69         2.64         2.69         2.64         2.69         2.61         2.52         2.64         2.69         2.64         2.69         2.64         2.69<		6.11	5.18	4.67	4.34	4.10	3.93	3.79	3.68	3.59	3.46	3.31	3.16	3.08	3.00	2.92	2.83	2.75	2.65
5.01         4.50         4.17         3.94         3.77         3.63         3.52         3.43         3.15         3.00         2.92         2.84         2.76         2.55           4.94         4.43         4.10         3.87         3.70         3.56         3.46         3.31         3.13         3.09         2.94         2.86         2.78         2.69         2.61         2.52           4.87         4.37         3.40         3.31         3.17         2.98         2.89         2.79         2.76         2.64         2.55         2.46           4.82         4.26         3.39         3.71         3.03         2.89         2.78         2.79         2.64         2.55         2.40         2.51           4.76         4.26         3.34         3.71         3.03         2.89         2.78         2.79         2.64         2.59         2.49         2.45         2.40         2.31           4.76         4.26         3.34         3.26         3.13         2.99         2.89         2.79         2.64         2.59         2.40         2.31         2.31         2.79         2.66         2.59         2.40         2.31         2.31         2.31		6.01	5.09	4.58	4.25	4.01	3.84	3.71	3.60	3.51	3.37	3.23	3.08	3.00	2.92	2.84	2.75	2.66	2.57
4.94         4.43         4.10         3.87         3.70         3.56         3.46         3.37         3.23         3.09         2.94         2.86         2.78         2.69         2.61         2.52         2.46           4.87         4.87         4.94         3.81         3.64         3.51         3.40         3.31         3.17         3.03         2.88         2.80         2.75         2.64         2.55         2.46           4.82         4.31         3.99         3.76         3.59         3.45         3.35         3.26         3.17         2.98         2.83         2.75         2.64         2.55         2.40           4.72         4.26         3.99         3.76         3.59         3.41         3.30         3.21         2.99         2.78         2.76         2.58         2.79 <td></td> <td>5.93</td> <td>5.01</td> <td>4.50</td> <td>4.17</td> <td>3.94</td> <td>3.77</td> <td>3.63</td> <td>3.52</td> <td>3.43</td> <td>3.30</td> <td>3.15</td> <td>3.00</td> <td>2.92</td> <td>2.84</td> <td>2.76</td> <td>2.67</td> <td>2.58</td> <td>2.49</td>		5.93	5.01	4.50	4.17	3.94	3.77	3.63	3.52	3.43	3.30	3.15	3.00	2.92	2.84	2.76	2.67	2.58	2.49
4.87         4.37         4.04         3.81         3.64         3.31         3.17         3.03         2.88         2.80         2.75         2.64         2.55         2.46           4.82         4.31         3.99         3.76         3.45         3.35         3.26         3.12         2.98         2.83         2.75         2.67         2.58         2.50         2.40           4.76         4.26         3.94         3.71         3.41         3.30         3.21         3.03         2.93         2.78         2.70         2.62         2.54         2.45         2.35         2.40           4.72         4.26         3.39         3.46         3.31         3.20         3.17         3.03         2.89         2.74         2.66         2.58         2.49         2.49         2.79         2.66         2.59         2.49 <td></td> <td>5.85</td> <td>4.94</td> <td>4.43</td> <td>4.10</td> <td>3.87</td> <td>3.70</td> <td>3.56</td> <td>3.46</td> <td>3.37</td> <td>3.23</td> <td>3.09</td> <td>2.94</td> <td>2.86</td> <td>2.78</td> <td>2.69</td> <td>2.61</td> <td>2.52</td> <td>2.42</td>		5.85	4.94	4.43	4.10	3.87	3.70	3.56	3.46	3.37	3.23	3.09	2.94	2.86	2.78	2.69	2.61	2.52	2.42
4.82         4.31         3.99         3.76         3.59         3.45         3.26         3.12         2.98         2.83         2.75         2.67         2.58         2.50         2.40         2.40           4.76         4.26         3.94         3.71         3.54         3.41         3.30         3.21         3.07         2.93         2.78         2.70         2.52         2.54         2.45         2.45         2.45         2.45         2.45         2.45         2.45         2.45         2.45         2.45         2.45         2.45         2.45         2.45         2.45         2.45         2.53         2.51         2.54         2.45         2.49         2.77         2.62         2.54         2.49         2.47         2.66         2.58         2.70         2.62         2.54         2.49         2.47         2.62         2.54         2.49         2.77         2.62         2.47         2.49         2.73         2.73         2.78         2.78         2.79         2.78         2.79         2.78         2.79         2.74         2.89         2.79         2.74         2.89         2.79         2.74         2.89         2.79         2.74         2.89         2.79         2.		5.78	4.87	4.37	4.04	3.81	3.64	3.51	3.40	3.31	3.17	3.03	2.88	2.80	2.72	2.64	2.55	2.46	2.36
4.76         4.26         3.94         3.71         3.54         3.41         3.30         3.21         3.07         2.93         2.78         2.70         2.62         2.54         2.45         2.35           4.72         4.22         3.90         3.67         3.36         3.17         3.03         2.89         2.74         2.66         2.58         2.49         2.40         2.31           4.68         4.18         3.85         3.63         3.46         3.22         3.13         2.99         2.85         2.70         2.62         2.54         2.49         2.31         2.31           4.64         4.14         3.85         3.63         3.26         3.13         2.99         2.87         2.60         2.58         2.49         2.49         2.70           4.64         4.14         3.82         3.26         3.15         3.06         2.93         2.78         2.65         2.59         2.47         2.38         2.23         2.21           4.60         4.11         3.78         3.56         3.12         3.09         2.96         2.75         2.69         2.44         2.35         2.29         2.24         2.23         2.21         2.21		5.72	4.82	4.31	3.99	3.76	3.59	3.45	3.35	3.26	3.12	2.98	2.83	2.75	2.67	2.58	2.50	2.40	2.31
4.72         4.22         3.90         3.67         3.56         3.17         3.03         2.89         2.74         2.66         2.58         2.49         2.40         2.31           4.68         4.18         3.85         3.63         3.46         3.32         3.13         2.99         2.85         2.70         2.62         2.54         2.45         2.45         2.37           4.64         4.14         3.85         3.63         3.46         3.29         3.13         2.99         2.87         2.60         2.58         2.49         2.45         2.36         2.27           4.64         4.14         3.82         3.59         3.15         3.09         2.96         2.81         2.66         2.58         2.47         2.38         2.29         2.27           4.57         4.07         3.75         3.53         3.26         3.17         3.09         2.99         2.78         2.69         2.74         2.39         2.29         2.17         2.69         2.79         2.49         2.41         2.33         2.20         2.17         2.29         2.21         2.11         2.33         2.21         2.11         2.23         2.21         2.11         2.23		99.5	4.76	4.26	3.94	3.71	3.54	3.41	3.30	3.21	3.07	2.93	2.78	2.70	2.62	2.54	2.45	2.35	2.26
4.68         4.18         3.85         3.63         3.46         3.32         3.13         2.99         2.85         2.70         2.62         2.54         2.45         2.36         2.27           4.64         4.14         3.82         3.59         3.13         3.09         2.96         2.81         2.66         2.58         2.50         2.42         2.33         2.23           4.60         4.11         3.78         3.56         3.39         3.26         3.15         3.09         2.99         2.78         2.65         2.47         2.38         2.29         2.77         2.82         2.79         2.77         2.82         2.79         2.77         2.82         2.79         2.77         2.82         2.79         2.79         2.78         2.79         2.71         2.71         2.71         2.71         2.71         2.71         2.71         2.71<		5.61	4.72	4.22	3.90	3.67	3.50	3.36	3.26	3.17	3.03	2.89	2.74	2.66	2.58	2.49	2.40	2.31	2.21
4.64         4.14         3.82         3.59         3.42         3.29         3.18         3.09         2.96         2.81         2.66         2.58         2.50         2.42         2.33         2.23           4.60         4.11         3.78         3.56         3.39         3.26         3.15         3.06         2.93         2.78         2.65         2.47         2.38         2.29         2.20           4.57         4.07         3.75         3.56         3.33         3.23         3.12         3.03         2.90         2.75         2.49         2.41         2.35         2.20         2.17           4.54         4.04         3.73         3.50         3.30         3.00         2.87         2.73         2.69         2.41         2.33         2.21         2.17         2.93         2.21         2.11         2.11           4.51         4.02         3.70         3.47         3.30         2.80         2.80         2.80         2.70         2.75         2.49         2.41         2.33         2.21         2.11           4.51         3.02         3.23         3.24         3.20         2.80         2.80         2.80         2.70         2.75		5.57	4.68	4.18	3.85	3.63	3.46	3.32	3.22	3.13	2.99	2.85	2.70	2.62	2.54	2.45	2.36	2.27	2.17
4.60         4.11         3.78         3.56         3.39         3.26         3.15         3.06         2.93         2.78         2.63         2.55         2.47         2.38         2.29         2.20           4.57         4.07         3.75         3.56         3.32         3.12         3.03         2.90         2.75         2.69         2.52         2.44         2.35         2.20         2.17           4.54         4.07         3.75         3.52         3.34         3.20         3.09         3.00         2.87         2.75         2.49         2.41         2.35         2.21         2.17           4.51         4.02         3.70         3.47         3.30         2.89         2.80         2.84         2.70         2.55         2.47         2.39         2.21         2.11 <td></td> <td>5.53</td> <td>4.64</td> <td>4.14</td> <td>3.82</td> <td>3.59</td> <td>3.42</td> <td>3.29</td> <td>3.18</td> <td>3.09</td> <td>2.96</td> <td>2.81</td> <td>2.66</td> <td>2.58</td> <td>2.50</td> <td>2.42</td> <td>2.33</td> <td>2.23</td> <td>2.13</td>		5.53	4.64	4.14	3.82	3.59	3.42	3.29	3.18	3.09	2.96	2.81	2.66	2.58	2.50	2.42	2.33	2.23	2.13
4.57         4.07         3.75         3.53         3.23         3.12         3.03         2.90         2.75         2.60         2.52         2.44         2.35         2.26         2.17           4.54         4.04         3.73         3.50         3.33         3.20         3.09         3.00         2.87         2.73         2.57         2.49         2.41         2.33         2.23         2.14           4.51         4.02         3.70         3.47         3.07         2.98         2.84         2.70         2.55         2.47         2.39         2.21         2.11         2.11         2.11         2.11         2.11         2.11         2.11         2.02         2.11         2.02         2.11         2.02         2.11         2.02         2.11         2.02         1.95         1.95         1.95         1.88         1.79         1.84         1.73           4.13         3.65         3.34         3.17         2.95         2.82         2.77         2.63         2.15         2.03         1.94         1.84         1.73           3.95         3.48         3.17         2.96         2.56         2.47         2.34         2.18         2.03         1.95		5.49	4.60	4.11	3.78	3.56	3.39	3.26	3.15	3.06	2.93	2.78	2.63	2.55	2.47	2.38	2.29	2.20	2.10
4.54 4.04 3.73 3.50 3.33 3.20 3.09 3.00 2.87 2.73 2.57 2.49 2.41 2.33 2.23 2.14 2 2.41 4.02 3.70 3.47 3.30 3.17 3.07 2.98 2.84 2.70 2.55 2.47 2.39 2.30 2.21 2.11 2.11 2.11 2.11 2.11 2.11 2.1		5.45	4.57	4.07	3.75	3.53	3.36	3.23	3.12	3.03	2.90	2.75	2.60	2.52	2.44	2.35	2.26	2.17	2.06
4.51     4.02     3.70     3.47     3.30     3.17     3.07     2.98     2.84     2.70     2.55     2.47     2.39     2.30     2.21     2.11     2       4.31     3.83     3.51     3.29     3.12     2.99     2.89     2.80     2.66     2.52     2.37     2.29     2.20     2.11     2.02     1.13     1.92     1       4.13     3.65     3.34     3.12     2.95     2.82     2.72     2.63     2.35     2.20     2.12     2.03     1.94     1.84     1.73     1       3.95     3.48     3.17     2.96     2.79     2.66     2.56     2.47     2.34     2.19     2.03     1.95     1.86     1.76     1.66     1.53     1       3.78     3.32     3.02     2.80     2.64     2.51     2.18     2.04     1.88     1.79     1.70     1.59     1.47     1.32     1		5.45	4.54	4.04	3.73	3.50	3.33	3.20	3.09	3.00	2.87	2.73	2.57	2.49	2.41	2.33	2.23	2.14	2.03
4.31     3.83     3.51     3.29     3.12     2.89     2.80     2.66     2.52     2.37     2.29     2.20     2.11     2.02     1.92     1       4.13     3.65     3.34     3.12     2.95     2.82     2.72     2.63     2.50     2.35     2.20     2.12     2.03     1.94     1.84     1.73     1       3.95     3.48     3.17     2.96     2.79     2.66     2.56     2.47     2.34     2.19     2.03     1.95     1.86     1.76     1.66     1.53     1       3.78     3.32     3.02     2.80     2.64     2.51     2.41     2.32     2.18     2.04     1.88     1.79     1.70     1.59     1.47     1.32     1		5.39	4.51	4.02	3.70	3.47	3.30	3.17	3.07	2.98	2.84	2.70	2.55	2.47	2.39	2.30	2.21	2.11	2.01
4.13 3.65 3.34 3.12 2.95 2.82 2.72 2.63 2.50 2.35 2.20 2.12 2.03 1.94 1.84 1.73 1 3.95 3.48 3.17 2.96 2.79 2.66 2.56 2.47 2.34 2.19 2.03 1.95 1.86 1.76 1.66 1.53 1 3.78 3.32 3.02 2.80 2.64 2.51 2.41 2.32 2.18 2.04 1.88 1.79 1.70 1.59 1.47 1.32 1		5.18	4.31	3.83	3.51	3.29	3.12	2.99	2.89	2.80	5.66	2.52	2.37	2.29	2.20	2.11	2.02	1.92	1.80
3.95 3.48 3.17 2.96 2.79 2.66 2.56 2.47 2.34 2.19 2.03 1.95 1.86 1.76 1.66 1.53 1 3.78 3.32 3.02 2.80 2.64 2.51 2.41 2.32 2.18 2.04 1.88 1.79 1.70 1.59 1.47 1.32 1		4.98	4.13	3.65	3.34	3.12	2.95	2.82	2.72	2.63	2.50	2.35	2.20	2.12	2.03	1.94	1.84	1.73	1.60
3.78 3.32 3.02 2.80 2.64 2.51 2.41 2.32 2.18 2.04 1.88 1.79 1.70 1.59 1.47 1.32 1		4.79	3.95	3.48	3.17	2.96	2.79	5.66	2.56	2.47	2.34	2.19	2.03	1.95	1.86	1.76	1.66	1.53	1.38
		4.61	3.78	3.32	3.02	2.80	2.64	2.51	2.41	2.32	2.18	2.04	1.88	1.79	1.70	1.59	1.47	1.32	1.00

Source: M. Merrington and C. M. Thompson, "Tables of Percentage Points of the Inverted Beta (F)-Distribution," Biometrika 33 (1943), pp. 73–88. Reproduced by permission of the Biometrika Trustees.

TABLE A.17 A Chi-Square Table: Values of  $\chi^2_{lpha}$ 

	$\chi^2_{.005}$	VV078 7	10.5966	12.8381	14.8602	16.7496	18.5476	20.2777	21.9550	23.5893	25.1882	26.7569	28.2995	29.8194	31.3193	32.8013	34.2672	35.7185	37.1564	38.5822	39.9968	41.4010	42.7956	44.1813	45.5585	46.9278	49 6449	50.9933	52.3356	53.6720	66.7659	79.4900	91.9517	104.215	116.321	128.299	140.169
	$\chi^2_{.01}$	6 63490	9.21034	11.3449	13.2767	15.0863	16.8119	18.4753	20.0902	21.6660	23.2093	24.7250	26.2170	27.6883	29.1413	30.5779	31.9999	33.4087	34.8053	36.1908	37.5662	38.9321	40.2894	41.6384	42.9798	44.3141	46 9630	48.2782	49.5879	50.8922	63.6907	76.1539	88.3794	100.425	112.329	124.116	135.807
	$\chi^{2}_{.025}$	5 02389	7.37776	9.34840	11.1433	12.8325	14.4494	16.0128	17.5346	19.0228	20.4831	21.9200	23.3367	24.7356	26.1190	27.4884	28.8454	30.1910	31.5264	32.8523	34.1696	35.4789	36.7807	38.0757	39.3641	40.6465	43 1944	44.4607	45.7222	46.9792	59.3417	71.4202	83.2976	95.0231	106.629	118.136	129.561
	$\chi^2_{.05}$	3 8/1/16	5.99147	7.81473	9.48773	11.0705	12.5916	14.0671	15.5073	16.9190	18.3070	19.6751	21.0261	22.3621	23.6848	24.9958	26.2962	27.5871	28.8693	30.1435	31.4104	32.6705	33.9244	35.1725	36.4151	38.8857	40 1133	41.3372	42.5569	43.7729	55.7585	67.5048	79.0819	90.5312	101.879	113.145	124.342
	$\chi^2_{.10}$	2 70554	4.60517	6.25139	7.77944	9.23635	10.6446	12.0170	13.3616	14.6837	15.9871	17.2750	18.5494	19.8119	21.0642	22.3072	23.5418	24.7690	25.9894	27.2036	28.4120	29.6151	30.8133	32.0069	33.1963	34.3810	36 7412	37.9159	39.0875	40.2560	51.8050	63.1671	74.3970	85.5271	96.5782	107.565	118.498
χ χ χ χ χ χ χ χ χ χ χ χ χ χ χ χ χ χ χ	$\chi^2_{.90}$	0157908	.210720	.584375	.063623	1.61031	2.20413	2.83311	3.48954	4.16816	4.86518	5.57779	6.30380	7.04150	7.78953	8.54675	9.31223	10.0852	10.8649	11.6509	12.4426	13.2396	14.0415	14.8479	15.658/	17 2019	18 1138	18.9392	19.7677	20.5992	29.0505	37.6886	46.4589	55.3290	64.2778	73.2912	82.3581
	$\chi^2_{.95}$	0039371	.102587	.341846	.710721	1.145476	1.63539	2.16735	2.73264	3.32511	3.94030	4.57481	5.22603	5.89186	6.57063	7.26094	7.96164	8.67176	9.39046	10.1170	10.8508	11.5913	12.3380	13.0905	13.8484	15 3701	16 1513	16,9279	17.7083	18.4926	26.5093	34.7642	43.1879	51.7393	60.3915	69.1260	77.9295
	$\chi^2_{.975}$	0009821	.0506356	.215795	.484419	.831211	1.237347	1.68987	2.17973	2.70039	3.24697	3.81575	4.40379	5.00874	5.62872	6.26214	99206.9	7.56418	8.23075	8.90655	9.59083	10.28293	10.9823	11.6885	12.4011	13.119/	14 5733	15.3079	16.0471	16.7908	24.4331	32.3574	40.4817	48.7576	57.1532	65.6466	74.2219
	$\chi^2_{.99}$	0001571	0201007	.114832	.297110	.554300	.872085	1.239043	1.646482	2.087912	2.55821	3.05347	3.57056	4.10691	4.66043	5.22935	5.81221	6.40776	7.01491	7.63273	8.26040	8.89720	9.54249	10.19567	10.8564	12 1081	12 8786	13.5648	14.2565	14.9535	22.1643	29.7067	37.4848	45.4418	53.5400	61.7541	70.0648
	$\chi^2_{.995}$	0000383	.0100251	.0717212	.206990	.411740	.675727	.989265	1.344419	1.734926	2.15585	2.60321	3.07382	3.56503	4.07468	4.60094	5.14224	5.69724	6.26481	6.84398	7.43386	8.03366	8.64272	9.26042	9.88623	11 1603	11 8076	12.4613	13.1211	13.7867	20.7065	27.9907	35.5346	43.2752	51.1720	59.1963	67.3276
	df	-	- 2	ım	4	Ŋ	9	7	œ	6	10	7	12	13	14	15	16	17	18	19	20	21	22	23	47	52	27	78	29	30	40	20	09	70	80	06	100

Source: C. M. Thompson, "Tables of the Percentage Points of the  $\chi^2$  Distribution," Biometrika 32 (1941), pp. 188–89. Reproduced by permission of the Biometrika Trustees.