## APPENDIX A

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765

Random Numbers  12651 61646 11769 75109 86996 97669 25757 32535	07122	
12651 61646 11769 75109 86996 97669 25757 32535	07122	
12031 01010 11707 73107 00770 77007 23737 32333		76763
81769 74436 02630 72310 45049 18029 07469 42341	98173	79260
36737         98863         77240         76251         00654         64688         09343         70278	67331	98729
82861 54371 76610 94934 72748 44124 05610 53750	95938	01485
21325     15732     24127     37431     09723     63529     73977     95218	96074	42138
74146         47887         62463         23045         41490         07954         22597         60012	98866	90959
90759 64410 54179 66075 61051 75385 51378 08360	95946	95547
55683         98078         02238         91540         21219         17720         87817         41705	95785	12563
79686         17969         76061         83748         55920         83612         41540         86492	06447	60568
70333 00201 86201 69716 78185 62154 77930 67663	29529	75116
14042 53536 07779 04157 41172 36473 42123 43929	50533	33437
59911 08256 06596 48416 69770 68797 56080 14223	59199	30162
62368 62623 62742 14891 39247 52242 98832 69533	91174	57979
57529         97751         54976         48957         74599         08759         78494         52785	68526	64618
15469 90574 78033 66885 13936 42117 71831 22961	94225	31816
18625     23674     53850     32827     81647     80820     00420     63555	74489	80141
74626         68394         88562         70745         23701         45630         65891         58220	35442	60414
11119 16519 27384 90199 79210 76965 99546 30323	31664	22845
41101 17336 48951 53674 17880 45260 08575 49321	36191	17095
32123 91576 84221 78902 82010 30847 62329 63898	23268	74283
26091 68409 69704 82267 14751 13151 93115 01437	56945	89661
67680       79790       48462       59278       44185       29616       76531       19589	83139	28454
15184 19260 14073 07026 25264 08388 27182 22557	61501	67481
58010     45039     57181     10238     36874     28546     37444     80824	63981	39942
56425 53996 86245 32623 78858 08143 60377 42925	42815	11159
82630       84066       13592       60642       17904       99718       63432       88642	37858	25431
14927     40909     23900     48761     44860     92467     31742     87142	03607	32059
23740 22505 07489 85986 74420 21744 97711 36648	35620	97949
32990 97446 03711 63824 07953 85965 87089 11687	92414	67257
05310         24058         91946         78437         34365         82469         12430         84754	19354	72745
21839     39937     27534     88913     49055     19218     47712     67677	51889	70926
08833       42549       93981       94051       28382       83725       72643       64233	97252	17133
58336     11139     47479     00931     91560     95372     97642     33856	54825	55680
62032 91144 75478 47431 52726 30289 42411 91886	51818	78292
45171     30557     53116     04118     58301     24375     65609     85810	18620	49198
91611 62656 60128 35609 63698 78356 50682 22505	01692	36291
55472 63819 86314 49174 93582 73604 78614 78849	23096	72825
18573         09729         74091         53994         10970         86557         65661         41854	26037	53296
60866         02955         90288         82136         83644         94455         06560         78029	98768	71296
45043 55608 82767 60890 74646 79485 13619 98868	40857	19415
17831         09737         79473         75945         28394         79334         70577         38048	03607	06932
40137 03981 07585 18128 11178 32601 27994 05641	22600	86064
77776 31343 14576 97706 16039 47517 43300 59080	80392	63189
69605         44104         40103         95635         05635         81673         68657         09559	23510	95875
19916     52934     26499     09821     97331     80993     61299     36979	73599	35055
02606 58552 07678 56619 65325 30705 99582 53390	46357	13244
65183 73160 87131 35530 47946 09854 18080 02321	05809	04893
10740 98914 44916 11322 89717 88189 30143 52687	19420	60061
98642     89822     71691     51573     83666     61642     46683     33761	47542	23551
60139         25601         93663         25547         02654         94829         48672         28736	84994	13071

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TABLE A.2
Binomial Probability
Distribution

				n	= 1				
				Prob	ability				
x	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	.900	.800	.700	.600	.500	.400	.300	.200	.100
1	.100	.200	.300	.400	.500	.600	.700	.800	.900
				n	= 2				
					ability				
x	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	.810	.640	.490	.360	.250	.160	.090	.040	.010
1	.180	.320	.420	.480	.500	.480	.420	.320	.180
2	.010	.040	.090	.160	.250	.360	.490	.640	.810
				n	= 3				
				Prob	ability				
x	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	.729	.512	.343	.216	.125	.064	.027	.008	.001
1	.243	.384	.441	.432	.375	.288	.189	.096	.027
2	.027	.096	.189	.288	.375	.432	.441	.384	.243
3	.001	.008	.027	.064	.125	.216	.343	.512	.729
				п	= 4				
				Prob	ability				
x	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	.656	.410	.240	.130	.063	.026	.008	.002	.000
1	.292	.410	.412	.346	.250	.154	.076	.026	.004
2	.049	.154	.265	.346	.375	.346	.265	.154	.049
3	.004	.026	.076	.154	.250	.346	.412	.410	.292
4	.000	.002	.008	.026	.063	.130	.240	.410	.656
				n	= 5				
					ability				
x	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	.590	.328	.168	.078	.031	.010	.002	.000	.000
1	.328	.410	.360	.259	.156	.077	.028	.006	.000
2	.073	.205	.309	.346	.313	.230	.132	.051	.008
3	.008	.051	.132	.230	.313	.346	.309	.205	.073
4	.000	.006	.028	.077	.156	.259	.360	.410	.328
5	.000	.000	.002	.010	.031	.078	.168	.328	.590
				n	= 6				
				Prob	ability				
x	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	.531	.262	.118	.047	.016	.004	.001	.000	.000
1	.354	.393	.303	.187	.094	.037	.010	.002	.000
2	.098	.246	.324	.311	.234	.138	.060	.015	.001
3	.015	.082	.185	.276	.313	.276	.185	.082	.015
4	.001	.015	.060	.138	.234	.311	.324	.246	.098
5	.000	.002	.010	.037	.094	.187	.303	.393	.354
6	.000	.000	.001	.004	.016	.047	.118	.262	.531

TABLE A.2

Binomial Probability Distribution (*Continued*)

				n	= 7				
				Prob	ability				
x	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	.478	.210	.082	.028	.008	.002	.000	.000	.000
1	.372	.367	.247	.131	.055	.017	.004	.000	.000
2	.124	.275	.318	.261	.164	.077	.025	.004	.000
3	.023	.115	.227	.290	.273	.194	.097	.029	.003
4	.003	.029	.097	.194	.273	.290	.227	.115	.023
5	.000	.004	.025	.077	.164	.261	.318	.275	.124
6	.000	.000	.004	.017	.055	.131	.247	.367	.372
7	.000	.000	.000	.002	.008	.028	.082	.210	.478
				n	= 8				
				Prob	ability				
x	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	.430	.168	.058	.017	.004	.001	.000	.000	.000
1	.383	.336	.198	.090	.031	.008	.001	.000	.000
2	.149	.294	.296	.209	.109	.041	.010	.001	.000
3	.033	.147	.254	.279	.219	.124	.047	.009	.000
4	.005	.046	.136	.232	.273	.232	.136	.046	.005
5	.000	.009	.047	.124	.219	.279	.254	.147	.033
6	.000	.001	.010	.041	.109	.209	.296	.294	.149
7	.000	.000	.001	.008	.031	.090	.198	.336	.383
8	.000	.000	.000	.001	.004	.017	.058	.168	.430
				n	= 9				
				Prob	ability				
x	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	.387	.134	.040	.010	.002	.000	.000	.000	.000
1	.387	.302	.156	.060	.018	.004	.000	.000	.000
2	.172	.302	.267	.161	.070	.021	.004	.000	.000
3	.045	.176	.267	.251	.164	.074	.021	.003	.000
4	.007	.066	.172	.251	.246	.167	.074	.017	.001
5	.001	.017	.074	.167	.246	.251	.172	.066	.007
6	.000	.003	.021	.074	.164	.251	.267	.176	.045
7	.000	.000	.004	.021	.070	.161	.267	.302	.172
8	.000	.000	.000	.004	.018	.060	.156	.302	.387
9	.000	.000	.000	.000	.002	.010	.040	.134	.387
				n	= 10				
				Prob	ability				
x	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	.349	.107	.028	.006	.001	.000	.000	.000	.000
1	.387	.268	.121	.040	.010	.002	.000	.000	.000
2	.194	.302	.233	.121	.044	.011	.001	.000	.000
3	.057	.201	.267	.215	.117	.042	.009	.001	.000
4	.011	.088	.200	.251	.205	.111	.037	.006	.000
5 6	.001	.026	.103	.201	.246	.201	.103	.026	.001
7	.000	.006 .001	.037 .009	.111 .042	.205 .117	.251 .215	.200 .267	.088 .201	.011 .057
8	.000	.000	.009	.042	.044	.121	.233	.302	.194
9	.000	.000	.000	.002	.010	.040	.121	.268	.387
10	.000	.000	.000	.002	.001	.006	.028	.107	.349
10	.000	.000	.000	.000	.001	.000	.020	.107	.547

TABLE A.2

Binomial Probability

Distribution (Continued)

				<i>n</i> .	- 11				
				Prob	ability				
x	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	.314	.086	.020	.004	.000	.000	.000	.000	.000
1	.384	.236	.093	.027	.005	.001	.000	.000	.000
2	.213	.295	.200	.089	.027	.005	.001	.000	.000
3	.071	.221	.257	.177	.081	.023	.004	.000	.000
4	.016	.111	.220	.236	.161	.070	.017	.002	.000
5	.002	.039	.132	.221	.226	.147	.057	.010	.000
6	.000	.010	.057	.147	.226	.221	.132	.039	.002
7	.000	.002	.017	.070	.161	.236	.220	.111	.016
8	.000	.000	.004	.023	.081	.177	.257	.221	.071
9	.000	.000	.004	.005	.027	.089	.200	.295	.213
10	.000	.000	.000	.003	.005	.027	.093	.236	.384
10				.000					
11	.000	.000	.000	.000	.000	.004	.020	.086	.314
				n:	= 12				
				Prob	ability				
x	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	.282	.069	.014	.002	.000	.000	.000	.000	.000
1	.377	.206	.071	.017	.003	.000	.000	.000	.000
2	.230	.283	.168	.064	.016	.002	.000	.000	.000
3	.085	.236	.240	.142	.054	.012	.001	.000	.000
4	.021	.133	.231	.213	.121	.042	.008	.001	.000
5	.004	.053	.158	.227	.193	.101	.029	.003	.000
6	.000	.016	.079	.177	.226	.177	.079	.016	.000
7	.000	.003	.029	.101	.193	.227	.158	.053	.004
8	.000	.001	.008	.042	.121	.213	.231	.133	.021
9	.000	.000	.001	.012	.054	.142	.240	.236	.085
10	.000	.000	.000	.002	.016	.064	.168	.283	.230
11	.000	.000	.000	.000	.003	.017	.071	.206	.377
12	.000	.000	.000	.000	.000	.002	.014	.069	.282
				n:	= 13				
					ability				
x	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	.254	.055	.010	.001	.000	.000	.000	.000	.000
1	.367	.179	.054	.011	.002	.000	.000	.000	.000
2	.245	.268	.139	.045	.010	.001	.000	.000	.000
3	.100	.246	.218	.111	.035	.006	.001	.000	.000
4	.028	.154	.234	.184	.087	.024	.003	.000	.000
5	.006	.069	.180	.221	.157	.066	.014	.001	.000
6	.001	.023	.103	.197	.209	.131	.044	.006	.000
7	.000	.006	.044	.131	.209	.197	.103	.023	.001
8	.000	.001	.014	.066	.157	.221	.180	.069	.006
9	.000	.000	.003	.024	.087	.184	.234	.154	.028
10	.000	.000	.001	.006	.035	.111	.218	.246	.100
11	.000	.000	.000	.001	.010	.045	.139	.268	.245
12	.000	.000	.000	.000	.002	.011	.054	.179	.367
13	.000	.000	.000	.000	.000	.001	.010	.055	.254
									7
								((	Continued)

n = 11

TABLE A.2

Binomial Probability
Distribution (Continued)

				n	= 14				
				Prob	ability				
x	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	.229	.044	.007	.001	.000	.000	.000	.000	.000
1	.356	.154	.041	.007	.001	.000	.000	.000	.000
2	.257	.250	.113	.032	.006	.001	.000	.000	.000
3	.114	.250	.194	.085	.022	.003	.000	.000	.000
4	.035	.172	.229	.155	.061	.014	.001	.000	.000
5	.008	.086	.196	.207	.122	.041	.007	.000	.000
6	.001	.032	.126	.207	.183	.092	.023	.002	.000
7	.000	.009	.062	.157	.209	.157	.062	.009	.000
8	.000	.002	.023	.092	.183	.207	.126	.032	.001
9	.000	.000	.007	.041	.122	.207	.196	.086	.008
10	.000	.000	.001	.014	.061	.155	.229	.172	.035
11	.000	.000	.000	.003	.022	.085	.194	.250	.114
12	.000	.000	.000	.001	.006	.032	.113	.250	.257
13	.000	.000	.000	.000	.001	.007	.041	.154	.356
14	.000	.000	.000	.000	.000	.001	.007	.044	.229
				44.	= 15				
x	.1	.2	.3	.4	ability .5	.6	.7	.8	.9
-									
0	.206	.035	.005	.000	.000	.000	.000	.000	.000
1	.343	.132	.031	.005	.000	.000	.000	.000	.000
2	.267	.231	.092	.022	.003	.000	.000	.000	.000
3	.129	.250	.170	.063	.014	.002	.000	.000	.000
4	.043	.188	.219	.127	.042	.007	.001	.000	.000
5	.010	.103	.206	.186	.092	.024	.003	.000	.000
6	.002	.043	.147	.207	.153	.061	.012	.001	.000
7	.000	.014	.081	.177	.196	.118	.035	.003	.000
8	.000	.003	.035	.118	.196	.177	.081	.014	.000
9	.000	.001	.012	.061	.153	.207	.147	.043	.002
10	.000	.000	.003	.024	.092	.186	.206	.103	.010
11	.000	.000	.001	.007	.042	.127	.219	.188	.043
12	.000	.000	.000	.002	.014	.063	.170	.250	.129
13	.000	.000	.000	.000	.003	.022	.092	.231	.267
14 15	.000	.000	.000	.000	.000	.005	.031	.132 .035	.343 .206
15	.000	.000	.000	.000	.000	.000	.005	.033	.206

TABLE A.2

Binomial Probability

Distribution (Continued)

				n:	= 16				
				Prob	ability				
x	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	.185	.028	.003	.000	.000	.000	.000	.000	.000
1	.329	.113	.023	.003	.000	.000	.000	.000	.000
2	.275	.211	.073	.015	.002	.000	.000	.000	.000
3	.142	.246	.146	.047	.009	.001	.000	.000	.000
4	.051	.200	.204	.101	.028	.004	.000	.000	.000
5	.014	.120	.210	.162	.067	.014	.001	.000	.000
6	.003	.055	.165	.198	.122	.039	.006	.000	.000
7	.000	.020	.101	.189	.175	.084	.019	.001	.000
8	.000	.006	.049	.142	.196	.142	.049	.006	.000
9	.000	.001	.019	.084	.175	.189	.101	.020	.000
10	.000	.000	.006	.039	.122	.198	.165	.055	.003
11	.000	.000	.001	.014	.067	.162	.210	.120	.014
12	.000	.000	.000	.004	.028	.101	.204	.200	.051
13	.000	.000	.000	.001	.009	.047	.146	.246	.142
14	.000	.000	.000	.000	.002	.015	.073	.211	.275
15	.000	.000	.000	.000	.000	.003	.023	.113	.329
16	.000	.000	.000	.000	.000	.000	.003	.028	.185
				n :	= 17				
					ability				
x	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	.167	.023	.002	.000	.000	.000	.000	.000	.000
1	.315	.096	.017	.002	.000	.000	.000	.000	.000
2	.280	.191	.058	.010	.001	.000	.000	.000	.000
3	.156	.239	.125	.034	.005	.000	.000	.000	.000
4	.060	.209	.187	.080	.018	.002	.000	.000	.000
5	.017	.136	.208	.138	.047	.008	.001	.000	.000
6	.004	.068	.178	.184	.094	.024	.003	.000	.000
7	.001	.027	.120	.193	.148	.057	.009	.000	.000
8	.000	.008	.064	.161	.185	.107	.028	.002	.000
9	.000	.002	.028	.107	.185	.161	.064	.008	.000
10	.000	.000	.009	.057	.148	.193	.120	.027	.001
11	.000	.000	.003	.024	.094	.184	.178	.068	.004
12	.000	.000	.001	.008	.047	.138	.208	.136	.017
13	.000	.000	.000	.002	.018	.080	.187	.209	.060
14	.000	.000	.000	.000	.005	.034	.125	.239	.156
15	.000	.000	.000	.000	.001	.010	.058	.191	.280
16	.000	.000	.000	.000	.000	.002	.017	.096	.315
17	.000	.000	.000	.000	.000	.000	.002	.023	.167
								1/	Continued)

TABLE A.2

Binomial Probability
Distribution (Continued)

				n:	= 18				
				Prob	ability				
x	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	.150	.018	.002	.000	.000	.000	.000	.000	.000
1	.300	.081	.013	.001	.000	.000	.000	.000	.000
2	.284	.172	.046	.007	.001	.000	.000	.000	.000
3	.168	.230	.105	.025	.003	.000	.000	.000	.000
4	.070	.215	.168	.061	.012	.001	.000	.000	.000
5	.022	.151	.202	.115	.033	.004	.000	.000	.000
6	.005	.082	.187	.166	.071	.015	.001	.000	.000
7	.001	.035	.138	.189	.121	.037	.005	.000	.000
8	.000	.012	.081	.173	.167	.077	.015	.001	.000
9	.000	.003	.039	.128	.185	.128	.039	.003	.000
10	.000	.001	.015	.077	.167	.173	.081	.012	.000
11	.000	.000	.005	.037	.121	.189	.138	.035	.001
12	.000	.000	.001	.015	.071	.166	.187	.082	.005
13	.000	.000	.000	.004	.033	.115	.202	.151	.022
14	.000	.000	.000	.001	.012	.061	.168	.215	.070
15	.000	.000	.000	.000	.003	.025	.105	.230	.168
16	.000	.000	.000	.000	.001	.007	.046	.172	.284
17 18	.000	.000	.000	.000	.000	.001	.013 .002	.081 .018	.300 .150
10	.000	.000	.000	.000	.000	.000	.002	.010	.130
				n :	<b>= 1</b> 9				
				Prob	ability				
x	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	.135	.014	.001	.000	.000	.000	.000	.000	.000
1	.285	.068	.009	.001	.000	.000	.000	.000	.000
2	.285	.154	.036	.005	.000	.000	.000	.000	.000
3	.180	.218	.087	.017	.002	.000	.000	.000	.000
4	.080	.218	.149	.047	.007	.001	.000	.000	.000
5	.027	.164	.192	.093	.022	.002	.000	.000	.000
6	.007	.095	.192	.145	.052	.008	.001	.000	.000
7	.001	.044	.153	.180	.096	.024	.002	.000	.000
8	.000	.017	.098	.180	.144	.053	.008	.000	.000
9	.000	.005	.051	.146	.176	.098	.022	.001	.000
10	.000	.001	.022 .008	.098	.176	.146	.051 .098	.005 .017	.000
11 12	.000	.000	.002	.053 .024	.144 .096	.180 .180	.153	.017	.000
13	.000	.000	.002	.008	.052	.145	.192	.095	.007
14	.000	.000	.000	.003	.032	.093	.192	.164	.027
15	.000	.000	.000	.002	.022	.047	.149	.218	.080
16	.000	.000	.000	.000	.002	.017	.087	.218	.180
17	.000	.000	.000	.000	.000	.005	.036	.154	.285
18	.000	.000	.000	.000	.000	.001	.009	.068	.285
19	.000	.000	.000	.000	.000	.000	.001	.014	.135

TABLE A.2

Binomial Probability

Distribution (Continued)

				n :	= 20				
				Prob	ability				
x	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	.122	.012	.001	.000	.000	.000	.000	.000	.000
1	.270	.058	.007	.000	.000	.000	.000	.000	.000
2	.285	.137	.028	.003	.000	.000	.000	.000	.000
3	.190	.205	.072	.012	.001	.000	.000	.000	.000
4	.090	.218	.130	.035	.005	.000	.000	.000	.000
5	.032	.175	.179	.075	.015	.001	.000	.000	.000
6	.009	.109	.192	.124	.037	.005	.000	.000	.000
7	.002	.055	.164	.166	.074	.015	.001	.000	.000
8	.000	.022	.114	.180	.120	.035	.004	.000	.000
9	.000	.007	.065	.160	.160	.071	.012	.000	.000
10	.000	.002	.031	.117	.176	.117	.031	.002	.000
11	.000	.000	.012	.071	.160	.160	.065	.007	.000
12	.000	.000	.004	.035	.120	.180	.114	.022	.000
13	.000	.000	.001	.015	.074	.166	.164	.055	.002
14	.000	.000	.000	.005	.037	.124	.192	.109	.009
15	.000	.000	.000	.001	.015	.075	.179	.175	.032
16	.000	.000	.000	.000	.005	.035	.130	.218	.090
17	.000	.000	.000	.000	.001	.012	.072	.205	.190
18	.000	.000	.000	.000	.000	.003	.028	.137	.285
19	.000	.000	.000	.000	.000	.000	.007	.058	.270
20	.000	.000	.000	.000	.000	.000	.001	.012	.122
					= 25				
				Prob	ability				
		_	•		_		_	_	_
x	.1	.2	.3	.4	.5	.6	.7	.8	.9
<b>x</b> 0	.072	.004	.000	.000	.000	.000	.000	.000	.000
0	.072 .199 .266	.004 .024 .071	.000 .001 .007	.000 .000	.000 .000	.000	.000 .000	.000 .000	.000 .000
0	.072 .199 .266 .226	.004 .024 .071 .136	.000 .001 .007 .024	.000 .000 .000 .002	.000 .000 .000	.000	.000	.000 .000 .000	.000 .000 .000
0 1 2 3 4	.072 .199 .266 .226 .138	.004 .024 .071 .136 .187	.000 .001 .007 .024 .057	.000 .000 .000 .002 .007	.000 .000	.000 .000 .000 .000	.000 .000 .000 .000	.000 .000 .000 .000	.000 .000 .000 .000
0 1 2 3	.072 .199 .266 .226 .138 .065	.004 .024 .071 .136	.000 .001 .007 .024	.000 .000 .000 .002 .007	.000 .000 .000	.000 .000 .000	.000 .000 .000 .000 .000	.000 .000 .000 .000 .000	.000 .000 .000 .000
0 1 2 3 4	.072 .199 .266 .226 .138	.004 .024 .071 .136 .187	.000 .001 .007 .024 .057	.000 .000 .000 .002 .007	.000 .000 .000 .000	.000 .000 .000 .000	.000 .000 .000 .000	.000 .000 .000 .000	.000 .000 .000 .000
0 1 2 3 4 5 6 7	.072 .199 .266 .226 .138 .065 .024	.004 .024 .071 .136 .187 .196 .163	.000 .001 .007 .024 .057 .103 .147	.000 .000 .000 .002 .007 .020 .044	.000 .000 .000 .000 .000 .002 .005	.000 .000 .000 .000 .000 .000 .000	.000 .000 .000 .000 .000 .000	.000 .000 .000 .000 .000 .000	.000 .000 .000 .000 .000 .000
0 1 2 3 4 5 6 7 8	.072 .199 .266 .226 .138 .065 .024 .007	.004 .024 .071 .136 .187 .196 .163 .111	.000 .001 .007 .024 .057 .103 .147 .171	.000 .000 .000 .002 .007 .020 .044 .080	.000 .000 .000 .000 .000 .002 .005 .014	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000	.000 .000 .000 .000 .000 .000 .000	.000 .000 .000 .000 .000 .000
0 1 2 3 4 5 6 7 8	.072 .199 .266 .226 .138 .065 .024 .007 .002	.004 .024 .071 .136 .187 .196 .163 .111 .062	.000 .001 .007 .024 .057 .103 .147 .171 .165	.000 .000 .000 .002 .007 .020 .044 .080 .120	.000 .000 .000 .000 .000 .002 .005 .014 .032	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000	.000 .000 .000 .000 .000 .000 .000	.000 .000 .000 .000 .000 .000 .000 .00
0 1 2 3 4 5 6 7 8 9	.072 .199 .266 .226 .138 .065 .024 .007 .002	.004 .024 .071 .136 .187 .196 .163 .111 .062 .029	.000 .001 .007 .024 .057 .103 .147 .171 .165 .134	.000 .000 .000 .002 .007 .020 .044 .080 .120	.000 .000 .000 .000 .000 .002 .005 .014 .032 .061	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00
0 1 2 3 4 5 6 7 8 9 10	.072 .199 .266 .226 .138 .065 .024 .007 .002 .000	.004 .024 .071 .136 .187 .196 .163 .111 .062 .029 .012	.000 .001 .007 .024 .057 .103 .147 .171 .165 .134 .092	.000 .000 .000 .002 .007 .020 .044 .080 .120 .151 .161	.000 .000 .000 .000 .000 .002 .005 .014 .032 .061 .097	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00
0 1 2 3 4 5 6 7 8 9 10 11	.072 .199 .266 .226 .138 .065 .024 .007 .002 .000 .000	.004 .024 .071 .136 .187 .196 .163 .111 .062 .029 .012 .004	.000 .001 .007 .024 .057 .103 .147 .171 .165 .134 .092 .054	.000 .000 .000 .002 .007 .020 .044 .080 .120 .151 .161	.000 .000 .000 .000 .000 .002 .005 .014 .032 .061 .097 .133	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00
0 1 2 3 4 5 6 7 8 9 10 11 12 13	.072 .199 .266 .226 .138 .065 .024 .007 .002 .000 .000	.004 .024 .071 .136 .187 .196 .163 .111 .062 .029 .012 .004	.000 .001 .007 .024 .057 .103 .147 .171 .165 .134 .092 .054	.000 .000 .000 .002 .007 .020 .044 .080 .120 .151 .161 .147 .114	.000 .000 .000 .000 .000 .002 .005 .014 .032 .061 .097 .133 .155	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00
0 1 2 3 4 5 6 7 8 9 10 11 12 13	.072 .199 .266 .226 .138 .065 .024 .007 .002 .000 .000 .000	.004 .024 .071 .136 .187 .196 .163 .111 .062 .029 .012 .004 .001	.000 .001 .007 .024 .057 .103 .147 .171 .165 .134 .092 .054 .027	.000 .000 .000 .002 .007 .020 .044 .080 .120 .151 .161 .147 .114	.000 .000 .000 .000 .000 .000 .002 .005 .014 .032 .061 .097 .133 .155 .155	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	.072 .199 .266 .226 .138 .065 .024 .007 .002 .000 .000 .000	.004 .024 .071 .136 .187 .196 .163 .111 .062 .029 .012 .004 .001	.000 .001 .007 .024 .057 .103 .147 .171 .165 .134 .092 .054 .027 .011	.000 .000 .000 .002 .007 .020 .044 .080 .120 .151 .161 .147 .114 .076	.000 .000 .000 .000 .000 .002 .005 .014 .032 .061 .097 .133 .155 .155	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	.072 .199 .266 .226 .138 .065 .024 .007 .002 .000 .000 .000 .000	.004 .024 .071 .136 .187 .196 .163 .111 .062 .029 .012 .004 .001 .000	.000 .001 .007 .024 .057 .103 .147 .171 .165 .134 .092 .054 .027 .011 .004	.000 .000 .000 .000 .002 .007 .020 .044 .080 .120 .151 .161 .147 .114 .076 .043 .021 .009	.000 .000 .000 .000 .000 .000 .002 .005 .014 .032 .061 .097 .133 .155 .155 .133 .097 .061	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	.072 .199 .266 .226 .138 .065 .024 .007 .002 .000 .000 .000 .000 .000 .000	.004 .024 .071 .136 .187 .196 .163 .111 .062 .029 .012 .004 .001 .000 .000	.000 .001 .007 .024 .057 .103 .147 .171 .165 .134 .092 .054 .027 .011 .004 .001 .000	.000 .000 .000 .000 .002 .007 .020 .044 .080 .120 .151 .161 .147 .114 .076 .043 .021 .009 .003	.000 .000 .000 .000 .000 .002 .005 .014 .032 .061 .097 .133 .155 .155 .133 .097	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	.072 .199 .266 .226 .138 .065 .024 .007 .002 .000 .000 .000 .000 .000 .000	.004 .024 .071 .136 .187 .196 .163 .111 .062 .029 .012 .004 .001 .000 .000 .000	.000 .001 .007 .024 .057 .103 .147 .171 .165 .134 .092 .054 .027 .011 .004 .001 .000 .000	.000 .000 .000 .000 .002 .007 .020 .044 .080 .120 .151 .161 .147 .114 .076 .043 .021 .009 .003 .001	.000 .000 .000 .000 .000 .000 .002 .005 .014 .032 .061 .097 .133 .155 .155 .133 .097 .061 .032 .014	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	.072 .199 .266 .226 .138 .065 .024 .007 .002 .000 .000 .000 .000 .000 .000	.004 .024 .071 .136 .187 .196 .163 .111 .062 .029 .012 .004 .001 .000 .000 .000 .000	.000 .001 .007 .024 .057 .103 .147 .171 .165 .134 .092 .054 .027 .011 .004 .001 .000 .000	.000 .000 .000 .000 .002 .007 .020 .044 .080 .120 .151 .161 .147 .114 .076 .043 .021 .009 .003 .001 .000	.000 .000 .000 .000 .000 .000 .002 .005 .014 .032 .061 .097 .133 .155 .155 .133 .097 .061 .032 .014 .005	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	.072 .199 .266 .226 .138 .065 .024 .007 .002 .000 .000 .000 .000 .000 .000	.004 .024 .071 .136 .187 .196 .163 .111 .062 .029 .012 .004 .001 .000 .000 .000 .000 .000 .000	.000 .001 .007 .024 .057 .103 .147 .171 .165 .134 .092 .054 .027 .011 .004 .001 .000 .000 .000	.000 .000 .000 .000 .002 .007 .020 .044 .080 .120 .151 .161 .147 .114 .076 .043 .021 .009 .003 .001 .000	.000 .000 .000 .000 .000 .000 .002 .005 .014 .032 .061 .097 .133 .155 .155 .133 .097 .061 .032 .014 .005 .002	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	.072 .199 .266 .226 .138 .065 .024 .007 .002 .000 .000 .000 .000 .000 .000	.004 .024 .071 .136 .187 .196 .163 .111 .062 .029 .012 .004 .001 .000 .000 .000 .000 .000 .000	.000 .001 .007 .024 .057 .103 .147 .171 .165 .134 .092 .054 .027 .011 .004 .001 .000 .000 .000 .000	.000 .000 .000 .000 .002 .007 .020 .044 .080 .120 .151 .161 .147 .114 .076 .043 .021 .009 .003 .001 .000 .000	.000 .000 .000 .000 .000 .000 .002 .005 .014 .032 .061 .097 .133 .155 .155 .133 .097 .061 .032 .014 .005 .002 .000	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	.072 .199 .266 .226 .138 .065 .024 .007 .002 .000 .000 .000 .000 .000 .000	.004 .024 .071 .136 .187 .196 .163 .111 .062 .029 .012 .004 .001 .000 .000 .000 .000 .000 .000	.000 .001 .007 .024 .057 .103 .147 .171 .165 .134 .092 .054 .027 .011 .004 .001 .000 .000 .000 .000	.000 .000 .000 .000 .002 .007 .020 .044 .080 .120 .151 .161 .147 .114 .076 .043 .021 .009 .003 .001 .000 .000 .000	.000 .000 .000 .000 .000 .000 .002 .005 .014 .032 .061 .097 .133 .155 .155 .133 .097 .061 .032 .014 .005 .002 .000	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	.072 .199 .266 .226 .138 .065 .024 .007 .002 .000 .000 .000 .000 .000 .000	.004 .024 .071 .136 .187 .196 .163 .111 .062 .029 .012 .004 .001 .000 .000 .000 .000 .000 .000	.000 .001 .007 .024 .057 .103 .147 .171 .165 .134 .092 .054 .027 .011 .004 .001 .000 .000 .000 .000 .000	.000 .000 .000 .000 .002 .007 .020 .044 .080 .120 .151 .161 .147 .114 .076 .043 .021 .009 .003 .001 .000 .000 .000	.000 .000 .000 .000 .000 .000 .002 .005 .014 .032 .061 .097 .133 .155 .155 .133 .097 .061 .032 .014 .005 .002 .000 .000	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	.072 .199 .266 .226 .138 .065 .024 .007 .002 .000 .000 .000 .000 .000 .000	.004 .024 .071 .136 .187 .196 .163 .111 .062 .029 .012 .004 .001 .000 .000 .000 .000 .000 .000	.000 .001 .007 .024 .057 .103 .147 .171 .165 .134 .092 .054 .027 .011 .004 .001 .000 .000 .000 .000	.000 .000 .000 .000 .002 .007 .020 .044 .080 .120 .151 .161 .147 .114 .076 .043 .021 .009 .003 .001 .000 .000 .000	.000 .000 .000 .000 .000 .000 .002 .005 .014 .032 .061 .097 .133 .155 .155 .133 .097 .061 .032 .014 .005 .002 .000	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00	.000 .000 .000 .000 .000 .000 .000 .00

TABLE A.3
Poisson Probabilities

					λ					
x	.005	.01	.02	.03	.04	.05	.06	.07	.08	.09
0	.9950	.9900	.9802	.9704	.9608	.9512	.9418	.9324	.9231	.9139
1	.0050	.0099	.0196	.0291	.0384	.0476	.0565	.0653	.0738	.0823
2	.0000	.0000	.0002	.0004	.0008	.0012	.0017	.0023	.0030	.0037
3	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0001	.0001
x	.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
7	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001
x	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
9	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0001	.0001	.0002
x	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0
0	.1225	.1108	.1003	.0907	.0821	.0743	.0672	.0608	.0550	.0498
1	.2572	.2438	.2306	.2177	.2052	.1931	.1815	.1703	.1596	.1494
2	.2700	.2681	.2652	.2613	.2565	.2510	.2450	.2384	.2314	.2240
3	.1890	.1966	.2033	.2090	.2138	.2176	.2205	.2225	.2237	.2240
4	.0992	.1082	.1169	.1254	.1336	.1414	.1488	.1557	.1622	.1680
5	.0417	.0476	.0538	.0602	.0668	.0735	.0804	.0872	.0940	.1008
6	.0146	.0174	.0206	.0241	.0278	.0319	.0362	.0407	.0455	.0504
7	.0044	.0055	.0068	.0083	.0099	.0118	.0139	.0163	.0188	.0216
8	.0011	.0015	.0019	.0025	.0031	.0038	.0047	.0057	.0068	.0081
9	.0003	.0004	.0005	.0007	.0009	.0011	.0014	.0018	.0022	.0027
10	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0005	.0006	.0008
11	.0000	.0000	.0000	.0000	.0000	.0001	.0001	.0001	.0002	.0002
12	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001

TABLE A.3
Poisson Probabilities
(Continued)

					λ					
x	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0
0	.0450	.0408	.0369	.0334	.0302	.0273	.0247	.0224	.0202	.0183
1	.1397	.1304	.1217	.1135	.1057	.0984	.0915	.0850	.0789	.0733
2	.2165	.2087	.2008	.1929	.1850	.1771	.1692	.1615	.1539	.1465
3	.2237	.2226	.2209	.2186	.2158	.2125	.2087	.2046	.2001	.1954
4	.1733	.1781	.1823	.1858	.1888	.1912	.1931	.1944	.1951	.1954
5	.1075	.1140	.1203	.1264	.1322	.1377	.1429	.1477	.1522	.1563
6	.0555	.0608	.0662	.0716	.0771	.0826	.0881	.0936	.0989	.1042
7	.0246	.0278	.0312	.0348	.0385	.0425	.0466	.0508	.0551	.0595
8	.0095	.0111	.0129	.0148	.0169	.0191	.0215	.0241	.0269	.0298
9	.0033	.0040	.0047	.0056	.0066	.0076	.0089	.0102	.0116	.0132
10	.0010	.0013	.0016	.0019	.0023	.0028	.0033	.0039	.0045	.0053
11	.0003	.0004	.0005	.0006	.0007	.0009	.0011	.0013	.0016	.0019
12	.0001	.0001	.0001	.0002	.0002	.0003	.0003	.0004	.0005	.0006
13	.0000	.0000	.0000	.0000	.0001	.0001	.0001	.0001	.0002	.0002
14	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001
x	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
0	.0166	.0150	.0136	.0123	.0111	.0101	.0091	.0082	.0074	.0067
0	.0166 .0679	.0150 .0630	.0136 .0583	.0123 .0540	.0111 .0500	.0101 .0462	.0091 .0427	.0082	.0074	.0067
1	.0679	.0630	.0583	.0540	.0500	.0462	.0427	.0395	.0365	.0337
1 2	.0679 .1393	.0630 .1323	.0583 .1254	.0540 .1188	.0500 .1125	.0462 .1063	.0427 .1005	.0395 .0948	.0365 .0894	.0337 .0842
1 2 3	.0679 .1393 .1904	.0630 .1323 .1852	.0583 .1254 .1798	.0540 .1188 .1743	.0500 .1125 .1687	.0462 .1063 .1631	.0427 .1005 .1574	.0395 .0948 .1517	.0365 .0894 .1460	.0337 .0842 .1404
1 2 3 4	.0679 .1393 .1904 .1951	.0630 .1323 .1852 .1944	.0583 .1254 .1798 .1933	.0540 .1188 .1743 .1917	.0500 .1125 .1687 .1898	.0462 .1063 .1631 .1875	.0427 .1005 .1574 .1849	.0395 .0948 .1517 .1820	.0365 .0894 .1460 .1789	.0337 .0842 .1404 .1755
1 2 3 4 5	.0679 .1393 .1904 .1951 .1600	.0630 .1323 .1852 .1944 .1633	.0583 .1254 .1798 .1933 .1662	.0540 .1188 .1743 .1917 .1687	.0500 .1125 .1687 .1898 .1708	.0462 .1063 .1631 .1875 .1725	.0427 .1005 .1574 .1849 .1738	.0395 .0948 .1517 .1820 .1747	.0365 .0894 .1460 .1789 .1753	.0337 .0842 .1404 .1755 .1755
1 2 3 4 5 6	.0679 .1393 .1904 .1951 .1600 .1093	.0630 .1323 .1852 .1944 .1633 .1143	.0583 .1254 .1798 .1933 .1662 .1191	.0540 .1188 .1743 .1917 .1687 .1237	.0500 .1125 .1687 .1898 .1708	.0462 .1063 .1631 .1875 .1725 .1323	.0427 .1005 .1574 .1849 .1738 .1362	.0395 .0948 .1517 .1820 .1747 .1398	.0365 .0894 .1460 .1789 .1753	.0337 .0842 .1404 .1755 .1755 .1462
1 2 3 4 5 6 7	.0679 .1393 .1904 .1951 .1600 .1093	.0630 .1323 .1852 .1944 .1633 .1143	.0583 .1254 .1798 .1933 .1662 .1191 .0732	.0540 .1188 .1743 .1917 .1687 .1237 .0778	.0500 .1125 .1687 .1898 .1708 .1281	.0462 .1063 .1631 .1875 .1725 .1323 .0869	.0427 .1005 .1574 .1849 .1738 .1362 .0914	.0395 .0948 .1517 .1820 .1747 .1398 .0959	.0365 .0894 .1460 .1789 .1753 .1432 .1002	.0337 .0842 .1404 .1755 .1755 .1462 .1044
1 2 3 4 5 6 7 8	.0679 .1393 .1904 .1951 .1600 .1093 .0640	.0630 .1323 .1852 .1944 .1633 .1143 .0686	.0583 .1254 .1798 .1933 .1662 .1191 .0732 .0393	.0540 .1188 .1743 .1917 .1687 .1237 .0778	.0500 .1125 .1687 .1898 .1708 .1281 .0824	.0462 .1063 .1631 .1875 .1725 .1323 .0869	.0427 .1005 .1574 .1849 .1738 .1362 .0914 .0537	.0395 .0948 .1517 .1820 .1747 .1398 .0959	.0365 .0894 .1460 .1789 .1753 .1432 .1002	.0337 .0842 .1404 .1755 .1755 .1462 .1044 .0653
1 2 3 4 5 6 7 8 9	.0679 .1393 .1904 .1951 .1600 .1093 .0640 .0328	.0630 .1323 .1852 .1944 .1633 .1143 .0686 .0360	.0583 .1254 .1798 .1933 .1662 .1191 .0732 .0393	.0540 .1188 .1743 .1917 .1687 .1237 .0778 .0428	.0500 .1125 .1687 .1898 .1708 .1281 .0824 .0463	.0462 .1063 .1631 .1875 .1725 .1323 .0869 .0500	.0427 .1005 .1574 .1849 .1738 .1362 .0914 .0537	.0395 .0948 .1517 .1820 .1747 .1398 .0959 .0575 .0307	.0365 .0894 .1460 .1789 .1753 .1432 .1002 .0614	.0337 .0842 .1404 .1755 .1755 .1462 .1044 .0653 .0363
1 2 3 4 5 6 7 8 9	.0679 .1393 .1904 .1951 .1600 .1093 .0640 .0328 .0150	.0630 .1323 .1852 .1944 .1633 .1143 .0686 .0360 .0168	.0583 .1254 .1798 .1933 .1662 .1191 .0732 .0393 .0188	.0540 .1188 .1743 .1917 .1687 .1237 .0778 .0428 .0209	.0500 .1125 .1687 .1898 .1708 .1281 .0824 .0463 .0232	.0462 .1063 .1631 .1875 .1725 .1323 .0869 .0500 .0255	.0427 .1005 .1574 .1849 .1738 .1362 .0914 .0537 .0281	.0395 .0948 .1517 .1820 .1747 .1398 .0959 .0575 .0307 .0147	.0365 .0894 .1460 .1789 .1753 .1432 .1002 .0614 .0334	.0337 .0842 .1404 .1755 .1755 .1462 .1044 .0653 .0363
1 2 3 4 5 6 7 8 9 10	.0679 .1393 .1904 .1951 .1600 .1093 .0640 .0328 .0150 .0061	.0630 .1323 .1852 .1944 .1633 .1143 .0686 .0360 .0168 .0071	.0583 .1254 .1798 .1933 .1662 .1191 .0732 .0393 .0188 .0081	.0540 .1188 .1743 .1917 .1687 .1237 .0778 .0428 .0209 .0092	.0500 .1125 .1687 .1898 .1708 .1281 .0824 .0463 .0232 .0104 .0043	.0462 .1063 .1631 .1875 .1725 .1323 .0869 .0500 .0255 .0118	.0427 .1005 .1574 .1849 .1738 .1362 .0914 .0537 .0281 .0132	.0395 .0948 .1517 .1820 .1747 .1398 .0959 .0575 .0307 .0147	.0365 .0894 .1460 .1789 .1753 .1432 .1002 .0614 .0334 .0164	.0337 .0842 .1404 .1755 .1755 .1462 .1044 .0653 .0363 .0181
1 2 3 4 5 6 7 8 9 10 11 12	.0679 .1393 .1904 .1951 .1600 .1093 .0640 .0328 .0150 .0061 .0023 .0008	.0630 .1323 .1852 .1944 .1633 .1143 .0686 .0360 .0168 .0071 .0027	.0583 .1254 .1798 .1933 .1662 .1191 .0732 .0393 .0188 .0081 .0032	.0540 .1188 .1743 .1917 .1687 .1237 .0778 .0428 .0209 .0092 .0037 .0013	.0500 .1125 .1687 .1898 .1708 .1281 .0824 .0463 .0232 .0104 .0043	.0462 .1063 .1631 .1875 .1725 .1323 .0869 .0500 .0255 .0118 .0049	.0427 .1005 .1574 .1849 .1738 .1362 .0914 .0537 .0281 .0132 .0056 .0022	.0395 .0948 .1517 .1820 .1747 .1398 .0959 .0575 .0307 .0147 .0064 .0026	.0365 .0894 .1460 .1789 .1753 .1432 .1002 .0614 .0334 .0164 .0073 .0030	.0337 .0842 .1404 .1755 .1755 .1462 .1044 .0653 .0363 .0181 .0082 .0034

TABLE A.3
Poisson Probabilities
(Continued)

					λ					
x	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	6.0
0	.0061	.0055	.0050	.0045	.0041	.0037	.0033	.0030	.0027	.0025
1	.0311	.0287	.0265	.0244	.0225	.0207	.0191	.0176	.0162	.0149
2	.0793	.0746	.0701	.0659	.0618	.0580	.0544	.0509	.0477	.0446
3	.1348	.1293	.1239	.1185	.1133	.1082	.1033	.0985	.0938	.0892
4	.1719	.1681	.1641	.1600	.1558	.1515	.1472	.1428	.1383	.1339
5	.1753	.1748	.1740	.1728	.1714	.1697	.1678	.1656	.1632	.1606
6	.1490	.1515	.1537	.1555	.1571	.1584	.1594	.1601	.1605	.1606
7	.1086	.1125	.1163	.1200	.1234	.1267	.1298	.1326	.1353	.1377
8	.0692	.0731	.0771	.0810	.0849	.0887	.0925	.0962	.0998	.1033
9	.0392	.0423	.0454	.0486	.0519	.0552	.0586	.0620	.0654	.0688
10	.0200	.0220	.0241	.0262	.0285	.0309	.0334	.0359	.0386	.0413
11	.0093	.0104	.0116	.0129	.0143	.0157	.0173	.0190	.0207	.0225
12	.0039	.0045	.0051	.0058	.0065	.0073	.0082	.0092	.0102	.0113
13	.0015	.0018	.0021	.0024	.0028	.0032	.0036	.0041	.0046	.0052
14	.0006	.0007	.0008	.0009	.0011	.0013	.0015	.0017	.0019	.0022
15	.0002	.0002	.0003	.0003	.0004	.0005	.0006	.0007	.0008	.0009
16	.0001	.0001	.0001	.0001	.0001	.0002	.0002	.0002	.0003	.0003
17	.0000	.0000	.0000	.0000	.0000	.0001	.0001	.0001	.0001	.0001
x	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9	7.0
0	.0022	.0020	.0018	.0017	.0015	.0014	.0012	.0011	.0010	.0009
1	.0137	.0126	.0116	.0106	.0098	.0090	.0082	.0076	.0070	.0064
2	.0417	.0390	.0364	.0340	.0318	.0296	.0276	.0258	.0240	.0223
3	.0848	.0806	.0765	.0726	.0688	.0652	.0617	.0584	.0552	.0521
4	.1294	.1249	.1205	.1162	.1118	.1076	.1034	.0992	.0952	.0912
5	.1579	.1549	.1519	1/107						
6			.1317	.1487	.1454	.1420	.1385	.1349	.1314	.1277
	.1605	.1601	.1595	.1586	.1454 .1575	.1420 .1562	.1385 .1546	.1349 .1529	.1314 .1511	.1277 .1490
7	.1605 .1399									
7 8		.1601	.1595	.1586	.1575	.1562	.1546	.1529	.1511	.1490
	.1399	.1601 .1418	.1595 .1435	.1586 .1450	.1575 .1462	.1562 .1472	.1546 .1480	.1529 .1486	.1511 .1489	.1490 .1490
8	.1399 .1066	.1601 .1418 .1099	.1595 .1435 .1130	.1586 .1450 .1160	.1575 .1462 .1188	.1562 .1472 .1215	.1546 .1480 .1240	.1529 .1486 .1263	.1511 .1489 .1284	.1490 .1490 .1304
8 9	.1399 .1066 .0723	.1601 .1418 .1099 .0757	.1595 .1435 .1130 .0791	.1586 .1450 .1160 .0825	.1575 .1462 .1188 .0858	.1562 .1472 .1215 .0891	.1546 .1480 .1240 .0923	.1529 .1486 .1263 .0954	.1511 .1489 .1284 .0985	.1490 .1490 .1304 .1014
8 9 10	.1399 .1066 .0723 .0441	.1601 .1418 .1099 .0757 .0469	.1595 .1435 .1130 .0791 .0498 .0285 .0150	.1586 .1450 .1160 .0825 .0528	.1575 .1462 .1188 .0858 .0558	.1562 .1472 .1215 .0891 .0588	.1546 .1480 .1240 .0923 .0618	.1529 .1486 .1263 .0954 .0649	.1511 .1489 .1284 .0985 .0679	.1490 .1490 .1304 .1014 .0710
8 9 10 11	.1399 .1066 .0723 .0441 .0244 .0124 .0058	.1601 .1418 .1099 .0757 .0469 .0265 .0137	.1595 .1435 .1130 .0791 .0498 .0285 .0150 .0073	.1586 .1450 .1160 .0825 .0528	.1575 .1462 .1188 .0858 .0558	.1562 .1472 .1215 .0891 .0588 .0353	.1546 .1480 .1240 .0923 .0618	.1529 .1486 .1263 .0954 .0649	.1511 .1489 .1284 .0985 .0679 .0426	.1490 .1490 .1304 .1014 .0710 .0452 .0263 .0142
8 9 10 11 12 13 14	.1399 .1066 .0723 .0441 .0244 .0124 .0058 .0025	.1601 .1418 .1099 .0757 .0469 .0265	.1595 .1435 .1130 .0791 .0498 .0285 .0150 .0073 .0033	.1586 .1450 .1160 .0825 .0528 .0307 .0164 .0081	.1575 .1462 .1188 .0858 .0558 .0330 .0179 .0089	.1562 .1472 .1215 .0891 .0588 .0353 .0194 .0099	.1546 .1480 .1240 .0923 .0618 .0377 .0210 .0108	.1529 .1486 .1263 .0954 .0649 .0401 .0227 .0119	.1511 .1489 .1284 .0985 .0679 .0426 .0245 .0130 .0064	.1490 .1490 .1304 .1014 .0710 .0452 .0263 .0142 .0071
8 9 10 11 12 13 14 15	.1399 .1066 .0723 .0441 .0244 .0124 .0058 .0025	.1601 .1418 .1099 .0757 .0469 .0265 .0137 .0065 .0029	.1595 .1435 .1130 .0791 .0498 .0285 .0150 .0073	.1586 .1450 .1160 .0825 .0528 .0307 .0164 .0081 .0037	.1575 .1462 .1188 .0858 .0558 .0330 .0179 .0089 .0041	.1562 .1472 .1215 .0891 .0588 .0353 .0194 .0099 .0046	.1546 .1480 .1240 .0923 .0618 .0377 .0210 .0108 .0052 .0023	.1529 .1486 .1263 .0954 .0649 .0401 .0227 .0119 .0058	.1511 .1489 .1284 .0985 .0679 .0426 .0245 .0130 .0064	.1490 .1490 .1304 .1014 .0710 .0452 .0263 .0142
8 9 10 11 12 13 14 15 16	.1399 .1066 .0723 .0441 .0244 .0124 .0058 .0025 .0010	.1601 .1418 .1099 .0757 .0469 .0265 .0137 .0065 .0029 .0012	.1595 .1435 .1130 .0791 .0498 .0285 .0150 .0073 .0033 .0014	.1586 .1450 .1160 .0825 .0528 .0307 .0164 .0081 .0037 .0016	.1575 .1462 .1188 .0858 .0558 .0330 .0179 .0089 .0041 .0018	.1562 .1472 .1215 .0891 .0588 .0353 .0194 .0099 .0046 .0020	.1546 .1480 .1240 .0923 .0618 .0377 .0210 .0108 .0052 .0023	.1529 .1486 .1263 .0954 .0649 .0401 .0227 .0119 .0058 .0026	.1511 .1489 .1284 .0985 .0679 .0426 .0245 .0130 .0064 .0029	.1490 .1490 .1304 .1014 .0710 .0452 .0263 .0142 .0071 .0033 .0014
8 9 10 11 12 13 14 15 16	.1399 .1066 .0723 .0441 .0244 .0124 .0058 .0025 .0010 .0004	.1601 .1418 .1099 .0757 .0469 .0265 .0137 .0065 .0029 .0012 .0005	.1595 .1435 .1130 .0791 .0498 .0285 .0150 .0073 .0033 .0014 .0005	.1586 .1450 .1160 .0825 .0528 .0307 .0164 .0081 .0037 .0016 .0006	.1575 .1462 .1188 .0858 .0558 .0330 .0179 .0089 .0041 .0018 .0007	.1562 .1472 .1215 .0891 .0588 .0353 .0194 .0099 .0046 .0020 .0008	.1546 .1480 .1240 .0923 .0618 .0377 .0210 .0108 .0052 .0023 .0010	.1529 .1486 .1263 .0954 .0649 .0401 .0227 .0119 .0058 .0026 .0011	.1511 .1489 .1284 .0985 .0679 .0426 .0245 .0130 .0064 .0029 .0013	.1490 .1490 .1304 .1014 .0710 .0452 .0263 .0142 .0071 .0033 .0014
8 9 10 11 12 13 14 15 16	.1399 .1066 .0723 .0441 .0244 .0124 .0058 .0025 .0010	.1601 .1418 .1099 .0757 .0469 .0265 .0137 .0065 .0029 .0012	.1595 .1435 .1130 .0791 .0498 .0285 .0150 .0073 .0033 .0014	.1586 .1450 .1160 .0825 .0528 .0307 .0164 .0081 .0037 .0016	.1575 .1462 .1188 .0858 .0558 .0330 .0179 .0089 .0041 .0018	.1562 .1472 .1215 .0891 .0588 .0353 .0194 .0099 .0046 .0020	.1546 .1480 .1240 .0923 .0618 .0377 .0210 .0108 .0052 .0023	.1529 .1486 .1263 .0954 .0649 .0401 .0227 .0119 .0058 .0026	.1511 .1489 .1284 .0985 .0679 .0426 .0245 .0130 .0064 .0029	.1490 .1490 .1304 .1014 .0710 .0452 .0263 .0142 .0071 .0033 .0014

TABLE A.3
Poisson Probabilities
(Continued)

					λ					
x	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	8.0
0	.0008	.0007	.0007	.0006	.0006	.0005	.0005	.0004	.0004	.0003
1	.0059	.0054	.0049	.0045	.0041	.0038	.0035	.0032	.0029	.0027
2	.0208	.0194	.0180	.0167	.0156	.0145	.0134	.0125	.0116	.0107
3	.0492	.0464	.0438	.0413	.0389	.0366	.0345	.0324	.0305	.0286
4	.0874	.0836	.0799	.0764	.0729	.0696	.0663	.0632	.0602	.0573
5	.1241	.1204	.1167	.1130	.1094	.1057	.1021	.0986	.0951	.0916
6	.1468	.1445	.1420	.1394	.1367	.1339	.1311	.1282	.1252	.1221
7	.1489	.1486	.1481	.1474	.1465	.1454	.1442	.1428	.1413	.1396
8	.1321	.1337	.1351	.1363	.1373	.1381	.1388	.1392	.1395	.1396
9	.1042	.1070	.1096	.1121	.1144	.1167	.1187	.1207	.1224	.1241
10	.0740	.0770	.0800	.0829	.0858	.0887	.0914	.0941	.0967	.0993
11	.0478	.0504	.0531	.0558	.0585	.0613	.0640	.0667	.0695	.0722
12	.0283	.0303	.0323	.0344	.0366	.0388	.0411	.0434	.0457	.0481
13	.0154	.0168	.0181	.0196	.0211	.0227	.0243	.0260	.0278	.0296
14	.0078	.0086	.0095	.0104	.0113	.0123	.0134	.0145	.0157	.0169
15	.0037	.0041	.0046	.0051	.0057	.0062	.0069	.0075	.0083	.0090
16	.0016	.0019	.0021	.0024	.0026	.0030	.0033	.0037	.0041	.0045
17	.0007	.0008	.0009	.0010	.0012	.0013	.0015	.0017	.0019	.0021
18	.0003	.0003	.0004	.0004	.0005	.0006	.0006	.0007	.0008	.0009
19	.0001	.0001	.0001	.0002	.0002	.0002	.0003	.0003	.0003	.0004
20	.0000	.0000	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0002
21	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0001
x	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	9.0
0	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0001	.0001
1	.0025	.0023	.0021	.0019	.0017	.0016	.0014	.0013	.0012	.0011
2	.0100	.0092	.0086	.0079	.0074	.0068	.0063	.0058	.0054	.0050
3	.0269	0252	0007	0222	0200	0105	0400	0.4=4		.0150
4		.0252	.0237	.0222	.0208	.0195	.0183	.0171	.0160	.0150
-	.0544	.0252	.0237	.0222	.0208	.0195	.0183	.0171	.0160 .0357	.0130
5	.0544 .0882									
		.0517	.0491	.0466	.0443	.0420	.0398	.0377	.0357	.0337
5	.0882	.0517 .0849	.0491 .0816	.0466 .0784	.0443 .0752	.0420 .0722	.0398 .0692	.0377 .0663	.0357 .0635	.0337
5 6	.0882 .1191	.0517 .0849 .1160	.0491 .0816 .1128	.0466 .0784 .1097	.0443 .0752 .1066	.0420 .0722 .1034	.0398 .0692 .1003	.0377 .0663 .0972	.0357 .0635 .0941	.0337 .0607 .0911
5 6 7	.0882 .1191 .1378	.0517 .0849 .1160 .1358	.0491 .0816 .1128 .1338	.0466 .0784 .1097 .1317	.0443 .0752 .1066 .1294	.0420 .0722 .1034 .1271	.0398 .0692 .1003 .1247	.0377 .0663 .0972 .1222	.0357 .0635 .0941 .1197	.0337 .0607 .0911 .1171
5 6 7 8	.0882 .1191 .1378 .1395	.0517 .0849 .1160 .1358 .1392	.0491 .0816 .1128 .1338 .1388	.0466 .0784 .1097 .1317 .1382	.0443 .0752 .1066 .1294 .1375	.0420 .0722 .1034 .1271 .1366	.0398 .0692 .1003 .1247 .1356	.0377 .0663 .0972 .1222 .1344	.0357 .0635 .0941 .1197 .1332	.0337 .0607 .0911 .1171 .1318
5 6 7 8 9	.0882 .1191 .1378 .1395 .1256	.0517 .0849 .1160 .1358 .1392 .1269	.0491 .0816 .1128 .1338 .1388 .1280	.0466 .0784 .1097 .1317 .1382 .1290	.0443 .0752 .1066 .1294 .1375 .1299	.0420 .0722 .1034 .1271 .1366 .1306	.0398 .0692 .1003 .1247 .1356	.0377 .0663 .0972 .1222 .1344 .1315	.0357 .0635 .0941 .1197 .1332 .1317	.0337 .0607 .0911 .1171 .1318
5 6 7 8 9	.0882 .1191 .1378 .1395 .1256 .1017	.0517 .0849 .1160 .1358 .1392 .1269 .1040	.0491 .0816 .1128 .1338 .1388 .1280 .1063	.0466 .0784 .1097 .1317 .1382 .1290 .1084	.0443 .0752 .1066 .1294 .1375 .1299 .1104	.0420 .0722 .1034 .1271 .1366 .1306	.0398 .0692 .1003 .1247 .1356 .1311 .1140	.0377 .0663 .0972 .1222 .1344 .1315 .1157	.0357 .0635 .0941 .1197 .1332 .1317 .1172	.0337 .0607 .0911 .1171 .1318 .1318
5 6 7 8 9 10 11	.0882 .1191 .1378 .1395 .1256 .1017	.0517 .0849 .1160 .1358 .1392 .1269 .1040	.0491 .0816 .1128 .1338 .1388 .1280 .1063 .0802	.0466 .0784 .1097 .1317 .1382 .1290 .1084 .0828	.0443 .0752 .1066 .1294 .1375 .1299 .1104 .0853	.0420 .0722 .1034 .1271 .1366 .1306 .1123	.0398 .0692 .1003 .1247 .1356 .1311 .1140	.0377 .0663 .0972 .1222 .1344 .1315 .1157	.0357 .0635 .0941 .1197 .1332 .1317 .1172	.0337 .0607 .0911 .1171 .1318 .1318 .1186
5 6 7 8 9 10 11 12	.0882 .1191 .1378 .1395 .1256 .1017 .0749	.0517 .0849 .1160 .1358 .1392 .1269 .1040 .0776 .0530	.0491 .0816 .1128 .1338 .1388 .1280 .1063 .0802	.0466 .0784 .1097 .1317 .1382 .1290 .1084 .0828	.0443 .0752 .1066 .1294 .1375 .1299 .1104 .0853	.0420 .0722 .1034 .1271 .1366 .1306 .1123 .0878 .0629	.0398 .0692 .1003 .1247 .1356 .1311 .1140 .0902	.0377 .0663 .0972 .1222 .1344 .1315 .1157 .0925	.0357 .0635 .0941 .1197 .1332 .1317 .1172 .0948 .0703	.0337 .0607 .0911 .1171 .1318 .1318 .1186 .0970
5 6 7 8 9 10 11 12 13 14 15	.0882 .1191 .1378 .1395 .1256 .1017 .0749 .0505 .0315 .0182 .0098	.0517 .0849 .1160 .1358 .1392 .1269 .1040 .0776 .0530 .0334 .0196 .0107	.0491 .0816 .1128 .1338 .1388 .1280 .1063 .0802 .0555 .0354 .0210	.0466 .0784 .1097 .1317 .1382 .1290 .1084 .0828 .0579 .0374 .0225 .0126	.0443 .0752 .1066 .1294 .1375 .1299 .1104 .0853 .0604 .0395 .0240 .0136	.0420 .0722 .1034 .1271 .1366 .1306 .1123 .0878 .0629 .0416 .0256 .0147	.0398 .0692 .1003 .1247 .1356 .1311 .1140 .0902 .0654 .0438 .0272 .0158	.0377 .0663 .0972 .1222 .1344 .1315 .1157 .0925 .0679 .0459 .0289 .0169	.0357 .0635 .0941 .1197 .1332 .1317 .1172 .0948 .0703 .0481 .0306 .0182	.0337 .0607 .0911 .1171 .1318 .1318 .1186 .0970 .0728 .0504 .0324 .0194
5 6 7 8 9 10 11 12 13 14 15 16	.0882 .1191 .1378 .1395 .1256 .1017 .0749 .0505 .0315 .0182 .0098 .0050	.0517 .0849 .1160 .1358 .1392 .1269 .1040 .0776 .0530 .0334 .0196 .0107	.0491 .0816 .1128 .1338 .1388 .1280 .1063 .0802 .0555 .0354 .0210 .0116	.0466 .0784 .1097 .1317 .1382 .1290 .1084 .0828 .0579 .0374 .0225 .0126 .0066	.0443 .0752 .1066 .1294 .1375 .1299 .1104 .0853 .0604 .0395 .0240 .0136 .0072	.0420 .0722 .1034 .1271 .1366 .1306 .1123 .0878 .0629 .0416 .0256 .0147 .0079	.0398 .0692 .1003 .1247 .1356 .1311 .1140 .0902 .0654 .0438 .0272 .0158 .0086	.0377 .0663 .0972 .1222 .1344 .1315 .1157 .0925 .0679 .0459 .0289 .0169	.0357 .0635 .0941 .1197 .1332 .1317 .1172 .0948 .0703 .0481 .0306 .0182	.0337 .0607 .0911 .1171 .1318 .1318 .1186 .0970 .0728 .0504 .0324 .0194 .0109
5 6 7 8 9 10 11 12 13 14 15 16 17	.0882 .1191 .1378 .1395 .1256 .1017 .0749 .0505 .0315 .0182 .0098 .0050	.0517 .0849 .1160 .1358 .1392 .1269 .1040 .0776 .0530 .0334 .0196 .0107 .0055 .0026	.0491 .0816 .1128 .1338 .1388 .1280 .1063 .0802 .0555 .0354 .0210 .0116 .0060	.0466 .0784 .1097 .1317 .1382 .1290 .1084 .0828 .0579 .0374 .0225 .0126 .0066 .0033	.0443 .0752 .1066 .1294 .1375 .1299 .1104 .0853 .0604 .0395 .0240 .0136 .0072 .0036	.0420 .0722 .1034 .1271 .1366 .1306 .1123 .0878 .0629 .0416 .0256 .0147 .0079 .0040	.0398 .0692 .1003 .1247 .1356 .1311 .1140 .0902 .0654 .0438 .0272 .0158 .0086	.0377 .0663 .0972 .1222 .1344 .1315 .1157 .0925 .0679 .0459 .0289 .0169 .0093 .0048	.0357 .0635 .0941 .1197 .1332 .1317 .1172 .0948 .0703 .0481 .0306 .0182 .0101 .0053	.0337 .0607 .0911 .1171 .1318 .1318 .1186 .0970 .0728 .0504 .0324 .0194 .0109 .0058
5 6 7 8 9 10 11 12 13 14 15 16 17 18	.0882 .1191 .1378 .1395 .1256 .1017 .0749 .0505 .0315 .0182 .0098 .0050 .0024	.0517 .0849 .1160 .1358 .1392 .1269 .1040 .0776 .0530 .0334 .0196 .0107 .0055 .0026	.0491 .0816 .1128 .1338 .1388 .1280 .1063 .0802 .0555 .0354 .0210 .0116 .0060 .0029	.0466 .0784 .1097 .1317 .1382 .1290 .1084 .0828 .0579 .0374 .0225 .0126 .0066 .0033 .0015	.0443 .0752 .1066 .1294 .1375 .1299 .1104 .0853 .0604 .0395 .0240 .0136 .0072 .0036	.0420 .0722 .1034 .1271 .1366 .1306 .1123 .0878 .0629 .0416 .0256 .0147 .0079 .0040	.0398 .0692 .1003 .1247 .1356 .1311 .1140 .0902 .0654 .0438 .0272 .0158 .0086 .0044	.0377 .0663 .0972 .1222 .1344 .1315 .1157 .0925 .0679 .0459 .0289 .0169 .0093 .0048	.0357 .0635 .0941 .1197 .1332 .1317 .1172 .0948 .0703 .0481 .0306 .0182 .0101 .0053 .0026	.0337 .0607 .0911 .1171 .1318 .1318 .1186 .0970 .0728 .0504 .0324 .0194 .0109 .0058 .0029
5 6 7 8 9 10 11 12 13 14 15 16 17 18	.0882 .1191 .1378 .1395 .1256 .1017 .0749 .0505 .0315 .0182 .0098 .0050 .0024 .0011	.0517 .0849 .1160 .1358 .1392 .1269 .1040 .0776 .0530 .0334 .0196 .0107 .0055 .0026 .0012	.0491 .0816 .1128 .1338 .1388 .1280 .1063 .0802 .0555 .0354 .0210 .0116 .0060 .0029 .0014	.0466 .0784 .1097 .1317 .1382 .1290 .1084 .0828 .0579 .0374 .0225 .0126 .0066 .0033 .0015 .0007	.0443 .0752 .1066 .1294 .1375 .1299 .1104 .0853 .0604 .0395 .0240 .0136 .0072 .0036 .0017	.0420 .0722 .1034 .1271 .1366 .1306 .1123 .0878 .0629 .0416 .0256 .0147 .0079 .0040 .0019	.0398 .0692 .1003 .1247 .1356 .1311 .1140 .0902 .0654 .0438 .0272 .0158 .0086 .0044 .0021	.0377 .0663 .0972 .1222 .1344 .1315 .1157 .0925 .0679 .0459 .0289 .0169 .0093 .0048 .0024	.0357 .0635 .0941 .1197 .1332 .1317 .1172 .0948 .0703 .0481 .0306 .0182 .0101 .0053 .0026	.0337 .0607 .0911 .1171 .1318 .1318 .1186 .0970 .0728 .0504 .0324 .0194 .0109 .0058 .0029
5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	.0882 .1191 .1378 .1395 .1256 .1017 .0749 .0505 .0315 .0182 .0098 .0050 .0024 .0011 .0005	.0517 .0849 .1160 .1358 .1392 .1269 .1040 .0776 .0530 .0334 .0196 .0107 .0055 .0026 .0012 .0005	.0491 .0816 .1128 .1338 .1388 .1280 .1063 .0802 .0555 .0354 .0210 .0116 .0060 .0029 .0014 .0006	.0466 .0784 .1097 .1317 .1382 .1290 .1084 .0828 .0579 .0374 .0225 .0126 .0066 .0033 .0015 .0007	.0443 .0752 .1066 .1294 .1375 .1299 .1104 .0853 .0604 .0395 .0240 .0136 .0072 .0036 .0017 .0008	.0420 .0722 .1034 .1271 .1366 .1306 .1123 .0878 .0629 .0416 .0256 .0147 .0079 .0040 .0019 .0009	.0398 .0692 .1003 .1247 .1356 .1311 .1140 .0902 .0654 .0438 .0272 .0158 .0086 .0044 .0021 .0010	.0377 .0663 .0972 .1222 .1344 .1315 .1157 .0925 .0679 .0459 .0289 .0169 .0093 .0048 .0024 .0011	.0357 .0635 .0941 .1197 .1332 .1317 .1172 .0948 .0703 .0481 .0306 .0182 .0101 .0053 .0026 .0012	.0337 .0607 .0911 .1171 .1318 .1318 .1186 .0970 .0728 .0504 .0324 .0194 .0109 .0058 .0029 .0014
5 6 7 8 9 10 11 12 13 14 15 16 17 18	.0882 .1191 .1378 .1395 .1256 .1017 .0749 .0505 .0315 .0182 .0098 .0050 .0024 .0011	.0517 .0849 .1160 .1358 .1392 .1269 .1040 .0776 .0530 .0334 .0196 .0107 .0055 .0026 .0012	.0491 .0816 .1128 .1338 .1388 .1280 .1063 .0802 .0555 .0354 .0210 .0116 .0060 .0029 .0014	.0466 .0784 .1097 .1317 .1382 .1290 .1084 .0828 .0579 .0374 .0225 .0126 .0066 .0033 .0015 .0007	.0443 .0752 .1066 .1294 .1375 .1299 .1104 .0853 .0604 .0395 .0240 .0136 .0072 .0036 .0017	.0420 .0722 .1034 .1271 .1366 .1306 .1123 .0878 .0629 .0416 .0256 .0147 .0079 .0040 .0019	.0398 .0692 .1003 .1247 .1356 .1311 .1140 .0902 .0654 .0438 .0272 .0158 .0086 .0044 .0021	.0377 .0663 .0972 .1222 .1344 .1315 .1157 .0925 .0679 .0459 .0289 .0169 .0093 .0048 .0024	.0357 .0635 .0941 .1197 .1332 .1317 .1172 .0948 .0703 .0481 .0306 .0182 .0101 .0053 .0026	.0337 .0607 .0911 .1171 .1318 .1318 .1186 .0970 .0728 .0504 .0324 .0194 .0109 .0058 .0029

TABLE A.3
Poisson Probabilities
(Continued)

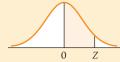
					λ					
x	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	10.0
0	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0000
1	.0010	.0009	.0009	.0008	.0007	.0007	.0006	.0005	.0005	.0005
2	.0046	.0043	.0040	.0037	.0034	.0031	.0029	.0027	.0025	.0023
3	.0140	.0131	.0123	.0115	.0107	.0100	.0093	.0087	.0081	.0076
4	.0319	.0302	.0285	.0269	.0254	.0240	.0226	.0213	.0201	.0189
5	.0581	.0555	.0530	.0506	.0483	.0460	.0439	.0418	.0398	.0378
6	.0881	.0851	.0822	.0793	.0764	.0736	.0709	.0682	.0656	.0631
7	.1145	.1118	.1091	.1064	.1037	.1010	.0982	.0955	.0928	.0901
8	.1302	.1286	.1269	.1251	.1232	.1212	.1191	.1170	.1148	.1126
9	.1317	.1315	.1311	.1306	.1300	.1293	.1284	.1274	.1263	.1251
10	.1198	.1210	.1219	.1228	.1235	.1241	.1245	.1249	.1250	.1251
11	.0991	.1012	.1031	.1049	.1067	.1083	.1098	.1112	.1125	.1137
12	.0752	.0776	.0799	.0822	.0844	.0866	.0888	.0908	.0928	.0948
13	.0526	.0549	.0572	.0594	.0617	.0640	.0662	.0685	.0707	.0729
14	.0342	.0361	.0380	.0399	.0419	.0439	.0459	.0479	.0500	.0521
15	.0208	.0221	.0235	.0250	.0265	.0281	.0297	.0313	.0330	.0347
16	.0118	.0127	.0137	.0147	.0157	.0168	.0180	.0192	.0204	.0217
17	.0063	.0069	.0075	.0081	.0088	.0095	.0103	.0111	.0119	.0128
18	.0032	.0035	.0039	.0042	.0046	.0051	.0055	.0060	.0065	.0071
19	.0015	.0017	.0019	.0021	.0023	.0026	.0028	.0031	.0034	.0037
20	.0007	.0008	.0009	.0010	.0011	.0012	.0014	.0015	.0017	.0019
21	.0003	.0003	.0004	.0004	.0005	.0006	.0006	.0007	.0008	.0009
22	.0001	.0001	.0002	.0002	.0002	.0002	.0003	.0003	.0004	.0004
23	.0000	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0002	.0002
24	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0001	.0001	.0001

## The $e^{-x}$ Table

x	$e^{-x}$	x	$e^{-x}$	x	$e^{-x}$	x	$e^{-x}$
0.0	1.0000	3.0	0.0498	6.0	0.00248	9.0	0.00012
0.1	0.9048	3.1	0.0450	6.1	0.00224	9.1	0.00011
0.2	0.8187	3.2	0.0408	6.2	0.00203	9.2	0.00010
0.3	0.7408	3.3	0.0369	6.3	0.00184	9.3	0.00009
0.4	0.6703	3.4	0.0334	6.4	0.00166	9.4	0.00008
0.5	0.6065	3.5	0.0302	6.5	0.00150	9.5	0.00007
0.6	0.5488	3.6	0.0273	6.6	0.00136	9.6	0.00007
0.7	0.4966	3.7	0.0247	6.7	0.00123	9.7	0.00006
0.8	0.4493	3.8	0.0224	6.8	0.00111	9.8	0.00006
0.9	0.4066	3.9	0.0202	6.9	0.00101	9.9	0.00005
1.0	0.3679	4.0	0.0183	7.0	0.00091	10.0	0.00005
1.1	0.3329	4.1	0.0166	7.1	0.00083		
1.2	0.3012	4.2	0.0150	7.2	0.00075		
1.3	0.2725	4.3	0.0136	7.3	0.00068		
1.4	0.2466	4.4	0.0123	7.4	0.00061		
1.5	0.2231	4.5	0.0111	7.5	0.00055		
1.6	0.2019	4.6	0.0101	7.6	0.00050		
1.7	0.1827	4.7	0.0091	7.7	0.00045		
1.8	0.1653	4.8	0.0082	7.8	0.00041		
1.9	0.1496	4.9	0.0074	7.9	0.00037		
2.0	0.1353	5.0	0.0067	8.0	0.00034		
2.1	0.1225	5.1	0.0061	8.1	0.00030		
2.2	0.1108	5.2	0.0055	8.2	0.00027		
2.3	0.1003	5.3	0.0050	8.3	0.00025		
2.4	0.0907	5.4	0.0045	8.4	0.00022		
2.5	0.0821	5.5	0.0041	8.5	0.00020		
2.6	0.0743	5.6	0.0037	8.6	0.00018		
2.7	0.0672	5.7	0.0033	8.7	0.00017		
2.8	0.0608	5.8	0.0030	8.8	0.00015		
2.9	0.0550	5.9	0.0027	8.9	0.00014		

## TABLE A.5

#### Areas of the Standard Normal Distribution

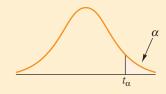


The entries in this table are the probabilities that a standard normal random variable is between 0 and z (the shaded area).

10											
0.1         0.398         0.438         0.478         0.517         0.557         0.596         0.636         0.675         0.714         0.753           0.2         0.793         0.832         0.871         0.910         0.9048         0.987         1.026         1.064         1.110         1.113         1.141           0.3         1.179         1.217         1.255         1.293         1.331         1.368         1.406         1.443         1.480         1.517           0.5         1.915         1.950         1.985         2.019         2.054         2.088         2.123         2.157         2.190         2.224           0.6         2.257         2.291         2.324         2.357         2.399         2.422         2.2446         2.274         2.549           0.7         2.580         2.611         2.642         2.673         2.704         2.734         2.764         2.794         2.274         2.794         2.794         2.794         2.794         2.274         2.794         2.794         2.279         3.331         3.336         3.316         3.316         3.313         3.343         3.365         3.389         3.703         3.311         3.368         3.310<	z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.2         .0793         .0832         .0871         .0910         .0948         .0987         .1026         .1064         .1103         .11140           0.3         .1179         .1217         .1255         .1293         .1331         .1368         .1406         .1443         .14180         .1514           0.4         .1554         .1591         .1628         .1644         .1700         .1736         .1712         .1808         .1844         .1879           0.5         .1915         .1950         .1985         .2019         .2054         .2088         .2123         .2157         .2190         .2224           0.6         .2257         .2291         .2324         .2357         .2389         .4222         .2454         .2486         .2517         .2580           0.8         .2881         .2910         .2939         .2967         .2995         .3023         .3051         .3078         .3106         .3133           0.9         .3159         .3186         .3212         .3238         .3264         .3289         .3315         .3340         .3355         .3538           1.0         .3413         .3483         .3461         .3485         .3508	0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.3         .1179         .1217         .1255         .1293         .1331         .1368         .1406         .1443         .1480         .1517           0.4         .1551         .1591         .1628         .1664         .1700         .1776         .1772         .1808         .1844         .1879           0.5         .1915         .1950         .1985         .2019         .2054         .2088         .2123         .2157         .2549           0.6         .2257         .2291         .2324         .2357         .2389         .2422         .2454         .2486         .2517         .2549           0.7         .2580         .2611         .2642         .2673         .2704         .2734         .2764         .2794         .2881         .3016         .3133         .3681         .3016         .3313         .3681         .3016         .3313         .3032         .3018         .3330         .3369         .3389         .3312         .3389         .3361         .3330         .3369         .3389         .3077         .3790         .3310         .3830         .3310         .3830         .3381         .3340         .3665         .3686         .3708         .3729         .3749         .3	0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.4         .1554         .1591         .1628         .1664         .1700         .1736         .1772         .1808         .1844         .1879           0.5         .1915         .1950         .1985         .2019         .2054         .2088         .2123         .2157         .2190         .2244           0.6         .2257         .2291         .2324         .2337         .2389         .2422         .2454         .2486         .2517         .25249           0.7         .2580         .2611         .2642         .2673         .2704         .2734         .2764         .2794         .2823         .2852           0.8         .2881         .2910         .2939         .2967         .2995         .3023         .3051         .3343         .3106         .3133           0.9         .3159         .3186         .3212         .3238         .3664         .3289         .3315         .3340         .3369         .3889           1.1         .3643         .3665         .3686         .3708         .3729         .3749         .3770         .3810         .3830           1.2         .3849         .3869         .3888         .3907         .3925         .3944	0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.5         1.915         1.950         1.985         2.019         2.054         2.088         2.123         2.157         2.190         2.224           0.6         2.257         2.291         2.324         2.357         2.389         2.422         2.454         2.486         2.517         2.549           0.7         2.580         2.611         2.642         2.673         2.704         2.734         2.764         2.794         2.784         2.746         2.746         2.748         3.061         3.078         3.106         3.313         0.99         3.159         3.186         3.212         3.238         3.264         3.289         3.315         3.340         3.365         3.389           1.0         3.413         3.438         3.461         3.485         3.508         3.531         3.554         3.577         3.359         3.621           1.1         3.643         3.665         3.686         3.708         3.729         3.749         3.770         3.790         3.810         3.830           1.2         3.849         3.869         3.888         3.907         3.925         3.944         3.962         3.980         3.997         4.015           1.4	0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.6         .2257         .2291         .2324         .2357         .2389         .2422         .2454         .2486         .2517         .2589           0.7         .2580         .2611         .2642         .2673         .2704         .2734         .2764         .2794         .2233         .2852           0.8         .2881         .2910         .2939         .2967         .2995         .3023         .3051         .3078         .3106         .3138           1.0         .3413         .3438         .3461         .3485         .3508         .3531         .3554         .3577         .3599         .3621           1.1         .3643         .3665         .3686         .3708         .3729         .3749         .3770         .3790         .3810         .3830           1.2         .3849         .3869         .3888         .3907         .3925         .3944         .3962         .3980         .3997         .4015           1.4         .4192         .4029         .4066         .4082         .4099         .4115         .4131         .4147         .4162         .4177           1.5         .4332         .4345         .4373         .4370         .4229         <	0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.6         .2257         .2291         .2324         .2357         .2389         .2422         .2454         .2486         .2517         .2589           0.7         .2580         .2611         .2642         .2673         .2704         .2734         .2764         .2794         .2233         .2852           0.8         .2881         .2910         .2939         .2967         .2995         .3023         .3051         .3078         .3106         .3138           1.0         .3413         .3438         .3461         .3485         .3508         .3531         .3554         .3577         .3599         .3621           1.1         .3643         .3665         .3686         .3708         .3729         .3749         .3770         .3790         .3810         .3830           1.2         .3849         .3869         .3888         .3907         .3925         .3944         .3962         .3980         .3997         .4015           1.4         .4192         .4029         .4066         .4082         .4099         .4115         .4131         .4147         .4162         .4177           1.5         .4332         .4345         .4373         .4370         .4229         <	0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.7         .2580         .2611         .2642         .2673         .2704         .2734         .2764         .2794         .2823         .2881           0.8         .2881         .2910         .2939         .2967         .2995         .3023         .3051         .3078         .3106         .3133           1.0         .3413         .3438         .3461         .3485         .3508         .3531         .3554         .3577         .3599         .3621           1.1         .3643         .3665         .3686         .3708         .3729         .3749         .3770         .3790         .3810         .3830           1.2         .3849         .3869         .3888         .3907         .3925         .3944         .3962         .3980         .3997         .4015           1.3         .4032         .4049         .4066         .4082         .4099         .4115         .4147         .4162         .4177           1.4         .4192         .4207         .4222         .4236         .4251         .4265         .4279         .4292         .4306         .4117           1.4         .4192         .4207         .4222         .4236         .4391         .4966         <											
0.9         .3159         .3186         .3212         .3238         .3264         .3289         .3315         .3340         .3365         .3389           1.0         .3413         .3438         .3461         .3485         .3508         .3531         .3554         .3577         .3599         .3621           1.1         .3643         .3665         .3686         .3708         .3729         .3770         .3790         .3810         .3830           1.2         .3849         .3869         .3888         .3907         .3925         .3944         .3962         .3980         .3997         .4015           1.3         .4032         .4049         .4066         .4082         .4099         .4115         .4131         .4147         .4162         .4177           1.4         .4192         .4207         .4222         .4236         .4251         .4265         .4279         .4292         .4306         .4319           1.5         .4332         .4345         .4357         .4370         .4382         .4394         .4406         .4418         .4429         .4411           1.6         .4452         .4463         .4473         .4582         .4591         .4599         <					.2673			.2764			.2852
1.0	0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
1.1.         .3643         .3665         .3686         .3708         .3729         .3749         .3770         .3790         .3810         .3830           1.2         .3849         .3869         .3888         .3907         .3925         .3944         .3962         .3980         .3997         .4015           1.3         .4032         .4049         .4066         .4082         .4099         .4115         .4131         .4147         .4162         .4177           1.4         .4192         .4207         .4222         .4236         .4251         .4265         .4279         .4292         .4306         .4319           1.5         .4332         .4345         .4357         .4370         .4382         .4394         .4406         .4418         .4429         .4441           1.6         .4452         .4463         .4474         .4484         .4495         .4505         .4515         .4525         .4535         .4545           1.7         .4554         .4564         .4573         .4582         .4591         .4505         .4515         .4525         .4535         .4545           1.7         .4513         .4726         .4732         .4738         .4594	0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.1.         .3643         .3665         .3686         .3708         .3729         .3749         .3770         .3790         .3810         .3830           1.2         .3849         .3869         .3888         .3907         .3925         .3944         .3962         .3980         .3997         .4015           1.3         .4032         .4049         .4066         .4082         .4099         .4115         .4131         .4147         .4162         .4177           1.4         .4192         .4207         .4222         .4236         .4251         .4265         .4279         .4292         .4306         .4319           1.5         .4332         .4345         .4357         .4370         .4382         .4394         .4406         .4418         .4429         .4441           1.6         .4452         .4463         .4474         .4484         .4495         .4505         .4515         .4525         .4535         .4545           1.7         .4554         .4564         .4573         .4582         .4591         .4505         .4515         .4525         .4535         .4545           1.7         .4513         .4726         .4732         .4738         .4594	1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.2         3849         3869         3888         3907         3925         3944         3962         3980         3997         4015           1.3         4032         4049         4066         4082         4099         4115         4131         4147         4162         4177           1.4         4192         4207         4222         4236         4251         4265         4279         4292         4306         4319           1.5         4332         4345         4357         4370         4382         4394         4406         4418         4429         4441           1.6         4452         4463         4474         4484         4495         4505         4515         4525         4535         4545           1.7         4554         4564         4573         4582         4591         4599         4608         4616         4625         4633           1.8         4641         4649         4656         4664         4671         4678         4686         4693         4699         4706           1.9         4713         4718         4783         4788         4793         4798         4803         4808         4812 </th <th></th>											
1.3       .4032       .4049       .4066       .4082       .4099       .4115       .4131       .4147       .4162       .4177         1.4       .4192       .4207       .4222       .4236       .4251       .4265       .4279       .4292       .4306       .4319         1.5       .4332       .4345       .4357       .4370       .4382       .4394       .4406       .4418       .4429       .4441         1.6       .4452       .4463       .4474       .4484       .4495       .4505       .4515       .4525       .4535       .4545         1.7       .4554       .4564       .4573       .4582       .4591       .4599       .4608       .4616       .4625       .4633         1.8       .4641       .4649       .4656       .4664       .4671       .4678       .4686       .4693       .4699       .4706         1.9       .4713       .4719       .4726       .4732       .4738       .4744       .4750       .4756       .4761       .4767         2.0       .4772       .4778       .4783       .4788       .4793       .4798       .4803       .4808       .4812       .4817         2.1       .4821											
1.5         .4332         .4345         .4357         .4370         .4382         .4394         .4406         .4418         .4429         .4411           1.6         .4452         .4463         .4474         .4484         .4495         .4505         .4515         .4525         .4535         .4545           1.7         .4554         .4564         .4573         .4582         .4591         .4599         .4608         .4616         .4625         .4633           1.8         .4641         .4649         .4656         .4664         .4671         .4678         .4686         .4693         .4699         .4706           1.9         .4713         .4719         .4726         .4732         .4738         .4744         .4750         .4756         .4761         .4767           2.0         .4772         .4778         .4783         .4788         .4793         .4798         .4803         .4812         .4812         .4812         .4812         .4812         .4812         .4814         .4826         .4830         .4834         .4884         .4846         .4857         .4878         .4881         .4884         .4887         .4887         .4878         .4881         .4884         .4887 <th>1.3</th> <th>.4032</th> <th>.4049</th> <th>.4066</th> <th>.4082</th> <th></th> <th>.4115</th> <th>.4131</th> <th></th> <th>.4162</th> <th>.4177</th>	1.3	.4032	.4049	.4066	.4082		.4115	.4131		.4162	.4177
1.6       .4452       .4463       .4474       .4484       .4495       .4505       .4515       .4525       .4535       .4545         1.7       .4554       .4564       .4573       .4582       .4591       .4599       .4608       .4616       .4625       .4633         1.8       .4641       .4649       .4656       .4664       .4671       .4678       .4686       .4693       .4699       .4706         1.9       .4713       .4719       .4726       .4732       .4738       .4744       .4750       .4756       .4761       .4767         2.0       .4772       .4778       .4783       .4788       .4793       .4803       .4803       .4808       .4812       .4817         2.1       .4821       .4826       .4830       .4834       .4838       .4842       .4864       .4887       .4880         2.2       .4861       .4864       .4868       .4871       .4875       .4878       .4881       .4884       .4887       .4890         2.3       .4893       .4896       .4898       .4901       .4904       .4906       .4909       .4911       .4913       .4916         2.4       .4918       .4920	1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.6       .4452       .4463       .4474       .4484       .4495       .4505       .4515       .4525       .4535       .4545         1.7       .4554       .4564       .4573       .4582       .4591       .4599       .4608       .4616       .4625       .4633         1.8       .4641       .4649       .4656       .4664       .4671       .4678       .4686       .4693       .4699       .4706         1.9       .4713       .4719       .4726       .4732       .4738       .4744       .4750       .4756       .4761       .4767         2.0       .4772       .4778       .4783       .4788       .4793       .4803       .4803       .4808       .4812       .4817         2.1       .4821       .4826       .4830       .4834       .4838       .4842       .4864       .4887       .4880         2.2       .4861       .4864       .4868       .4871       .4875       .4878       .4881       .4884       .4887       .4890         2.3       .4893       .4896       .4898       .4901       .4904       .4906       .4909       .4911       .4913       .4916         2.4       .4918       .4920	1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.7       .4554       .4564       .4573       .4582       .4591       .4599       .4608       .4616       .4625       .4633         1.8       .4641       .4649       .4656       .4664       .4671       .4678       .4686       .4693       .4699       .4706         1.9       .4713       .4719       .4726       .4732       .4738       .4744       .4750       .4756       .4761       .4767         2.0       .4772       .4778       .4783       .4788       .4793       .4798       .4803       .4808       .4812       .4817         2.1       .4821       .4826       .4830       .4834       .4838       .4842       .4846       .4850       .4857         2.2       .4861       .4864       .4868       .4891       .4875       .4878       .4881       .4884       .4887       .4880         2.3       .4893       .4896       .4898       .4901       .4906       .4990       .4911       .4913       .4916         2.4       .4918       .4920       .4922       .4925       .4927       .4929       .4931       .4932       .4934       .4936         2.5       .4938       .4940       .4941											
1.8       .4641       .4649       .4656       .4664       .4671       .4678       .4686       .4693       .4699       .4706         1.9       .4713       .4719       .4726       .4732       .4738       .4744       .4750       .4756       .4761       .4767         2.0       .4772       .4778       .4783       .4788       .4793       .4798       .4803       .4808       .4812       .4817         2.1       .4821       .4826       .4830       .4834       .4838       .4842       .4846       .4850       .4854       .4857         2.2       .4861       .4864       .4868       .4871       .4875       .4878       .4881       .4844       .4887       .4890         2.3       .4893       .4896       .4898       .4901       .4904       .4906       .4909       .4911       .4913       .4916         2.4       .4918       .4920       .4922       .4925       .4927       .4929       .4931       .4932       .4934       .4936         2.5       .4938       .4940       .4941       .4943       .4945       .4946       .4948       .4949       .4951       .4952         2.6       .4953											
1.9       .4713       .4719       .4726       .4732       .4738       .4744       .4750       .4756       .4761       .4767         2.0       .4772       .4778       .4783       .4788       .4793       .4798       .4803       .4808       .4812       .4817         2.1       .4821       .4826       .4830       .4834       .4838       .4842       .4846       .4850       .4854       .4857         2.2       .4861       .4864       .4868       .4871       .4875       .4878       .4881       .4844       .4887       .4890         2.3       .4893       .4896       .4898       .4901       .4904       .4906       .4909       .4911       .4913       .4916         2.4       .4918       .4920       .4922       .4925       .4927       .4929       .4931       .4932       .4934       .4936         2.5       .4938       .4940       .4941       .4943       .4945       .4946       .4948       .4949       .4951       .4952         2.6       .4953       .4955       .4956       .4957       .4959       .4960       .4961       .4962       .4963       .4974         2.7       .4965											
2.1       .4821       .4826       .4830       .4834       .4838       .4842       .4846       .4850       .4854       .4857         2.2       .4861       .4864       .4868       .4871       .4875       .4878       .4881       .4884       .4887       .4890         2.3       .4893       .4896       .4898       .4901       .4904       .4906       .4909       .4911       .4913       .4916         2.4       .4918       .4920       .4922       .4925       .4927       .4929       .4931       .4932       .4934       .4936         2.5       .4938       .4940       .4941       .4943       .4945       .4946       .4948       .4949       .4951       .4952         2.6       .4953       .4955       .4956       .4957       .4959       .4960       .4961       .4962       .4963       .4964         2.7       .4965       .4966       .4967       .4968       .4969       .4970       .4971       .4972       .4973       .4974         2.8       .4974       .4975       .4976       .4977       .4977       .4978       .4979       .4979       .4980       .4986         3.0       .4987											
2.1       .4821       .4826       .4830       .4834       .4838       .4842       .4846       .4850       .4854       .4857         2.2       .4861       .4864       .4868       .4871       .4875       .4878       .4881       .4884       .4887       .4890         2.3       .4893       .4896       .4898       .4901       .4904       .4906       .4909       .4911       .4913       .4916         2.4       .4918       .4920       .4922       .4925       .4927       .4929       .4931       .4932       .4934       .4936         2.5       .4938       .4940       .4941       .4943       .4945       .4946       .4948       .4949       .4951       .4952         2.6       .4953       .4955       .4956       .4957       .4959       .4960       .4961       .4962       .4963       .4964         2.7       .4965       .4966       .4967       .4968       .4969       .4970       .4971       .4972       .4973       .4974         2.8       .4974       .4975       .4976       .4977       .4977       .4978       .4979       .4979       .4980       .4986         3.0       .4987	2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.3       .4893       .4896       .4898       .4901       .4904       .4906       .4909       .4911       .4913       .4916         2.4       .4918       .4920       .4922       .4925       .4927       .4929       .4931       .4932       .4934       .4936         2.5       .4938       .4940       .4941       .4943       .4945       .4946       .4948       .4949       .4951       .4952         2.6       .4953       .4955       .4956       .4957       .4959       .4960       .4961       .4962       .4963       .4964         2.7       .4965       .4966       .4967       .4968       .4969       .4970       .4971       .4972       .4973       .4974         2.8       .4974       .4975       .4976       .4977       .4977       .4978       .4979       .4970       .4980       .4980         2.9       .4981       .4982       .4982       .4983       .4984       .4985       .4985       .4986       .4986         3.0       .4987       .4987       .4988       .4988       .4989       .4989       .4989       .4990       .4990         3.1       .4990       .4991       .4991								.4846			.4857
2.4       .4918       .4920       .4922       .4925       .4927       .4929       .4931       .4932       .4934       .4936         2.5       .4938       .4940       .4941       .4943       .4945       .4946       .4948       .4949       .4951       .4952         2.6       .4953       .4955       .4956       .4957       .4959       .4960       .4961       .4962       .4963       .4964         2.7       .4965       .4966       .4967       .4968       .4969       .4970       .4971       .4972       .4973       .4974         2.8       .4974       .4975       .4976       .4977       .4977       .4978       .4979       .4979       .4980       .4981         2.9       .4981       .4982       .4983       .4984       .4984       .4985       .4985       .4986       .4986         3.0       .4987       .4987       .4988       .4988       .4989       .4989       .4989       .4990       .4990         3.1       .4990       .4991       .4991       .4991       .4992       .4992       .4992       .4992       .4992       .4993       .4995       .4995       .4995       .4996       .4996 <th>2.2</th> <th>.4861</th> <th>.4864</th> <th>.4868</th> <th>.4871</th> <th>.4875</th> <th>.4878</th> <th>.4881</th> <th>.4884</th> <th>.4887</th> <th>.4890</th>	2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.5       .4938       .4940       .4941       .4943       .4945       .4946       .4948       .4949       .4951       .4952         2.6       .4953       .4955       .4956       .4957       .4959       .4960       .4961       .4962       .4963       .4964         2.7       .4965       .4966       .4967       .4968       .4969       .4970       .4971       .4972       .4973       .4974         2.8       .4974       .4975       .4976       .4977       .4977       .4978       .4979       .4979       .4980       .4981         2.9       .4981       .4982       .4982       .4983       .4984       .4984       .4985       .4985       .4986       .4986         3.0       .4987       .4987       .4988       .4988       .4989       .4989       .4989       .4996       .4990       .4990         3.1       .4990       .4991       .4991       .4991       .4992       .4992       .4992       .4992       .4993       .4993         3.2       .4993       .4993       .4994       .4994       .4994       .4994       .4994       .4995       .4995       .4995         3.4       .4997	2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.6       .4953       .4955       .4956       .4957       .4959       .4960       .4961       .4962       .4963       .4964         2.7       .4965       .4966       .4967       .4968       .4969       .4970       .4971       .4972       .4973       .4974         2.8       .4974       .4975       .4976       .4977       .4978       .4979       .4979       .4980       .4981         2.9       .4981       .4982       .4982       .4983       .4984       .4984       .4985       .4985       .4986       .4986         3.0       .4987       .4987       .4988       .4988       .4989       .4989       .4989       .4990       .4990         3.1       .4990       .4991       .4991       .4991       .4992       .4992       .4992       .4992       .4993       .4993       .4995       .4995       .4995       .4996       .4994       .4994       .4994       .4994       .4994       .4994       .4994       .4996       .4996       .4996       .4996       .4996       .4996       .4996       .4996       .4996       .4997       .4997       .4997       .4997       .4997       .4997       .4997       .4997	2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.7       .4965       .4966       .4967       .4968       .4969       .4970       .4971       .4972       .4973       .4974         2.8       .4974       .4975       .4976       .4977       .4977       .4978       .4979       .4979       .4980       .4981         2.9       .4981       .4982       .4982       .4983       .4984       .4984       .4985       .4985       .4986       .4986         3.0       .4987       .4987       .4988       .4988       .4989       .4989       .4989       .4990       .4990         3.1       .4990       .4991       .4991       .4991       .4992       .4992       .4992       .4992       .4992       .4993       .4993       .4993       .4993       .4993       .4995       .4995       .4995       .4995       .4995       .4995       .4996       .4994       .4994       .4994       .4994       .4994       .4996       .4996       .4996       .4996       .4996       .4996       .4996       .4996       .4997       .4997       .4997       .4997       .4997       .4997       .4997       .4997       .4997       .4997       .4997       .4997       .4997       .4997       .4997	2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	.4951	.4952
2.8       .4974       .4975       .4976       .4977       .4977       .4978       .4979       .4979       .4980       .4981         2.9       .4981       .4982       .4982       .4983       .4984       .4984       .4985       .4985       .4986       .4986         3.0       .4987       .4987       .4988       .4988       .4989       .4989       .4989       .4990       .4990         3.1       .4990       .4991       .4991       .4991       .4992       .4992       .4992       .4992       .4993       .4993       .4993         3.2       .4993       .4993       .4994       .4994       .4994       .4994       .4994       .4995       .4995       .4995       .4995         3.3       .4995       .4995       .4996       .4996       .4996       .4996       .4996       .4996       .4996       .4997		.4953					.4960				
2.9       .4981       .4982       .4982       .4983       .4984       .4984       .4985       .4985       .4986       .4986         3.0       .4987       .4987       .4988       .4988       .4989       .4989       .4989       .4990       .4990       .4990         3.1       .4990       .4991       .4991       .4992       .4992       .4992       .4992       .4993       .4993       .4993         3.2       .4993       .4993       .4994       .4994       .4994       .4994       .4994       .4995       .4995       .4995       .4995         3.3       .4995       .4995       .4996       .4996       .4996       .4996       .4996       .4996       .4997											
3.0       .4987       .4987       .4988       .4988       .4989       .4989       .4989       .4990       .4990       .4990       .4990       .4990       .4991       .4991       .4991       .4992       .4992       .4992       .4992       .4993       .4993       .4993       .4993       .4994       .4994       .4994       .4994       .4994       .4994       .4995       .4995       .4995       .4995       .4996       .4996       .4996       .4996       .4996       .4996       .4996       .4997       .											
3.1       .4990       .4991       .4991       .4992       .4992       .4992       .4992       .4993       .4993       .4993         3.2       .4993       .4993       .4994       .4994       .4994       .4994       .4995       .4995       .4995       .4995         3.3       .4995       .4995       .4996       .4996       .4996       .4996       .4996       .4996       .4997 <th>2.9</th> <th>.4981</th> <th>.4982</th> <th>.4982</th> <th>.4983</th> <th>.4984</th> <th>.4984</th> <th>.4985</th> <th>.4985</th> <th>.4986</th> <th>.4986</th>	2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.2       .4993       .4993       .4994       .4994       .4994       .4994       .4995       .4995       .4995         3.3       .4995       .4995       .4996       .4996       .4996       .4996       .4996       .4996       .4996       .4996       .4997       .4997       .4997       .4997       .4997       .4997       .4997       .4997       .4997       .4997       .4997       .4998         3.5       .4998       .49997       .49997       .4999 </th <th>3.0</th> <th>.4987</th> <th>.4987</th> <th>.4987</th> <th>.4988</th> <th>.4988</th> <th>.4989</th> <th>.4989</th> <th>.4989</th> <th>.4990</th> <th>.4990</th>	3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990
3.3       .4995       .4995       .4996       .4996       .4996       .4996       .4996       .4996       .4997         3.4       .4997       .4997       .4997       .4997       .4997       .4997       .4997       .4997       .4998         3.5       .4998         4.0       .49997       .4999	3.1	.4990	.4991	.4991	.4991	.4992	.4992	.4992	.4992	.4993	.4993
3.4 .4997 .4997 .4997 .4997 .4997 .4997 .4997 .4997 .4997 .4997 .4997 .4998 .4998 .4998 .4998 .49997 .49997 .4999 .4999 .4999997 .49999997	3.2	.4993	.4993	.4994	.4994	.4994	.4994	.4994	.4995	.4995	.4995
3.5 .4998 4.0 .49997 4.5 .499997 5.0 .4999997		.4995	.4995	.4995	.4996	.4996	.4996	.4996	.4996	.4996	.4997
4.0       .49997         4.5       .499997         5.0       .4999997	3.4	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4998
4.5       .499997         5.0       .4999997	3.5	.4998									
5.0 .4999997	4.0	.49997									
		.499997									
6.0 .499999999											
	6.0	.499999999									

TABLE A.6

Critical Values from the t Distribution



	Va	lues of $\alpha$ for or	ne-tailed test ar	nd $\alpha/2$ for two-	tailed test	
df	t <sub>.100</sub>	t <sub>.050</sub>	t <sub>.025</sub>	t <sub>.010</sub>	t.005	t <sub>.001</sub>
1	3.078	6.314	12.706	31.821	63.656	318.289
2	1.886	2.920	4.303	6.965	9.925	22.328
3	1.638	2.353	3.182	4.541	5.841	10.214
4	1.533	2.132	2.776	3.747	4.604	7.173
5	1.476	2.015	2.571	3.365	4.032	5.894
6	1.440	1.943	2.447	3.143	3.707	5.208
7	1.415	1.895	2.365	2.998	3.499	4.785
8	1.397	1.860	2.306	2.896	3.355	4.501
9	1.383	1.833	2.262	2.821	3.250	4.297
10	1.372	1.812	2.228	2.764	3.169	4.144
11	1.363	1.796	2.201	2.718	3.106	4.025
12	1.356	1.782	2.179	2.681	3.055	3.930
13	1.350	1.771	2.160	2.650	3.012	3.852
14	1.345	1.761	2.145	2.624	2.977	3.787
15	1.341	1.753	2.131	2.602	2.947	3.733
16	1.337	1.746	2.120	2.583	2.921	3.686
17	1.333	1.740	2.110	2.567	2.898	3.646
18	1.330	1.734	2.101	2.552	2.878	3.610
19	1.328	1.729	2.093	2.539	2.861	3.579
20	1.325	1.725	2.086	2.528	2.845	3.552
21	1.323	1.721	2.080	2.518	2.831	3.527
22	1.321	1.717	2.074	2.508	2.819	3.505
23	1.319	1.714	2.069	2.500	2.807	3.485
24	1.318	1.711	2.064	2.492	2.797	3.467
25	1.316	1.708	2.060	2.485	2.787	3.450
26	1.315	1.706	2.056	2.479	2.779	3.435
27	1.314	1.703	2.052	2.473	2.771	3.421
28	1.313	1.701	2.048	2.467	2.763	3.408
29	1.311	1.699	2.045	2.462	2.756	3.396
30	1.310	1.697	2.042	2.457	2.750	3.385
40	1.303	1.684	2.021	2.423	2.704	3.307
50	1.299	1.676	2.009	2.403	2.678	3.261
60	1.296	1.671	2.000	2.390	2.660	3.232
70	1.294	1.667	1.994	2.381	2.648	3.211
80	1.292	1.664	1.990	2.374	2.639	3.195
90	1.291	1.662	1.987	2.368	2.632	3.183
100	1.290	1.660	1.984	2.364	2.626	3.174
150	1.287	1.655	1.976	2.351	2.609	3.145
200	1.286	1.653	1.972	2.345	2.601	3.131
$\infty$	1.282	1.645	1.960	2.326	2.576	3.090

## TABLE A.7

## Percentage Points of the F Distribution



	$\stackrel{\nu_1}{\smile}$ —			NT.		= .10	. 1			
$v_2$					imerator De			_		
		1	2	3	4	5	6	7	8	9
	1	39.86	49.50	53.59	55.83	57.24	58.20	58.91	59.44	59.86
	2	8.53	9.00	9.16	9.24	9.29	9.33	9.35	9.37	9.38
	3	5.54	5.46	5.39	5.34	5.31	5.28	5.27	5.25	5.24
	4	4.54	4.32	4.19	4.11	4.05	4.01	3.98	3.95	3.94
	5	4.06	3.78	3.62	3.52	3.45	3.40	3.37	3.34	3.32
	6	3.78	3.46	3.29	3.18	3.11	3.05	3.01	2.98	2.96
	7	3.59	3.26	3.07	2.96	2.88	2.83	2.78	2.75	2.72
	8	3.46	3.11	2.92	2.81	2.73	2.67	2.62	2.59	2.56
	9	3.36	3.01	2.81	2.69	2.61	2.55	2.51	2.47	2.44
	10	3.29	2.92	2.73	2.61	2.52	2.46	2.41	2.38	2.35
000	11	3.23	2.86	2.66	2.54	2.45	2.39	2.34	2.30	2.27
i.	12	3.18	2.81	2.61	2.48	2.39	2.33	2.28	2.24	2.21
01	13	3.14	2.76	2.56	2.43	2.35	2.28	2.23	2.20	2.16
Second	14	3.10	2.73	2.52	2.39	2.31	2.24	2.19	2.15	2.12
36	15	3.07	2.70	2.49	2.36	2.27	2.21	2.16	2.12	2.09
ין ב	16	3.05	2.67	2.46	2.33	2.24	2.18	2.13	2.09	2.06
a10	17	3.03	2.64	2.44	2.31	2.22	2.15	2.10	2.06	2.03
Denominator Degrees of Freedom	18	3.01	2.62	2.42	2.29	2.20	2.13	2.08	2.04	2.00
	19	2.99	2.61	2.40	2.27	2.18	2.11	2.06	2.02	1.98
De	20	2.97	2.59	2.38	2.25	2.16	2.09	2.04	2.00	1.96
	21	2.96	2.57	2.36	2.23	2.14	2.08	2.02	1.98	1.95
	22	2.95	2.56	2.35	2.22	2.13	2.06	2.01	1.97	1.93
	23	2.94	2.55	2.34	2.21	2.11	2.05	1.99	1.95	1.92
	24	2.93	2.54	2.33	2.19	2.10	2.04	1.98	1.94	1.91
	25	2.92	2.53	2.32	2.18	2.09	2.02	1.97	1.93	1.89
	26	2.91	2.52	2.31	2.17	2.08	2.01	1.96	1.92	1.88
	27	2.90	2.51	2.30	2.17	2.07	2.00	1.95	1.91	1.87
	28	2.89	2.50	2.29	2.16	2.06	2.00	1.94	1.90	1.87
	29	2.89	2.50	2.28	2.15	2.06	1.99	1.93	1.89	1.86
	30	2.88	2.49	2.28	2.14	2.05	1.98	1.93	1.88	1.85
	40	2.84	2.44	2.23	2.09	2.00	1.93	1.87	1.83	1.79
	60	2.79	2.39	2.18	2.04	1.95	1.87	1.82	1.77	1.74
	120	2.75	2.35	2.13	1.99	1.90	1.82	1.77	1.72	1.68
	$\infty$	2.71	2.30	2.08	1.94	1.85	1.77	1.72	1.67	1.63

TABLE A.7 Percentage Points of the F Distribution (Continued)

					$\alpha = .10$					ν <sub>1</sub>	
					r Degrees of						
	12	15	20	24	30	40	60	120	∞		$\nu_2$
60.19	60.71	61.22	61.74	62.00	62.26	62.53	62.79	63.06	63.33	1	
9.39	9.41	9.42	9.44	9.45	9.46	9.47	9.47	9.48	9.49	2	
5.23	5.22	5.20	5.18	5.18	5.17	5.16	5.15	5.14	5.13	3	
3.92	3.90	3.87	3.84	3.83	3.82	3.80	3.79	3.78	3.76	4	
3.30	3.27	3.24	3.21	3.19	3.17	3.16	3.14	3.12	3.10	5	
2.94	2.90	2.87	2.84	2.82	2.80	2.78	2.76	2.74	2.72	6	
2.70	2.67	2.63	2.59	2.58	2.56	2.54	2.51	2.49	2.47	7	
2.54	2.50	2.46	2.42	2.40	2.38	2.36	2.34	2.32	2.29	8	
2.42	2.38	2.34	2.30	2.28	2.25	2.23	2.21	2.18	2.16	9	
2.32	2.28	2.24	2.20	2.18	2.16	2.13	2.11	2.08	2.06	10	
2.25	2.21	2.17	2.12	2.10	2.08	2.05	2.03	2.00	1.97	11	8
2.19	2.15	2.10	2.06	2.04	2.01	1.99	1.96	1.93	1.90	12	opo
2.14	2.10	2.05	2.01	1.98	1.96	1.93	1.90	1.88	1.85	13	Denominator Degrees of Freedom
2.10	2.05	2.01	1.96	1.94	1.91	1.89	1.86	1.83	1.80	14	of 1
2.06	2.02	1.97	1.92	1.90	1.87	1.85	1.82	1.79	1.76	15	sees
2.03	1.99	1.94	1.89	1.87	1.84	1.81	1.78	1.75	1.72	16	egr
2.00	1.96	1.91	1.86	1.84	1.81	1.78	1.75	1.72	1.69	17	Į.
1.98	1.93	1.89	1.84	1.81	1.78	1.75	1.72	1.69	1.66	18	ato
1.96	1.91	1.86	1.81	1.79	1.76	1.73	1.70	1.67	1.63	19	iji
1.94	1.89	1.84	1.79	1.77	1.74	1.71	1.68	1.64	1.61	20	101
1.92	1.87	1.83	1.78	1.75	1.72	1.69	1.66	1.62	1.59	21	Del
1.90	1.86	1.81	1.76	1.73	1.70	1.67	1.64	1.60	1.57	22	
1.89	1.84	1.80	1.74	1.72	1.69	1.66	1.62	1.59	1.55	23	
1.88	1.83	1.78	1.73	1.70	1.67	1.64	1.61	1.57	1.53	24	
1.87	1.82	1.77	1.72	1.69	1.66	1.63	1.59	1.56	1.52	25	
1.86	1.81	1.76	1.71	1.68	1.65	1.61	1.58	1.54	1.50	26	
1.85	1.80	1.75	1.70	1.67	1.64	1.60	1.57	1.53	1.49	27	
1.84	1.79	1.74	1.69	1.66	1.63	1.59	1.56	1.52	1.48	28	
1.83	1.78	1.73	1.68	1.65	1.62	1.58	1.55	1.51	1.47	29	
1.82	1.77	1.72	1.67	1.64	1.61	1.57	1.54	1.50	1.46	30	
1.76	1.71	1.66	1.61	1.57	1.54	1.51	1.47	1.42	1.38	40	
1.71	1.66	1.60	1.54	1.51	1.48	1.44	1.40	1.35	1.29	60	
1.65	1.60	1.55	1.48	1.45	1.41	1.37	1.32	1.26	1.19	120	
1.60	1.55	1.49	1.42	1.38	1.34	1.30	1.24	1.17	1.00	$\infty$	

TABLE A.7
Percentage Points of the F Distribution (Continued)

	$v_1$ $\alpha = .05$														
	$\nu_1$				$\alpha = .$	05									
$v_2$	Numerator Degrees of Freedom														
		1	2					7	8	9					
	1	161.45	199.50	215.71	224.58	230.16	233.99	236.77	238.88	240.54					
	2	18.51	19.00	19.16	19.25	19.30	19.33	19.35	19.37	19.38					
	3	10.13	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81					
	4	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00					
	5	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77					
	6	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10					
	7	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68					
	8	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39					
	9	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18					
_	10	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02					
mol	11	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.90					
Denominator Degrees of Freedom	12	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80					
fFr	13	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77	2.71					
o sa	14	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.65					
gre	15	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59					
Deg	16	4.49	3.63	3.24	3.01	2.85	2.74	2.66	2.59	2.54					
tor	17	4.45	3.59	3.20	2.96	2.81	2.70	2.61	2.55	2.49					
ina	18	4.41	3.55	3.16	2.93	2.77	2.66	2.58	2.51	2.46					
omo	19	4.38	3.52	3.13	2.90	2.74	2.63	2.54	2.48	2.42					
)en	20	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39					
П	21	4.32	3.47	3.07	2.84	2.68	2.57	2.49	2.42	2.37					
	22	4.30	3.44	3.05	2.82	2.66	2.55	2.46	2.40	2.34					
	23	4.28	3.42	3.03	2.80	2.64	2.53	2.44	2.37	2.32					
	24	4.26	3.40	3.01	2.78	2.62	2.51	2.42	2.36	2.30					
	25	4.24	3.39	2.99	2.76	2.60	2.49	2.40	2.34	2.28					
	26	4.23	3.37	2.98	2.74	2.59	2.47	2.39	2.32	2.27					
	27	4.21	3.35	2.96	2.73	2.57	2.46	2.37	2.31	2.25					
	28	4.20	3.34	2.95	2.71	2.56	2.45	2.36	2.29	2.24					
	29	4.18	3.33	2.93	2.70	2.55	2.43	2.35	2.28	2.22					
	30	4.17	3.32	2.92	2.69	2.53	2.42	2.33	2.27	2.21					
	40	4.08	3.23	2.84	2.61	2.45	2.34	2.25	2.18	2.12					
	60	4.00	3.15	2.76	2.53	2.37	2.25	2.17	2.10	2.04					
	120	3.92	3.07	2.68	2.45	2.29	2.18	2.09	2.02	1.96					
	$\infty$	3.84	3.00	2.60	2.37	2.21	2.10	2.01	1.94	1.88					

TABLE A.7 Percentage Points of the F Distribution (Continued)

						= .05				ν <sub>1</sub>	
10	12	15	20	Num 24	erator Deg 30	grees of Fre	edom 60	120	$\infty$		$v_{\rm z}$
241.88	243.90	245.90	248.00	249.10	250.10	251.10	252.20	253.30	254.30	1	<u>L</u>
19.40	19.41	19.43	19.45	19.45	19.46	19.47	19.48	19.49	19.50	2	
8.79	8.74	8.70	8.66	8.64	8.62	8.59	8.57	8.55	8.53	3	
5.96	5.91	5.86	5.80	5.77	5.75	5.72	5.69	5.66	5.63	4	
4.74	4.68	4.62	4.56	4.53	4.50	4.46	4.43	4.40	4.36	5	
4.06	4.00	3.94	3.87	3.84	3.81	3.77	3.74	3.70	3.67	6	
3.64	3.57	3.51	3.44	3.41	3.38	3.34	3.30	3.27	3.23	7	
3.35	3.28	3.22	3.15	3.12	3.08	3.04	3.01	2.97	2.93	8	
3.14	3.07	3.01	2.94	2.90	2.86	2.83	2.79	2.75	2.71	9	
2.98	2.91	2.85	2.77	2.74	2.70	2.66	2.62	2.58	2.54	10	
2.85	2.79	2.72	2.65	2.61	2.57	2.53	2.49	2.45	2.40	11	
2.75	2.69	2.62	2.54	2.51	2.47	2.43	2.38	2.34	2.30	12	
2.67	2.60	2.53	2.46	2.42	2.38	2.34	2.30	2.25	2.21	13	
2.60	2.53	2.46	2.39	2.35	2.31	2.27	2.22	2.18	2.13	14	_
2.54	2.48	2.40	2.33	2.29	2.25	2.20	2.16	2.11	2.07	15	
2.49	2.42	2.35	2.28	2.24	2.19	2.15	2.11	2.06	2.01	16	
2.45	2.38	2.31	2.23	2.19	2.15	2.10	2.06	2.01	1.96	17	- - -
2.41	2.34	2.27	2.19	2.15	2.11	2.06	2.02	1.97	1.92	18	4
2.38	2.31	2.23	2.16	2.11	2.07	2.03	1.98	1.93	1.88	19	
2.35	2.28	2.20	2.12	2.08	2.04	1.99	1.95	1.90	1.84	20	
2.32	2.25	2.18	2.10	2.05	2.01	1.96	1.92	1.87	1.81	21	
2.30	2.23	2.15	2.07	2.03	1.98	1.94	1.89	1.84	1.78	22	
2.27	2.20	2.13	2.05	2.01	1.96	1.91	1.86	1.81	1.76	23	
2.25	2.18	2.11	2.03	1.98	1.94	1.89	1.84	1.79	1.73	24	
2.24	2.16	2.09	2.01	1.96	1.92	1.87	1.82	1.77	1.71	25	
2.22	2.15	2.07	1.99	1.95	1.90	1.85	1.80	1.75	1.69	26	
2.20	2.13	2.06	1.97	1.93	1.88	1.84	1.79	1.73	1.67	27	
2.19	2.12	2.04	1.96	1.91	1.87	1.82	1.77	1.71	1.65	28	
2.18	2.10	2.03	1.94	1.90	1.85	1.81	1.75	1.70	1.64	29	
2.16	2.09	2.01	1.93	1.89	1.84	1.79	1.74	1.68	1.62	30	
2.08	2.00	1.92	1.84	1.79	1.74	1.69	1.64	1.58	1.51	40	
1.99	1.92	1.84	1.75	1.70	1.65	1.59	1.53	1.47	1.39	60	
1.91	1.83	1.75	1.66	1.61	1.55	1.50	1.43	1.35	1.25	120	
1.83	1.75	1.67	1.57	1.52	1.46	1.39	1.32	1.22	1.00	∞	

TABLE A.7
Percentage Points of the F Distribution (Continued)

	$\nu_1$				$\alpha = .$	.025									
		Numerator Degrees of Freedom  1 2 3 4 5 6 7 8 9													
$\nu_2$		1	2		_			7	8	9					
	1	647.79	799.48	864.15	899.60	921.83	937.11	948.20	956.64	963.28					
	2	38.51	39.00	39.17	39.25	39.30	39.33	39.36	39.37	39.39					
	3	17.44	16.04	15.44	15.10	14.88	14.73	14.62	14.54	14.47					
	4	12.22	10.65	9.98	9.60	9.36	9.20	9.07	8.98	8.90					
	5	10.01	8.43	7.76	7.39	7.15	6.98	6.85	6.76	6.68					
	6	8.81	7.26	6.60	6.23	5.99	5.82	5.70	5.60	5.52					
	7	8.07	6.54	5.89	5.52	5.29	5.12	4.99	4.90	4.82					
	8	7.57	6.06	5.42	5.05	4.82	4.65	4.53	4.43	4.36					
	9	7.21	5.71	5.08	4.72	4.48	4.32	4.20	4.10	4.03					
_	10	6.94	5.46	4.83	4.47	4.24	4.07	3.95	3.85	3.78					
Denominator Degrees of Freedom	11	6.72	5.26	4.63	4.28	4.04	3.88	3.76	3.66	3.59					
eed	12	6.55	5.10	4.47	4.12	3.89	3.73	3.61	3.51	3.44					
Ė	13	6.41	4.97	4.35	4.00	3.77	3.60	3.48	3.39	3.31					
SO	14	6.30	4.86	4.24	3.89	3.66	3.50	3.38	3.29	3.21					
ree	15	6.20	4.77	4.15	3.80	3.58	3.41	3.29	3.20	3.12					
Deg	16	6.12	4.69	4.08	3.73	3.50	3.34	3.22	3.12	3.05					
0 <b>r</b>	17	6.04	4.62	4.01	3.66	3.44	3.28	3.16	3.06	2.98					
nat	18	5.98	4.56	3.95	3.61	3.38	3.22	3.10	3.01	2.93					
in in	19	5.92	4.51	3.90	3.56	3.33	3.17	3.05	2.96	2.88					
enc	20	5.87	4.46	3.86	3.51	3.29	3.13	3.01	2.91	2.84					
Ω	21	5.83	4.42	3.82	3.48	3.25	3.09	2.97	2.87	2.80					
	22	5.79	4.38	3.78	3.44	3.22	3.05	2.93	2.84	2.76					
	23	5.75	4.35	3.75	3.41	3.18	3.02	2.90	2.81	2.73					
	24	5.72	4.32	3.72	3.38	3.15	2.99	2.87	2.78	2.70					
	25	5.69	4.29	3.69	3.35	3.13	2.97	2.85	2.75	2.68					
	26	5.66	4.27	3.67	3.33	3.10	2.94	2.82	2.73	2.65					
	27	5.63	4.24	3.65	3.31	3.08	2.92	2.80	2.71	2.63					
	28	5.61	4.22	3.63	3.29	3.06	2.90	2.78	2.69	2.61					
	29	5.59	4.20	3.61	3.27	3.04	2.88	2.76	2.67	2.59					
	30	5.57	4.18	3.59	3.25	3.03	2.87	2.75	2.65	2.57					
	40	5.42	4.05	3.46	3.13	2.90	2.74	2.62	2.53	2.45					
	60	5.29	3.93	3.34	3.01	2.79	2.63	2.51	2.41	2.33					
	120	5.15	3.80	3.23	2.89	2.67	2.52	2.39	2.30	2.22					
	$\infty$	5.02	3.69	3.12	2.79	2.57	2.41	2.29	2.19	2.11					

TABLE A.7 Percentage Points of the F Distribution (Continued)

					$\alpha = .02$	5				$\nu_1$	/
				Numer	ator Degree	s of Freedor					
10	12	15	20	24	30	40	60	120	$\infty$	/_	1
968.63	976.72	984.87	993.08	997.27	1001.40	1005.60	1009.79	1014.04	1018.00	1	
39.40	39.41	39.43	39.45	39.46	39.46	39.47	39.48	39.49	39.50	2	
14.42	14.34	14.25	14.17	14.12	14.08	14.04	13.99	13.95	13.90	3	
8.84	8.75	8.66	8.56	8.51	8.46	8.41	8.36	8.31	8.26	4	
6.62	6.52	6.43	6.33	6.28	6.23	6.18	6.12	6.07	6.02	5	
5.46	5.37	5.27	5.17	5.12	5.07	5.01	4.96	4.90	4.85	6	
4.76	4.67	4.57	4.47	4.41	4.36	4.31	4.25	4.20	4.14	7	
4.30	4.20	4.10	4.00	3.95	3.89	3.84	3.78	3.73	3.67	8	
3.96	3.87	3.77	3.67	3.61	3.56	3.51	3.45	3.39	3.33	9	
3.72	3.62	3.52	3.42	3.37	3.31	3.26	3.20	3.14	3.08	10	
3.53	3.43	3.33	3.23	3.17	3.12	3.06	3.00	2.94	2.88	11	
3.37	3.28	3.18	3.07	3.02	2.96	2.91	2.85	2.79	2.72	12	
3.25	3.15	3.05	2.95	2.89	2.84	2.78	2.72	2.66	2.60	13	
3.15	3.05	2.95	2.84	2.79	2.73	2.67	2.61	2.55	2.49	14	
3.06	2.96	2.86	2.76	2.70	2.64	2.59	2.52	2.46	2.40	15	
2.99	2.89	2.79	2.68	2.63	2.57	2.51	2.45	2.38	2.32	16	
2.92	2.82	2.72	2.62	2.56	2.50	2.44	2.38	2.32	2.25	17	
2.87	2.77	2.67	2.56	2.50	2.44	2.38	2.32	2.26	2.19	18	
2.82	2.72	2.62	2.51	2.45	2.39	2.33	2.27	2.20	2.13	19	
2.77	2.68	2.57	2.46	2.41	2.35	2.29	2.22	2.16	2.09	20	
2.73	2.64	2.53	2.42	2.37	2.31	2.25	2.18	2.11	2.04	21	
2.70	2.60	2.50	2.39	2.33	2.27	2.21	2.14	2.08	2.00	22	
2.67	2.57	2.47	2.36	2.30	2.24	2.18	2.11	2.04	1.97	23	
2.64	2.54	2.44	2.33	2.27	2.21	2.15	2.08	2.01	1.94	24	
2.61	2.51	2.41	2.30	2.24	2.18	2.12	2.05	1.98	1.91	25	
2.59	2.49	2.39	2.28	2.22	2.16	2.09	2.03	1.95	1.88	26	
2.57	2.47	2.36	2.25	2.19	2.13	2.07	2.00	1.93	1.85	27	
2.55	2.45	2.34	2.23	2.17	2.11	2.05	1.98	1.91	1.83	28	
2.53	2.43	2.32	2.21	2.15	2.09	2.03	1.96	1.89	1.81	29	
2.51	2.41	2.31	2.20	2.14	2.07	2.01	1.94	1.87	1.79	30	
2.39	2.29	2.18	2.07	2.01	1.94	1.88	1.80	1.72	1.64	40	
2.27	2.17	2.06	1.94	1.88	1.82	1.74	1.67	1.58	1.48	60	
2.16	2.05	1.94	1.82	1.76	1.69	1.61	1.53	1.43	1.31	120	
2.05	1.94	1.83	1.71	1.64	1.57	1.48	1.39	1.27	1.00	$\infty$	

(Continued)

TABLE A.7
Percentage Points of the F Distribution (Continued)

	$\nu_1$				α	=.01									
	$\overline{}$	Numerator Degrees of Freedom													
$\nu_2$		1	2					7	8	9					
	1	4052.18	4999.34	5403.53	5624.26	5763.96	5858.95	5928.33	5980.95	6022.40					
	2	98.50	99.00	99.16	99.25	99.30	99.33	99.36	99.38	99.39					
	3	34.12	30.82	29.46	28.71	28.24	27.91	27.67	27.49	27.34					
	4	21.20	18.00	16.69	15.98	15.52	15.21	14.98	14.80	14.66					
	5	16.26	13.27	12.06	11.39	10.97	10.67	10.46	10.29	10.16					
	6	13.75	10.92	9.78	9.15	8.75	8.47	8.26	8.10	7.98					
	7	12.25	9.55	8.45	7.85	7.46	7.19	6.99	6.84	6.72					
	8	11.26	8.65	7.59	7.01	6.63	6.37	6.18	6.03	5.91					
	9	10.56	8.02	6.99	6.42	6.06	5.80	5.61	5.47	5.35					
d	10	10.04	7.56	6.55	5.99	5.64	5.39	5.20	5.06	4.94					
dor	11	9.65	7.21	6.22	5.67	5.32	5.07	4.89	4.74	4.63					
ree	12	9.33	6.93	5.95	5.41	5.06	4.82	4.64	4.50	4.39					
Denominator Degrees of Freedom	13	9.07	6.70	5.74	5.21	4.86	4.62	4.44	4.30	4.19					
ses	14	8.86	6.51	5.56	5.04	4.69	4.46	4.28	4.14	4.03					
gre	15	8.68	6.36	5.42	4.89	4.56	4.32	4.14	4.00	3.89					
·De	16	8.53	6.23	5.29	4.77	4.44	4.20	4.03	3.89	3.78					
tor	17	8.40	6.11	5.19	4.67	4.34	4.10	3.93	3.79	3.68					
ina	18	8.29	6.01	5.09	4.58	4.25	4.01	3.84	3.71	3.60					
lon	19	8.18	5.93	5.01	4.50	4.17	3.94	3.77	3.63	3.52					
Der	20	8.10	5.85	4.94	4.43	4.10	3.87	3.70	3.56	3.46					
	21	8.02	5.78	4.87	4.37	4.04	3.81	3.64	3.51	3.40					
	22	7.95	5.72	4.82	4.31	3.99	3.76	3.59	3.45	3.35					
	23	7.88	5.66	4.76	4.26	3.94	3.71	3.54	3.41	3.30					
	24	7.82	5.61	4.72	4.22	3.90	3.67	3.50	3.36	3.26					
	25	7.77	5.57	4.68	4.18	3.85	3.63	3.46	3.32	3.22					
	26	7.72	5.53	4.64	4.14	3.82	3.59	3.42	3.29	3.18					
	27	7.68	5.49	4.60	4.11	3.78	3.56	3.39	3.26	3.15					
	28	7.64	5.45	4.57	4.07	3.75	3.53	3.36	3.23	3.12					
	29	7.60	5.42	4.54	4.04	3.73	3.50	3.33	3.20	3.09					
	30	7.56	5.39	4.51	4.02	3.70	3.47	3.30	3.17	3.07					
	40	7.31	5.18	4.31	3.83	3.51	3.29	3.12	2.99	2.89					
	60	7.08	4.98	4.13	3.65	3.34	3.12	2.95	2.82	2.72					
	120	6.85	4.79	3.95	3.48	3.17	2.96	2.79	2.66	2.56					
	$\infty$	6.63	4.61	3.78	3.32	3.02	2.80	2.64	2.51	2.41					

TABLE A.7 Percentage Points of the F Distribution (Continued)

				<i>α</i> =	.01					$\nu_1$	
			Nun	nerator Deg	grees of Free	edom					
10	12	15	20	24	30	40	60	120	$\infty$		$v_2$
6055.93	6106.68	6156.97	6208.66	6234.27	6260.35	6286.43	6312.97	6339.51	6366.00	1	
99.40	99.42	99.43	99.45	99.46	99.47	99.48	99.48	99.49	99.50	2	
27.23	27.05	26.87	26.69	26.60	26.50	26.41	26.32	26.22	26.13	3	
14.55	14.37	14.20	14.02	13.93	13.84	13.75	13.65	13.56	13.46	4	
10.05	9.89	9.72	9.55	9.47	9.38	9.29	9.20	9.11	9.02	5	
7.87	7.72	7.56	7.40	7.31	7.23	7.14	7.06	6.97	6.88	6	
6.62	6.47	6.31	6.16	6.07	5.99	5.91	5.82	5.74	5.65	7	
5.81	5.67	5.52	5.36	5.28	5.20	5.12	5.03	4.95	4.86	8	
5.26	5.11	4.96	4.81	4.73	4.65	4.57	4.48	4.40	4.31	9	
4.85	4.71	4.56	4.41	4.33	4.25	4.17	4.08	4.00	3.91	10	
4.54	4.40	4.25	4.10	4.02	3.94	3.86	3.78	3.69	3.60	11	
4.30	4.16	4.01	3.86	3.78	3.70	3.62	3.54	3.45	3.36	12	E E
4.10	3.96	3.82	3.66	3.59	3.51	3.43	3.34	3.25	3.17	13	Denominator Degrees of Freedom
3.94	3.80	3.66	3.51	3.43	3.35	3.27	3.18	3.09	3.00	14	Fre
3.80	3.67	3.52	3.37	3.29	3.21	3.13	3.05	2.96	2.87	15	jo (
3.69	3.55	3.41	3.26	3.18	3.10	3.02	2.93	2.84	2.75	16	rees
3.59	3.46	3.31	3.16	3.08	3.00	2.92	2.83	2.75	2.65	17	eg
3.51	3.37	3.23	3.08	3.00	2.92	2.84	2.75	2.66	2.57	18	or D
3.43	3.30	3.15	3.00	2.92	2.84	2.76	2.67	2.58	2.49	19	nato
3.37	3.23	3.09	2.94	2.86	2.78	2.69	2.61	2.52	2.42	20	mir.
3.31	3.17	3.03	2.88	2.80	2.72	2.64	2.55	2.46	2.36	21	inoli:
3.26	3.12	2.98	2.83	2.75	2.67	2.58	2.50	2.40	2.31	22	De
3.21	3.07	2.93	2.78	2.70	2.62	2.54	2.45	2.35	2.26	23	
3.17	3.03	2.89	2.74	2.66	2.58	2.49	2.40	2.31	2.21	24	
3.13	2.99	2.85	2.70	2.62	2.54	2.45	2.36	2.27	2.17	25	
3.09	2.96	2.81	2.66	2.58	2.50	2.42	2.33	2.23	2.13	26	
3.06	2.93	2.78	2.63	2.55	2.47	2.38	2.29	2.20	2.10	27	
3.03	2.90	2.75	2.60	2.52	2.44	2.35	2.26	2.17	2.06	28	
3.00	2.87	2.73	2.57	2.49	2.41	2.33	2.23	2.14	2.03	29	
2.98	2.84	2.70	2.55	2.47	2.39	2.30	2.21	2.11	2.01	30	
2.80	2.66	2.52	2.37	2.29	2.20	2.11	2.02	1.92	1.80	40	
2.63	2.50	2.35	2.20	2.12	2.03	1.94	1.84	1.73	1.60	60	
2.47	2.34	2.19	2.03	1.95	1.86	1.76	1.66	1.53	1.38	120	
2.32	2.18	2.04	1.88	1.79	1.70	1.59	1.47	1.32	1.00	$\infty$	

(Continued)

TABLE A.7
Percentage Points of the F Distribution (Continued)

	$\sim \frac{\nu_1}{-}$					$\alpha = .005$				
					Numerat	or Degrees of	Freedom			
	$\nu_2$	1	2	3	4	5	6	7	8	9
	1	16212.46	19997.36	21614.13	22500.75	23055.82	23439.53	23715.20	23923.81	24091.45
	2	198.50	199.01	199.16	199.24	199.30	199.33	199.36	199.38	199.39
	3	55.55	49.80	47.47	46.20	45.39	44.84	44.43	44.13	43.88
	4	31.33	26.28	24.26	23.15	22.46	21.98	21.62	21.35	21.14
	5	22.78	18.31	16.53	15.56	14.94	14.51	14.20	13.96	13.77
	6	18.63	14.54	12.92	12.03	11.46	11.07	10.79	10.57	10.39
	7	16.24	12.40	10.88	10.05	9.52	9.16	8.89	8.68	8.51
	8	14.69	11.04	9.60	8.81	8.30	7.95	7.69	7.50	7.34
	9	13.61	10.11	8.72	7.96	7.47	7.13	6.88	6.69	6.54
	10	12.83	9.43	8.08	7.34	6.87	6.54	6.30	6.12	5.97
E E	11	12.23	8.91	7.60	6.88	6.42	6.10	5.86	5.68	5.54
edc	12	11.75	8.51	7.23	6.52	6.07	5.76	5.52	5.35	5.20
Fre	13	11.37	8.19	6.93	6.23	5.79	5.48	5.25	5.08	4.94
of.	14	11.06	7.92	6.68	6.00	5.56	5.26	5.03	4.86	4.72
Denominator Degrees of Freedom	15	10.80	7.70	6.48	5.80	5.37	5.07	4.85	4.67	4.54
eg (	16	10.58	7.51	6.30	5.64	5.21	4.91	4.69	4.52	4.38
or L	17	10.38	7.35	6.16	5.50	5.07	4.78	4.56	4.39	4.25
natc	18	10.22	7.21	6.03	5.37	4.96	4.66	4.44	4.28	4.14
E.	19	10.07	7.09	5.92	5.27	4.85	4.56	4.34	4.18	4.04
ino [0	20	9.94	6.99	5.82	5.17	4.76	4.47	4.26	4.09	3.96
Ď	21	9.83	6.89	5.73	5.09	4.68	4.39	4.18	4.01	3.88
	22	9.73	6.81	5.65	5.02	4.61	4.32	4.11	3.94	3.81
	23	9.63	6.73	5.58	4.95	4.54	4.26	4.05	3.88	3.75
	24	9.55	6.66	5.52	4.89	4.49	4.20	3.99	3.83	3.69
	25	9.48	6.60	5.46	4.84	4.43	4.15	3.94	3.78	3.64
	26	9.41	6.54	5.41	4.79	4.38	4.10	3.89	3.73	3.60
	27	9.34	6.49	5.36	4.74	4.34	4.06	3.85	3.69	3.56
	28	9.28	6.44	5.32	4.70	4.30	4.02	3.81	3.65	3.52
	29	9.23	6.40	5.28	4.66	4.26	3.98	3.77	3.61	3.48
	30	9.18	6.35	5.24	4.62	4.23	3.95	3.74	3.58	3.45
	40	8.83	6.07	4.98	4.37	3.99	3.71	3.51	3.35	3.22
	60	8.49	5.79	4.73	4.14	3.76	3.49	3.29	3.13	3.01
	120	8.18	5.54	4.50	3.92	3.55	3.28	3.09	2.93	2.81
	8	7.88	5.30	4.28	3.72	3.35	3.09	2.90	2.74	2.62

TABLE A.7

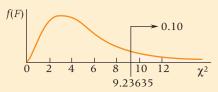
Percentage Points of the F Distribution (Continued)

				<i>α</i> =	.005					ν <sub>1</sub>	/
			Nu	nerator Deg	grees of Free	dom					
10	12	15	20	24	30	40	60	120	$\infty$		ν
24221.84	24426.73	24631.62	24836.51	24937.09	25041.40	25145.71	25253.74	25358.05	25465.00	1	
199.39	199.42	199.43	199.45	199.45	199.48	199.48	199.48	199.49	199.50	2	
43.68	43.39	43.08	42.78	42.62	42.47	42.31	42.15	41.99	41.83	3	
20.97	20.70	20.44	20.17	20.03	19.89	19.75	19.61	19.47	19.32	4	
13.62	13.38	13.15	12.90	12.78	12.66	12.53	12.40	12.27	12.14	5	
10.25	10.03	9.81	9.59	9.47	9.36	9.24	9.12	9.00	8.88	6	
8.38	8.18	7.97	7.75	7.64	7.53	7.42	7.31	7.19	7.08	7	
7.21	7.01	6.81	6.61	6.50	6.40	6.29	6.18	6.06	5.95	8	
6.42	6.23	6.03	5.83	5.73	5.62	5.52	5.41	5.30	5.19	9	
5.85	5.66	5.47	5.27	5.17	5.07	4.97	4.86	4.75	4.64	10	
5.42	5.24	5.05	4.86	4.76	4.65	4.55	4.45	4.34	4.23	11	
5.09	4.91	4.72	4.53	4.43	4.33	4.23	4.12	4.01	3.90	12	
4.82	4.64	4.46	4.27	4.17	4.07	3.97	3.87	3.76	3.65	13	
4.60	4.43	4.25	4.06	3.96	3.86	3.76	3.66	3.55	3.44	14	
4.42	4.25	4.07	3.88	3.79	3.69	3.59	3.48	3.37	3.26	15	
4.27	4.10	3.92	3.73	3.64	3.54	3.44	3.33	3.22	3.11	16	
4.14	3.97	3.79	3.61	3.51	3.41	3.31	3.21	3.10	2.98	17	
4.03	3.86	3.68	3.50	3.40	3.30	3.20	3.10	2.99	2.87	18	
3.93	3.76	3.59	3.40	3.31	3.21	3.11	3.00	2.89	2.78	19	
3.85	3.68	3.50	3.32	3.22	3.12	3.02	2.92	2.81	2.69	20	
3.77	3.60	3.43	3.24	3.15	3.05	2.95	2.84	2.73	2.61	21	
3.70	3.54	3.36	3.18	3.08	2.98	2.88	2.77	2.66	2.55	22	
3.64	3.47	3.30	3.12	3.02	2.92	2.82	2.71	2.60	2.48	23	
3.59	3.42	3.25	3.06	2.97	2.87	2.77	2.66	2.55	2.43	24	
3.54	3.37	3.20	3.01	2.92	2.82	2.72	2.61	2.50	2.38	25	
3.49	3.33	3.15	2.97	2.87	2.77	2.67	2.56	2.45	2.33	26	
3.45	3.28	3.11	2.93	2.83	2.73	2.63	2.52	2.41	2.29	27	
3.41	3.25	3.07	2.89	2.79	2.69	2.59	2.48	2.37	2.25	28	
3.38	3.21	3.04	2.86	2.76	2.66	2.56	2.45	2.33	2.21	29	
3.34	3.18	3.01	2.82	2.73	2.63	2.52	2.42	2.30	2.18	30	
3.12	2.95	2.78	2.60	2.50	2.40	2.30	2.18	2.06	1.93	40	
2.90	2.74	2.57	2.39	2.29	2.19	2.08	1.96	1.83	1.69	60	
2.71	2.54	2.37	2.19	2.09	1.98	1.87	1.75	1.61	1.43	120	
2.52	2.36	2.19	2.00	1.90	1.79	1.67	1.53	1.36	1.00	$\infty$	

## TABLE A.8

#### The Chi-Square Table

Values of  $\chi^2$  for Selected Probabilities



Example: df (Number of degrees of freedom) = 5, the tail above  $\chi^2 = 9.23635$  represents 0.10 or 10% of area under the curve.

Degrees of		legices of freed		Λ	Area in Up					
Freedom	.995	.99	.975	.95	.9	.1	.05	.025	.01	.005
1	0.0000393	0.0001571	0.0009821	0.0039322	0.0157907	2.7055	3.8415	5.0239	6.6349	7.8794
2	0.010025	0.020100	0.050636	0.102586	0.210721	4.6052	5.9915	7.3778	9.2104	10.5965
3	0.07172	0.11483	0.21579	0.35185	0.58438	6.2514	7.8147	9.3484	11.3449	12.8381
4	0.20698	0.29711	0.48442	0.71072	1.06362	7.7794	9.4877	11.1433	13.2767	14.8602
5	0.41175	0.55430	0.83121	1.14548	1.61031	9.2363	11.0705	12.8325	15.0863	16.7496
6	0.67573	0.87208	1.23734	1.63538	2.20413	10.6446	12.5916	14.4494	16.8119	18.5475
7	0.98925	1.23903	1.68986	2.16735	2.83311	12.0170	14.0671	16.0128	18.4753	20.2777
8	1.34440	1.64651	2.17972	2.73263	3.48954	13.3616	15.5073	17.5345	20.0902	21.9549
9	1.73491	2.08789	2.70039	3.32512	4.16816	14.6837	16.9190	19.0228	21.6660	23.5893
10	2.15585	2.55820	3.24696	3.94030	4.86518	15.9872	18.3070	20.4832	23.2093	25.1881
11	2.60320	3.05350	3.81574	4.57481	5.57779	17.2750	19.6752	21.9200	24.7250	26.7569
12	3.07379	3.57055	4.40378	5.22603	6.30380	18.5493	21.0261	23.3367	26.2170	28.2997
13	3.56504	4.10690	5.00874	5.89186	7.04150	19.8119	22.3620	24.7356	27.6882	29.8193
14	4.07466	4.66042	5.62872	6.57063	7.78954	21.0641	23.6848	26.1189	29.1412	31.3194
15	4.60087	5.22936	6.26212	7.26093	8.54675	22.3071	24.9958	27.4884	30.5780	32.8015
16	5.14216	5.81220	6.90766	7.96164	9.31224	23.5418	26.2962	28.8453	31.9999	34.2671
17	5.69727	6.40774	7.56418	8.67175	10.08518	24.7690	27.5871	30.1910	33.4087	35.7184
18	6.26477	7.01490	8.23074	9.39045	10.86494	25.9894	28.8693	31.5264	34.8052	37.1564
19	6.84392	7.63270	8.90651	10.11701	11.65091	27.2036	30.1435	32.8523	36.1908	38.5821
20	7.43381	8.26037	9.59077	10.85080	12.44260	28.4120	31.4104	34.1696	37.5663	39.9969
21	8.03360	8.89717	10.28291	11.59132	13.23960	29.6151	32.6706	35.4789	38.9322	41.4009
22	8.64268	9.54249	10.98233	12.33801	14.04149	30.8133	33.9245	36.7807	40.2894	42.7957
23	9.26038	10.19569	11.68853	13.09051	14.84795	32.0069	35.1725	38.0756	41.6383	44.1814
24	9.88620	10.85635	12.40115	13.84842	15.65868	33.1962	36.4150	39.3641	42.9798	45.5584
25	10.51965	11.52395	13.11971	14.61140	16.47341	34.3816	37.6525	40.6465	44.3140	46.9280
26	11.16022	12.19818	13.84388	15.37916	17.29188	35.5632	38.8851	41.9231	45.6416	48.2898
27	11.80765	12.87847	14.57337	16.15139	18.11389	36.7412	40.1133	43.1945	46.9628	49.6450
28	12.46128	13.56467	15.30785	16.92788	18.93924	37.9159	41.3372	44.4608	48.2782	50.9936
29	13.12107	14.25641	16.04705	17.70838	19.76774	39.0875	42.5569	45.7223	49.5878	52.3355
30	13.78668	14.95346	16.79076	18.49267	20.59924	40.2560	43.7730	46.9792	50.8922	53.6719
40	20.70658	22.16420	24.43306	26.50930	29.05052	51.8050	55.7585	59.3417	63.6908	66.7660
50	27.99082	29.70673	32.35738	34.76424	37.68864	63.1671	67.5048	71.4202	76.1538	79.4898
60	35.53440	37.48480	40.48171	43.18797	46.45888	74.3970	79.0820	83.2977	88.3794	91.9518
70	43.27531	45.44170	48.75754	51.73926	55.32894	85.5270	90.5313	95.0231	100.4251	
80	51.17193	53.53998	57.15315	60.39146	64.27784	96.5782	101.8795	106.6285		116.3209
90	59.19633	61.75402	65.64659	69.12602	73.29108		113.1452			
100	67.32753	70.06500	74.22188	77.92944	82.35813	118.4980	124.3221	129.5613	135.8069	140.1697

#### TABLE A.9

Critical Values for the **Durbin-Watson Test** 

Entries in the table give the critical values for a one-tailed Durbin-Watson test for autocorrelation. For a two-tailed test, the level of significance is doubled.

Significant Points of $d_L$ and $d_U$ : $\alpha = .05$
Number of Independent Variables

						ent Varia	Dies			
1	k 1	1	2	!		3	4	1		5
n	$d_{ m L}$	$d_{ m U}$								
15	1.08	1.36	0.95	1.54	0.82	1.75	0.69	1.97	0.56	2.21
16	1.10	1.37	0.98	1.54	0.86	1.73	0.74	1.93	0.62	2.15
17	1.13	1.38	1.02	1.54	0.90	1.71	0.78	1.90	0.67	2.10
18	1.16	1.39	1.05	1.53	0.93	1.69	0.82	1.87	0.71	2.06
19	1.18	1.40	1.08	1.53	0.97	1.68	0.86	1.85	0.75	2.02
20	1.20	1.41	1.10	1.54	1.00	1.68	0.90	1.83	0.79	1.99
21	1.22	1.42	1.13	1.54	1.03	1.67	0.93	1.81	0.83	1.96
22	1.24	1.43	1.15	1.54	1.05	1.66	0.96	1.80	0.86	1.94
23	1.26	1.44	1.17	1.54	1.08	1.66	0.99	1.79	0.90	1.92
24	1.27	1.45	1.19	1.55	1.10	1.66	1.01	1.78	0.93	1.90
25	1.29	1.45	1.21	1.55	1.12	1.66	1.04	1.77	0.95	1.89
26	1.30	1.46	1.22	1.55	1.14	1.65	1.06	1.76	0.98	1.88
27	1.32	1.47	1.24	1.56	1.16	1.65	1.08	1.76	1.01	1.86
28	1.33	1.48	1.26	1.56	1.18	1.65	1.10	1.75	1.03	1.85
29	1.34	1.48	1.27	1.56	1.20	1.65	1.12	1.74	1.05	1.84
30	1.35	1.49	1.28	1.57	1.21	1.65	1.14	1.74	1.07	1.83
31	1.36	1.50	1.30	1.57	1.23	1.65	1.16	1.74	1.09	1.83
32	1.37	1.50	1.31	1.57	1.24	1.65	1.18	1.73	1.11	1.82
33	1.38	1.51	1.32	1.58	1.26	1.65	1.19	1.73	1.13	1.81
34	1.39	1.51	1.33	1.58	1.27	1.65	1.21	1.73	1.15	1.81
35	1.40	1.52	1.34	1.58	1.28	1.65	1.22	1.73	1.16	1.80
36	1.41	1.52	1.35	1.59	1.29	1.65	1.24	1.73	1.18	1.80
37	1.42	1.53	1.36	1.59	1.31	1.66	1.25	1.72	1.19	1.80
38	1.43	1.54	1.37	1.59	1.32	1.66	1.26	1.72	1.21	1.79
39	1.43	1.54	1.38	1.60	1.33	1.66	1.27	1.72	1.22	1.79
40	1.44	1.54	1.39	1.60	1.34	1.66	1.29	1.72	1.23	1.79
45	1.48	1.57	1.43	1.62	1.38	1.67	1.34	1.72	1.29	1.78
50	1.50	1.59	1.46	1.63	1.42	1.67	1.38	1.72	1.34	1.77
55	1.53	1.60	1.49	1.64	1.45	1.68	1.41	1.72	1.38	1.77
60	1.55	1.62	1.51	1.65	1.48	1.69	1.44	1.73	1.41	1.77
65	1.57	1.63	1.54	1.66	1.50	1.70	1.47	1.73	1.44	1.77
70	1.58	1.64	1.55	1.67	1.52	1.70	1.49	1.74	1.46	1.77
75	1.60	1.65	1.57	1.68	1.54	1.71	1.51	1.74	1.49	1.77
80	1.61	1.66	1.59	1.69	1.56	1.72	1.53	1.74	1.51	1.77
85	1.62	1.67	1.60	1.70	1.57	1.72	1.55	1.75	1.52	1.77
90	1.63	1.68	1.61	1.70	1.59	1.73	1.57	1.75	1.54	1.78
95	1.64	1.69	1.62	1.71	1.60	1.73	1.58	1.75	1.56	1.78
100	1.65	1.69	1.63	1.72	1.61	1.74	1.59	1.76	1.57	1.78

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TABLE A.9
Critical Values for the Durbin-Watson Test
(Continued)

						and d <sub>U</sub> : α lent Varia				
j	k i	!	2	2		3	4	4		5
n	$d_{ m L}$	$d_{ m U}$	$d_{ m L}$	$d_{ m U}$	$d_{ m L}$	$d_{ m U}$	$d_{ m L}$	$d_{ m U}$	$d_{ m L}$	$d_{ m U}$
15	0.81	1.07	0.70	1.25	0.59	1.46	0.49	1.70	0.39	1.96
16	0.84	1.09	0.74	1.25	0.63	1.44	0.53	1.66	0.44	1.90
17	0.87	1.10	0.77	1.25	0.67	1.43	0.57	1.63	0.48	1.85
18	0.90	1.12	0.80	1.26	0.71	1.42	0.61	1.60	0.52	1.80
19	0.93	1.13	0.83	1.26	0.74	1.41	0.65	1.58	0.56	1.77
20	0.95	1.15	0.86	1.27	0.77	1.41	0.68	1.57	0.60	1.74
21	0.97	1.16	0.89	1.27	0.80	1.41	0.72	1.55	0.63	1.71
22	1.00	1.17	0.91	1.28	0.83	1.40	0.75	1.54	0.66	1.69
23	1.02	1.19	0.94	1.29	0.86	1.40	0.77	1.53	0.70	1.67
24	1.04	1.20	0.96	1.30	0.88	1.41	0.80	1.53	0.72	1.66
25	1.05	1.21	0.98	1.30	0.90	1.41	0.83	1.52	0.75	1.65
26	1.07	1.22	1.00	1.31	0.93	1.41	0.85	1.52	0.78	1.64
27	1.09	1.23	1.02	1.32	0.95	1.41	0.88	1.51	0.81	1.63
28	1.10	1.24	1.04	1.32	0.97	1.41	0.90	1.51	0.83	1.62
29	1.12	1.25	1.05	1.33	0.99	1.42	0.92	1.51	0.85	1.61
30	1.13	1.26	1.07	1.34	1.01	1.42	0.94	1.51	0.88	1.61
31	1.15	1.27	1.08	1.34	1.02	1.42	0.96	1.51	0.90	1.60
32	1.16	1.28	1.10	1.35	1.04	1.43	0.98	1.51	0.92	1.60
33	1.17	1.29	1.11	1.36	1.05	1.43	1.00	1.51	0.94	1.59
34	1.18	1.30	1.13	1.36	1.07	1.43	1.01	1.51	0.95	1.59
35	1.19	1.31	1.14	1.37	1.08	1.44	1.03	1.51	0.97	1.59
36	1.21	1.32	1.15	1.38	1.10	1.44	1.04	1.51	0.99	1.59
37	1.22	1.32	1.16	1.38	1.11	1.45	1.06	1.51	1.00	1.59
38	1.23	1.33	1.18	1.39	1.12	1.45	1.07	1.52	1.02	1.58
39	1.24	1.34	1.19	1.39	1.14	1.45	1.09	1.52	1.03	1.58
40	1.25	1.34	1.20	1.40	1.15	1.46	1.10	1.52	1.05	1.58
45	1.29	1.38	1.24	1.42	1.20	1.48	1.16	1.53	1.11	1.58
50	1.32	1.40	1.28	1.45	1.24	1.49	1.20	1.54	1.16	1.59
55	1.36	1.43	1.32	1.47	1.28	1.51	1.25	1.55	1.21	1.59
60	1.38	1.45	1.35	1.48	1.32	1.52	1.28	1.56	1.25	1.60
65	1.41	1.47	1.38	1.50	1.35	1.53	1.31	1.57	1.28	1.61
70	1.43	1.49	1.40	1.52	1.37	1.55	1.34	1.58	1.31	1.61
75	1.45	1.50	1.42	1.53	1.39	1.56	1.37	1.59	1.34	1.62
80	1.47	1.52	1.44	1.54	1.42	1.57	1.39	1.60	1.36	1.62
85	1.48	1.53	1.46	1.55	1.43	1.58	1.41	1.60	1.39	1.63
90	1.50	1.54	1.47	1.56	1.45	1.59	1.43	1.61	1.41	1.64
95	1.51	1.55	1.49	1.57	1.47	1.60	1.45	1.62	1.42	1.64
100	1.52	1.56	1.50	1.58	1.48	1.60	1.46	1.63	1.44	1.65

TABLE A.10

#### Critical Values of the Studentized Range (q) Distribution

									$\alpha = .0$	5									
Degrees of								N	umber	of Popu	lations	1							
Freedom	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	18.0	27.0	32.8	37.1	40.4	43.1	45.4	47.4	49.1	50.6	52.0	53.2	54.3	55.4	56.3	57.2	58.0	58.8	59.6
2	6.08	8.33	9.80	10.9	11.7	12.4	13.0	13.5	14.0	14.4	14.7	15.1	15.4	15.7	15.9	16.1	16.4	16.6	16.8
3	4.50	5.91	6.82	7.50	8.04	8.48	8.85	9.18	9.46	9.72	9.95	10.2	10.3	10.5	10.7	10.8	11.0	11.1	11.2
4	3.93	5.04	5.76	6.29	6.71	7.05	7.35	7.60	7.83	8.03	8.21	8.37	8.52	8.66	8.79	8.91	9.03	9.13	9.23
5	3.64	4.60	5.22	5.67	6.03	6.33	6.58	6.80	6.99	7.17	7.32	7.47	7.60	7.72	7.83	7.93	8.03	8.12	8.21
6	3.46	4.34	4.90	5.30	5.63	5.90	6.12	6.32	6.49	6.65	6.79	6.92	7.03	7.14	7.24	7.34	7.43	7.51	7.59
7	3.34	4.16	4.68	5.06	5.36	5.61	5.82	6.00	6.16	6.30	6.43	6.55	6.66	6.76	6.85	6.94	7.02	7.10	7.17
8	3.26	4.04	4.53	4.89	5.17	5.40	5.60	5.77	5.92	6.05	6.18	6.29	6.39	6.48	6.57	6.65	6.73	6.80	6.87
9	3.20	3.95	4.41	4.76	5.02	5.24	5.43	5.59	5.74	5.87	5.98	6.09	6.19	6.28	6.36	6.44	6.51	6.58	6.64
10	3.15	3.88	4.33	4.65	4.91	5.12	5.30	5.46	5.60	5.72	5.83	5.93	6.03	6.11	6.19	6.27	6.34	6.40	6.47
11	3.11	3.82	4.26	4.57	4.82	5.03	5.20	5.35	5.49	5.61	5.71	5.81	5.90	5.98	6.06	6.13	6.20	6.27	6.33
12	3.08	3.77	4.20	4.51	4.75	4.95	5.12	5.27	5.39	5.51	5.61	5.71	5.80	5.88	5.95	6.02	6.09	6.15	6.21
13	3.06	3.73	4.15	4.45	4.69	4.88	5.05	5.19	5.32	5.43	5.53	5.63	5.71	5.79	5.86	5.93	5.99	6.05	6.11
14	3.03	3.70	4.11	4.41	4.64	4.83	4.99	5.13	5.25	5.36	5.46	5.55	5.64	5.71	5.79	5.85	5.91	5.97	6.03
15	3.01	3.67	4.08	4.37	4.59	4.78	4.94	5.08	5.20	5.31	5.40	5.49	5.57	5.65	5.72	5.78	5.85	5.90	5.96
16	3.00	3.65	4.05	4.33	4.56	4.74	4.90	5.03	5.15	5.26	5.35	5.44	5.52	5.59	5.66	5.73	5.79	5.84	5.90
17	2.98	3.63	4.02	4.30	4.52	4.70	4.86	4.99	5.11	5.21	5.31	5.39	5.47	5.54	5.61	5.67	5.73	5.79	5.84
18	2.97	3.61	4.00	4.28	4.49	4.67	4.82	4.96	5.07	5.17	5.27	5.35	5.43	5.50	5.57	5.63	5.69	5.74	5.79
19	2.96	3.59	3.98	4.25	4.47	4.65	4.79	4.92	5.04	5.14	5.23	5.31	5.39	5.46	5.53	5.59	5.65	5.70	5.75
20	2.95	3.58	3.96	4.23	4.45	4.62	4.77	4.90	5.01	5.11	5.20	5.28	5.36	5.43	5.49	5.55	5.61	5.66	5.71
24	2.92	3.53	3.90	4.17	4.37	4.54	4.68	4.81	4.92	5.01	5.10	5.18	5.25	5.32	5.38	5.44	5.49	5.55	5.59
30	2.89	3.49	3.85	4.10	4.30	4.46	4.60	4.72	4.82	4.92	5.00	5.08	5.15	5.21	5.27	5.33	5.38	5.43	5.47
40	2.86	3.44	3.79	4.04	4.23	4.39	4.52	4.63	4.73	4.82	4.90	4.98	5.04	5.11	5.16	5.22	5.27	5.31	5.36
60	2.83	3.40	3.74	3.98	4.16	4.31	4.44	4.55	4.65	4.73	4.81	4.88	4.94	5.00	5.06	5.11	5.15	5.20	5.24
120	2.80	3.36	3.68	3.92	4.10	4.24	4.36	4.47	4.56	4.64	4.71	4.78	4.84	4.90	4.95	5.00	5.04	5.09	5.13
$\infty$	2.77	3.31	3.63	3.86	4.03	4.17	4.29	4.39	4.47	4.55	4.62	4.68	4.74	4.80	4.85	4.89	4.93	4.97	5.01

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TABLE A.10

Critical Values of the Studentized Range (q) Distribution (Continued)

									α =	.01									
Degrees of	Degrees of Number of Populations																		
Freedom	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	90.0	135.	164.	186.	202.	216.	227.	237.	246.	253.	260.	266.	272.	277.	282.	286.	290.	294.	298.
2	14.0	19.0	22.3	24.7	26.6	28.2	29.5	30.7	31.7	32.6	33.4	34.1	34.8	35.4	36.0	36.5	37.0	37.5	37.9
3	8.26	10.6	12.2	13.3	14.2	15.0	15.6	16.2	16.7	17.1	17.5	17.9	18.2	18.5	18.8	19.1	19.3	19.5	19.8
4	6.51	8.12	9.17	9.96	10.6	11.1	11.5	11.9	12.3	12.6	12.8	13.1	13.3	13.5	13.7	13.9	14.1	14.2	14.4
5	5.70	6.97	7.80	8.42	8.91	9.32	9.67	9.97	10.2	10.5	10.7	10.9	11.1	11.2	11.4	11.6	11.7	11.8	11.9
6	5.24	6.33	7.03	7.56	7.97	8.32	8.61	8.87	9.10	9.30	9.49	9.65	9.81	9.95	10.1	10.2	10.3	10.4	10.5
7	4.95	5.92	6.54	7.01	7.37	7.68	7.94	8.17	8.37	8.55	8.71	8.86	9.00	9.12	9.24	9.35	9.46	9.55	9.65
8	4.74	5.63	6.20	6.63	6.96	7.24	7.47	7.68	7.87	8.03	8.18	8.31	8.44	8.55	8.66	8.76	8.85	8.94	9.03
9	4.60	5.43	5.96	6.35	6.66	6.91	7.13	7.32	7.49	7.65	7.78	7.91	8.03	8.13	8.23	8.32	8.41	8.49	8.57
10	4.48	5.27	5.77	6.14	6.43	6.67	6.87	7.05	7.21	7.36	7.48	7.60	7.71	7.81	7.91	7.99	8.07	8.15	
11	4.39	5.14	5.62	5.97	6.25	6.48	6.67	6.84	6.99	7.13	7.25	7.36	7.46	7.56	7.65	7.73	7.81	7.88	7.95
12	4.32	5.04	5.50	5.84	6.10	6.32	6.51	6.67	6.81	6.94	7.06	7.17	7.26	7.36		7.52	7.59	7.66	
13	4.26	4.96	5.40	5.73	5.98	6.19	6.37	6.53	6.67	6.79	6.90	7.01	7.10		7.27	7.34	7.42	7.48	
14	4.21	4.89	5.32	5.63	5.88	6.08	6.26	6.41	6.54	6.66	6.77	6.87	6.96	7.05	7.12	7.20	7.27	7.33	
15	4.17	4.83	5.25	5.56	5.80	5.99	6.16	6.31	6.44	6.55	6.66	6.76	6.84		7.00	7.07	7.14	7.20	
16	4.13	4.78	5.19	5.49	5.72	5.92	6.08	6.22	6.35	6.46	6.56	6.66	6.74		6.90	6.97	7.03	7.09	
17	4.10	4.74	5.14	5.43	5.66	5.85	6.01	6.15	6.27	6.38	6.48	6.57	6.66		6.80	6.87	6.94	7.00	
18	4.07	4.70	5.09	5.38	5.60	5.79	5.94	6.08	6.20	6.31	6.41	6.50	6.58		6.72	6.79	6.85	6.91	6.96
19	4.05	4.67	5.05	5.33	5.55	5.73	5.89	6.02	6.14	6.25	6.34	6.43	6.51	6.58	6.65	6.72	6.78	6.84	
20	4.02	4.64	5.02	5.29	5.51	5.69	5.84	5.97	6.09	6.19	6.29	6.37	6.45		6.59	6.65	6.71	6.76	
24	3.96	4.54	4.91	5.17	5.37	5.54	5.69	5.81	5.92	6.02	6.11	6.19	6.26		6.39	6.45	6.51	6.56	
30	3.89	4.45	4.80	5.05	5.24	5.40	5.54	5.65	5.76	5.85	5.93	6.01	6.08		6.20	6.26	6.31	6.36	
40	3.82	4.37	4.70	4.93	5.11	5.27	5.39	5.50	5.60	5.69	5.77	5.84	5.90			6.07	6.12	6.17	6.21
60	3.76	4.28	4.60	4.82	4.99	5.13	5.25	5.36	5.45	5.53	5.60	5.67	5.73		5.84	5.89	5.93	5.98	
120	3.70	4.20	4.50	4.71	4.87	5.01	5.12	5.21	5.30	5.38	5.44	5.51	5.56		5.66	5.71	5.75	5.79	
$\infty$	3.64	4.12	4.40	4.60	4.76	4.88	4.99	5.08	5.16	5.23	5.29	5.35	5.40	5.45	5.49	5.54	5.57	5.61	5.65

TABLE A.11

Critical Values of R for the Runs Test: Lower Tail

$n_2$									α	= .025									
$n_1$	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2											2	2	2	2	2	2	2	2	2
3					2	2	2	2	2	2	2	2	2	3	3	3	3	3	3
4				2	2	2	3	3	3	3	3	3	3	3	4	4	4	4	4
5			2	2	3	3	3	3	3	4	4	4	4	4	4	4	5	5	5
6		2	2	3	3	3	3	4	4	4	4	5	5	5	5	5	5	6	6
7		2	2	3	3	3	4	4	5	5	5	5	5	6	6	6	6	6	6
8		2	3	3	3	4	4	5	5	5	6	6	6	6	6	7	7	7	7
9		2	3	3	4	4	5	5	5	6	6	6	7	7	7	7	8	8	8
10		2	3	3	4	5	5	5	6	6	7	7	7	7	8	8	8	8	9
11		2	3	4	4	5	5	6	6	7	7	7	8	8	8	9	9	9	9
12	2	2	3	4	4	5	6	6	7	7	7	8	8	8	9	9	9	10	10
13	2	2	3	4	5	5	6	6	7	7	8	8	9	9	9	10	10	10	10
14	2	2	3	4	5	5	6	7	7	8	8	9	9	9	10	10	10	11	11
15	2	3	3	4	5	6	6	7	7	8	8	9	9	10	10	11	11	11	12
16	2	3	4	4	5	6	6	7	8	8	9	9	10	10	11	11	11	12	12
17	2	3	4	4	5	6	7	7	8	9	9	10	10	11	11	11	12	12	13
18	2	3	4	5	5	6	7	8	8	9	9	10	10	11	11	12	12	13	13
19	2	3	4	5	6	6	7	8	8	9	10	10	11	11	12	12	13	13	13
20	2	3	4	5	6	6	7	8	9	9	10	10	11	12	12	13	13	13	14

Source: Adapted from F. S. Swed and C. Eisenhart, Ann. Math. Statist., vol. 14, 1943, pp. 83–86.

TABLE A.12

Critical Values of R for the Runs Test: Upper Tail

= .025 11 12 13 14 15 16 17 18 19 20
11 12 13 14 15 16 17 18 19 20
13 13
14 14 15 15 15
15 16 16 16 16 17 17 17 17 17
16 16 17 17 18 18 18 18 18 18 18
17 17 18 18 18 19 19 19 20 20
17 18 19 19 19 20 20 20 21 21
18 19 19 20 20 21 21 21 22 22
19
19 20 20 21 22 22 23 23 23 24 19 20 21 22 22 23 23 24 24 25
20 21 22 22 23 23 24 24 25 25 25 25
20 21 22 23 23 24 25 25 26 26 26
20 21 22 23 24 25 25 26 26 27
21 22 23 23 24 25 26 26 27 27
21 22 23 24 25 25 26 27 27 28

TABLE A.13

p-Values for Mann-Whitney UStatistic Small Samples  $(n_1 \le n_2)$ 

			$n_1$			
$n_2 = 3$	$U_0$	1	2	3		
	0	.25	.10	.05		
	1	.50	.20	.10		
	2		.40	.20		
	3		.60	.35		
	4			.50		
			$n_1$			
$n_2 = 4$	$U_0$	1	2	3	4	
	0	.2000	.0667	.0286	.0143	
	1	.4000	.1333	.0571	.0286	
	2	.6000	.2667	.1143	.0571	
	3		.4000	.2000	.1000	
	4		.6000	.3143	.1714	
	5			.4286	.2429	
	6			.5714	.3429	
	7				.4429	
	8				.5571	
				$n_1$		
$n_2 = 5$	$U_0$	1	2	3	4	5
	0	.1667	.0476	.0179	.0079	.0040
	1	.3333	.0952	.0357	.0159	.0079
	2	.5000	.1905	.0714	.0317	.0159
	3		.2857	.1250	.0556	.0278
	4		.4286	.1964	.0952	.0476
	5		.5714	.2857	.1429	.0754
	6			.3929	.2063	.1111
	7			.5000	.2778	.1548
	8				.3651	.2103
	9				.4524	.2738
	10				.5476	.3452
	11					.4206
	12					.5000

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TABLE A.13

*p*-Values for Mann-Whitney *U* Statistic Small Samples  $(n_1 \le n_2)$  (Continued)

				$n_1$			
$n_2 = 6$	$U_0$	1	2	3	4	5	6
	0	.1429	.0357	.0119	.0048	.0022	.0011
	1	.2857	.0714	.0238	.0095	.0043	.0022
	2	.4286	.1429	.0476	.0190	.0087	.0043
	3	.5714	.2143	.0833	.0333	.0152	.0076
	4		.3214	.1310	.0571	.0260	.0130
	5		.4286	.1905	.0857	.0411	.0206
	6		.5714	.2738	.1286	.0628	.0325
	7			.3571	.1762	.0887	.0465
	8			.4524	.2381	.1234	.0660
	9			.5476	.3048	.1645	.0898
	10				.3810	.2143	.1201
	11				.4571	.2684	.1548
	12				.5429	.3312	.1970
	13					.3961	.2424
	14					.4654	.2944
	15					.5346	.3496
	16						.4091
	17						.4686
	18						.5314

$n_2 = 7$ $U_0$ 1         2         3         4         5         6           0         .1250         .0278         .0083         .0030         .0013         .0006           1         .2500         .0556         .0167         .0061         .0025         .0012           2         .3750         .1111         .0333         .0121         .0051         .0023           3         .5000         .1667         .0583         .0212         .0088         .0041           4         .2500         .0917         .0364         .0152         .0070           5         .3333         .1333         .0545         .0240         .0111           6         .4444         .1917         .0818         .0366         .0175           7         .5556         .2583         .1152         .0530         .0256           8         .3333         .1576         .0745         .0367           9         .4167         .2061         .1010         .0507	
1       .2500       .0556       .0167       .0061       .0025       .0012         2       .3750       .1111       .0333       .0121       .0051       .0023         3       .5000       .1667       .0583       .0212       .0088       .0041         4       .2500       .0917       .0364       .0152       .0070         5       .3333       .1333       .0545       .0240       .0111         6       .4444       .1917       .0818       .0366       .0175         7       .5556       .2583       .1152       .0530       .0256         8       .3333       .1576       .0745       .0367         9       .4167       .2061       .1010       .0507	7
2       .3750       .1111       .0333       .0121       .0051       .0023         3       .5000       .1667       .0583       .0212       .0088       .0041         4       .2500       .0917       .0364       .0152       .0070         5       .3333       .1333       .0545       .0240       .0111         6       .4444       .1917       .0818       .0366       .0175         7       .5556       .2583       .1152       .0530       .0256         8       .3333       .1576       .0745       .0367         9       .4167       .2061       .1010       .0507	.0003
3       .5000       .1667       .0583       .0212       .0088       .0041         4       .2500       .0917       .0364       .0152       .0070         5       .3333       .1333       .0545       .0240       .0111         6       .4444       .1917       .0818       .0366       .0175         7       .5556       .2583       .1152       .0530       .0256         8       .3333       .1576       .0745       .0367         9       .4167       .2061       .1010       .0507	.0006
4       .2500       .0917       .0364       .0152       .0070         5       .3333       .1333       .0545       .0240       .0111         6       .4444       .1917       .0818       .0366       .0175         7       .5556       .2583       .1152       .0530       .0256         8       .3333       .1576       .0745       .0367         9       .4167       .2061       .1010       .0507	.0012
5       .3333       .1333       .0545       .0240       .0111         6       .4444       .1917       .0818       .0366       .0175         7       .5556       .2583       .1152       .0530       .0256         8       .3333       .1576       .0745       .0367         9       .4167       .2061       .1010       .0507	.0020
6 .4444 .1917 .0818 .0366 .0175 7 .5556 .2583 .1152 .0530 .0256 8 .3333 .1576 .0745 .0367 9 .4167 .2061 .1010 .0507	.0035
7 .5556 .2583 .1152 .0530 .0256 8 .3333 .1576 .0745 .0367 9 .4167 .2061 .1010 .0507	.0055
8 .3333 .1576 .0745 .0367 9 .4167 .2061 .1010 .0507	.0087
9 .4167 .2061 .1010 .0507	.0131
	.0189
	.0265
10 .5000 .2636 .1338 .0688	.0364
11 .3242 .1717 .0903	.0487
12 .3939 .2159 .1171	.0641
13 .4636 .2652 .1474	.0825
14 .5364 .3194 .1830	.1043
15 .3775 .2226	.1297
16 .4381 .2669	.1588
.5000 .3141	.1914
18 .3654	.2279
.4178	.2675
20 .4726	.3100
21 .5274	.3552
22	.4024
23	.4508
24	.5000

TABLE A.13

*p*-Values for Mann-Whitney *U* Statistic Small Samples  $(n_1 \le n_2)$  (*Continued*)

					$n_1$				
$n_2 = 8$	$U_0$	1	2	3	4	5	6	7	8
	0	.1111	.0222	.0061	.0020	.0008	.0003	.0002	.0001
	1	.2222	.0444	.0121	.0040	.0016	.0007	.0003	.0002
	2	.3333	.0889	.0242	.0081	.0031	.0013	.0006	.0003
	3	.4444	.1333	.0424	.0141	.0054	.0023	.0011	.0005
	4	.5556	.2000	.0667	.0242	.0093	.0040	.0019	.0009
	5		.2667	.0970	.0364	.0148	.0063	.0030	.0015
	6		.3556	.1394	.0545	.0225	.0100	.0047	.0023
	7		.4444	.1879	.0768	.0326	.0147	.0070	.0035
	8		.5556	.2485	.1071	.0466	.0213	.0103	.0052
	9			.3152	.1414	.0637	.0296	.0145	.0074
	10			.3879	.1838	.0855	.0406	.0200	.0103
	11			.4606	.2303	.1111	.0539	.0270	.0141
	12			.5394	.2848	.1422	.0709	.0361	.0190
	13				.3414	.1772	.0906	.0469	.0249
	14				.4040	.2176	.1142	.0603	.0325
	15				.4667	.2618	.1412	.0760	.0415
	16				.5333	.3108	.1725	.0946	.0524
	17					.3621	.2068	.1159	.0652
	18					.4165	.2454	.1405	.0803
	19					.4716	.2864	.1678	.0974
	20					.5284	.3310	.1984	.1172
	21						.3773	.2317	.1393
	22						.4259	.2679	.1641
	23						.4749	.3063	.1911
	24						.5251	.3472	.2209
	25							.3894	.2527
	26							.4333	.2869
	27							.4775	.3227
	28							.5225	.3605
	29								.3992
	30								.4392
	31								.4796
	32								.5204

TABLE A.13

p-Values for Mann-Whitney UStatistic Small Samples  $(n_1 \le n_2)$  (Continued)

					$n_1$					
$n_2 = 9$	$U_0$	1	2	3	4	5	6	7	8	9
	0	.1000	.0182	.0045	.0014	.0005	.0002	.0001	.0000	.0000
	1	.2000	.0364	.0091	.0028	.0010	.0004	.0002	.0001	.0000
	2	.3000	.0727	.0182	.0056	.0020	.0008	.0003	.0002	.0001
	3	.4000	.1091	.0318	.0098	.0035	.0014	.0006	.0003	.0001
	4	.5000	.1636	.0500	.0168	.0060	.0024	.0010	.0005	.0002
	5		.2182	.0727	.0252	.0095	.0038	.0017	.0008	.0004
	6		.2909	.1045	.0378	.0145	.0060	.0026	.0012	.0006
	7		.3636	.1409	.0531	.0210	.0088	.0039	.0019	.0009
	8		.4545	.1864	.0741	.0300	.0128	.0058	.0028	.0014
	9		.5455	.2409	.0993	.0415	.0180	.0082	.0039	.0020
	10			.3000	.1301	.0559	.0248	.0115	.0056	.0028
	11			.3636	.1650	.0734	.0332	.0156	.0076	.0039
	12			.4318	.2070	.0949	.0440	.0209	.0103	.0053
	13			.5000	.2517	.1199	.0567	.0274	.0137	.0071
	14				.3021	.1489	.0723	.0356	.0180	.0094
	15				.3552	.1818	.0905	.0454	.0232	.0122
	16				.4126	.2188	.1119	.0571	.0296	.0157
	17				.4699	.2592	.1361	.0708	.0372	.0200
	18				.5301	.3032	.1638	.0869	.0464	.0252
	19					.3497	.1942	.1052	.0570	.0313
	20					.3986	.2280	.1261	.0694	.0385
	21					.4491	.2643	.1496	.0836	.0470
	22					.5000	.3035	.1755	.0998	.0567
	23						.3445	.2039	.1179	.0680
	24						.3878	.2349	.1383	.0807
	25						.4320	.2680	.1606	.0951
	26						.4773	.3032	.1852	.1112
	27						.5227	.3403	.2117	.1290
	28							.3788	.2404	.1487
	29							.4185	.2707	.1701
	30							.4591	.3029	.1933
	31							.5000	.3365	.2181
	32								.3715	.2447
	33								.4074	.2729
	34								.4442	.3024
	35								.4813	.3332
	36								.5187	.3652
	37									.3981
	38									.4317
	39									.4657
	40									.5000

TABLE A.13

*p*-Values for Mann-Whitney *U* Statistic Small Samples  $(n_1 \le n_2)$  (*Continued*)

				i	$n_1$					
$n_2 = 10  U_0$	1	2	3	4	5	6	7	8	9	10
0	.0909	.0152	.0035	.0010	.0003	.0001	.0001	.0000	.0000	.0000
1	.1818	.0303	.0070	.0020	.0007	.0002	.0001	.0000	.0000	.0000
2	.2727	.0606	.0140	.0040	.0013	.0005	.0002	.0001	.0000	.0000
3	.3636	.0909	.0245	.0070	.0023	.0009	.0004	.0002	.0001	.0000
4	.4545	.1364	.0385	.0120	.0040	.0015	.0006	.0003	.0001	.0001
5	.5455	.1818	.0559	.0180	.0063	.0024	.0010	.0004	.0002	.0001
6		.2424	.0804	.0270	.0097	.0037	.0015	.0007	.0003	.0002
7		.3030	.1084	.0380	.0140	.0055	.0023	.0010	.0005	.0002
8		.3788	.1434	.0529	.0200	.0080	.0034	.0015	.0007	.0004
9		.4545	.1853	.0709	.0276	.0112	.0048	.0022	.0011	.0005
10		.5455	.2343	.0939	.0376	.0156	.0068	.0031	.0015	.0008
11			.2867	.1199	.0496	.0210	.0093	.0043	.0021	.0010
12			.3462	.1518	.0646	.0280	.0125	.0058	.0028	.0014
13			.4056	.1868	.0823	.0363	.0165	.0078	.0038	.0019
14			.4685	.2268	.1032	.0467	.0215	.0103	.0051	.0026
15			.5315	.2697	.1272	.0589	.0277	.0133	.0066	.0034
16				.3177	.1548	.0736	.0351	.0171	.0086	.0045
17				.3666	.1855	.0903	.0439	.0217	.0110	.0057
18				.4196	.2198	.1099	.0544	.0273	.0140	.0073
19				.4725	.2567	.1317	.0665	.0338	.0175	.0093
20				.5275	.2970	.1566	.0806	.0416	.0217	.0116
21					.3393	.1838	.0966	.0506	.0267	.0144
22					.3839	.2139	.1148	.0610	.0326	.0177
23					.4296	.2461	.1349	.0729	.0394	.0216
24					.4765	.2811	.1574	.0864	.0474	.0262
25					.5235	.3177	.1819	.1015	.0564	.0315
26						.3564	.2087	.1185	.0667	.0376
27						.3962	.2374	.1371	.0782	.0446
28						.4374	.2681	.1577	.0912	.0526
29						.4789	.3004	.1800	.1055	.0615
30						.5211	.3345	.2041	.1214	.0716
31 32							.3698	.2299	.1388	.0827
33							.4063	.2574	.1577	.0952
34							.4434 .4811	.2863	.1781 .2001	.1088
35							.5189	.3167 .3482	.2235	.1399
36							.510)	.3809	.2483	.1575
37								.4143	.2745	.1763
38								.4484	.3019	.1765
39								.4827	.3304	.2179
40								.5173	.3598	.2406
41								10170	.3901	.2644
42									.4211	.2894
43									.4524	.3153
44									.4841	.3421
45									.5159	.3697
46										.3980
47										.4267
48										.4559
49										.4853
50										.5147

TABLE A.14

Critical Values of *T* for the Wilcoxon Matched-Pairs Signed Rank Test (Small Samples)

1-SIDED	2-SIDED	n = 5	n = 6	n = 7	n = 8	n = 9	n = 10
$\alpha = .05$	$\alpha = .10$	1	2	4	6	8	11
$\alpha = .025$	$\alpha = .05$		1	2	4	6	8
$\alpha = .01$	$\alpha = .02$			0	2	3	5
$\alpha = .005$	$\alpha = .01$				0	2	3
1-SIDED	2-SIDED	n = 11	n = 12	n = 13	n = 14	n = 15	n = 16
$\alpha = .05$	$\alpha = .10$	14	17	21	26	30	36
$\alpha = .025$	$\alpha = .05$	11	14	17	21	25	30
$\alpha = .01$	$\alpha = .02$	7	10	13	16	20	24
$\alpha = .005$	$\alpha = .01$	5	7	10	13	16	19
1-SIDED	2-SIDED	n = 17	n = 18	n = 19	n = 20	n = 21	n = 22
$\alpha = .05$	$\alpha = .10$	41	47	54	60	68	75
$\alpha = .025$	$\alpha = .05$	35	40	46	52	59	66
$\alpha = .01$	$\alpha = .02$	28	33	38	43	49	56
$\alpha = .005$	$\alpha = .01$	23	28	32	37	43	49
1-SIDED	2-SIDED	n = 23	n = 24	n = 25	n = 26	n = 27	n = 28
$\alpha = .05$	$\alpha = .10$	83	92	101	110	120	130
$\alpha = .025$	$\alpha = .05$	73	81	90	98	107	117
$\alpha = .01$	$\alpha = .02$	62	69	77	85	93	102
$\alpha = .005$	$\alpha = .01$	55	61	68	76	84	92
1-SIDED	a CIDED	20	- 20	21	- 22	22	2.4
1-31DED	2-SIDED	n = 29	n = 30	n = 31	n = 32	n = 33	n = 34
$\alpha = .05$	$\alpha = .10$	n = 29 $141$	n = 30 152	n = 31 163	n = 32 175	n = 33 188	n = 34 201
$\alpha = .05$	$\alpha = .10$	141	152	163	175	188	201
$\alpha = .05$ $\alpha = .025$	$\alpha = .10$ $\alpha = .05$	141 127	152 137	163 148	175 159	188 171	201 183
$\alpha = .05$ $\alpha = .025$ $\alpha = .01$	$\alpha = .10$ $\alpha = .05$ $\alpha = .02$	141 127 111	152 137 120	163 148 130	175 159 141	188 171 151	201 183 162
$\alpha = .05$ $\alpha = .025$ $\alpha = .01$ $\alpha = .005$	$\alpha = .10$ $\alpha = .05$ $\alpha = .02$ $\alpha = .01$	141 127 111 100	152 137 120 109	163 148 130 118	175 159 141 128	188 171 151 138	201 183 162
$\alpha = .05$ $\alpha = .025$ $\alpha = .01$ $\alpha = .005$ 1-SIDED	$\alpha = .10$ $\alpha = .05$ $\alpha = .02$ $\alpha = .01$ 2-SIDED	$     \begin{array}{r}       141 \\       127 \\       111 \\       100 \\       n = 35     \end{array} $	$   \begin{array}{r}     152 \\     137 \\     120 \\     109 \\     n = 36   \end{array} $	163 148 130 118 n = 37	175 159 141 128 n = 38	188 171 151 138 n = 39	201 183 162
$\alpha = .05$ $\alpha = .025$ $\alpha = .01$ $\alpha = .005$ 1-SIDED $\alpha = .05$	$\alpha = .10$ $\alpha = .05$ $\alpha = .02$ $\alpha = .01$ 2-SIDED $\alpha = .10$	141 127 111 100 <i>n</i> = 35	152 137 120 109 <b>n = 36</b>	163 148 130 118 n = 37	175 159 141 128 <b>n = 38</b>	188 171 151 138 <b>n = 39</b> 271	201 183 162
$\alpha = .05$ $\alpha = .025$ $\alpha = .01$ $\alpha = .005$ 1-SIDED $\alpha = .05$ $\alpha = .05$	$\alpha = .10$ $\alpha = .05$ $\alpha = .02$ $\alpha = .01$ 2-SIDED $\alpha = .10$ $\alpha = .05$	141 127 111 100  n = 35  214 195	152 137 120 109 <b>n = 36</b> 228 208	163 148 130 118 n = 37 242 222	175 159 141 128  n = 38	188 171 151 138 <b>n = 39</b> 271 250	201 183 162
$\alpha = .05$ $\alpha = .025$ $\alpha = .01$ $\alpha = .005$ 1-SIDED $\alpha = .05$ $\alpha = .025$ $\alpha = .01$	$\alpha = .10$ $\alpha = .05$ $\alpha = .02$ $\alpha = .01$ 2-SIDED $\alpha = .10$ $\alpha = .05$ $\alpha = .02$	141 127 111 100  n = 35  214 195 174	152 137 120 109 <b>n = 36</b> 228 208 186	163 148 130 118 n = 37 242 222 198	175 159 141 128  n = 38  256 235 211	$   \begin{array}{r}     188 \\     171 \\     151 \\     138 \\     n = 39 \\     \hline     271 \\     250 \\     224 \\   \end{array} $	201 183 162
$\alpha = .05$ $\alpha = .025$ $\alpha = .01$ $\alpha = .005$ 1-SIDED $\alpha = .05$ $\alpha = .025$ $\alpha = .025$ $\alpha = .01$ $\alpha = .005$	$\alpha = .10$ $\alpha = .05$ $\alpha = .02$ $\alpha = .01$ 2-SIDED $\alpha = .10$ $\alpha = .05$ $\alpha = .02$ $\alpha = .01$	141 127 111 100  n = 35  214 195 174 160	152 137 120 109 <b>n = 36</b> 228 208 186 171	163 148 130 118 n = 37 242 222 198 183	175 159 141 128 n = 38  256 235 211 195	188 171 151 138 <b>n = 39</b> 271 250 224 208	201 183 162 149
$\alpha = .05$ $\alpha = .025$ $\alpha = .01$ $\alpha = .005$ 1-SIDED $\alpha = .05$ $\alpha = .025$ $\alpha = .01$ $\alpha = .005$	$\alpha = .10$ $\alpha = .05$ $\alpha = .02$ $\alpha = .01$ 2-SIDED $\alpha = .10$ $\alpha = .05$ $\alpha = .02$ $\alpha = .01$ 2-SIDED	$   \begin{array}{r}     141 \\     127 \\     111 \\     100 \\     n = 35 \\     \hline     214 \\     195 \\     174 \\     160 \\     n = 40 \\   \end{array} $	152 137 120 109 <b>n = 36</b> 228 208 186 171 <b>n = 41</b>	$   \begin{array}{c}     163 \\     148 \\     130 \\     118 \\     m = 37 \\     \hline     242 \\     222 \\     198 \\     183 \\     m = 42   \end{array} $	175 159 141 128 n = 38 256 235 211 195 n = 43	$   \begin{array}{c}     188 \\     171 \\     151 \\     138 \\     n = 39 \\     \hline     271 \\     250 \\     224 \\     208 \\     n = 44 \\   \end{array} $	$   \begin{array}{c}     201 \\     183 \\     162 \\     149   \end{array} $ $     n = 45 $
$\alpha = .05$ $\alpha = .025$ $\alpha = .01$ $\alpha = .005$ 1-SIDED $\alpha = .05$ $\alpha = .025$ $\alpha = .01$ $\alpha = .005$ 1-SIDED $\alpha = .005$	$\alpha = .10$ $\alpha = .05$ $\alpha = .02$ $\alpha = .01$ 2-SIDED $\alpha = .10$ $\alpha = .05$ $\alpha = .02$ $\alpha = .01$ 2-SIDED $\alpha = .01$	141 127 111 100  n = 35  214 195 174 160  n = 40	152 137 120 109 <b>n = 36</b> 228 208 186 171 <b>n = 41</b>	$   \begin{array}{c}     163 \\     148 \\     130 \\     118 \\     \boldsymbol{n} = 37 \\     242 \\     222 \\     198 \\     183 \\     \boldsymbol{n} = 42 \\     319   \end{array} $	175 159 141 128 n = 38 256 235 211 195 n = 43	$   \begin{array}{c}     188 \\     171 \\     151 \\     138 \\     n = 39 \\     \hline     271 \\     250 \\     224 \\     208 \\     n = 44 \\     353   \end{array} $	$   \begin{array}{c}     201 \\     183 \\     162 \\     149   \end{array} $ $   \begin{array}{c}     n = 45 \\     371   \end{array} $
$\alpha = .05$ $\alpha = .025$ $\alpha = .01$ $\alpha = .005$ 1-SIDED $\alpha = .05$ $\alpha = .025$ $\alpha = .01$ $\alpha = .005$ 1-SIDED $\alpha = .005$ $\alpha = .005$	$\alpha = .10$ $\alpha = .05$ $\alpha = .02$ $\alpha = .01$ 2-SIDED $\alpha = .10$ $\alpha = .05$ $\alpha = .02$ $\alpha = .01$ 2-SIDED $\alpha = .05$ $\alpha = .05$ $\alpha = .05$	141 127 111 100  n = 35  214 195 174 160  n = 40	152 137 120 109 <b>n = 36</b> 228 208 186 171 <b>n = 41</b>	163 148 130 118  n = 37  242 222 198 183  n = 42  319 295	175 159 141 128  n = 38  256 235 211 195  n = 43  336 311	188 171 151 138 <b>n = 39</b> 271 250 224 208 <b>n = 44</b> 353 327	201 183 162 149  n = 45 371 344
$\alpha = .05$ $\alpha = .025$ $\alpha = .01$ $\alpha = .005$ 1-SIDED $\alpha = .05$ $\alpha = .025$ $\alpha = .01$ $\alpha = .005$ 1-SIDED $\alpha = .005$ $\alpha = .005$ $\alpha = .01$ $\alpha = .05$ $\alpha = .01$	$\alpha = .10$ $\alpha = .05$ $\alpha = .02$ $\alpha = .01$ 2-SIDED $\alpha = .05$ $\alpha = .05$ $\alpha = .05$ $\alpha = .02$ $\alpha = .01$ 2-SIDED $\alpha = .05$ $\alpha = .02$ $\alpha = .00$	141 127 111 100  n = 35  214 195 174 160  n = 40  287 264 238	152 137 120 109 <b>n</b> = <b>36</b> 228 208 186 171 <b>n</b> = <b>41</b> 303 279 252	163 148 130 118  n = 37  242 222 198 183  n = 42  319 295 267	175 159 141 128  n = 38  256 235 211 195  n = 43  336 311 281	188 171 151 138 <b>n = 39</b> 271 250 224 208 <b>n = 44</b> 353 327 297	$   \begin{array}{c}     201 \\     183 \\     162 \\     149   \end{array} $ $   \begin{array}{c}     n = 45 \\     \hline     371 \\     344 \\     313   \end{array} $
$\alpha = .05$ $\alpha = .025$ $\alpha = .01$ $\alpha = .005$ 1-SIDED $\alpha = .05$ $\alpha = .025$ $\alpha = .01$ $\alpha = .005$ 1-SIDED $\alpha = .005$	$\alpha = .10$ $\alpha = .05$ $\alpha = .02$ $\alpha = .01$ 2-SIDED $\alpha = .10$ $\alpha = .05$ $\alpha = .02$ $\alpha = .01$ 2-SIDED $\alpha = .02$ $\alpha = .01$ $\alpha = .05$ $\alpha = .02$ $\alpha = .01$ $\alpha = .05$ $\alpha = .02$ $\alpha = .01$	141 127 111 100  n = 35  214 195 174 160  n = 40  287 264 238 221	152 137 120 109 <b>n</b> = <b>36</b> 228 208 186 171 <b>n</b> = <b>41</b> 303 279 252 234	163 148 130 118  n = 37  242 222 198 183  n = 42  319 295 267 248	175 159 141 128  n = 38  256 235 211 195  n = 43  336 311 281 262	$   \begin{array}{r}     188 \\     171 \\     151 \\     138 \\     \boldsymbol{n} = 39 \\     \hline     271 \\     250 \\     224 \\     208 \\     \boldsymbol{n} = 44 \\     \hline     353 \\     327 \\     297 \\     277 \\   \end{array} $	$   \begin{array}{c}     201 \\     183 \\     162 \\     149   \end{array} $ $   \begin{array}{c}     n = 45 \\     \hline     371 \\     344 \\     313   \end{array} $
$\alpha = .05$ $\alpha = .025$ $\alpha = .01$ $\alpha = .005$ 1-SIDED $\alpha = .05$ $\alpha = .025$ $\alpha = .01$ $\alpha = .005$ 1-SIDED $\alpha = .005$ 1-SIDED $\alpha = .05$	$\alpha = .10$ $\alpha = .05$ $\alpha = .02$ $\alpha = .01$ 2-SIDED $\alpha = .10$ $\alpha = .05$ $\alpha = .02$ $\alpha = .01$ 2-SIDED $\alpha = .02$ $\alpha = .01$ 2-SIDED $\alpha = .05$ $\alpha = .02$ $\alpha = .01$ 2-SIDED	141 127 111 100  n = 35  214 195 174 160  n = 40  287 264 238 221 n = 46	152 137 120 109 n = 36 228 208 186 171 n = 41 303 279 252 234 n = 47	$     \begin{array}{r}       163 \\       148 \\       130 \\       118 \\       n = 37     \end{array} $ $     \begin{array}{r}       242 \\       222 \\       198 \\       183 \\       n = 42     \end{array} $ $     \begin{array}{r}       319 \\       295 \\       267 \\       248 \\       n = 48     \end{array} $	175 159 141 128  n = 38  256 235 211 195  n = 43  336 311 281 262 n = 49	$   \begin{array}{c}     188 \\     171 \\     151 \\     138   \end{array} $ $   \begin{array}{c}     n = 39 \\     271 \\     250 \\     224 \\     208   \end{array} $ $   \begin{array}{c}     224 \\     208 \\     n = 44 \\     353 \\     327 \\     297 \\     277   \end{array} $ $   \begin{array}{c}     n = 50 \\   \end{array} $	201 183 162 149  n = 45 371 344 313
$\alpha = .05$ $\alpha = .025$ $\alpha = .01$ $\alpha = .005$ 1-SIDED $\alpha = .05$ $\alpha = .025$ $\alpha = .01$ $\alpha = .005$ 1-SIDED $\alpha = .005$ 1-SIDED $\alpha = .05$	$\alpha = .10$ $\alpha = .05$ $\alpha = .02$ $\alpha = .01$ 2-SIDED $\alpha = .10$ $\alpha = .05$ $\alpha = .02$ $\alpha = .01$ 2-SIDED $\alpha = .02$ $\alpha = .01$ 2-SIDED $\alpha = .05$ $\alpha = .05$ $\alpha = .05$ $\alpha = .05$ $\alpha = .01$ 2-SIDED $\alpha = .01$	$   \begin{array}{r}     141 \\     127 \\     111 \\     100   \end{array} $ $   \begin{array}{r}     n = 35 \\     214 \\     195 \\     174 \\     160   \end{array} $ $   \begin{array}{r}     287 \\     264 \\     238 \\     221   \end{array} $ $   \begin{array}{r}     n = 46 \\     389   \end{array} $	152 137 120 109 n = 36 228 208 186 171 n = 41 303 279 252 234 n = 47 408	163 148 130 118  n = 37  242 222 198 183  n = 42  319 295 267 248  n = 48	175 159 141 128  n = 38  256 235 211 195  n = 43  336 311 281 262  n = 49	$   \begin{array}{c}     188 \\     171 \\     151 \\     138   \end{array} $ $   \begin{array}{c}     n = 39 \\     271 \\     250 \\     224 \\     208   \end{array} $ $   \begin{array}{c}     224 \\     208 \\     n = 44 \\     353 \\     327 \\     297 \\     277   \end{array} $ $   \begin{array}{c}     n = 50 \\     466   \end{array} $	201 183 162 149  n = 45 371 344 313

From E. Wilcoxon and R. A. Wilcox, "Some Rapid Approximate Statistical Procedures," 1964. Reprinted by permission of Lederle Labs, a division of the American Cyanamid Co.

# TABLE A.15 Factors for Control Charts

	RANGES				
Number of Items In Sample	Factors for Factors for Control Limits Central Line		Factors for Control Limits		
n	$A_2$	$A_3$	$d_2$	$D_3$	$D_4$
2	1.880	2.659	1.128	0	3.267
3	1.023	1.954	1.693	0	2.575
4	0.729	1.628	2.059	0	2.282
5	0.577	1.427	2.326	0	2.115
6	0.483	1.287	2.534	0	2.004
7	0.419	1.182	2.704	0.076	1.924
8	0.373	1.099	2.847	0.136	1.864
9	0.337	1.032	2.970	0.184	1.816
10	0.308	0.975	3.078	0.223	1.777
11	0.285	0.927	3.173	0.256	1.744
12	0.266	0.886	3.258	0.284	1.716
13	0.249	0.850	3.336	0.308	1.692
14	0.235	0.817	3.407	0.329	1.671
15	0.223	0.789	3.472	0.348	1.652

Adapted from American Society for Testing and Materials, *Manual on Quality Control of Materials*, 1951, Table B2, p. 115. For a more detailed table and explanation, see Acheson J. Duncan, *Quality Control and Industrial Statistics*, 3d ed. Homewood, IL.: Richard D. Irwin, 1974, Table M, p. 927.