

APPENDIX A TABLES

TABLE A.1 Binomial probabilities $[_nC_x p^x (1-p)^{n-x}]$.

n	x	P												x	
		0.01	0.05	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	0.95		0.99
2	0	.980	.902	.810	.640	.490	.360	.250	.160	.090	.040	.010	.003	.000	0
	1	.020	.095	.180	.320	.420	.480	.500	.480	.420	.320	.180	.095	.020	1
	2	.000	.003	.010	.040	.090	.160	.250	.360	.490	.640	.810	.902	.980	2
3	0	.970	.857	.729	.512	.343	.216	.125	.064	.027	.008	.001	.000	.000	0
	1	.029	.135	.243	.384	.441	.432	.375	.288	.189	.096	.027	.007	.000	1
	2	.000	.007	.027	.096	.189	.288	.375	.432	.441	.384	.243	.135	.029	2
	3	.000	.000	.001	.008	.027	.064	.125	.216	.343	.512	.729	.857	.970	3
4	0	.961	.815	.656	.410	.240	.130	.063	.026	.008	.002	.000	.000	.000	0
	1	.039	.171	.292	.410	.412	.346	.250	.154	.076	.026	.004	.000	.000	1
	2	.001	.014	.049	.154	.265	.346	.375	.346	.265	.154	.049	.014	.001	2
	3	.000	.000	.004	.026	.076	.154	.250	.346	.412	.410	.292	.171	.039	3
	4	.000	.000	.000	.002	.008	.026	.063	.130	.240	.410	.656	.815	.961	4
5	0	.951	.774	.590	.328	.168	.078	.031	.010	.002	.000	.000	.000	.000	0
	1	.048	.204	.328	.410	.360	.259	.156	.077	.028	.006	.000	.000	.000	1
	2	.001	.021	.073	.205	.309	.346	.312	.230	.132	.051	.008	.001	.000	2
	3	.000	.001	.008	.051	.132	.230	.312	.346	.309	.205	.073	.021	.001	3
	4	.000	.000	.000	.006	.028	.077	.156	.259	.360	.410	.328	.204	.048	4
	5	.000	.000	.000	.000	.002	.010	.031	.078	.168	.328	.590	.774	.951	5
6	0	.941	.735	.531	.262	.118	.047	.016	.004	.001	.000	.000	.000	.000	0
	1	.057	.232	.354	.393	.303	.187	.094	.037	.010	.002	.000	.000	.000	1
	2	.001	.031	.098	.246	.324	.311	.234	.138	.060	.015	.001	.000	.000	2
	3	.000	.002	.015	.082	.185	.276	.313	.276	.185	.082	.015	.002	.000	3
	4	.000	.000	.001	.015	.060	.138	.234	.311	.324	.246	.098	.031	.001	4
	5	.000	.000	.000	.002	.010	.037	.094	.187	.303	.393	.354	.232	.057	5
	6	.000	.000	.000	.000	.001	.004	.016	.047	.118	.262	.531	.735	.941	6
7	0	.932	.698	.478	.210	.082	.028	.008	.002	.000	.000	.000	.000	.000	0
	1	.066	.257	.372	.367	.247	.131	.055	.017	.004	.000	.000	.000	.000	1
	2	.002	.041	.124	.275	.318	.261	.164	.077	.025	.004	.000	.000	.000	2
	3	.000	.004	.023	.115	.227	.290	.273	.194	.097	.029	.003	.000	.000	3
	4	.000	.000	.003	.029	.097	.194	.273	.290	.227	.115	.023	.004	.000	4
	5	.000	.000	.000	.004	.025	.077	.164	.261	.318	.275	.124	.041	.002	5
	6	.000	.000	.000	.000	.004	.017	.055	.131	.247	.367	.372	.257	.066	6
	7	.000	.000	.000	.000	.000	.002	.008	.028	.082	.210	.478	.698	.932	7
8	0	.923	.663	.430	.168	.058	.017	.004	.001	.000	.000	.000	.000	.000	0
	1	.075	.279	.383	.336	.198	.090	.031	.008	.001	.000	.000	.000	.000	1
	2	.003	.051	.149	.294	.296	.209	.109	.041	.010	.001	.000	.000	.000	2
	3	.000	.005	.033	.147	.254	.279	.219	.124	.047	.009	.000	.000	.000	3
	4	.000	.000	.005	.046	.136	.232	.273	.232	.136	.046	.005	.000	.000	4
	5	.000	.000	.000	.009	.047	.124	.219	.279	.254	.147	.033	.005	.000	5
	6	.000	.000	.000	.001	.010	.041	.109	.209	.296	.294	.149	.051	.003	6
	7	.000	.000	.000	.000	.001	.008	.031	.090	.198	.336	.383	.279	.075	7
	8	.000	.000	.000	.000	.000	.001	.004	.017	.058	.168	.430	.663	.923	8
9	0	.914	.630	.387	.134	.040	.010	.002	.000	.000	.000	.000	.000	.000	0
	1	.083	.299	.387	.302	.156	.060	.018	.004	.000	.000	.000	.000	.000	1
	2	.003	.063	.172	.302	.267	.161	.070	.021	.004	.000	.000	.000	.000	2
	3	.000	.008	.045	.176	.267	.251	.164	.074	.021	.003	.000	.000	.000	3
	4	.000	.001	.007	.066	.172	.251	.246	.167	.074	.017	.001	.000	.000	4
	5	.000	.000	.001	.017	.074	.167	.246	.251	.172	.066	.007	.001	.000	5
	6	.000	.000	.000	.003	.021	.074	.164	.251	.267	.176	.045	.008	.000	6
	7	.000	.000	.000	.000	.004	.021	.070	.161	.267	.302	.172	.063	.003	7
	8	.000	.000	.000	.000	.000	.004	.018	.060	.156	.302	.387	.299	.083	8
	9	.000	.000	.000	.000	.000	.000	.002	.010	.040	.134	.387	.630	.914	9
10	0	.904	.599	.349	.107	.028	.006	.001	.000	.000	.000	.000	.000	.000	0
	1	.091	.315	.387	.268	.121	.040	.010	.002	.000	.000	.000	.000	.000	1
	2	.004	.075	.194	.302	.233	.121	.044	.011	.001	.000	.000	.000	.000	2
	3	.000	.010	.057	.201	.267	.215	.117	.042	.009	.001	.000	.000	.000	3
	4	.000	.001	.011	.088	.200	.251	.205	.111	.037	.006	.000	.000	.000	4
	5	.000	.000	.001	.026	.103	.201	.246	.201	.103	.026	.001	.000	.000	5
	6	.000	.000	.000	.006	.037	.111	.205	.251	.200	.088	.011	.001	.000	6
	7	.000	.000	.000	.001	.009	.042	.117	.215	.267	.201	.057	.010	.000	7
	8	.000	.000	.000	.000	.001	.011	.044	.121	.233	.302	.194	.075	.004	8
	9	.000	.000	.000	.000	.000	.002	.010	.040	.121	.268	.387	.315	.091	9
	10	.000	.000	.000	.000	.000	.000	.001	.006	.028	.107	.349	.599	.904	10

TABLE A.1 Binomial probabilities $[_nC_x p^x (1 - p)^{n-x}]$ (continued).

<i>n</i>	<i>x</i>	<i>P</i>												<i>x</i>	
		0.01	0.05	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	0.95		0.99
15		.000	.000	.000	.000	.000	.001	.007	.047	.149	.218	.080	.011	.000	15
16		.000	.000	.000	.000	.000	.000	.002	.017	.087	.218	.180	.053	.001	16
17		.000	.000	.000	.000	.000	.000	.000	.005	.036	.154	.285	.179	.014	17
18		.000	.000	.000	.000	.000	.000	.000	.001	.009	.068	.285	.377	.159	18
19		.000	.000	.000	.000	.000	.000	.000	.000	.001	.014	.135	.377	.826	19
20	0	.818	.358	.122	.012	.001	.000	.000	.000	.000	.000	.000	.000	.000	0
	1	.165	.377	.270	.058	.007	.000	.000	.000	.000	.000	.000	.000	.000	1
	2	.016	.189	.285	.137	.028	.003	.000	.000	.000	.000	.000	.000	.000	2
	3	.001	.060	.190	.205	.072	.012	.001	.000	.000	.000	.000	.000	.000	3
	4	.000	.013	.090	.218	.130	.035	.005	.000	.000	.000	.000	.000	.000	4
	5	.000	.002	.032	.175	.179	.075	.015	.001	.000	.000	.000	.000	.000	5
	6	.000	.000	.009	.109	.192	.124	.037	.005	.000	.000	.000	.000	.000	6
	7	.000	.000	.002	.055	.164	.166	.074	.015	.001	.000	.000	.000	.000	7
	8	.000	.000	.000	.022	.114	.180	.120	.035	.004	.000	.000	.000	.000	8
	9	.000	.000	.000	.007	.065	.160	.160	.071	.012	.000	.000	.000	.000	9
	10	.000	.000	.000	.002	.031	.117	.176	.117	.031	.002	.000	.000	.000	10
	11	.000	.000	.000	.000	.012	.071	.160	.160	.065	.007	.000	.000	.000	11
	12	.000	.000	.000	.000	.004	.035	.120	.180	.114	.022	.000	.000	.000	12
	13	.000	.000	.000	.000	.001	.015	.074	.166	.164	.055	.002	.000	.000	13
	14	.000	.000	.000	.000	.000	.005	.037	.124	.192	.109	.009	.000	.000	14
	15	.000	.000	.000	.000	.000	.001	.015	.075	.179	.175	.032	.002	.000	15
	16	.000	.000	.000	.000	.000	.000	.005	.035	.130	.218	.090	.013	.000	16
	17	.000	.000	.000	.000	.000	.000	.001	.012	.072	.205	.190	.060	.001	17
	18	.000	.000	.000	.000	.000	.000	.000	.003	.028	.137	.285	.189	.016	18
	19	.000	.000	.000	.000	.000	.000	.000	.000	.007	.058	.270	.377	.165	19
	20	.000	.000	.000	.000	.000	.000	.000	.000	.001	.012	.122	.358	.818	20

Appendix A Tables

TABLE A.2 Cumulative Binomial Probabilities (continued).

Table with columns for n, x, and P (0.01 to 0.99). Rows are grouped by n (16, 17, 18, 19) and x (0 to n).

TABLE A.2 Cumulative Binomial Probabilities (continued).

<i>n</i>	<i>x</i>	<i>P</i>												<i>x</i>	
		0.01	0.05	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	0.95		0.99
15		1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.977	0.867	0.545	0.115	0.013	0.000	15
16		1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.995	0.954	0.763	0.295	0.067	0.001	16
17		1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.990	0.917	0.580	0.245	0.015	17
18		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.986	0.865	0.623	0.174	18
19		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	19
20	0	0.818	0.358	0.122	0.012	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0
	1	0.983	0.736	0.392	0.069	0.008	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1
	2	0.999	0.925	0.677	0.206	0.035	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2
	3	1.000	0.984	0.867	0.411	0.107	0.016	0.001	0.000	0.000	0.000	0.000	0.000	0.000	3
	4	1.000	0.997	0.957	0.630	0.238	0.051	0.006	0.000	0.000	0.000	0.000	0.000	0.000	4
	5	1.000	1.000	0.989	0.804	0.416	0.126	0.021	0.002	0.000	0.000	0.000	0.000	0.000	5
	6	1.000	1.000	0.998	0.913	0.608	0.250	0.058	0.006	0.000	0.000	0.000	0.000	0.000	6
	7	1.000	1.000	1.000	0.968	0.772	0.416	0.132	0.021	0.001	0.000	0.000	0.000	0.000	7
	8	1.000	1.000	1.000	0.990	0.887	0.596	0.252	0.057	0.005	0.000	0.000	0.000	0.000	8
	9	1.000	1.000	1.000	0.997	0.952	0.755	0.412	0.128	0.017	0.001	0.000	0.000	0.000	9
	10	1.000	1.000	1.000	0.999	0.983	0.872	0.588	0.245	0.048	0.003	0.000	0.000	0.000	10
	11	1.000	1.000	1.000	1.000	0.995	0.943	0.748	0.404	0.113	0.010	0.000	0.000	0.000	11
	12	1.000	1.000	1.000	1.000	0.999	0.979	0.868	0.584	0.228	0.032	0.000	0.000	0.000	12
	13	1.000	1.000	1.000	1.000	1.000	0.994	0.942	0.750	0.392	0.087	0.002	0.000	0.000	13
	14	1.000	1.000	1.000	1.000	1.000	0.998	0.979	0.874	0.584	0.196	0.011	0.000	0.000	14
	15	1.000	1.000	1.000	1.000	1.000	1.000	0.994	0.949	0.762	0.370	0.043	0.003	0.000	15
	16	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.984	0.893	0.589	0.133	0.016	0.000	16
	17	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.996	0.965	0.794	0.323	0.075	0.001	17
	18	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.992	0.931	0.608	0.264	0.017	18
	19	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.988	0.878	0.642	0.182	19
	20	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	20

TABLE A.3

Poisson Probabilities $\left[\frac{e^{-\mu} \mu^x}{x!} \right]$

<i>x</i>	μ									
	0.005	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0	0.9950	0.9900	0.9802	0.9704	0.9608	0.9512	0.9418	0.9324	0.9231	0.9139
1	0.0050	0.0099	0.0196	0.0291	0.0384	0.0476	0.0565	0.0653	0.0738	0.0823
2	0.0000	0.0000	0.0002	0.0004	0.0008	0.0012	0.0017	0.0023	0.0030	0.0037
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001
<i>x</i>	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
0	0.9048	0.8187	0.7408	0.6703	0.6065	0.5488	0.4966	0.4493	0.4066	0.3679
1	0.0905	0.1637	0.2222	0.2681	0.3033	0.3293	0.3476	0.3595	0.3659	0.3679
2	0.0045	0.0164	0.0333	0.0536	0.0758	0.0988	0.1217	0.1438	0.1647	0.1839
3	0.0002	0.0011	0.0033	0.0072	0.0126	0.0198	0.0284	0.0383	0.0494	0.0613
4	0.0000	0.0001	0.0003	0.0007	0.0016	0.0030	0.0050	0.0077	0.0111	0.0153
5	0.0000	0.0000	0.0000	0.0001	0.0002	0.0004	0.0007	0.0012	0.0020	0.0031
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0002	0.0003	0.0005
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001
<i>x</i>	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
0	0.3329	0.3012	0.2725	0.2466	0.2231	0.2019	0.1827	0.1653	0.1496	0.1353
1	0.3662	0.3614	0.3543	0.3452	0.3347	0.3230	0.3106	0.2975	0.2842	0.2707
2	0.2014	0.2169	0.2303	0.2417	0.2510	0.2584	0.2640	0.2678	0.2700	0.2707
3	0.0738	0.0867	0.0998	0.1128	0.1255	0.1378	0.1496	0.1607	0.1710	0.1804
4	0.0203	0.0260	0.0324	0.0395	0.0471	0.0551	0.0636	0.0723	0.0812	0.0902
5	0.0045	0.0062	0.0084	0.0111	0.0141	0.0176	0.0216	0.0260	0.0309	0.0361
6	0.0008	0.0012	0.0018	0.0026	0.0035	0.0047	0.0061	0.0078	0.0098	0.0120
7	0.0001	0.0002	0.0003	0.0005	0.0008	0.0011	0.0015	0.0020	0.0027	0.0034
8	0.0000	0.0000	0.0001	0.0001	0.0001	0.0002	0.0003	0.0005	0.0006	0.0009
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0002
<i>x</i>	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0
0	0.1225	0.1108	0.1003	0.0907	0.0821	0.0743	0.0672	0.0608	0.0550	0.0498
1	0.2572	0.2438	0.2306	0.2177	0.2052	0.1931	0.1815	0.1703	0.1596	0.1494
2	0.2700	0.2681	0.2652	0.2613	0.2565	0.2510	0.2450	0.2384	0.2314	0.2240
3	0.1890	0.1966	0.2033	0.2090	0.2138	0.2176	0.2205	0.2225	0.2237	0.2240
4	0.0992	0.1082	0.1169	0.1254	0.1336	0.1414	0.1488	0.1557	0.1622	0.1680
5	0.0417	0.0476	0.0538	0.0602	0.0668	0.0735	0.0804	0.0872	0.0940	0.1008
6	0.0146	0.0174	0.0206	0.0241	0.0278	0.0319	0.0362	0.0407	0.0455	0.0504
7	0.0044	0.0055	0.0068	0.0083	0.0099	0.0118	0.0139	0.0163	0.0188	0.0216
8	0.0011	0.0015	0.0019	0.0025	0.0031	0.0038	0.0047	0.0057	0.0068	0.0081
9	0.0003	0.0004	0.0005	0.0007	0.0009	0.0011	0.0014	0.0018	0.0022	0.0027
10	0.0001	0.0001	0.0001	0.0002	0.0002	0.0003	0.0004	0.0005	0.0006	0.0008
11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0002	0.0002
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001
<i>x</i>	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0
0	0.0450	0.0408	0.0369	0.0334	0.0302	0.0273	0.0247	0.0224	0.0202	0.0183
1	0.1397	0.1304	0.1217	0.1135	0.1057	0.0984	0.0915	0.0850	0.0789	0.0733
2	0.2165	0.2087	0.2008	0.1929	0.1850	0.1771	0.1692	0.1615	0.1539	0.1465
3	0.2237	0.2226	0.2209	0.2186	0.2158	0.2125	0.2087	0.2046	0.2001	0.1954
4	0.1733	0.1781	0.1823	0.1858	0.1888	0.1912	0.1931	0.1944	0.1951	0.1954
5	0.1075	0.1140	0.1203	0.1264	0.1322	0.1377	0.1429	0.1477	0.1522	0.1563
6	0.0555	0.0608	0.0662	0.0716	0.0771	0.0826	0.0881	0.0936	0.0989	0.1042
7	0.0246	0.0278	0.0312	0.0348	0.0385	0.0425	0.0466	0.0508	0.0551	0.0595
8	0.0095	0.0111	0.0129	0.0148	0.0169	0.0191	0.0215	0.0241	0.0269	0.0298
9	0.0033	0.0040	0.0047	0.0056	0.0066	0.0076	0.0089	0.0102	0.0116	0.0132
10	0.0010	0.0013	0.0016	0.0019	0.0023	0.0028	0.0033	0.0039	0.0045	0.0053
11	0.0003	0.0004	0.0005	0.0006	0.0007	0.0009	0.0011	0.0013	0.0016	0.0019
12	0.0001	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0005	0.0006
13	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002
14	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001
<i>x</i>	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
0	0.0166	0.0150	0.0136	0.0123	0.0111	0.0101	0.0091	0.0082	0.0074	0.0067
1	0.0679	0.0630	0.0583	0.0540	0.0500	0.0462	0.0427	0.0395	0.0365	0.0337
2	0.1393	0.1323	0.1254	0.1188	0.1125	0.1063	0.1005	0.0948	0.0894	0.0842
3	0.1904	0.1852	0.1798	0.1743	0.1687	0.1631	0.1574	0.1517	0.1460	0.1404
4	0.1951	0.1944	0.1933	0.1917	0.1898	0.1875	0.1849	0.1820	0.1789	0.1755
5	0.1600	0.1633	0.1662	0.1687	0.1708	0.1725	0.1738	0.1747	0.1753	0.1755
6	0.1093	0.1143	0.1191	0.1237	0.1281	0.1323	0.1362	0.1398	0.1432	0.1462
7	0.0640	0.0686	0.0732	0.0778	0.0824	0.0869	0.0914	0.0959	0.1002	0.1044
8	0.0328	0.0360	0.0393	0.0428	0.0463	0.0500	0.0537	0.0575	0.0614	0.0653
9	0.0150	0.0168	0.0188	0.0209	0.0232	0.0255	0.0281	0.0307	0.0334	0.0363
10	0.0061	0.0071	0.0081	0.0092	0.0104	0.0118	0.0132	0.0147	0.0164	0.0181
11	0.0023	0.0027	0.0032	0.0037	0.0043	0.0049	0.0056	0.0064	0.0073	0.0082

TABLE A.3

Poisson Probabilities $\left[\frac{e^{-\mu} \mu^x}{x!} \right]$ (continued).

<i>x</i>	μ									
	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0
12	0.0008	0.0009	0.0011	0.0013	0.0016	0.0019	0.0022	0.0026	0.0030	0.0034
13	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0011	0.0013
14	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0004	0.0005
15	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002
<i>x</i>	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	6.0
0	0.0061	0.0055	0.0050	0.0045	0.0041	0.0037	0.0033	0.0030	0.0027	0.0025
1	0.0311	0.0287	0.0265	0.0244	0.0225	0.0207	0.0191	0.0176	0.0162	0.0149
2	0.0793	0.0746	0.0701	0.0659	0.0618	0.0580	0.0544	0.0509	0.0477	0.0446
3	0.1348	0.1293	0.1239	0.1185	0.1133	0.1082	0.1033	0.0985	0.0938	0.0892
4	0.1719	0.1681	0.1641	0.1600	0.1558	0.1515	0.1472	0.1428	0.1383	0.1339
5	0.1753	0.1748	0.1740	0.1728	0.1714	0.1697	0.1678	0.1656	0.1632	0.1606
6	0.1490	0.1515	0.1537	0.1555	0.1571	0.1584	0.1594	0.1601	0.1605	0.1606
7	0.1086	0.1125	0.1163	0.1200	0.1234	0.1267	0.1298	0.1326	0.1353	0.1377
8	0.0692	0.0731	0.0771	0.0810	0.0849	0.0887	0.0925	0.0962	0.0998	0.1033
9	0.0392	0.0423	0.0454	0.0486	0.0519	0.0552	0.0586	0.0620	0.0654	0.0688
10	0.0200	0.0220	0.0241	0.0262	0.0285	0.0309	0.0334	0.0359	0.0386	0.0413
11	0.0093	0.0104	0.0116	0.0129	0.0143	0.0157	0.0173	0.0190	0.0207	0.0225
12	0.0039	0.0045	0.0051	0.0058	0.0065	0.0073	0.0082	0.0092	0.0102	0.0113
13	0.0015	0.0018	0.0021	0.0024	0.0028	0.0032	0.0036	0.0041	0.0046	0.0052
14	0.0006	0.0007	0.0008	0.0009	0.0011	0.0013	0.0015	0.0017	0.0019	0.0022
15	0.0002	0.0002	0.0003	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009
16	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0003	0.0003
17	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001
<i>x</i>	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9	7.0
0	0.0022	0.0020	0.0018	0.0017	0.0015	0.0014	0.0012	0.0011	0.0010	0.0009
1	0.0137	0.0126	0.0116	0.0106	0.0098	0.0090	0.0082	0.0076	0.0070	0.0064
2	0.0417	0.0390	0.0364	0.0340	0.0318	0.0296	0.0276	0.0258	0.0240	0.0223
3	0.0848	0.0806	0.0765	0.0726	0.0688	0.0652	0.0617	0.0584	0.0552	0.0521
4	0.1294	0.1249	0.1205	0.1162	0.1118	0.1076	0.1034	0.0992	0.0952	0.0912
5	0.1579	0.1549	0.1519	0.1487	0.1454	0.1420	0.1385	0.1349	0.1314	0.1277
6	0.1605	0.1601	0.1595	0.1586	0.1575	0.1562	0.1546	0.1529	0.1511	0.1490
7	0.1399	0.1418	0.1435	0.1450	0.1462	0.1472	0.1480	0.1486	0.1489	0.1490
8	0.1066	0.1099	0.1130	0.1160	0.1188	0.1215	0.1240	0.1263	0.1284	0.1304
9	0.0723	0.0757	0.0791	0.0825	0.0858	0.0891	0.0923	0.0954	0.0985	0.1014
10	0.0441	0.0469	0.0498	0.0528	0.0558	0.0588	0.0618	0.0649	0.0679	0.0710
11	0.0244	0.0265	0.0285	0.0307	0.0330	0.0353	0.0377	0.0401	0.0426	0.0452
12	0.0124	0.0137	0.0150	0.0164	0.0179	0.0194	0.0210	0.0227	0.0245	0.0263
13	0.0058	0.0065	0.0073	0.0081	0.0089	0.0099	0.0108	0.0119	0.0130	0.0142
14	0.0025	0.0029	0.0033	0.0037	0.0041	0.0046	0.0052	0.0058	0.0064	0.0071
15	0.0010	0.0012	0.0014	0.0016	0.0018	0.0020	0.0023	0.0026	0.0029	0.0033
16	0.0004	0.0005	0.0005	0.0006	0.0007	0.0008	0.0010	0.0011	0.0013	0.0014
17	0.0001	0.0002	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0006
18	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002
19	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001
<i>x</i>	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	8.0
0	0.0008	0.0007	0.0007	0.0006	0.0006	0.0005	0.0005	0.0004	0.0004	0.0003
1	0.0059	0.0054	0.0049	0.0045	0.0041	0.0038	0.0035	0.0032	0.0029	0.0027
2	0.0208	0.0194	0.0180	0.0167	0.0156	0.0145	0.0134	0.0125	0.0116	0.0107
3	0.0492	0.0464	0.0438	0.0413	0.0389	0.0366	0.0345	0.0324	0.0305	0.0286
4	0.0874	0.0836	0.0799	0.0764	0.0729	0.0696	0.0663	0.0632	0.0602	0.0573
5	0.1241	0.1204	0.1167	0.1130	0.1094	0.1057	0.1021	0.0986	0.0951	0.0916
6	0.1468	0.1445	0.1420	0.1394	0.1367	0.1339	0.1311	0.1282	0.1252	0.1221
7	0.1489	0.1486	0.1481	0.1474	0.1465	0.1454	0.1442	0.1428	0.1413	0.1396
8	0.1321	0.1337	0.1351	0.1363	0.1373	0.1381	0.1388	0.1392	0.1395	0.1396
9	0.1042	0.1070	0.1096	0.1121	0.1144	0.1167	0.1187	0.1207	0.1224	0.1241
10	0.0740	0.0770	0.0800	0.0829	0.0858	0.0887	0.0914	0.0941	0.0967	0.0993
11	0.0478	0.0504	0.0531	0.0558	0.0585	0.0613	0.0640	0.0667	0.0695	0.0722
12	0.0283	0.0303	0.0323	0.0344	0.0366	0.0388	0.0411	0.0434	0.0457	0.0481
13	0.0154	0.0168	0.0181	0.0196	0.0211	0.0227	0.0243	0.0260	0.0278	0.0296
14	0.0078	0.0086	0.0095	0.0104	0.0113	0.0123	0.0134	0.0145	0.0157	0.0169
15	0.0037	0.0041	0.0046	0.0051	0.0057	0.0062	0.0069	0.0075	0.0083	0.0090
16	0.0016	0.0019	0.0021	0.0024	0.0026	0.0030	0.0033	0.0037	0.0041	0.0045
17	0.0007	0.0008	0.0009	0.0010	0.0012	0.0013	0.0015	0.0017	0.0019	0.0021
18	0.0003	0.0003	0.0004	0.0004	0.0005	0.0006	0.0006	0.0007	0.0008	0.0009
19	0.0001	0.0001	0.0001	0.0002	0.0002	0.0003	0.0003	0.0003	0.0003	0.0004
20	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002
21	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001

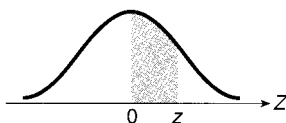
TABLE A.3

Poisson Probabilities $\left[\frac{e^{-\mu} \mu^x}{x!} \right]$ (continued).

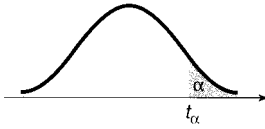
x	μ									
	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	9.0
0	0.0003	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0001	0.0001
1	0.0025	0.0023	0.0021	0.0019	0.0017	0.0016	0.0014	0.0013	0.0012	0.0011
2	0.0100	0.0092	0.0086	0.0079	0.0074	0.0068	0.0063	0.0058	0.0054	0.0050
3	0.0269	0.0252	0.0237	0.0222	0.0208	0.0195	0.0183	0.0171	0.0160	0.0150
4	0.0544	0.0517	0.0491	0.0466	0.0443	0.0420	0.0398	0.0377	0.0357	0.0337
5	0.0882	0.0849	0.0816	0.0784	0.0752	0.0722	0.0692	0.0663	0.0635	0.0607
6	0.1191	0.1160	0.1128	0.1097	0.1066	0.1034	0.1003	0.0972	0.0941	0.0911
7	0.1378	0.1358	0.1338	0.1317	0.1294	0.1271	0.1247	0.1222	0.1197	0.1171
8	0.1395	0.1392	0.1388	0.1382	0.1375	0.1366	0.1356	0.1344	0.1332	0.1318
9	0.1256	0.1269	0.1280	0.1290	0.1299	0.1306	0.1311	0.1315	0.1317	0.1318
10	0.1017	0.1040	0.1063	0.1084	0.1104	0.1123	0.1140	0.1157	0.1172	0.1186
11	0.0749	0.0776	0.0802	0.0828	0.0853	0.0878	0.0902	0.0925	0.0948	0.0970
12	0.0505	0.0530	0.0555	0.0579	0.0604	0.0629	0.0654	0.0679	0.0703	0.0728
13	0.0315	0.0334	0.0354	0.0374	0.0395	0.0416	0.0438	0.0459	0.0481	0.0504
14	0.0182	0.0196	0.0210	0.0225	0.0240	0.0256	0.0272	0.0289	0.0306	0.0324
15	0.0098	0.0107	0.0116	0.0126	0.0136	0.0147	0.0158	0.0169	0.0182	0.0194
16	0.0050	0.0055	0.0060	0.0066	0.0072	0.0079	0.0086	0.0093	0.0101	0.0109
17	0.0024	0.0026	0.0029	0.0033	0.0036	0.0040	0.0044	0.0048	0.0053	0.0058
18	0.0011	0.0012	0.0014	0.0015	0.0017	0.0019	0.0021	0.0024	0.0026	0.0029
19	0.0005	0.0005	0.0006	0.0007	0.0008	0.0009	0.0010	0.0011	0.0012	0.0014
20	0.0002	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0005	0.0005	0.0006
21	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0003
22	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
x	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	10.0
0	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0000
1	0.0010	0.0009	0.0009	0.0008	0.0007	0.0007	0.0006	0.0005	0.0005	0.0005
2	0.0046	0.0043	0.0040	0.0037	0.0034	0.0031	0.0029	0.0027	0.0025	0.0023
3	0.0140	0.0131	0.0123	0.0115	0.0107	0.0100	0.0093	0.0087	0.0081	0.0076
4	0.0319	0.0302	0.0285	0.0269	0.0254	0.0240	0.0226	0.0213	0.0201	0.0189
5	0.0581	0.0555	0.0530	0.0506	0.0483	0.0460	0.0439	0.0418	0.0398	0.0378
6	0.0881	0.0851	0.0822	0.0793	0.0764	0.0736	0.0709	0.0682	0.0656	0.0631
7	0.1145	0.1118	0.1091	0.1064	0.1037	0.1010	0.0982	0.0955	0.0928	0.0901
8	0.1302	0.1286	0.1269	0.1251	0.1232	0.1212	0.1191	0.1170	0.1148	0.1126
9	0.1317	0.1315	0.1311	0.1306	0.1300	0.1293	0.1284	0.1274	0.1263	0.1251
10	0.1198	0.1210	0.1219	0.1228	0.1235	0.1241	0.1245	0.1249	0.1250	0.1251
11	0.0991	0.1012	0.1031	0.1049	0.1067	0.1083	0.1098	0.1112	0.1125	0.1137
12	0.0752	0.0776	0.0799	0.0822	0.0844	0.0866	0.0888	0.0908	0.0928	0.0948
13	0.0526	0.0549	0.0572	0.0594	0.0617	0.0640	0.0662	0.0685	0.0707	0.0729
14	0.0342	0.0361	0.0380	0.0399	0.0419	0.0439	0.0459	0.0479	0.0500	0.0521
15	0.0208	0.0221	0.0235	0.0250	0.0265	0.0281	0.0297	0.0313	0.0330	0.0347
16	0.0118	0.0127	0.0137	0.0147	0.0157	0.0168	0.0180	0.0192	0.0204	0.0217
17	0.0063	0.0069	0.0075	0.0081	0.0088	0.0095	0.0103	0.0111	0.0119	0.0128
18	0.0032	0.0035	0.0039	0.0042	0.0046	0.0051	0.0055	0.0060	0.0065	0.0071
19	0.0015	0.0017	0.0019	0.0021	0.0023	0.0026	0.0028	0.0031	0.0034	0.0037
20	0.0007	0.0008	0.0009	0.0010	0.0011	0.0012	0.0014	0.0015	0.0017	0.0019
21	0.0003	0.0003	0.0004	0.0004	0.0005	0.0006	0.0006	0.0007	0.0008	0.0009
22	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004
23	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002
24	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001

TABLE A.4

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).

Second Decimal Place in z

z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
0.7	0.2580	0.2611	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852
0.8	0.2881	0.2910	0.2939	0.2967	0.2995	0.3023	0.3051	0.3078	0.3106	0.3133
0.9	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.4	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
2.6	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
2.7	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
2.8	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
2.9	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
3.0	0.4987	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990
3.1	0.4990	0.4991	0.4991	0.4991	0.4992	0.4992	0.4992	0.4992	0.4993	0.4993
3.2	0.4993	0.4993	0.4994	0.4994	0.4994	0.4994	0.4994	0.4995	0.4995	0.4995
3.3	0.4995	0.4995	0.4995	0.4996	0.4996	0.4996	0.4996	0.4996	0.4996	0.4997
3.4	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4998
3.5	0.4998									
4.0	0.49997									
4.5	0.499997									
5.0	0.4999997									

TABLE A.5 Critical values of t .

Degrees of Freedom	t_{100}	t_{050}	t_{025}	t_{010}	t_{005}
1	3.078	6.314	12.706	31.821	63.657
2	1.886	2.920	4.303	6.965	9.925
3	1.638	2.353	3.182	4.541	5.841
4	1.533	2.132	2.776	3.747	4.604
5	1.476	2.015	2.571	3.365	4.032
6	1.440	1.943	2.447	3.143	3.707
7	1.415	1.895	2.365	2.998	3.499
8	1.397	1.860	2.306	2.896	3.355
9	1.383	1.833	2.262	2.821	3.250
10	1.372	1.812	2.228	2.764	3.169
11	1.363	1.796	2.201	2.718	3.106
12	1.356	1.782	2.179	2.681	3.055
13	1.350	1.771	2.160	2.650	3.012
14	1.345	1.761	2.145	2.624	2.977
15	1.341	1.753	2.131	2.602	2.947
16	1.337	1.746	2.120	2.583	2.921
17	1.333	1.740	2.110	2.567	2.898
18	1.330	1.734	2.101	2.552	2.878
19	1.328	1.729	2.093	2.539	2.861
20	1.325	1.725	2.086	2.528	2.845
21	1.323	1.721	2.080	2.518	2.831
22	1.321	1.717	2.074	2.508	2.819
23	1.319	1.714	2.069	2.500	2.807
24	1.318	1.711	2.064	2.492	2.797
25	1.316	1.708	2.060	2.485	2.787
26	1.315	1.706	2.056	2.479	2.779
27	1.314	1.703	2.052	2.473	2.771
28	1.313	1.701	2.048	2.467	2.763
29	1.311	1.699	2.045	2.462	2.756
30	1.310	1.697	2.042	2.457	2.750
35	1.306	1.690	2.030	2.438	2.724
40	1.303	1.684	2.021	2.423	2.704
50	1.299	1.676	2.009	2.403	2.678
60	1.296	1.671	2.000	2.390	2.660
120	1.289	1.658	1.980	2.358	2.617
∞	1.282	1.645	1.960	2.326	2.576

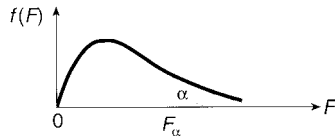
TABLE A.6 Critical values of χ^2 .

Degrees of Freedom	$\chi^2_{0.0000}$	$\chi^2_{0.0002}$	$\chi^2_{0.0005}$	$\chi^2_{0.0010}$	$\chi^2_{0.0020}$	$\chi^2_{0.0050}$	$\chi^2_{0.0100}$	$\chi^2_{0.0200}$	$\chi^2_{0.0500}$	$\chi^2_{0.1000}$	$\chi^2_{0.2000}$	$\chi^2_{0.2500}$	$\chi^2_{0.5000}$	$\chi^2_{0.7500}$	$\chi^2_{1.0000}$
1	0.0000	0.0002	0.0010	0.0039	0.0158	0.2107	0.7055	3.8415	5.0239	6.6349	7.8794	9.2103	10.5966	12.8382	14.8603
2	0.0100	0.0201	0.0506	0.1026	0.2107	0.5844	1.3858	2.7707	3.8415	4.6052	5.9915	7.3778	8.5575	9.5508	10.5966
3	0.0717	0.1148	0.2158	0.3518	0.5844	1.2128	2.3658	3.7076	4.6052	5.5411	6.5758	7.3778	8.0349	8.7979	9.3484
4	0.2070	0.2971	0.4844	0.7107	1.0636	1.7531	2.4851	3.3571	4.2929	5.1916	6.0921	6.9578	7.7794	8.4459	9.0463
5	0.4117	0.5543	0.8312	1.1455	1.6103	2.2041	2.9947	3.9188	4.8186	5.6293	6.3441	7.0415	7.7086	8.2498	8.7460
6	0.6757	0.8721	1.2373	1.6354	2.2041	2.8331	3.6808	4.6052	5.4922	6.1916	6.8524	7.4845	8.0508	8.5508	9.0000
7	0.9893	1.2390	1.6899	2.1673	2.8331	3.5650	4.3515	5.2929	6.1916	6.8524	7.4845	8.0508	8.5508	9.0000	9.3974
8	1.3444	1.6465	2.1797	2.7326	3.4895	4.1682	4.9658	5.8919	6.7823	7.4496	8.0508	8.5508	9.0000	9.3974	9.7779
9	1.7349	2.0879	2.7004	3.3251	4.1682	4.9658	5.8919	6.8524	7.7086	8.3076	8.8524	9.3484	9.7779	10.1781	10.5508
10	2.1559	2.5582	3.2470	3.9403	4.8652	5.5778	6.3441	7.1725	7.9787	8.5508	9.0000	9.3974	9.7779	10.1781	10.5508
11	2.6032	3.0535	3.8157	4.5748	5.5778	6.3441	7.1725	7.9787	8.7460	9.2929	9.6779	10.0508	10.4167	10.7779	11.1333
12	3.0738	3.5706	4.4038	5.2260	6.3038	7.0415	7.7086	8.5508	9.3484	9.9999	10.5966	11.1781	11.7641	12.3208	12.8583
13	3.5650	4.1069	5.0088	5.8919	7.0415	7.7086	8.5508	9.3484	10.0508	10.6416	11.2121	11.7641	12.3208	12.8583	13.3779
14	4.0747	4.6604	5.6287	6.5706	7.7895	8.5508	9.3484	10.0508	10.6416	11.2121	11.7641	12.3208	12.8583	13.3779	13.8889
15	4.6009	5.2293	6.2621	7.2609	8.5468	9.3484	10.0508	10.6416	11.2121	11.7641	12.3208	12.8583	13.3779	13.8889	14.3889
16	5.1422	5.8122	6.9077	7.9616	9.3122	10.0508	10.6416	11.2121	11.7641	12.3208	12.8583	13.3779	13.8889	14.3889	14.8779
17	5.6972	6.4078	7.5642	8.6718	10.0852	10.8649	11.6509	12.4426	13.1509	13.8524	14.5416	15.2121	15.8779	16.5333	17.1833
18	6.2648	7.0149	8.2307	9.3905	10.8649	11.6509	12.4426	13.1509	13.8524	14.5416	15.2121	15.8779	16.5333	17.1833	17.8279
19	6.8440	7.6327	8.9065	10.1170	11.6509	12.4426	13.1509	13.8524	14.5416	15.2121	15.8779	16.5333	17.1833	17.8279	18.4641
20	7.4338	8.2604	9.5908	10.8508	12.4426	13.1509	13.8524	14.5416	15.2121	15.8779	16.5333	17.1833	17.8279	18.4641	19.0941
21	8.0337	8.8972	10.2829	11.5913	13.2396	14.0415	14.8889	15.6587	16.4279	17.1833	17.8279	18.4641	19.0941	19.7167	20.3333
22	8.6427	9.5425	10.9823	12.3380	14.0415	14.8889	15.6587	16.4279	17.1833	17.8279	18.4641	19.0941	19.7167	20.3333	20.9441
23	9.2604	10.1957	11.6886	13.0905	14.8889	15.6587	16.4279	17.1833	17.8279	18.4641	19.0941	19.7167	20.3333	20.9441	21.5441
24	9.8862	10.8564	12.4012	13.8484	15.6587	16.4279	17.1833	17.8279	18.4641	19.0941	19.7167	20.3333	20.9441	21.5441	22.1333
25	10.5197	11.5240	13.1197	14.6114	16.4279	17.1833	17.8279	18.4641	19.0941	19.7167	20.3333	20.9441	21.5441	22.1333	22.7167
26	11.1602	12.1981	13.8439	15.3792	17.1833	17.8279	18.4641	19.0941	19.7167	20.3333	20.9441	21.5441	22.1333	22.7167	23.2941
27	11.8076	12.8785	14.5734	16.1514	18.1139	18.8932	19.5632	20.2560	20.9441	21.5441	22.1333	22.7167	23.2941	23.8667	24.4333
28	12.4613	13.5647	15.3079	16.9279	18.9392	19.7677	20.4560	21.1463	21.8333	22.4167	23.0000	23.5779	24.1463	24.7167	25.2833
29	13.1211	14.2565	16.0471	17.7084	19.7677	20.5922	21.2833	21.9167	22.5000	23.0779	23.6441	24.2167	24.7833	25.3441	25.9000
30	13.7867	14.9535	16.7908	18.4927	20.5922	21.2833	21.9167	22.5000	23.0779	23.6441	24.2167	24.7833	25.3441	25.9000	26.4500
40	20.7065	22.1643	24.4330	26.5093	29.0505	31.5263	33.1962	35.1725	37.1565	38.8851	40.2894	41.6731	42.7957	43.8279	44.7833
50	27.9907	29.7067	32.3574	34.7643	37.6886	40.2560	42.5570	44.3141	45.9922	47.5585	48.7579	49.9999	51.1781	52.2833	53.2779
60	35.5345	37.4849	40.4817	43.1880	46.4589	49.3308	51.8051	53.6721	55.3349	56.9093	58.3279	59.7000	60.9999	62.1833	63.2779
70	43.2752	45.4417	48.7576	51.7393	55.3289	58.5270	60.9015	62.5577	64.2886	65.8121	67.1533	68.4667	69.7000	70.8667	71.9333
80	51.1719	53.5401	57.1532	60.3915	64.2778	67.3308	69.7000	71.4202	72.9121	74.2833	75.5441	76.7500	77.8667	78.9333	79.9667
90	59.1963	61.7541	65.6466	69.1260	73.2911	76.1533	78.7833	80.5312	82.1333	83.6000	84.9333	86.1667	87.3000	88.3667	89.3667
100	67.3276	70.0649	74.2219	77.9295	82.3581	85.5270	88.7833	90.5312	92.3000	93.9333	95.4667	96.9000	98.3000	99.6000	100.8000



TABLE A.7a

Percentage points of the F distribution. $\alpha = .10$.



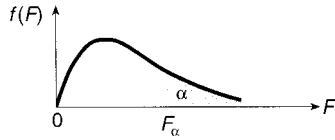
		Numerator Degrees of Freedom								
		1	2	3	4	5	6	7	8	9
Denominator Degrees of Freedom	$v_1 \backslash v_2$									
		1	39.86	49.50	53.59	55.83	57.24	58.20	58.91	59.44
	2	8.53	9.00	9.16	9.24	9.29	9.33	9.35	9.37	9.38
	3	5.54	5.46	5.39	5.34	5.31	5.28	5.27	5.25	5.24
	4	4.54	4.32	4.19	4.11	4.05	4.01	3.98	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
	11	3.23	2.86	2.66	2.54	2.45	2.39	2.34	2.30	2.27
	12	3.18	2.81	2.61	2.48	2.39	2.33	2.28	2.24	2.21
	13	3.14	2.76	2.56	2.43	2.35	2.28	2.23	2.20	2.16
	14	3.10	2.73	2.52	2.39	2.31	2.24	2.19	2.15	2.12
	15	3.07	2.70	2.49	2.36	2.27	2.21	2.16	2.12	2.09
	16	3.05	2.67	2.46	2.33	2.24	2.18	2.13	2.09	2.06
	17	3.03	2.64	2.44	2.31	2.22	2.15	2.10	2.06	2.03
	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
	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
	∞	2.71	2.30	2.08	1.94	1.85	1.77	1.72	1.67	1.63

TABLE A.7a Percentage points of the *F* distribution. $\alpha = .10$ (continued).

		Numerator Degrees of Freedom										
		v_1	10	12	15	20	24	30	40	60	120	∞
Denominator Degrees of Freedom	v_2											
	1	60.19	60.71	61.22	61.74	62.00	62.26	62.53	62.79	63.06	63.33	
	2	9.39	9.41	9.42	9.44	9.45	9.46	9.47	9.47	9.48	9.49	
	3	5.23	5.22	5.20	5.18	5.18	5.17	5.16	5.15	5.14	5.13	
	4	3.92	3.90	3.87	3.84	3.83	3.82	3.80	3.79	3.78	3.76	
	5	3.30	3.27	3.24	3.21	3.19	3.17	3.16	3.14	3.12	3.10	
	6	2.94	2.90	2.87	2.84	2.82	2.80	2.78	2.76	2.74	2.72	
	7	2.70	2.67	2.63	2.59	2.58	2.56	2.54	2.51	2.49	2.47	
	8	2.54	2.50	2.46	2.42	2.40	2.38	2.36	2.34	2.32	2.29	
	9	2.42	2.38	2.34	2.30	2.28	2.25	2.23	2.21	2.18	2.16	
	10	2.32	2.28	2.24	2.20	2.18	2.16	2.13	2.11	2.08	2.06	
	11	2.25	2.21	2.17	2.12	2.10	2.08	2.05	2.03	2.00	1.97	
	12	2.19	2.15	2.10	2.06	2.04	2.01	1.99	1.96	1.93	1.90	
	13	2.14	2.10	2.05	2.01	1.98	1.96	1.93	1.90	1.88	1.85	
	14	2.10	2.05	2.01	1.96	1.94	1.91	1.89	1.86	1.83	1.80	
	15	2.06	2.02	1.97	1.92	1.90	1.87	1.85	1.82	1.79	1.76	
	16	2.03	1.99	1.94	1.89	1.87	1.84	1.81	1.78	1.75	1.72	
	17	2.00	1.96	1.91	1.86	1.84	1.81	1.78	1.75	1.72	1.69	
	18	1.98	1.93	1.89	1.84	1.81	1.78	1.75	1.72	1.69	1.66	
	19	1.96	1.91	1.86	1.81	1.79	1.76	1.73	1.70	1.67	1.63	
	20	1.94	1.89	1.84	1.79	1.77	1.74	1.71	1.68	1.64	1.61	
	21	1.92	1.87	1.83	1.78	1.75	1.72	1.69	1.66	1.62	1.59	
22	1.90	1.86	1.81	1.76	1.73	1.70	1.67	1.64	1.60	1.57		
23	1.89	1.84	1.80	1.74	1.72	1.69	1.66	1.62	1.59	1.55		
24	1.88	1.83	1.78	1.73	1.70	1.67	1.64	1.61	1.57	1.53		
25	1.87	1.82	1.77	1.72	1.69	1.66	1.63	1.59	1.56	1.52		
26	1.86	1.81	1.76	1.71	1.68	1.65	1.61	1.58	1.54	1.50		
27	1.85	1.80	1.75	1.70	1.67	1.64	1.60	1.57	1.53	1.49		
28	1.84	1.79	1.74	1.69	1.66	1.63	1.59	1.56	1.52	1.48		
29	1.83	1.78	1.73	1.68	1.65	1.62	1.58	1.55	1.51	1.47		
30	1.82	1.77	1.72	1.67	1.64	1.61	1.57	1.54	1.50	1.46		
40	1.76	1.71	1.66	1.61	1.57	1.54	1.51	1.47	1.42	1.38		
60	1.71	1.66	1.60	1.54	1.51	1.48	1.44	1.40	1.35	1.29		
120	1.65	1.60	1.55	1.48	1.45	1.41	1.37	1.32	1.26	1.19		
∞	1.60	1.55	1.49	1.42	1.38	1.34	1.30	1.24	1.17	1.00		

TABLE A.7b

Percentage points of the F distribution. $\alpha = .05$.



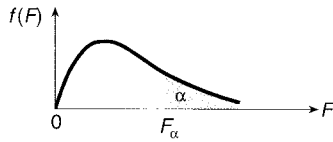
		Numerator Degrees of Freedom								
		1	2	3	4	5	6	7	8	9
Denominator Degrees of Freedom	$v_1 \backslash v_2$									
	1	161.4	199.5	215.7	224.6	230.2	234.0	236.8	238.9	240.5
	2	18.51	19.00	19.16	19.25	19.30	19.33	19.35	19.37	19.38
	3	10.13	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81
	4	7.71	6.94	6.59	6.39	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
	11	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.90
	12	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80
	13	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77	2.71
	14	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.65
	15	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59
	16	4.49	3.63	3.24	3.01	2.85	2.74	2.66	2.59	2.54
	17	4.45	3.59	3.20	2.96	2.81	2.70	2.61	2.55	2.49
	18	4.41	3.55	3.16	2.93	2.77	2.66	2.58	2.51	2.46
	19	4.38	3.52	3.13	2.90	2.74	2.63	2.54	2.48	2.42
	20	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39
	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	
∞	3.84	3.00	2.60	2.37	2.21	2.10	2.01	1.94	1.88	

TABLE A.7b Percentage points of the *F* distribution. $\alpha = .05$ (continued).

		Numerator Degrees of Freedom										
		v_1	10	12	15	20	24	30	40	60	120	∞
Denominator Degrees of Freedom	v_2											
	1	241.9	243.9	245.9	248.0	249.1	250.1	251.1	252.2	253.3	254.3	
	2	19.40	19.41	19.43	19.45	19.45	19.46	19.47	19.48	19.49	19.50	
	3	8.79	8.74	8.70	8.66	8.64	8.62	8.59	8.57	8.55	8.53	
	4	5.96	5.91	5.86	5.80	5.77	5.75	5.72	5.69	5.66	5.63	
	5	4.74	4.68	4.62	4.56	4.53	4.50	4.46	4.43	4.40	4.37	
	6	4.06	4.00	3.94	3.87	3.84	3.81	3.77	3.74	3.70	3.67	
	7	3.64	3.57	3.51	3.44	3.41	3.38	3.34	3.30	3.27	3.23	
	8	3.35	3.28	3.22	3.15	3.12	3.08	3.04	3.01	2.97	2.93	
	9	3.14	3.07	3.01	2.94	2.90	2.86	2.83	2.79	2.75	2.71	
	10	2.98	2.91	2.85	2.77	2.74	2.70	2.66	2.62	2.58	2.54	
	11	2.85	2.79	2.72	2.65	2.61	2.57	2.53	2.49	2.45	2.40	
	12	2.75	2.69	2.62	2.54	2.51	2.47	2.43	2.38	2.34	2.30	
	13	2.67	2.60	2.53	2.46	2.42	2.38	2.34	2.30	2.25	2.21	
	14	2.60	2.53	2.46	2.39	2.35	2.31	2.27	2.22	2.18	2.13	
	15	2.54	2.48	2.40	2.33	2.29	2.25	2.20	2.16	2.11	2.07	
	16	2.49	2.42	2.35	2.28	2.24	2.19	2.15	2.11	2.06	2.01	
	17	2.45	2.38	2.31	2.23	2.19	2.15	2.10	2.06	2.01	1.96	
	18	2.41	2.34	2.27	2.19	2.15	2.11	2.06	2.02	1.97	1.92	
	19	2.38	2.31	2.23	2.16	2.11	2.07	2.03	1.98	1.93	1.88	
	20	2.35	2.28	2.20	2.12	2.08	2.04	1.99	1.95	1.90	1.84	
	21	2.32	2.25	2.18	2.10	2.05	2.01	1.96	1.92	1.87	1.81	
	22	2.30	2.23	2.15	2.07	2.03	1.98	1.94	1.89	1.84	1.78	
	23	2.27	2.20	2.13	2.05	2.01	1.96	1.91	1.86	1.81	1.76	
24	2.25	2.18	2.11	2.03	1.98	1.94	1.89	1.84	1.79	1.73		
25	2.24	2.16	2.09	2.01	1.96	1.92	1.87	1.82	1.77	1.71		
26	2.22	2.15	2.07	1.99	1.95	1.90	1.85	1.80	1.75	1.69		
27	2.20	2.13	2.06	1.97	1.93	1.88	1.84	1.79	1.73	1.67		
28	2.19	2.12	2.04	1.96	1.91	1.87	1.82	1.77	1.71	1.65		
29	2.18	2.10	2.03	1.94	1.90	1.85	1.81	1.75	1.70	1.64		
30	2.16	2.09	2.01	1.93	1.89	1.84	1.79	1.74	1.68	1.62		
40	2.08	2.00	1.92	1.84	1.79	1.74	1.69	1.64	1.58	1.51		
60	1.99	1.92	1.84	1.75	1.70	1.65	1.59	1.53	1.47	1.39		
120	1.91	1.83	1.75	1.66	1.61	1.55	1.50	1.43	1.35	1.25		
∞	1.83	1.75	1.67	1.57	1.52	1.46	1.39	1.32	1.22	1.00		

TABLE A.7c

Percentage points of the F distribution. $\alpha = .025$.



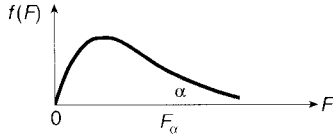
		Numerator Degrees of Freedom								
		1	2	3	4	5	6	7	8	9
Denominator Degrees of Freedom	v_2									
	1	647.8	799.5	864.2	899.6	921.8	937.1	948.2	956.6	963.3
	2	38.51	39.00	39.17	39.25	39.30	39.33	39.36	39.37	39.39
	3	17.44	16.04	15.44	15.10	14.88	14.73	14.62	14.54	14.47
	4	12.22	10.65	9.98	9.60	9.36	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
	11	6.72	5.26	4.63	4.28	4.04	3.88	3.76	3.66	3.59
	12	6.55	5.10	4.47	4.12	3.89	3.73	3.61	3.51	3.44
	13	6.41	4.97	4.35	4.00	3.77	3.60	3.48	3.39	3.31
	14	6.30	4.86	4.24	3.89	3.66	3.50	3.38	3.29	3.21
	15	6.20	4.77	4.15	3.80	3.58	3.41	3.29	3.20	3.12
	16	6.12	4.69	4.08	3.73	3.50	3.34	3.22	3.12	3.05
	17	6.04	4.62	4.01	3.66	3.44	3.28	3.16	3.06	2.98
	18	5.98	4.56	3.95	3.61	3.38	3.22	3.10	3.01	2.93
	19	5.92	4.51	3.90	3.56	3.33	3.17	3.05	2.96	2.88
	20	5.87	4.46	3.86	3.51	3.29	3.13	3.01	2.91	2.84
	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	
∞	5.02	3.69	3.12	2.79	2.57	2.41	2.29	2.19	2.11	

TABLE A.7c Percentage points of the *F* distribution. $\alpha = .025$ (continued).

		Numerator Degrees of Freedom										
		v_1	10	12	15	20	24	30	40	60	120	∞
Denominator Degrees of Freedom	v_2											
	1	968.6	976.7	984.9	993.1	997.3	1001	1006	1010	1014	1018	
	2	37.40	39.41	39.43	39.45	39.46	39.46	39.47	39.48	39.49	39.50	
	3	14.42	14.34	14.25	14.17	14.12	14.08	14.04	13.99	13.95	13.90	
	4	8.84	8.75	8.66	8.56	8.51	8.46	8.41	8.36	8.31	8.26	
	5	6.62	6.52	6.43	6.33	6.28	6.23	6.18	6.12	6.07	6.02	
	6	5.46	5.37	5.27	5.17	5.12	5.07	5.01	4.96	4.90	4.85	
	7	4.76	4.67	4.57	4.47	4.41	4.36	4.31	4.25	4.20	4.14	
	8	4.30	4.20	4.10	4.00	3.95	3.89	3.84	3.78	3.73	3.67	
	9	3.96	3.87	3.77	3.67	3.61	3.56	3.51	3.45	3.39	3.33	
	10	3.72	3.62	3.52	3.42	3.37	3.31	3.26	3.20	3.14	3.08	
	11	3.53	3.43	3.33	3.23	3.17	3.12	3.06	3.00	2.94	2.88	
	12	3.37	3.28	3.18	3.07	3.02	2.96	2.91	2.85	2.79	2.73	
	13	3.25	3.15	3.05	2.95	2.89	2.84	2.78	2.72	2.66	2.60	
	14	3.15	3.05	2.95	2.84	2.79	2.73	2.67	2.61	2.55	2.49	
	15	3.06	2.96	2.86	2.76	2.70	2.64	2.59	2.52	2.46	2.40	
	16	2.99	2.89	2.79	2.68	2.63	2.57	2.51	2.45	2.38	2.32	
	17	2.92	2.82	2.72	2.62	2.56	2.50	2.44	2.38	2.32	2.25	
	18	2.87	2.77	2.67	2.56	2.50	2.44	2.38	2.32	2.26	2.19	
	19	2.82	2.72	2.62	2.51	2.45	2.39	2.33	2.27	2.20	2.13	
	20	2.77	2.68	2.57	2.46	2.41	2.35	2.29	2.22	2.16	2.09	
	21	2.73	2.64	2.53	2.42	2.37	2.31	2.25	2.18	2.11	2.04	
22	2.70	2.60	2.50	2.39	2.33	2.27	2.21	2.14	2.08	2.00		
23	2.67	2.57	2.47	2.36	2.30	2.24	2.18	2.11	2.04	1.97		
24	2.64	2.54	2.44	2.33	2.27	2.21	2.15	2.08	2.01	1.94		
25	2.61	2.51	2.41	2.30	2.24	2.18	2.12	2.05	1.98	1.91		
26	2.59	2.49	2.39	2.28	2.22	2.16	2.09	2.03	1.95	1.88		
27	2.57	2.47	2.36	2.25	2.19	2.13	2.07	2.00	1.93	1.85		
28	2.55	2.45	2.34	2.23	2.17	2.11	2.05	1.98	1.91	1.83		
29	2.53	2.43	2.32	2.21	2.15	2.09	2.03	1.96	1.89	1.81		
30	2.51	2.41	2.31	2.20	2.14	2.07	2.01	1.94	1.87	1.79		
40	2.39	2.29	2.18	2.07	2.01	1.94	1.88	1.80	1.72	1.64		
60	2.27	2.17	2.06	1.94	1.88	1.82	1.74	1.67	1.58	1.48		
120	2.16	2.05	1.94	1.82	1.76	1.69	1.61	1.53	1.43	1.31		
∞	2.05	1.94	1.83	1.71	1.64	1.57	1.48	1.39	1.27	1.00		

TABLE A.7d

Percentage points of the F distribution. $\alpha = .01$.



		Numerator Degrees of Freedom								
$v_1 \backslash v_2$		1	2	3	4	5	6	7	8	9
Denominator Degrees of Freedom	1	4052	4999	5404	5624	5764	5859	5928	5981	6022
	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
	10	10.04	7.56	6.55	5.99	5.64	5.39	5.20	5.06	4.94
	11	9.65	7.21	6.22	5.67	5.32	5.07	4.89	4.74	4.63
	12	9.33	6.93	5.95	5.41	5.06	4.82	4.64	4.50	4.39
	13	9.07	6.70	5.74	5.21	4.86	4.62	4.44	4.30	4.19
	14	8.86	6.51	5.56	5.04	4.69	4.46	4.28	4.14	4.03
	15	8.68	6.36	5.42	4.89	4.56	4.32	4.14	4.00	3.89
	16	8.53	6.23	5.29	4.77	4.44	4.20	4.03	3.89	3.78
	17	8.40	6.11	5.19	4.67	4.34	4.10	3.93	3.79	3.68
	18	8.29	6.01	5.09	4.58	4.25	4.01	3.84	3.71	3.60
	19	8.18	5.93	5.01	4.50	4.17	3.94	3.77	3.63	3.52
	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	
∞	6.63	4.61	3.78	3.32	3.02	2.80	2.64	2.51	2.41	

TABLE A.7d

Percentage points of the *F* distribution. $\alpha = .01$ (continued).

		Numerator Degrees of Freedom										
		v_1	10	12	15	20	24	30	40	60	120	∞
Denominator Degrees of Freedom	v_2											
	1	6056.	6107.	6157.	6209.	6234.	6260.	6286.	6313.	6340.	6366.	
	2	99.40	99.42	99.43	99.45	99.46	99.47	99.48	99.48	99.49	99.50	
	3	27.23	27.05	26.87	26.69	26.60	26.50	26.41	26.32	26.22	26.13	
	4	14.55	14.37	14.20	14.02	13.93	13.84	13.75	13.65	13.56	13.46	
	5	10.05	9.89	9.72	9.55	9.47	9.38	9.29	9.20	9.11	9.02	
	6	7.87	7.72	7.56	7.40	7.31	7.23	7.14	7.06	6.97	6.88	
	7	6.62	6.47	6.31	6.16	6.07	5.99	5.91	5.82	5.74	5.65	
	8	5.81	5.67	5.52	5.36	5.28	5.20	5.12	5.03	4.95	4.86	
	9	5.26	5.11	4.96	4.81	4.73	4.65	4.57	4.48	4.40	4.31	
	10	4.85	4.71	4.56	4.41	4.33	4.25	4.17	4.08	4.00	3.91	
	11	4.54	4.40	4.25	4.10	4.02	3.94	3.86	3.78	3.69	3.60	
	12	4.30	4.16	4.01	3.86	3.78	3.70	3.62	3.54	3.45	3.36	
	13	4.10	3.96	3.82	3.66	3.59	3.51	3.43	3.34	3.25	3.17	
	14	3.94	3.80	3.66	3.51	3.43	3.35	3.27	3.18	3.09	3.00	
	15	3.80	3.67	3.52	3.37	3.29	3.21	3.13	3.05	2.96	2.87	
	16	3.69	3.55	3.41	3.26	3.18	3.10	3.02	2.93	2.84	2.75	
	17	3.59	3.46	3.31	3.16	3.08	3.00	2.92	2.83	2.75	2.65	
	18	3.51	3.37	3.23	3.08	3.00	2.92	2.84	2.75	2.66	2.57	
	19	3.43	3.30	3.15	3.00	2.92	2.84	2.76	2.67	2.58	2.49	
	20	3.37	3.23	3.09	2.94	2.86	2.78	2.69	2.61	2.52	2.42	
	21	3.31	3.17	3.03	2.88	2.80	2.72	2.64	2.55	2.46	2.36	
	22	3.26	3.12	2.98	2.83	2.75	2.67	2.58	2.50	2.40	2.31	
	23	3.21	3.07	2.93	2.78	2.70	2.62	2.54	2.45	2.35	2.26	
24	3.17	3.03	2.89	2.74	2.66	2.58	2.49	2.40	2.31	2.21		
25	3.13	2.99	2.85	2.70	2.62	2.54	2.45	2.36	2.27	2.17		
26	3.09	2.96	2.81	2.66	2.58	2.50	2.42	2.33	2.23	2.13		
27	3.06	2.93	2.78	2.63	2.55	2.47	2.38	2.29	2.20	2.10		
28	3.03	2.90	2.75	2.60	2.52	2.44	2.35	2.26	2.17	2.06		
29	3.00	2.87	2.73	2.57	2.49	2.41	2.33	2.23	2.14	2.03		
30	2.98	2.84	2.70	2.55	2.47	2.39	2.30	2.21	2.11	2.01		
40	2.80	2.66	2.52	2.37	2.29	2.20	2.11	2.02	1.92	1.80		
60	2.63	2.50	2.35	2.20	2.12	2.03	1.94	1.84	1.73	1.60		
120	2.47	2.34	2.19	2.03	1.95	1.86	1.76	1.66	1.53	1.38		
∞	2.32	2.18	2.04	1.88	1.79	1.70	1.59	1.47	1.32	1.00		

TABLE A.8Critical values for the Durbin-Watson DW statistic. $\alpha = .05$.

<i>n</i>	<i>k</i> = 1		<i>k</i> = 2		<i>k</i> = 3		<i>k</i> = 4		<i>k</i> = 5	
	<i>d_L</i>	<i>d_U</i>	<i>d_L</i>	<i>d_U</i>	<i>d_L</i>	<i>d_U</i>	<i>d_L</i>	<i>d_U</i>	<i>d_L</i>	<i>d_U</i>
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

From J. Durbin and G. S. Watson, "Testing for Serial Correlation in Least Squares Regression, II," *Biometrika*, 1951, 30, 159-178. Reproduced by permission of the *Biometrika* trustees.

TABLE A.9

Critical values of the studentized range (Q) distribution. The values listed in the table are the critical values of Q for $\alpha = .05$ and $\alpha = .01$, as a function of degrees of freedom for MS(error) and k (the number of means).

df for MS(ERROR) (v)	α	k (NUMBER OF MEANS)									
		2	3	4	5	6	7	8	9	10	11
5	.05	3.64	4.60	5.22	5.67	6.03	6.33	6.58	6.80	6.99	7.17
	.01	5.70	6.98	7.80	8.42	8.91	9.32	9.67	9.97	10.24	10.48
6	.05	3.46	4.34	4.90	5.30	5.63	5.90	6.12	6.32	6.49	6.65
	.01	5.24	6.33	7.03	7.56	7.97	8.32	8.61	8.87	9.10	9.30
7	.05	3.34	4.16	4.68	5.06	5.36	5.61	5.82	6.00	6.16	6.30
	.01	4.95	5.92	6.54	7.01	7.37	7.68	7.94	8.17	8.37	8.55
8	.05	3.26	4.04	4.53	4.89	5.17	5.40	5.60	5.77	5.92	6.05
	.01	4.75	5.64	6.20	6.62	6.96	7.24	7.47	7.68	7.86	8.03
9	.05	3.20	3.95	4.41	4.76	5.02	5.24	5.43	5.59	5.74	5.87
	.01	4.60	5.43	5.96	6.35	6.66	6.91	7.13	7.33	7.49	7.65
10	.05	3.15	3.88	4.33	4.65	4.91	5.12	5.30	5.46	5.60	5.72
	.01	4.48	5.27	5.77	6.14	6.43	6.67	6.87	7.05	7.21	7.36
11	.05	3.11	3.82	4.26	4.57	4.82	5.03	5.20	5.35	5.49	5.61
	.01	4.39	5.15	5.62	5.97	6.25	6.48	6.67	6.84	6.99	7.13
12	.05	3.08	3.77	4.20	4.51	4.75	4.95	5.12	5.27	5.39	5.51
	.01	4.32	5.05	5.50	5.84	6.10	6.32	6.51	6.67	6.81	6.94
13	.05	3.06	3.73	4.15	4.45	4.69	4.88	5.05	5.19	5.32	5.43
	.01	4.26	4.96	5.40	5.73	5.98	6.19	6.37	6.53	6.67	6.79
14	.05	3.03	3.70	4.11	4.41	4.64	4.83	4.99	5.13	5.25	5.36
	.01	4.21	4.89	5.32	5.63	5.88	6.08	6.26	6.41	6.54	6.66
15	.05	3.01	3.67	4.08	4.37	4.59	4.78	4.94	5.08	5.20	5.31
	.01	4.17	4.84	5.25	5.56	5.80	5.99	6.16	6.31	6.44	6.55
16	.05	3.00	3.65	4.05	4.33	4.56	4.74	4.90	5.03	5.15	5.26
	.01	4.13	4.79	5.19	5.49	5.72	5.92	6.08	6.22	6.35	6.46
17	.05	2.98	3.63	4.02	4.30	4.52	4.70	4.86	4.99	5.11	5.21
	.01	4.10	4.74	5.14	5.43	5.66	5.85	6.01	6.15	6.27	6.38
18	.05	2.97	3.61	4.00	4.28	4.49	4.67	4.82	4.96	5.07	5.17
	.01	4.07	4.70	5.09	5.38	5.60	5.79	5.94	6.08	6.20	6.31
19	.05	2.96	3.59	3.98	4.25	4.47	4.65	4.79	4.92	5.04	5.14
	.01	4.05	4.67	5.05	5.33	5.55	5.73	5.89	6.02	6.14	6.25
20	.05	2.95	3.58	3.96	4.23	4.45	4.62	4.77	4.90	5.01	5.11
	.01	4.02	4.64	5.02	5.29	5.51	5.69	5.84	5.97	6.09	6.19
24	.05	2.92	3.53	3.90	4.17	4.37	4.54	4.68	4.81	4.92	5.01
	.01	3.96	4.55	4.91	5.17	5.37	5.54	5.69	5.81	5.92	6.02
30	.05	2.89	3.49	3.85	4.10	4.30	4.46	4.60	4.72	4.82	4.92
	.01	3.89	4.45	4.80	5.05	5.24	5.40	5.54	5.65	5.76	5.85
40	.05	2.86	3.44	3.79	4.04	4.23	4.39	4.52	4.63	4.73	4.82
	.01	3.82	4.37	4.70	4.93	5.11	5.26	5.39	5.50	5.60	5.69
60	.05	2.83	3.40	3.74	3.98	4.16	4.31	4.44	4.55	4.65	4.73
	.01	3.76	4.28	4.59	4.82	4.99	5.13	5.25	5.36	5.45	5.53
120	.05	2.80	3.36	3.68	3.92	4.10	4.24	4.36	4.47	4.56	4.64
	.01	3.70	4.20	4.50	4.71	4.87	5.01	5.12	5.21	5.30	5.37
∞	.05	2.77	3.31	3.63	3.86	4.03	4.17	4.29	4.39	4.47	4.55
	.01	3.64	4.12	4.40	4.60	4.76	4.88	4.99	5.08	5.16	5.23

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