



# APPENDIX A

# TABLES

**TABLE A-1** Normal Curve Areas:  
Percentage of the Normal Curve Between  
the Mean and the Z Scores Shown

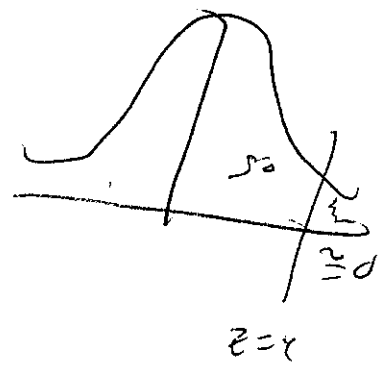
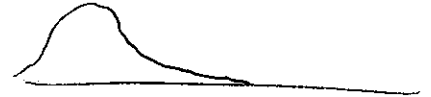
Z	% Mean to Z	Z	% Mean to Z	Z	% Mean to Z
.00	.00	.24	9.48	.48	18.44
.01	.40	.25	9.87	.49	18.79
.02	.80	.26	10.26	.50	19.15
.03	1.20	.27	10.64	.51	19.50
.04	1.60	.28	11.03	.52	19.85
.05	1.99	.29	11.41	.53	20.19
.06	2.39	.30	11.79	.54	20.54
.07	2.79	.31	12.17	.55	20.88
.08	3.19	.32	12.55	.56	21.23
.09	3.59	.33	12.93	.57	21.57
.10	3.98	.34	13.31	.58	21.90
.11	4.38	.35	13.68	.59	22.24
.12	4.78	.36	14.06	.60	22.57
.13	5.17	.37	14.43	.61	22.91
.14	5.57	.38	14.80	.62	23.24
.15	5.96	.39	15.17	.63	23.57
.16	6.36	.40	15.54	.64	23.89
.17	6.75	.41	15.91	.65	24.22
.18	7.14	.42	16.28	.66	24.54
.19	7.53	.43	16.64	.67	24.86
.20	7.93	.44	17.00	.68	25.17
.21	8.32	.45	17.36	.69	25.49
.22	8.71	.46	17.72	.70	25.80
.23	9.10	.47	18.08	.71	26.11

TABLE A-1 (cont.)

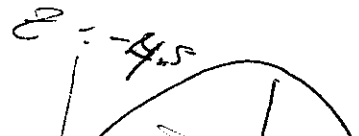
Z	% Mean to Z	Z	% Mean to Z	Z	% Mean to Z
.72	26.42	1.19	38.30	1.66	45.15
.73	26.73	1.20	38.49	1.67	45.25
.74	27.04	1.21	38.69	1.68	45.35
.75	27.34	1.22	38.88	1.69	45.45
.76	27.64	1.23	39.07	1.70	45.54
.77	27.94	1.24	39.25	1.71	45.64
.78	28.23	1.25	39.44	1.72	45.73
.79	28.52	1.26	39.62	1.73	45.82
.80	28.81	1.27	39.80	1.74	45.91
.81	29.10	1.28	39.97	1.75	45.99
.82	29.39	1.29	40.15	1.76	46.08
.83	29.67	1.30	40.32	1.77	46.16
.84	29.95	1.31	40.49	1.78	46.25
.85	30.23	1.32	40.66	1.79	46.33
.86	30.51	1.33	40.82	1.80	46.41
.87	30.78	1.34	40.99	1.81	46.49
.88	31.06	1.35	41.15	1.82	46.56
.89	31.33	1.36	41.31	1.83	46.64
.90	31.59	1.37	41.47	1.84	46.71
.91	31.86	1.38	41.62	1.85	46.78
.92	32.12	1.39	41.77	1.86	46.86
.93	32.38	1.40	41.92	1.87	46.93
.94	32.64	1.41	42.07	1.88	46.99
.95	32.89	1.42	42.22	1.89	47.06
.96	33.15	1.43	42.36	1.90	47.13
.97	33.40	1.44	42.51	1.91	47.19
.98	33.65	1.45	42.65	1.92	47.26
.99	33.89	1.46	42.79	1.93	47.32
1.00	34.13	1.47	42.92	1.94	47.38
1.01	34.38	1.48	43.06	1.95	47.44
1.02	34.61	1.49	43.19	1.96	47.50
1.03	34.85	1.50	43.32	1.97	47.56
1.04	35.08	1.51	43.45	1.98	47.61
1.05	35.31	1.52	43.57	1.99	47.67
1.06	35.54	1.53	43.70	2.00	47.72
1.07	35.77	1.54	43.82	2.01	47.78
1.08	35.99	1.55	43.94	2.02	47.83
1.09	36.21	1.56	44.06	2.03	47.88
1.10	36.43	1.57	44.18	2.04	47.93
1.11	36.65	1.58	44.29	2.05	47.98
1.12	36.86	1.59	44.41	2.06	48.03
1.13	37.08	1.60	44.52	2.07	48.08
1.14	37.29	1.61	44.63	2.08	48.12
1.15	37.49	1.62	44.74	2.09	48.17
1.16	37.70	1.63	44.84	2.10	48.21
1.17	37.90	1.64	44.95	2.11	48.26
1.18	38.10	1.65	45.05	2.12	48.30

TABLE A-1 (cont.)

Z	% Mean to Z	Z	% Mean to Z	Z	% Mean to Z
2.13	48.34	2.44	49.27	2.75	49.70
2.14	48.38	2.45	49.29	2.76	49.71
2.15	48.42	2.46	49.31	2.77	49.72
2.16	48.46	2.47	49.32	2.78	49.73
2.17	48.50	2.48	49.34	2.79	49.74
2.18	48.54	2.49	49.36	2.80	49.74
2.19	48.57	2.50	49.38	2.81	49.75
2.20	48.61	2.51	49.40	2.82	49.76
2.21	48.64	2.52	49.41	2.83	49.77
2.22	48.68	2.53	49.43	2.84	49.77
2.23	48.71	2.54	49.45	2.85	49.78
2.24	48.75	2.55	49.46	2.86	49.79
2.25	48.78	2.56	49.48	2.87	49.79
2.26	48.81	2.57	49.49	2.88	49.80
2.27	48.84	2.58	49.51	2.89	49.81
2.28	48.87	2.59	49.52	2.90	49.81
2.29	48.90	2.60	49.53	2.91	49.82
2.30	48.93	2.61	49.55	2.92	49.82
2.31	48.96	2.62	49.56	2.93	49.83
2.32	48.98	2.63	49.57	2.94	49.84
2.33	49.01	2.64	49.59	2.95	49.84
2.34	49.04	2.65	49.60	2.96	49.85
2.35	49.06	2.66	49.61	2.97	49.85
2.36	49.09	2.67	49.62	2.98	49.86
2.37	49.11	2.68	49.63	2.99	49.86
2.38	49.13	2.69	49.64	3.00	49.87
2.39	49.16	2.70	49.65	3.50	49.98
2.40	49.18	2.71	49.66	4.00	50.00
2.41	49.20	2.72	49.67	4.50	50.00
2.42	49.22	2.73	49.68		
2.43	49.25	2.74	49.69		



if  $z = -12.71$



**TABLE A-2** Cutoff Scores for the *t* Distribution

<i>df</i>	One-Tailed Tests			Two-Tailed Tests		
	.10	.05	.01	.10	.05	.01
1	3.078	6.314	31.821	6.314	12.706	63.657
2	1.886	2.920	6.965	2.920	4.303	9.925
3	1.638	2.353	4.541	2.353	3.182	5.841
4	1.533	2.132	3.747	2.132	2.776	4.604
5	1.476	2.015	3.365	2.015	2.571	4.032
6	1.440	1.943	3.143	1.943	2.447	3.708
7	1.415	1.895	2.998	1.895	2.365	3.500
8	1.397	1.860	2.897	1.860	2.306	3.356
9	1.383	1.833	2.822	1.833	2.262	3.250
10	1.372	1.813	2.764	1.813	2.228	3.170
11	1.364	1.796	2.718	1.796	2.201	3.106
12	1.356	1.783	2.681	1.783	2.179	3.055
13	1.350	1.771	2.651	1.771	2.161	3.013
14	1.345	1.762	2.625	1.762	2.145	2.977
15	1.341	1.753	2.603	1.753	2.132	2.947
16	1.337	1.746	2.584	1.746	2.120	2.921
17	1.334	1.740	2.567	1.740	2.110	2.898
18	1.331	1.734	2.553	1.734	2.101	2.879
19	1.328	1.729	2.540	1.729	2.093	2.861
20	1.326	1.725	2.528	1.725	2.086	2.846
21	1.323	1.721	2.518	1.721	2.080	2.832
22	1.321	1.717	2.509	1.717	2.074	2.819
23	1.320	1.714	2.500	1.714	2.069	2.808
24	1.318	1.711	2.492	1.711	2.064	2.797
25	1.317	1.708	2.485	1.708	2.060	2.788
26	1.315	1.706	2.479	1.706	2.056	2.779
27	1.314	1.704	2.473	1.704	2.052	2.771
28	1.313	1.701	2.467	1.701	2.049	2.764
29	1.312	1.699	2.462	1.699	2.045	2.757
30	1.311	1.698	2.458	1.698	2.043	2.750
35	1.306	1.690	2.438	1.690	2.030	2.724
40	1.303	1.684	2.424	1.684	2.021	2.705
45	1.301	1.680	2.412	1.680	2.014	2.690
50	1.299	1.676	2.404	1.676	2.009	2.678
55	1.297	1.673	2.396	1.673	2.004	2.668
60	1.296	1.671	2.390	1.671	2.001	2.661
65	1.295	1.669	2.385	1.669	1.997	2.654
70	1.294	1.667	2.381	1.667	1.995	2.648
75	1.293	1.666	2.377	1.666	1.992	2.643
80	1.292	1.664	2.374	1.664	1.990	2.639
85	1.292	1.663	2.371	1.663	1.989	2.635
90	1.291	1.662	2.369	1.662	1.987	2.632
95	1.291	1.661	2.366	1.661	1.986	2.629
100	1.290	1.660	2.364	1.660	1.984	2.626
$\infty$	1.282	1.645	2.327	1.645	1.960	2.576

**TABLE A-3 Cutoff Scores for the F Distribution**

Denom- inator df	Signi- ficance Level	$df_{\beta C}$ Numerator Degrees of Freedom					
		1	2	3	4	5	6
1	.01	4,052	5,000	5,404	5,625	5,764	5,859
	.05	162	200	216	225	230	234
	.10	39.9	49.5	53.6	55.8	57.2	58.2
2	.01	98.50	99.00	99.17	99.25	99.30	99.33
	.05	18.51	19.00	19.17	19.25	19.30	19.33
	.10	8.53	9.00	9.16	9.24	9.29	9.33
3	.01	34.12	30.82	29.46	28.71	28.24	27.91
	.05	10.13	9.55	9.28	9.12	9.01	8.94
	.10	5.54	5.46	5.39	5.34	5.31	5.28
4	.01	21.20	18.00	16.70	15.98	15.52	15.21
	.05	7.71	6.95	6.59	6.39	6.26	6.16
	.10	4.55	4.33	4.19	4.11	4.05	4.01
5	.01	16.26	13.27	12.06	11.39	10.97	10.67
	.05	6.61	5.79	5.41	5.19	5.05	4.95
	.10	4.06	3.78	3.62	3.52	3.45	3.41
6	<u>.01</u>	13.75	10.93	9.78	9.15	8.75	8.47
	.05	5.99	5.14	4.76	4.53	4.39	4.28
	.10	3.78	3.46	3.29	3.18	3.11	3.06
7	.01	12.25	9.55	8.45	7.85	7.46	7.19
	.05	5.59	4.74	4.35	4.12	3.97	3.87
	.10	3.59	3.26	3.08	2.96	2.88	2.83
8	.01	11.26	8.65	7.59	7.01	6.63	6.37
	.05	5.32	4.46	4.07	3.84	3.69	3.58
	.10	3.46	3.11	2.92	2.81	2.73	2.67
9	.01	10.56	8.02	6.99	6.42	6.06	5.80
	.05	5.12	4.26	3.86	3.63	3.48	3.37
	.10	3.36	3.01	2.81	2.69	2.61	2.55
10	.01	10.05	7.56	6.55	6.00	5.64	5.39
	.05	4.97	4.10	3.71	3.48	3.33	3.22
	.10	3.29	2.93	2.73	2.61	2.52	2.46
11	.01	9.65	7.21	6.22	5.67	5.32	5.07
	.05	4.85	3.98	3.59	3.36	3.20	3.10
	.10	3.23	2.86	2.66	2.54	2.45	2.39
12	.01	9.33	6.93	5.95	5.41	5.07	4.82
	.05	4.75	3.89	3.49	3.26	3.11	3.00
	.10	3.18	2.81	2.61	2.48	2.40	2.33
13	.01	9.07	6.70	5.74	5.21	4.86	4.62
	.05	4.67	3.81	3.41	3.18	3.03	2.92
	.10	3.14	2.76	2.56	2.43	2.35	2.28
14	.01	8.86	6.52	5.56	5.04	4.70	4.46
	.05	4.60	3.74	3.34	3.11	2.96	2.85
	.10	3.10	2.73	2.52	2.40	2.31	2.24
15	.01	8.68	6.36	5.42	4.89	4.56	4.32
	.05	4.54	3.68	3.29	3.06	2.90	2.79
	.10	3.07	2.70	2.49	2.36	2.27	2.21

with  
Group  
df

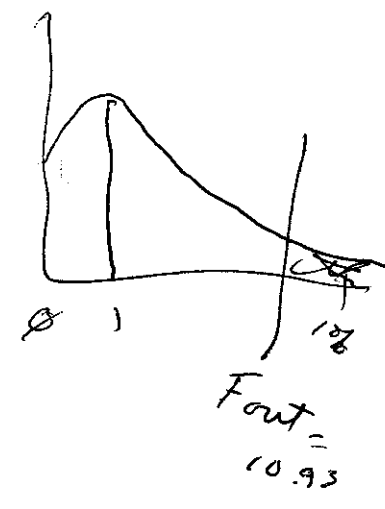


TABLE A-3 (cont.)

Denom- inator <i>df</i>	Signi- ficance Level	Numerator Degrees of Freedom					
		1	2	3	4	5	6
16	.01	8.53	6.23	5.29	4.77	4.44	4.20
	.05	4.49	3.63	3.24	3.01	2.85	2.74
	.10	3.05	2.67	2.46	2.33	2.24	2.18
17	.01	8.40	6.11	5.19	4.67	4.34	4.10
	.05	4.45	3.59	3.20	2.97	2.81	2.70
	.10	3.03	2.65	2.44	2.31	2.22	2.15
18	.01	8.29	6.01	5.09	4.58	4.25	4.02
	.05	4.41	3.56	3.16	2.93	2.77	2.66
	.10	3.01	2.62	2.42	2.29	2.20	2.13
19	.01	8.19	5.93	5.01	4.50	4.17	3.94
	.05	4.38	3.52	3.13	2.90	2.74	2.63
	.10	2.99	2.61	2.40	2.27	2.18	2.11
20	.01	8.10	5.85	4.94	4.43	4.10	3.87
	.05	4.35	3.49	3.10	2.87	2.71	2.60
	.10	2.98	2.59	2.38	2.25	2.16	2.09
21	.01	8.02	5.78	4.88	4.37	4.04	3.81
	.05	4.33	3.47	3.07	2.84	2.69	2.57
	.10	2.96	2.58	2.37	2.23	2.14	2.08
22	.01	7.95	5.72	4.82	4.31	3.99	3.76
	.05	4.30	3.44	3.05	2.82	2.66	2.55
	.10	2.95	2.56	2.35	2.22	2.13	2.06
23	.01	7.88	5.66	4.77	4.26	3.94	3.71
	.05	4.28	3.42	3.03	2.80	2.64	2.53
	.10	2.94	2.55	2.34	2.21	2.12	2.05
24	.01	7.82	5.61	4.72	4.22	3.90	3.67
	.05	4.26	3.40	3.01	2.78	2.62	2.51
	.10	2.93	2.54	2.33	2.20	2.10	2.04
25	.01	7.77	5.57	4.68	4.18	3.86	3.63
	.05	4.24	3.39	2.99	2.76	2.60	2.49
	.10	2.92	2.53	2.32	2.19	2.09	2.03
26	.01	7.72	5.53	4.64	4.14	3.82	3.59
	.05	4.23	3.37	2.98	2.74	2.59	2.48
	.10	2.91	2.52	2.31	2.18	2.08	2.01
27	.01	7.68	5.49	4.60	4.11	3.79	3.56
	.05	4.21	3.36	2.96	2.73	2.57	2.46
	.10	2.90	2.51	2.30	2.17	2.07	2.01
28	.01	7.64	5.45	4.57	4.08	3.75	3.53
	.05	4.20	3.34	2.95	2.72	2.56	2.45
	.10	2.89	2.50	2.29	2.16	2.07	2.00
29	.01	7.60	5.42	4.54	4.05	3.73	3.50
	.05	4.18	3.33	2.94	2.70	2.55	2.43
	.10	2.89	2.50	2.28	2.15	2.06	1.99
30	.01	7.56	5.39	4.51	4.02	3.70	3.47
	.05	4.17	3.32	2.92	2.69	2.53	2.42
	.10	2.88	2.49	2.28	2.14	2.05	1.98

**TABLE A-3** (cont.)

Denom- inator <i>df</i>	Signi- ficance Level	Numerator Degrees of Freedom					
		1	2	3	4	5	6
35	.01	7.42	5.27	4.40	3.91	3.59	3.37
	.05	4.12	3.27	2.88	2.64	2.49	2.37
	.10	2.86	2.46	2.25	2.11	2.02	1.95
40	.01	7.32	5.18	4.31	3.83	3.51	3.29
	.05	4.09	3.23	2.84	2.61	2.45	2.34
	.10	2.84	2.44	2.23	2.09	2.00	1.93
45	.01	7.23	5.11	4.25	3.77	3.46	3.23
	.05	4.06	3.21	2.81	2.58	2.42	2.31
	.10	2.82	2.43	2.21	2.08	1.98	1.91
50	.01	7.17	5.06	4.20	3.72	3.41	3.19
	.05	4.04	3.18	2.79	2.56	2.40	2.29
	.10	2.81	2.41	2.20	2.06	1.97	1.90
55	.01	7.12	5.01	4.16	3.68	3.37	3.15
	.05	4.02	3.17	2.77	2.54	2.38	2.27
	.10	2.80	2.40	2.19	2.05	1.96	1.89
60	.01	7.08	4.98	4.13	3.65	3.34	3.12
	.05	4.00	3.15	2.76	2.53	2.37	2.26
	.10	2.79	2.39	2.18	2.04	1.95	1.88
65	.01	7.04	4.95	4.10	3.62	3.31	3.09
	.05	3.99	3.14	2.75	2.51	2.36	2.24
	.10	2.79	2.39	2.17	2.03	1.94	1.87
70	.01	7.01	4.92	4.08	3.60	3.29	3.07
	.05	3.98	3.13	2.74	2.50	2.35	2.23
	.10	2.78	2.38	2.16	2.03	1.93	1.86
75	.01	6.99	4.90	4.06	3.58	3.27	3.05
	.05	3.97	3.12	2.73	2.49	2.34	2.22
	.10	2.77	2.38	2.16	2.02	1.93	1.86
80	.01	6.96	4.88	4.04	3.56	3.26	3.04
	.05	3.96	3.11	2.72	2.49	2.33	2.22
	.10	2.77	2.37	2.15	2.02	1.92	1.85
85	.01	6.94	4.86	4.02	3.55	3.24	3.02
	.05	3.95	3.10	2.71	2.48	2.32	2.21
	.10	2.77	2.37	2.15	2.01	1.92	1.85
90	.01	6.93	4.85	4.01	3.54	3.23	3.01
	.05	3.95	3.10	2.71	2.47	2.32	2.20
	.10	2.76	2.36	2.15	2.01	1.91	1.84
95	.01	6.91	4.84	4.00	3.52	3.22	3.00
	.05	3.94	3.09	2.70	2.47	2.31	2.20
	.10	2.76	2.36	2.14	2.01	1.91	1.84
100	.01	6.90	4.82	3.98	3.51	3.21	2.99
	.05	3.94	3.09	2.70	2.46	2.31	2.19
	.10	2.76	2.36	2.14	2.00	1.91	1.83
$\infty$	.01	6.64	4.61	3.78	3.32	3.02	2.80
	.05	3.84	3.00	2.61	2.37	2.22	2.10
	.10	2.71	2.30	2.08	1.95	1.85	1.78

**TABLE A-4** Cutoff Scores for the Chi-Square Distribution

<i>df</i>	Significance Level		
	.10	.05	.01
1	2.706	3.841	6.635
2	4.605	5.992	9.211
3	6.252	7.815	11.345
4	7.780	9.488	13.277
5	9.237	11.071	15.087
6	10.645	12.592	16.812
7	12.017	14.067	18.475
8	13.362	15.507	20.090
9	14.684	16.919	21.666
10	15.987	18.307	23.209

**TABLE A-5** Index to Power Tables and Tables Giving Number of Participants Needed for 80% Power

Hypothesis-Testing Procedure	Chapter	Power Table	Number of Participants Table
Correlation coefficient ( <i>r</i> )	3	111	111
<i>t</i> test for dependent means	9	324	325
<i>t</i> test for independent means	10	360	361
One-way analysis of variance	12	435	436
Two-way analysis of variance	13	482	483
Chi-square test for independence	14	528	529