

APPENDIX 2

**TABLES FOR
INFERENTIAL TESTS**

TABLE A. Areas under the right half (positive z scores) of the standard normal curve ($\mu = 0, \sigma = 1$)

(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)
z	area between mean and z	area beyond z	z	area between mean and z	area beyond z	z	area between mean and z	area beyond z
0.00	00.00	50.00	0.55	20.88	29.12	1.10	36.43	13.57
0.01	00.40	49.60	0.56	21.23	28.77	1.11	36.65	13.35
0.02	00.80	49.20	0.57	21.57	28.43	1.12	36.86	13.14
0.03	01.20	48.80	0.58	21.90	28.10	1.13	37.08	12.92
0.04	01.60	48.40	0.59	22.24	27.76	1.14	37.29	12.71
0.05	01.99	48.01	0.60	22.57	27.43	1.15	37.49	12.51
0.06	02.39	47.61	0.61	22.91	27.09	1.16	37.70	12.30
0.07	02.79	47.21	0.62	23.24	26.76	1.17	37.90	12.10
0.08	03.19	46.81	0.63	23.57	26.43	1.18	38.10	11.90
0.09	03.59	46.41	0.64	23.89	26.11	1.19	38.30	11.70
0.10	03.98	46.02	0.65	24.22	25.78	1.20	38.49	11.51
0.11	04.38	45.62	0.66	24.54	25.46	1.21	38.69	11.31
0.12	04.78	45.22	0.67	24.86	25.14	1.22	38.88	11.12
0.13	05.17	44.83	0.68	25.17	24.83	1.23	39.07	10.93
0.14	05.57	44.43	0.69	25.49	24.51	1.24	39.25	10.75
0.15	05.96	44.04	0.70	25.80	24.20	1.25	39.44	10.56
0.16	06.36	43.64	0.71	26.11	23.89	1.26	39.62	10.38
0.17	06.75	43.25	0.72	26.42	23.58	1.27	39.80	10.20
0.18	07.14	42.86	0.73	26.73	23.27	1.28	39.97	10.03
0.19	07.53	42.47	0.74	27.04	22.96	1.29	40.15	09.85
0.20	07.93	42.07	0.75	27.34	22.66	1.30	40.32	09.68
0.21	08.32	41.68	0.76	27.64	22.36	1.31	40.49	09.51
0.22	08.71	41.29	0.77	27.94	22.06	1.32	40.66	09.34
0.23	09.10	40.90	0.78	28.23	21.77	1.33	40.82	09.18
0.24	09.48	40.52	0.79	28.52	21.48	1.34	40.99	09.01
0.25	09.87	40.13	0.80	28.81	21.19	1.35	41.15	08.85
0.26	10.26	39.74	0.81	29.10	20.90	1.36	41.31	08.69
0.27	10.64	39.36	0.82	29.39	20.61	1.37	41.47	08.53
0.28	11.03	38.97	0.83	29.67	20.33	1.38	41.62	08.38
0.29	11.41	38.59	0.84	29.95	20.05	1.39	41.77	08.23
0.30	11.79	38.21	0.85	30.23	19.77	1.40	41.92	08.08
0.31	12.17	37.83	0.86	30.51	19.49	1.41	42.07	07.93
0.32	12.55	37.45	0.87	30.78	19.22	1.42	42.22	07.78
0.33	12.93	37.07	0.88	31.06	18.94	1.43	42.36	07.64
0.34	13.31	36.69	0.89	31.33	18.67	1.44	42.51	07.49
0.35	13.68	36.32	0.90	31.59	18.41	1.45	42.65	07.35
0.36	14.06	35.94	0.91	31.86	18.14	1.46	42.79	07.21
0.37	14.43	35.57	0.92	32.12	17.88	1.47	42.92	07.08
0.38	14.80	35.20	0.93	32.38	17.62	1.48	43.06	06.94
0.39	15.17	34.83	0.94	32.64	17.36	1.49	43.19	06.81
0.40	15.54	34.46	0.95	32.89	17.11	1.50	43.32	06.68
0.41	15.91	34.09	0.96	33.15	16.85	1.51	43.45	06.55
0.42	16.28	33.72	0.97	33.40	16.60	1.52	43.57	06.43
0.43	16.64	33.36	0.98	33.65	16.35	1.53	43.70	06.30
0.44	17.00	33.00	0.99	33.89	16.11	1.54	43.82	06.18
0.45	17.36	32.64	1.00	34.13	15.87	1.55	43.94	06.06
0.46	17.72	32.28	1.01	34.38	15.62	1.56	44.06	05.94
0.47	18.08	31.92	1.02	34.61	15.39	1.57	44.18	05.82
0.48	18.44	31.56	1.03	34.85	15.15	1.58	44.29	05.71
0.49	18.79	31.21	1.04	35.08	14.92	1.59	44.41	05.59
0.50	19.15	30.85	1.05	35.31	14.69	1.60	44.52	05.48
0.51	19.50	30.50	1.06	35.54	14.46	1.61	44.63	05.37
0.52	19.85	30.15	1.07	35.77	14.23	1.62	44.74	05.26
0.53	20.19	29.81	1.08	35.99	14.01	1.63	44.84	05.16
0.54	20.54	29.46	1.09	36.21	13.79	1.64	44.95	05.05

Source: This table is from *Fundamentals of Behavioral Statistics* (Third Edition), by R. P. Runyon and A. Haber, 1976, Addison-Wesley, pp. 377–379. Copyright © 1976 by Addison-Wesley. Reprinted with permission of The McGraw-Hill Companies.

TABLE A. continued

(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)
z	area between mean and z	area beyond z	z	area between mean and z	area beyond z	z	area between mean and z	area beyond z
1.65	45.05	04.95	2.22	48.68	01.32	2.79	49.74	00.26
1.66	45.15	04.85	2.23	48.71	01.29	2.80	49.74	00.26
1.67	45.25	04.75	2.24	48.75	01.25	2.81	49.75	00.25
1.68	45.35	04.65	2.25	48.78	01.22	2.82	49.76	00.24
1.69	45.45	04.55	2.26	48.81	01.19	2.83	49.77	00.23
1.70	45.54	04.46	2.27	48.84	01.16	2.84	49.77	00.23
1.71	45.64	04.36	2.28	48.87	01.13	2.85	49.78	00.22
1.72	45.73	04.27	2.29	48.90	01.10	2.86	49.79	00.21
1.73	45.82	04.18	2.30	48.93	01.07	2.87	49.79	00.21
1.74	45.91	04.09	2.31	48.96	01.04	2.88	49.80	00.20
1.75	45.99	04.01	2.32	48.98	01.02	2.89	49.81	00.19
1.76	46.08	03.92	2.33	49.01	00.99	2.90	49.81	00.19
1.77	46.16	03.84	2.34	49.04	00.96	2.91	49.82	00.18
1.78	46.25	03.75	2.35	49.06	00.94	2.92	49.82	00.18
1.79	46.33	03.67	2.36	49.09	00.91	2.93	49.83	00.17
1.80	46.41	03.59	2.37	49.11	00.89	2.94	49.84	00.16
1.81	46.49	03.51	2.38	49.13	00.87	2.95	49.84	00.16
1.82	46.56	03.44	2.39	49.16	00.84	2.96	49.85	00.15
1.83	46.64	03.36	2.40	49.18	00.82	2.97	49.85	00.15
1.84	46.71	03.29	2.41	49.20	00.80	2.98	49.86	00.14
1.85	46.78	03.22	2.42	49.22	00.78	2.99	49.86	00.14
1.86	46.86	03.14	2.43	49.25	00.75	3.00	49.87	00.13
1.87	46.93	03.07	2.44	49.27	00.73	3.01	49.87	00.13
1.88	46.99	03.01	2.45	49.29	00.71	3.02	49.87	00.13
1.89	47.06	02.94	2.46	49.31	00.69	3.03	49.88	00.12
1.90	47.13	02.87	2.47	49.32	00.68	3.04	49.88	00.12
1.91	47.19	02.81	2.48	49.34	00.66	3.05	49.89	00.11
1.92	47.26	02.74	2.49	49.36	00.64	3.06	49.89	00.11
1.93	47.32	02.68	2.50	49.38	00.62	3.07	49.89	00.11
1.94	47.38	02.62	2.51	49.40	00.60	3.08	49.90	00.10
1.95	47.44	02.56	2.52	49.41	00.59	3.09	49.90	00.10
1.96	47.50	02.50	2.53	49.43	00.57	3.10	49.90	00.10
1.97	47.56	02.44	2.54	49.45	00.55	3.11	49.91	00.09
1.98	47.61	02.39	2.55	49.46	00.54	3.12	49.91	00.09
1.99	47.67	02.33	2.56	49.48	00.52	3.13	49.91	00.09
2.00	47.72	02.28	2.57	49.49	00.51	3.14	49.92	00.08
2.01	47.78	02.22	2.58	49.51	00.49	3.15	49.92	00.08
2.02	47.83	02.17	2.59	49.52	00.48	3.16	49.92	00.08
2.03	47.88	02.12	2.60	49.53	00.47	3.17	49.92	00.08
2.04	47.93	02.07	2.61	49.55	00.45	3.18	49.93	00.07
2.05	47.98	02.02	2.62	49.56	00.44	3.19	49.93	00.07
2.06	48.03	01.97	2.63	49.57	00.43	3.20	49.93	00.07
2.07	48.08	01.92	2.64	49.59	00.41	3.21	49.93	00.07
2.08	48.12	01.88	2.65	49.60	00.40	3.22	49.94	00.06
2.09	48.17	01.83	2.66	49.61	00.39	3.23	49.94	00.06
2.10	48.21	01.79	2.67	49.62	00.38	3.24	49.94	00.06
2.11	48.26	01.74	2.68	49.63	00.37	3.25	49.94	00.06
2.12	48.30	01.70	2.69	49.64	00.36	3.30	49.95	00.05
2.13	48.34	01.66	2.70	49.65	00.35	3.35	49.96	00.04
2.14	48.38	01.62	2.71	49.66	00.34	3.40	49.97	00.03
2.15	48.42	01.58	2.72	49.67	00.33	3.45	49.97	00.03
2.16	48.46	01.54	2.73	49.68	00.32	3.50	49.98	00.02
2.17	48.50	01.50	2.74	49.69	00.31	3.60	49.98	00.02
2.18	48.54	01.46	2.75	49.70	00.30	3.70	49.99	00.01
2.19	48.57	01.43	2.76	49.71	00.29	3.80	49.99	00.01
2.20	48.61	01.39	2.77	49.72	00.28	3.90	49.995	00.005
2.21	48.64	01.36	2.78	49.73	00.27	4.00	49.997	00.003

Table B. Critical Values of t $df = N - 1$ for one-sample t test, confidence intervals, and for the t test for dependent samples $df = N_1 + N_2 - 2$ for two-sample t test

df	Level of Significance for Two-Tailed Test (For One-Tailed Test, Halve the Following Percentages)			
	10% ($p = .10$)	5% ($p = .05$)	2% ($p = .02$)	1% ($p = .01$)
1	6.3138	12.7062	31.8207	63.6574
2	2.9200	4.3027	6.9646	9.9248
3	2.3534	3.1824	4.5407	5.8409
4	2.1318	2.7764	3.7469	4.6041
5	2.0150	2.5706	3.3649	4.0322
6	1.9432	2.4469	3.1427	3.7074
7	1.8946	2.3646	2.9980	3.4995
8	1.8595	2.3060	2.8965	3.3554
9	1.8331	2.2622	2.8214	3.2498
10	1.8125	2.2281	2.7638	3.1693
11	1.7959	2.2010	2.7181	3.1058
12	1.7823	2.1788	2.6810	3.0545
13	1.7709	2.1604	2.6503	3.0123
14	1.7613	2.1448	2.6245	2.9768
15	1.7531	2.1315	2.6025	2.9467
16	1.7459	2.1199	2.5835	2.9208
17	1.7396	2.1098	2.5669	2.8982
18	1.7341	2.1009	2.5524	2.8784
19	1.7291	2.0930	2.5395	2.8609
20	1.7247	2.0860	2.5280	2.8453
21	1.7207	2.0796	2.5177	2.8314
22	1.7171	2.0739	2.5083	2.8188
23	1.7139	2.0687	2.4999	2.8073
24	1.7109	2.0639	2.4922	2.7969
25	1.7081	2.0595	2.4851	2.7874
26	1.7056	2.0555	2.4786	2.7787
27	1.7033	2.0518	2.4727	2.7707
28	1.7011	2.0484	2.4671	2.7633
29	1.6991	2.0452	2.4620	2.7564
30	1.6973	2.0423	2.4573	2.7500
35	1.6869	2.0301	2.4377	2.7238
40	1.6839	2.0211	2.4233	2.7045
45	1.6794	2.0141	2.4121	2.6896
50	1.6759	2.0086	2.4033	2.6778
60	1.6706	2.0003	2.3901	2.6603
70	1.6669	1.9944	2.3808	2.6479
80	1.6641	1.9901	2.3739	2.6387
90	1.6620	1.9867	2.3685	2.6316
100	1.6602	1.9840	2.3642	2.6259
110	1.6588	1.9818	2.3607	2.6213
120	1.6577	1.9799	2.3598	2.6174
∞	1.6449	1.9600	2.3263	2.5758

Source: This table is from *Handbook of Statistical Tables* by D. B. Owen, 1962, Addison-Wesley, pp. 28–30. Copyright © 1962 by Addison-Wesley Publishing Company, Inc. Reprinted with permission of Addison Wesley Longman.

Table C. Critical Values of F

df associated with the denominator (df_w)	df associated with the numerator (df_b)									
		1	2	3	4	5	6	7	8	9
1	5%	161	200	216	225	230	234	237	239	241
	1%	4052	5000	5403	5625	5764	5859	5928	5982	6022
2	5%	18.5	19.0	19.2	19.2	19.3	19.3	19.4	19.4	19.4
	1%	98.5	99.0	99.2	99.2	99.3	99.3	99.4	99.4	99.4
3	5%	10.1	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81
	1%	34.1	30.8	29.5	28.7	28.2	27.9	27.7	27.5	27.3
4	5%	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00
	1%	21.2	18.0	16.7	16.0	15.5	15.2	15.0	14.8	14.7
5	5%	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77
	1%	16.3	13.3	12.1	11.4	11.0	10.7	10.5	10.3	10.2
6	5%	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10
	1%	13.7	10.9	9.78	9.15	8.75	8.47	8.26	8.10	7.98
7	5%	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68
	1%	12.2	9.55	8.45	7.85	7.46	7.19	6.99	6.84	6.72
8	5%	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39
	1%	11.3	8.65	7.59	7.01	6.63	6.37	6.18	6.03	5.91
9	5%	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18
	1%	10.6	8.02	6.99	6.42	6.06	5.80	5.61	5.47	5.35
10	5%	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02
	1%	10.0	7.56	6.55	5.99	5.64	5.39	5.20	5.06	4.94
11	5%	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.90
	1%	9.65	7.21	6.22	5.67	5.32	5.07	4.89	4.74	4.63
12	5%	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80
	1%	9.33	6.93	5.95	5.41	5.06	4.82	4.64	4.50	4.39
13	5%	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77	2.71
	1%	9.07	6.70	5.74	5.21	4.86	4.62	4.44	4.30	4.19
14	5%	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.65
	1%	8.86	6.51	5.56	5.04	4.70	4.46	4.28	4.14	4.03
15	5%	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59
	1%	8.68	6.36	5.42	4.89	4.56	4.32	4.14	4.00	3.89
16	5%	4.49	3.63	3.24	3.01	2.85	2.74	2.66	2.59	2.54
	1%	8.53	6.23	5.29	4.77	4.44	4.20	4.03	3.89	3.78
17	5%	4.45	3.59	3.20	2.96	2.81	2.70	2.61	2.55	2.49
	1%	8.40	6.11	5.18	4.67	4.34	4.10	3.93	3.79	3.68

Source: This table is adapted from "Tables of percentage points of the inverted beta (F) distribution," by M. Merrington and C. M. Thompson, 1943, *Biometrika*, 33, pp. 73–88, with permission of the Biometrika Trustees.

Table C.
continued

<i>df</i> associated with the denominator (<i>df_w</i>)	<i>df</i> associated with the numerator (<i>df_b</i>)									
		1	2	3	4	5	6	7	8	9
18	5%	4.41	3.55	3.16	2.93	2.77	2.66	2.58	2.51	2.46
	1%	8.29	6.01	5.09	4.58	4.25	4.01	3.84	3.71	3.60
19	5%	4.38	3.52	3.13	2.90	2.74	2.63	2.54	2.48	2.42
	1%	8.18	5.93	5.01	4.50	4.17	3.94	3.77	3.63	3.52
20	5%	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39
	1%	8.10	5.85	4.94	4.43	4.10	3.87	3.70	3.56	3.46
21	5%	4.32	3.47	3.07	2.84	2.68	2.57	2.49	2.42	2.37
	1%	8.02	5.78	4.87	4.37	4.04	3.81	3.64	3.51	3.40
22	5%	4.30	3.44	3.05	2.82	2.66	2.55	2.46	2.40	2.34
	1%	7.95	5.72	4.82	4.31	3.99	3.76	3.59	3.45	3.35
23	5%	4.28	3.42	3.03	2.80	2.64	2.53	2.44	2.37	2.32
	1%	7.88	5.66	4.76	4.26	3.94	3.71	3.54	3.41	3.30
24	5%	4.26	3.40	3.01	2.78	2.62	2.51	2.42	2.36	2.30
	1%	7.82	5.61	4.72	4.22	3.90	3.67	3.50	3.36	3.26
25	5%	4.24	3.39	2.29	2.76	2.60	2.49	2.40	2.34	2.28
	1%	7.77	5.57	4.68	4.18	3.86	3.63	3.46	3.32	3.22
26	5%	4.23	3.37	2.98	2.74	2.59	2.47	2.39	2.32	2.27
	1%	7.72	5.53	4.64	4.14	3.82	3.59	3.42	3.29	3.18
27	5%	4.21	3.35	2.96	2.73	2.57	2.46	2.37	2.31	2.25
	1%	7.68	5.49	4.60	4.11	3.78	3.56	3.39	3.26	3.15
28	5%	4.20	3.34	2.95	2.71	2.56	2.45	2.36	2.29	2.24
	1%	7.64	5.45	4.57	4.07	3.75	3.53	3.36	3.23	3.12
29	5%	4.18	3.33	2.93	2.70	2.55	2.43	2.35	2.28	2.22
	1%	7.60	5.42	4.54	4.04	3.73	3.50	3.33	3.20	3.09
30	5%	4.17	3.32	2.92	2.69	2.53	2.42	2.33	2.27	2.21
	1%	7.56	5.39	4.51	4.02	3.70	3.47	3.30	3.17	3.07
40	5%	4.08	3.23	2.84	2.61	2.45	2.34	2.25	2.18	2.12
	1%	7.31	5.18	4.31	3.83	3.51	3.29	3.12	2.99	2.89
60	5%	4.00	3.15	2.76	2.53	2.37	2.25	2.17	2.10	2.04
	1%	7.08	4.98	4.13	3.65	3.34	3.12	2.95	2.82	2.72
120	5%	3.92	3.07	2.68	2.45	2.29	2.18	2.09	2.02	1.96
	1%	6.85	4.79	3.95	3.48	3.17	2.96	2.79	2.66	2.56

Table D. Critical Values of q_α

df_v	α	$K = \text{Number of Groups (Means)}$								
		2	3	4	5	6	7	8	9	10
1	.05	17.97	26.98	32.82	37.08	40.41	43.12	45.40	47.36	49.07
	.01	90.03	135.00	164.30	185.60	202.20	215.80	227.20	237.00	245.60
2	.05	6.08	8.33	9.80	10.88	11.74	12.44	13.03	13.54	13.99
	.01	14.04	19.02	22.29	24.72	26.63	28.20	29.53	30.68	31.69
3	.05	4.50	5.91	6.82	7.50	8.04	8.48	8.85	9.18	9.46
	.01	8.26	10.62	12.17	13.33	14.24	15.00	15.64	16.20	16.69
4	.05	3.93	5.04	5.76	6.29	6.71	7.05	7.35	7.60	7.83
	.01	6.51	8.12	9.17	9.96	10.58	11.10	11.55	11.93	12.27
5	.05	3.64	4.60	5.22	5.67	6.03	6.33	6.58	6.80	6.99
	.01	5.70	6.98	7.80	8.42	8.91	9.32	9.67	9.97	10.24
6	.05	3.46	4.34	4.90	5.30	5.63	5.90	6.12	6.32	6.49
	.01	5.24	6.33	7.03	7.56	7.97	8.32	8.61	8.87	9.10
7	.05	3.34	4.16	4.68	5.06	5.36	5.61	5.82	6.00	6.16
	.01	4.95	5.92	6.54	7.01	7.37	7.68	7.94	8.17	8.37
8	.05	3.26	4.04	4.53	4.89	5.17	5.40	5.60	5.77	5.92
	.01	4.75	5.64	6.20	6.62	6.96	7.24	7.47	7.68	7.86
9	.05	3.20	3.95	4.41	4.76	5.02	5.24	5.43	5.59	5.74
	.01	4.60	5.43	5.96	6.35	6.66	6.91	7.13	7.33	7.49
10	.05	3.15	3.88	4.33	4.65	4.91	5.12	5.30	5.46	5.60
	.01	4.48	5.27	5.77	6.14	6.43	6.67	6.87	7.05	7.21
11	.05	3.11	3.82	4.26	4.57	4.82	5.03	5.20	5.35	5.49
	.01	4.39	5.15	5.62	5.97	6.25	6.48	6.67	6.84	6.99
12	.05	3.08	3.77	4.20	4.51	4.75	4.95	5.12	5.27	5.39
	.01	4.32	5.05	5.50	5.84	6.10	6.32	6.51	6.67	6.81
13	.05	3.06	3.73	4.15	4.45	4.69	4.88	5.05	5.19	5.32
	.01	4.26	4.96	5.40	5.73	5.98	6.19	6.37	6.53	6.67
14	.05	3.03	3.70	4.11	4.41	4.64	4.83	4.99	5.13	5.25
	.01	4.21	4.89	5.32	5.63	5.88	6.08	6.26	6.41	6.54
15	.05	3.01	3.67	4.08	4.37	4.59	4.78	4.94	5.08	5.20
	.01	4.17	4.84	5.25	5.56	5.80	5.99	6.16	6.31	6.44
16	.05	3.00	3.65	4.05	4.33	4.56	4.74	4.90	5.03	5.15
	.01	4.13	4.79	5.19	5.49	5.72	5.92	6.08	6.22	6.35
17	.05	2.98	3.63	4.02	4.30	4.52	4.70	4.86	4.99	5.11
	.01	4.10	4.74	5.14	5.43	5.66	5.85	6.01	6.15	6.27
18	.05	2.97	3.61	4.00	4.28	4.49	4.67	4.82	4.96	5.07
	.01	4.07	4.70	5.09	5.38	5.60	5.79	5.94	6.08	6.20
19	.05	2.96	3.59	3.98	4.25	4.47	4.65	4.79	4.92	5.04
	.01	4.05	4.67	5.05	5.33	5.55	5.73	5.89	6.02	6.14
20	.05	2.95	3.58	3.96	4.23	4.45	4.62	4.77	4.90	5.01
	.01	4.02	4.64	5.02	5.29	5.51	5.69	5.84	5.97	6.09
24	.05	2.92	3.53	3.90	4.17	4.37	4.54	4.68	4.81	4.92
	.01	3.96	4.55	4.91	5.17	5.37	5.54	5.69	5.81	5.92
30	.05	2.89	3.49	3.85	4.10	4.30	4.46	4.60	4.72	4.82
	.01	3.89	4.45	4.80	5.05	5.24	5.40	5.54	5.65	5.76
40	.05	2.86	3.44	3.79	4.04	4.23	4.39	4.52	4.63	4.73
	.01	3.82	4.37	4.70	4.93	5.11	5.26	5.39	5.50	5.60
60	.05	2.83	3.40	3.74	3.98	4.16	4.31	4.44	4.55	4.65
	.01	3.76	4.28	4.59	4.82	4.99	5.13	5.25	5.36	5.45
120	.05	2.80	3.36	3.68	3.92	4.10	4.24	4.36	4.47	4.56
	.01	3.70	4.20	4.50	4.71	4.87	5.01	5.12	5.21	5.30
∞	.05	2.77	3.31	3.63	3.86	4.03	4.17	4.29	4.39	4.47
	.01	3.64	4.12	4.40	4.60	4.76	4.88	4.99	5.08	5.16

Source: This table is from Table 29 of E. S. Pearson and H. O. Hartley (Eds.), *Biometrika Tables for Statisticians*, 1, 3rd ed., Cambridge University Press. Reprinted with permission of the Biometrika Trustees.

Table E. Critical Values of r
 $df = N-2$, where N is the number of pairs of scores.

Degrees of Freedom (df)	5%	1%	Degrees of Freedom (df)	5%	1%
1	.997	1.000	24	.388	.496
2	.950	.990	25	.381	.487
3	.878	.959	26	.374	.478
4	.811	.917	27	.367	.470
5	.754	.874	28	.361	.463
6	.707	.834	29	.355	.456
7	.666	.798	30	.349	.449
8	.632	.765	35	.325	.418
9	.602	.735	40	.304	.393
10	.576	.708	45	.288	.372
11	.553	.684	50	.273	.354
12	.532	.661	60	.250	.325
13	.514	.641	70	.232	.302
14	.497	.623	80	.217	.283
15	.482	.606	90	.205	.267
16	.468	.590	100	.195	.254
17	.456	.575	125	.174	.228
18	.444	.561	150	.159	.208
19	.433	.549	200	.138	.181
20	.423	.537	300	.113	.148
21	.413	.526	400	.098	.128
22	.404	.515	500	.088	.115
23	.396	.505	1000	.062	.081

Source: This table is adapted from Table VII of Fisher and Yates, *Statistical Tables for Biological, Agricultural and Medical Research*, published by Longman Group Ltd., London (previously published by Oliver and Boyd, Edinburgh), and by permission of Pearson Education Limited.

Table F. Critical Values of r_s

N	5%	1%
5	1.000	—
6	.886	1.000
7	.786	.929
8	.738	.881
9	.683	.833
10	.648	.794
12	.591	.777
14	.544	.714
16	.506	.665
18	.475	.625
20	.450	.591
22	.428	.562
24	.409	.537
26	.392	.515
28	.377	.496
30	.364	.478

Source: This table is adapted from "Distribution of Sums of Squares of Rank Differences for Small Samples," by E. G. Olds, 1938, *Annals of Mathematical Statistics*, 9, pp. 133–148, and "The 5% Significance Levels for Sums of Squares of Rank Differences and a Correction," 1949, *Annals of Mathematical Statistics*, 20, pp. 117–118, with permission of the editor.

Table G. Critical Values of χ^2

$df = K - 1$ for the chi-square goodness-of-fit test. K is the number of categories.

$df = (R - 1)(C - 1)$ for the chi-square test of independence. R is the number of rows; C is the number of columns.

Degrees of Freedom (df)	5%	1%
1	3.84	6.64
2	5.99	9.21
3	7.82	11.34
4	9.49	13.28
5	11.07	15.09
6	12.59	16.81
7	14.07	18.48
8	15.51	20.09
9	16.92	21.67
10	18.31	23.21
11	19.68	24.72
12	21.03	26.22
13	22.36	27.69
14	23.68	29.14
15	25.00	30.58
16	26.30	32.00
17	27.59	33.41
18	28.87	34.80
19	30.14	36.19
20	31.41	37.57
21	32.67	38.93
22	33.92	40.29
23	35.17	41.64
24	36.42	42.98
25	37.65	44.31
26	38.88	45.64
27	40.11	46.96
28	41.34	48.28
29	42.56	49.59
30	43.77	50.89

Source: This table is from Table IV of Fisher and Yates, *Statistical Tables for Biological, Agricultural and Medical Research*, published by Longman Group Ltd., London (previously published by Oliver and Boyd, Edinburgh). Reprinted by permission of Pearson Education Limited.

Table H. Critical Values for the Mann-Whitney U

For a two-tailed test at the 10% level (roman type, $\alpha = .10$) and at the 5% level (boldface type, $\alpha = .05$). For a one-tailed test, halve the probabilities.

Dashes in the body of the table mean that no decision is possible at the given α .

N_1 N_2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0	0
2	—	—	—	—	0	0	0	1	1	1	1	2	2	2	3	3	3	4	4	4	4
3	—	—	0	0	1	2	2	3	3	4	5	5	6	7	7	8	9	9	10	11	11
4	—	—	0	1	2	3	4	5	6	7	8	9	10	11	12	14	15	16	17	18	18
5	—	0	1	2	4	5	6	8	9	11	12	13	15	16	18	19	20	22	23	25	25
6	—	0	2	3	5	7	8	10	12	14	16	17	19	21	23	25	26	28	30	32	32
7	—	0	2	4	6	8	11	13	15	17	19	21	24	26	28	30	33	35	37	39	39
8	—	1	3	5	8	10	13	15	18	20	23	26	28	31	33	36	39	41	44	47	47
9	—	1	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	54
10	—	1	4	7	11	14	17	20	24	27	31	34	37	41	44	48	51	55	58	62	62
11	—	1	5	8	12	16	19	23	27	31	34	38	42	46	50	54	57	61	65	69	69
12	—	2	5	9	13	17	21	26	30	34	38	42	47	51	55	60	64	68	72	77	77
13	—	2	6	10	15	19	24	28	33	37	42	47	51	56	61	65	70	75	80	84	84
14	—	2	7	11	16	21	26	31	36	41	46	51	56	61	66	71	77	82	87	92	92
15	—	3	7	12	18	23	28	33	39	44	50	55	61	66	72	77	83	88	94	100	100
16	—	3	8	14	19	25	30	36	42	48	54	60	65	71	77	83	89	95	101	107	107
17	—	3	9	15	20	26	33	39	45	51	57	64	70	77	83	89	96	102	109	115	115
18	—	4	9	16	22	28	35	41	48	55	61	68	75	82	88	95	102	109	116	123	123
19	0	4	10	17	23	30	37	44	51	58	65	72	80	87	94	101	109	116	123	130	130
20	0	4	11	18	25	32	39	47	54	62	69	77	84	92	100	107	115	123	130	138	138
		2	8	13	20	27	34	41	48	55	62	69	76	83	90	98	105	112	119	127	127

Source: This table is from *Elementary Statistics* (2nd Edition) by Roger E. Kirk, Copyright © 1984, 1978 by Roger E. Kirk. Adapted by permission of the author.

Table H. continued

For a two-tailed test at the 2% level (roman type, $\alpha = .02$) and at the 1% level (boldface type, $\alpha = .01$). For a one-tailed test, halve the probabilities.

Dashes in the body of the table mean that no decision is possible at the given α .

N_1 N_2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2	—	—	—	—	—	—	—	—	—	—	—	—	0	0	0	0	0	0	1	1
3	—	—	—	—	—	—	0	0	1	1	1	2	2	2	3	3	4	4	4	5
4	—	—	—	—	0	1	1	2	3	3	4	5	5	6	7	7	8	9	9	10
5	—	—	—	—	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
6	—	—	—	—	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
7	—	—	0	1	3	4	6	7	9	11	12	14	16	17	19	21	23	24	26	28
8	—	—	—	0	1	3	4	6	7	9	11	13	15	17	20	22	24	26	28	30
9	—	—	—	—	0	1	3	4	6	7	9	11	13	15	17	20	22	24	26	28
10	—	—	1	3	5	7	9	11	14	16	18	21	23	26	28	31	33	36	38	40
11	—	—	—	—	0	1	3	5	7	9	11	13	16	18	20	22	24	27	29	31
12	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
13	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
18	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
19	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table I. Critical Values of T

Level of Significance for Two-Tailed Test (For One-Tailed Test, Halve the Probabilities)							
N	.05	.02	.01	N	.05	.02	.01
6	0	—	—	16	30	24	20
7	2	0	—	17	35	28	23
8	4	2	0	18	40	33	28
9	6	3	2	19	46	38	32
10	8	5	3	20	52	43	38
11	11	7	5	21	59	49	43
12	14	10	7	22	66	56	49
13	17	13	10	23	73	62	55
14	21	16	13	24	81	69	61
15	25	20	16	25	89	77	68

Source: This table is from Table 1 of F. Wilcoxon, 1949, *Some Rapid Approximate Statistical Procedures*, American Cyanamid Company, p. 13.