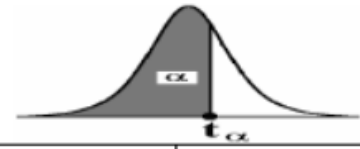


Critical Values of the t-distribution (t_{α})



$v=df$	$t_{0.90}$	$t_{0.95}$	$t_{0.975}$	$t_{0.99}$	$t_{0.995}$
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	1.3062	1.6896	2.0301	2.4377	2.7238
40	1.3030	1.6840	2.0210	2.4230	2.7040
45	1.3006	1.6794	2.0141	2.4121	2.6896
50	1.2987	1.6759	2.0086	2.4033	2.6778
60	1.2958	1.6706	2.0003	2.3901	2.6603
70	1.2938	1.6669	1.9944	2.3808	2.6479
80	1.2922	1.6641	1.9901	2.3739	2.6387
90	1.2910	1.6620	1.9867	2.3685	2.6316
100	1.2901	1.6602	1.9840	2.3642	2.6259
120	1.2886	1.6577	1.9799	2.3578	2.6174
140	1.2876	1.6558	1.9771	2.3533	2.6114
160	1.2869	1.6544	1.9749	2.3499	2.6069
180	1.2863	1.6534	1.9732	2.3472	2.6034
200	1.2858	1.6525	1.9719	2.3451	2.6006
∞	1.282	1.645	1.960	2.326	2.576

Table 8 Chi-square distribution – inverse cdf

df	P													
	0.005	0.010	0.025	0.050	0.100	0.250	0.500	0.750	0.900	0.950	0.975	0.990	0.995	0.999
1	0.000	0.000	0.001	0.004	0.016	0.102	0.455	1.323	2.706	3.841	5.024	6.635	7.879	10.83
2	0.010	0.020	0.051	0.103	0.211	0.575	1.386	2.773	4.605	5.991	7.378	9.210	10.60	13.82
3	0.072	0.115	0.216	0.352	0.584	1.213	2.366	4.108	6.251	7.815	9.348	11.34	12.84	16.27
4	0.207	0.297	0.484	0.711	1.064	1.923	3.357	5.385	7.779	9.488	11.14	13.28	14.86	18.47
5	0.412	0.554	0.831	1.145	1.610	2.675	4.351	6.626	9.236	11.07	12.83	15.09	16.75	20.51
6	0.676	0.872	1.237	1.635	2.204	3.455	5.348	7.841	10.64	12.59	14.45	16.81	18.55	22.46
7	0.989	1.239	1.690	2.167	2.833	4.255	6.346	9.037	12.02	14.07	16.01	18.48	20.28	24.32
8	1.344	1.647	2.180	2.733	3.490	5.071	7.344	10.22	13.36	15.51	17.53	20.09	21.95	26.12
9	1.735	2.088	2.700	3.325	4.168	5.899	8.343	11.39	14.68	16.92	19.02	21.67	23.59	27.88
10	2.156	2.558	3.247	3.940	4.865	6.737	9.342	12.55	15.99	18.31	20.48	23.21	25.19	29.59
11	2.603	3.053	3.816	4.575	5.578	7.584	10.34	13.70	17.28	19.68	21.92	24.73	26.76	31.26
12	3.074	3.571	4.404	5.226	6.304	8.438	11.34	14.85	18.55	21.03	23.34	26.22	28.30	32.91
13	3.565	4.107	5.009	5.892	7.041	9.299	12.34	15.98	19.81	22.36	24.74	27.69	29.82	34.53
14	4.075	4.660	5.629	6.571	7.790	10.17	13.34	17.12	21.06	23.68	26.12	29.14	31.32	36.12
15	4.601	5.229	6.262	7.261	8.547	11.04	14.34	18.25	22.31	25.00	27.49	30.58	32.80	37.70
16	5.142	5.812	6.908	7.962	9.312	11.91	15.34	19.37	23.54	26.30	28.85	32.00	34.27	39.25
17	5.697	6.408	7.564	8.672	10.09	12.79	16.34	20.49	24.77	27.59	30.19	33.41	35.72	40.79
18	6.265	7.015	8.231	9.390	10.86	13.68	17.34	21.60	25.99	28.87	31.53	34.81	37.16	42.31
19	6.844	7.633	8.907	10.12	11.65	14.56	18.34	22.72	27.20	30.14	32.85	36.19	38.58	43.82
20	7.434	8.260	9.591	10.85	12.44	15.45	19.34	23.83	28.41	31.41	34.17	37.57	40.00	45.31
21	8.034	8.897	10.28	11.59	13.24	16.34	20.34	24.93	29.62	32.67	35.48	38.93	41.40	46.80
22	8.643	9.542	10.98	12.34	14.04	17.24	21.34	26.04	30.81	33.92	36.78	40.29	42.80	48.27
23	9.260	10.20	11.69	13.09	14.85	18.14	22.34	27.14	32.01	35.17	38.08	41.64	44.18	49.73
24	9.886	10.86	12.40	13.85	15.66	19.04	23.34	28.24	33.20	36.42	39.36	42.98	45.56	51.18
25	10.52	11.52	13.12	14.61	16.47	19.94	24.34	29.34	34.38	37.65	40.65	44.31	46.93	52.62
26	11.16	12.20	13.84	15.38	17.29	20.84	25.34	30.43	35.56	38.89	41.92	45.64	48.29	54.05
27	11.81	12.88	14.57	16.15	18.11	21.75	26.34	31.53	36.74	40.11	43.19	46.96	49.65	55.48
28	12.46	13.56	15.31	16.93	18.94	22.66	27.34	32.62	37.92	41.34	44.46	48.28	50.99	56.89
29	13.12	14.26	16.05	17.71	19.77	23.57	28.34	33.71	39.09	42.56	45.72	49.59	52.34	58.30
30	13.79	14.95	16.79	18.49	20.60	24.48	29.34	34.80	40.26	43.77	46.98	50.89	53.67	59.70
31	14.46	15.66	17.54	19.28	21.43	25.39	30.34	35.89	41.42	44.99	48.23	52.19	55.00	61.10
32	15.13	16.36	18.29	20.07	22.27	26.30	31.34	36.97	42.58	46.19	49.48	53.49	56.33	62.49
33	15.82	17.07	19.05	20.87	23.11	27.22	32.34	38.06	43.75	47.40	50.73	54.78	57.65	63.87
34	16.50	17.79	19.81	21.66	23.95	28.14	33.34	39.14	44.90	48.60	51.97	56.06	58.96	65.25
35	17.19	18.51	20.57	22.47	24.80	29.05	34.34	40.22	46.06	49.80	53.20	57.34	60.27	66.62
36	17.89	19.23	21.34	23.27	25.64	29.97	35.34	41.30	47.21	51.00	54.44	58.62	61.58	67.98
37	18.59	19.96	22.11	24.07	26.49	30.89	36.34	42.38	48.36	52.19	55.67	59.89	62.88	69.35
38	19.29	20.69	22.88	24.88	27.34	31.81	37.34	43.46	49.51	53.38	56.90	61.16	64.18	70.70
39	20.00	21.43	23.65	25.70	28.20	32.74	38.34	44.54	50.66	54.57	58.12	62.43	65.48	72.06
40	20.71	22.16	24.43	26.51	29.05	33.66	39.34	45.62	51.81	55.76	59.34	63.69	66.77	73.40
50	27.99	29.71	32.36	34.76	37.69	42.94	49.33	56.33	63.17	67.50	71.42	76.15	79.49	86.66
60	35.53	37.48	40.48	43.19	46.46	52.29	59.33	66.98	74.40	79.08	83.30	88.38	91.95	99.61
70	43.28	45.44	48.76	51.74	55.33	61.70	69.33	77.58	85.53	90.53	95.02	100.4	104.2	112.3
80	51.17	53.54	57.15	60.39	64.28	71.14	79.33	88.13	96.58	101.9	106.6	112.3	116.3	124.8
90	59.20	61.75	65.65	69.13	73.29	80.62	89.33	98.65	107.6	113.1	118.1	124.1	128.3	137.2
100	67.33	70.06	74.22	77.93	82.36	90.13	99.33	109.1	118.5	124.3	129.6	135.8	140.2	149.4
120	83.85	86.92	91.57	95.70	100.6	109.2	119.3	130.1	140.2	146.6	152.2	159.0	163.6	173.6
140	100.7	104.0	109.1	113.7	119.0	128.4	139.3	150.9	161.8	168.6	174.6	181.8	186.8	197.4
160	117.7	121.3	126.9	131.8	137.5	147.6	159.3	171.7	183.3	190.5	196.9	204.5	209.8	221.0
180	134.9	138.8	144.7	150.0	156.2	166.9	179.3	192.4	204.7	212.3	219.0	227.1	232.6	244.4
200	152.2	156.4	162.7	168.3	174.8	186.2	199.3	213.1	226.0	234.0	241.1	249.4	255.3	267.5
240	187.3	192.0	199.0	205.1	212.4	224.9	239.3	254.4	268.5	277.1	284.8	293.9	300.2	313.4
300	240.7	246.0	253.9	260.9	269.1	283.1	299.3	316.1	331.8	341.4	349.9	359.9	366.8	381.4
400	330.9	337.2	346.5	354.6	364.2	380.6	399.3	418.7	436.6	447.6	457.3	468.7	476.6	493.1

F Distribution

Table C-5 Percentiles of the *F* Distribution

Entry is $F(A; \nu_1, \nu_2)$ where $P\{F(\nu_1, \nu_2) \leq F(A; \nu_1, \nu_2)\} = A$



$$F(A; \nu_1, \nu_2) = \frac{1}{F(1-A; \nu_2, \nu_1)}$$

Den. df	A	Numerator df								
		1	2	3	4	5	6	7	8	9
1	.50	1.00	1.50	1.71	1.82	1.89	1.94	1.98	2.00	2.03
	.90	39.9	49.5	53.6	55.8	57.2	58.2	58.9	59.4	59.9
	.95	161	200	216	225	230	234	237	239	241
	.975	648	800	864	900	922	937	948	957	963
	.99	4,052	5,000	5,403	5,625	5,764	5,859	5,928	5,981	6,022
	.995	16,211	20,000	21,615	22,500	23,056	23,437	23,715	23,925	24,091
	.999	405,280	500,000	540,380	562,500	576,400	585,940	592,870	598,140	602,280
2	.50	0.667	1.00	1.13	1.21	1.25	1.28	1.30	1.32	1.33
	.90	8.53	9.00	9.16	9.24	9.29	9.33	9.35	9.37	9.38
	.95	18.5	19.0	19.2	19.2	19.3	19.3	19.4	19.4	19.4
	.975	38.5	39.0	39.2	39.2	39.3	39.3	39.4	39.4	39.4
	.99	98.5	99.0	99.2	99.2	99.3	99.3	99.4	99.4	99.4
	.995	199	199	199	199	199	199	199	199	199
	.999	998.5	999.0	999.2	999.2	999.3	999.3	999.4	999.4	999.4
3	.50	0.585	0.881	1.00	1.06	1.10	1.13	1.15	1.16	1.17
	.90	5.54	5.46	5.39	5.34	5.31	5.28	5.27	5.25	5.24
	.95	10.1	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81
	.975	17.4	16.0	15.4	15.1	14.9	14.7	14.6	14.5	14.5
	.99	34.1	30.8	29.5	28.7	28.2	27.9	27.7	27.5	27.3
	.995	55.6	49.8	47.5	46.2	45.4	44.8	44.4	44.1	43.9
	.999	167.0	148.5	141.1	137.1	134.6	132.8	131.6	130.6	129.9
4	.50	0.549	0.828	0.941	1.00	1.04	1.06	1.08	1.09	1.10
	.90	4.54	4.32	4.19	4.11	4.05	4.01	3.98	3.95	3.94
	.95	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00
	.975	12.2	10.6	9.98	9.60	9.36	9.20	9.07	8.98	8.90
	.99	21.2	18.0	16.7	16.0	15.5	15.2	15.0	14.8	14.7
	.995	31.3	26.3	24.3	23.2	22.5	22.0	21.6	21.4	21.1
	.999	74.1	61.2	56.2	53.4	51.7	50.5	49.7	49.0	48.5
5	.50	0.528	0.799	0.907	0.965	1.00	1.02	1.04	1.05	1.06
	.90	4.06	3.78	3.62	3.52	3.45	3.40	3.37	3.34	3.32
	.95	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77
	.975	10.0	8.43	7.76	7.39	7.15	6.98	6.85	6.76	6.68
	.99	16.3	13.3	12.1	11.4	11.0	10.7	10.5	10.3	10.2
	.995	22.8	18.3	16.5	15.6	14.9	14.5	14.2	14.0	13.8
	.999	47.2	37.1	33.2	31.1	29.8	28.8	28.2	27.6	27.2
6	.50	0.515	0.780	0.886	0.942	0.977	1.00	1.02	1.03	1.04
	.90	3.78	3.46	3.29	3.18	3.11	3.05	3.01	2.98	2.96
	.95	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10
	.975	8.81	7.26	6.60	6.23	5.99	5.82	5.70	5.60	5.52
	.99	13.7	10.9	9.78	9.15	8.75	8.47	8.26	8.10	7.98
	.995	18.6	14.5	12.9	12.0	11.5	11.1	10.8	10.6	10.4
	.999	35.5	27.0	23.7	21.9	20.8	20.0	19.5	19.0	18.7
7	.50	0.506	0.767	0.871	0.926	0.960	0.983	1.00	1.01	1.02
	.90	3.59	3.26	3.07	2.96	2.88	2.83	2.78	2.75	2.72
	.95	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68
	.975	8.07	6.54	5.89	5.52	5.29	5.12	4.99	4.90	4.82
	.99	12.2	9.55	8.45	7.85	7.46	7.19	6.99	6.84	6.72
	.995	16.2	12.4	10.9	10.1	9.52	9.16	8.89	8.68	8.51
	.999	29.2	21.7	18.8	17.2	16.2	15.5	15.0	14.6	14.3

Den. df	A	Numerator df								
		10	12	15	20	24	30	60	120	∞
1	.50	2.04	2.07	2.09	2.12	2.13	2.15	2.17	2.18	2.20
	.90	60.2	60.7	61.2	61.7	62.0	62.3	62.8	63.1	63.3
	.95	242	244	246	248	249	250	252	253	254
	.975	969	977	985	993	997	1,001	1,010	1,014	1,018
	.99	6,056	6,106	6,157	6,209	6,235	6,261	6,313	6,330	6,366
	.995	24,224	24,426	24,630	24,836	24,940	25,044	25,253	25,359	25,464
	.999	605,620	610,670	615,760	620,910	623,500	626,100	631,240	633,970	636,620
2	.50	1.34	1.36	1.38	1.39	1.40	1.41	1.43	1.43	1.44
	.90	9.39	9.41	9.42	9.44	9.45	9.46	9.47	9.48	9.49
	.95	19.4	19.4	19.4	19.4	19.5	19.5	19.5	19.5	19.5
	.975	39.4	39.4	39.4	39.4	39.5	39.5	39.5	39.5	39.5
	.99	99.4	99.4	99.4	99.4	99.5	99.5	99.5	99.5	99.5
	.995	199	199	199	199	199	199	199	199	200
	.999	999.4	999.4	999.4	999.4	999.5	999.5	999.5	999.5	999.5
3	.50	1.18	1.20	1.21	1.23	1.23	1.24	1.25	1.26	1.27
	.90	5.23	5.22	5.20	5.18	5.18	5.17	5.15	5.14	5.13
	.95	8.79	8.74	8.70	8.66	8.64	8.62	8.57	8.55	8.53
	.975	14.4	14.3	14.3	14.2	14.1	14.1	14.0	13.9	13.9
	.99	27.2	27.1	26.9	26.7	26.6	26.5	26.3	26.2	26.1
	.995	43.7	43.4	43.1	42.8	42.6	42.5	42.1	42.0	41.8
	.999	129.2	128.3	127.4	126.4	125.9	125.4	124.5	124.0	123.5
4	.50	1.11	1.13	1.14	1.15	1.16	1.16	1.18	1.18	1.19
	.90	3.92	3.90	3.87	3.84	3.83	3.82	3.79	3.78	3.76
	.95	5.96	5.91	5.86	5.80	5.77	5.75	5.69	5.66	5.63
	.975	8.84	8.75	8.66	8.56	8.51	8.46	8.36	8.31	8.26
	.99	14.5	14.4	14.2	14.0	13.9	13.8	13.7	13.6	13.5
	.995	21.0	20.7	20.4	20.2	20.0	19.9	19.6	19.5	19.3
	.999	48.1	47.4	46.8	46.1	45.8	45.4	44.7	44.4	44.1
5	.50	1.07	1.09	1.10	1.11	1.12	1.12	1.14	1.14	1.15
	.90	3.30	3.27	3.24	3.21	3.19	3.17	3.14	3.12	3.11
	.95	4.74	4.68	4.62	4.56	4.53	4.50	4.43	4.40	4.37
	.975	6.62	6.52	6.43	6.33	6.28	6.23	6.12	6.07	6.02
	.99	10.1	9.89	9.72	9.55	9.47	9.38	9.20	9.11	9.02
	.995	13.6	13.4	13.1	12.9	12.8	12.7	12.4	12.3	12.1
	.999	26.9	26.4	25.9	25.4	25.1	24.9	24.3	24.1	23.8
6	.50	1.05	1.06	1.07	1.08	1.09	1.10	1.11	1.12	1.12
	.90	2.94	2.90	2.87	2.84	2.82	2.80	2.76	2.74	2.72
	.95	4.06	4.00	3.94	3.87	3.84	3.81	3.74	3.70	3.67
	.975	5.46	5.37	5.27	5.17	5.12	5.07	4.96	4.90	4.85
	.99	7.87	7.72	7.56	7.40	7.31	7.23	7.06	6.97	6.88
	.995	10.2	10.0	9.81	9.59	9.47	9.36	9.12	9.00	8.88
	.999	18.4	18.0	17.6	17.1	16.9	16.7	16.2	16.0	15.7
7	.50	1.03	1.04	1.05	1.07	1.07	1.08	1.09	1.10	1.10
	.90	2.70	2.67	2.63	2.59	2.58	2.56	2.51	2.49	2.47
	.95	3.64	3.57	3.51	3.44	3.41	3.38	3.30	3.27	3.23
	.975	4.76	4.67	4.57	4.47	4.42	4.36	4.25	4.20	4.14
	.99	6.62	6.47	6.31	6.16	6.07	5.99	5.82	5.74	5.65
	.995	8.38	8.18	7.97	7.75	7.65	7.53	7.31	7.19	7.08
	.999	14.1	13.7	13.3	12.9	12.7	12.5	12.1	11.9	11.7

Den. df	4	Numerator df								
		1	2	3	4	5	6	7	8	9
8	.50	0.499	0.757	0.860	0.915	0.948	0.971	0.988	1.00	1.01
	.90	3.46	3.11	2.92	2.81	2.73	2.67	2.62	2.59	2.56
	.95	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39
	.975	7.57	6.06	5.42	5.05	4.82	4.65	4.53	4.43	4.36
	.99	11.3	8.65	7.59	7.01	6.63	6.37	6.18	6.03	5.91
	.995	14.7	11.0	9.60	8.81	8.30	7.95	7.69	7.50	7.34
	.999	25.4	18.5	15.8	14.4	13.5	12.9	12.4	12.0	11.8
	9	.50	0.494	0.749	0.852	0.906	0.939	0.962	0.978	0.990
.90		3.36	3.01	2.81	2.69	2.61	2.55	2.51	2.47	2.44
.95		5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18
.975		7.21	5.71	5.08	4.72	4.48	4.32	4.20	4.10	4.03
.99		10.6	8.02	6.99	6.42	6.06	5.80	5.61	5.47	5.35
.995		13.6	10.1	8.72	7.96	7.47	7.13	6.88	6.69	6.54
.999		22.9	16.4	13.9	12.6	11.7	11.1	10.7	10.4	10.1
10		.50	0.490	0.743	0.845	0.899	0.932	0.954	0.971	0.983
	.90	3.29	2.92	2.73	2.61	2.52	2.46	2.41	2.38	2.35
	.95	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02
	.975	6.94	5.46	4.83	4.47	4.24	4.07	3.95	3.85	3.78
	.99	10.0	7.56	6.55	5.99	5.64	5.39	5.20	5.06	4.94
	.995	12.8	9.43	8.08	7.34	6.87	6.54	6.30	6.12	5.97
	.999	21.0	14.9	12.6	11.3	10.5	9.93	9.52	9.20	8.96
	12	.50	0.484	0.735	0.835	0.888	0.921	0.943	0.959	0.972
.90		3.18	2.81	2.61	2.48	2.39	2.33	2.28	2.24	2.21
.95		4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80
.975		6.55	5.10	4.47	4.12	3.89	3.73	3.61	3.51	3.44
.99		9.33	6.93	5.95	5.41	5.06	4.82	4.64	4.50	4.39
.995		11.8	8.51	7.23	6.52	6.07	5.76	5.52	5.35	5.20
.999		18.6	13.0	10.8	9.63	8.89	8.38	8.00	7.71	7.48
15		.50	0.478	0.726	0.826	0.878	0.911	0.933	0.949	0.960
	.90	3.07	2.70	2.49	2.36	2.27	2.21	2.16	2.12	2.09
	.95	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59
	.975	6.20	4.77	4.15	3.80	3.58	3.41	3.29	3.20	3.12
	.99	8.68	6.36	5.42	4.89	4.56	4.32	4.14	4.00	3.89
	.995	10.8	7.70	6.48	5.80	5.37	5.07	4.85	4.67	4.54
	.999	16.6	11.3	9.34	8.25	7.57	7.09	6.74	6.47	6.26
	20	.50	0.472	0.718	0.816	0.868	0.900	0.922	0.938	0.950
.90		2.97	2.59	2.38	2.25	2.16	2.09	2.04	2.00	1.96
.95		4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39
.975		5.87	4.46	3.86	3.51	3.29	3.13	3.01	2.91	2.84
.99		8.10	5.85	4.94	4.43	4.10	3.87	3.70	3.56	3.46
.995		9.94	6.99	5.82	5.17	4.76	4.47	4.26	4.09	3.96
.999		14.8	9.95	8.10	7.10	6.46	6.02	5.69	5.44	5.24
24		.50	0.469	0.714	0.812	0.863	0.895	0.917	0.932	0.944
	.90	2.93	2.54	2.33	2.19	2.10	2.04	1.98	1.94	1.91
	.95	4.26	3.40	3.01	2.78	2.62	2.51	2.42	2.36	2.30
	.975	5.72	4.32	3.72	3.38	3.15	2.99	2.87	2.78	2.70
	.99	7.82	5.61	4.72	4.22	3.90	3.67	3.50	3.36	3.26
	.995	9.55	6.66	5.52	4.89	4.49	4.20	3.99	3.83	3.69
	.999	14.0	9.34	7.55	6.59	5.98	5.55	5.23	4.99	4.80

Den. df	A	Numerator df								
		10	12	15	20	24	30	60	120	∞
8	.50	1.02	1.03	1.04	1.05	1.06	1.07	1.08	1.08	1.09
	.90	2.54	2.50	2.46	2.42	2.40	2.38	2.34	2.32	2.29
	.95	3.35	3.28	3.22	3.15	3.12	3.08	3.01	2.97	2.93
	.975	4.30	4.20	4.10	4.00	3.95	3.89	3.78	3.73	3.67
	.99	5.81	5.67	5.52	5.36	5.28	5.20	5.03	4.95	4.86
	.995	7.21	7.01	6.81	6.61	6.50	6.40	6.18	6.06	5.95
	.999	11.5	11.2	10.8	10.5	10.3	10.1	9.73	9.53	9.33
	9	.50	1.01	1.02	1.03	1.04	1.05	1.05	1.07	1.07
.90		2.42	2.38	2.34	2.30	2.28	2.25	2.21	2.18	2.16
.95		3.14	3.07	3.01	2.94	2.90	2.86	2.79	2.75	2.71
.975		3.96	3.87	3.77	3.67	3.61	3.56	3.45	3.39	3.33
.99		5.26	5.11	4.96	4.81	4.73	4.65	4.48	4.40	4.31
.995		6.42	6.23	6.03	5.83	5.73	5.62	5.41	5.30	5.19
.999		9.89	9.57	9.24	8.90	8.72	8.55	8.19	8.00	7.81
10		.50	1.00	1.01	1.02	1.03	1.04	1.05	1.06	1.06
	.90	2.32	2.28	2.24	2.20	2.18	2.16	2.11	2.08	2.06
	.95	2.98	2.91	2.84	2.77	2.74	2.70	2.62	2.58	2.54
	.975	3.72	3.62	3.52	3.42	3.37	3.31	3.20	3.14	3.08
	.99	4.85	4.71	4.56	4.41	4.33	4.25	4.08	4.00	3.91
	.995	5.85	5.66	5.47	5.27	5.17	5.07	4.86	4.75	4.64
	.999	8.75	8.45	8.13	7.80	7.64	7.47	7.12	6.94	6.76
	12	.50	0.989	1.00	1.01	1.02	1.03	1.03	1.05	1.05
.90		2.19	2.15	2.10	2.06	2.04	2.01	1.96	1.93	1.90
.95		2.75	2.69	2.62	2.54	2.51	2.47	2.38	2.34	2.30
.975		3.37	3.28	3.18	3.07	3.02	2.96	2.85	2.79	2.72
.99		4.30	4.16	4.01	3.86	3.78	3.70	3.54	3.45	3.36
.995		5.09	4.91	4.72	4.53	4.43	4.33	4.12	4.01	3.90
.999		7.29	7.00	6.71	6.40	6.25	6.09	5.76	5.59	5.42
15		.50	0.977	0.989	1.00	1.01	1.02	1.02	1.03	1.04
	.90	2.06	2.02	1.97	1.92	1.90	1.87	1.82	1.79	1.76
	.95	2.54	2.48	2.40	2.33	2.29	2.25	2.16	2.11	2.07
	.975	3.06	2.96	2.86	2.76	2.70	2.64	2.52	2.46	2.40
	.99	3.80	3.67	3.52	3.37	3.29	3.21	3.05	2.96	2.87
	.995	4.42	4.25	4.07	3.88	3.79	3.69	3.48	3.37	3.26
	.999	6.08	5.81	5.54	5.25	5.10	4.95	4.64	4.48	4.31
	20	.50	0.966	0.977	0.989	1.00	1.01	1.01	1.02	1.03
.90		1.94	1.89	1.84	1.79	1.77	1.74	1.68	1.64	1.61
.95		2.35	2.28	2.20	2.12	2.08	2.04	1.95	1.90	1.84
.975		2.77	2.68	2.57	2.46	2.41	2.35	2.22	2.16	2.09
.99		3.37	3.23	3.09	2.94	2.86	2.78	2.61	2.52	2.42
.995		3.85	3.68	3.50	3.32	3.22	3.12	2.92	2.81	2.69
.999		5.08	4.82	4.56	4.29	4.15	4.00	3.70	3.54	3.38
24		.50	0.961	0.972	0.983	0.994	1.00	1.01	1.02	1.02
	.90	1.88	1.83	1.78	1.73	1.70	1.67	1.61	1.57	1.53
	.95	2.25	2.18	2.11	2.03	1.98	1.94	1.84	1.79	1.73
	.975	2.64	2.54	2.44	2.33	2.27	2.21	2.08	2.01	1.94
	.99	3.17	3.03	2.89	2.74	2.66	2.58	2.40	2.31	2.21
	.995	3.59	3.42	3.25	3.06	2.97	2.87	2.66	2.55	2.43
	.999	4.64	4.39	4.14	3.87	3.74	3.59	3.29	3.14	2.97

Den. df	A	Numerator df								
		1	2	3	4	5	6	7	8	9
30	.50	0.466	0.709	0.807	0.858	0.890	0.912	0.927	0.939	0.948
	.90	2.88	2.49	2.28	2.14	2.05	1.98	1.93	1.88	1.85
	.95	4.17	3.32	2.92	2.69	2.53	2.42	2.33	2.27	2.21
	.975	5.57	4.18	3.59	3.25	3.03	2.87	2.75	2.65	2.57
	.99	7.56	5.39	4.51	4.02	3.70	3.47	3.30	3.17	3.07
	.995	9.18	6.35	5.24	4.62	4.23	3.95	3.74	3.58	3.45
	.999	13.3	8.77	7.05	6.12	5.53	5.12	4.82	4.58	4.39
	60	.50	0.461	0.701	0.798	0.849	0.880	0.901	0.917	0.928
.90		2.79	2.39	2.18	2.04	1.95	1.87	1.82	1.77	1.74
.95		4.00	3.15	2.76	2.53	2.37	2.25	2.17	2.10	2.04
.975		5.29	3.93	3.34	3.01	2.79	2.63	2.51	2.41	2.33
.99		7.08	4.98	4.13	3.65	3.34	3.12	2.95	2.82	2.72
.995		8.49	5.80	4.73	4.14	3.76	3.49	3.29	3.13	3.01
.999		12.0	7.77	6.17	5.31	4.76	4.37	4.09	3.86	3.69
120		.50	0.458	0.697	0.793	0.844	0.875	0.896	0.912	0.923
	.90	2.75	2.35	2.13	1.99	1.90	1.82	1.77	1.72	1.68
	.95	3.92	3.07	2.68	2.45	2.29	2.18	2.09	2.02	1.96
	.975	5.15	3.80	3.23	2.89	2.67	2.52	2.39	2.30	2.22
	.99	6.85	4.79	3.95	3.48	3.17	2.96	2.79	2.66	2.56
	.995	8.18	5.54	4.50	3.92	3.55	3.28	3.09	2.93	2.81
	.999	11.4	7.32	5.78	4.95	4.42	4.04	3.77	3.55	3.38
	∞	.50	0.455	0.693	0.789	0.839	0.870	0.891	0.907	0.918
.90		2.71	2.30	2.08	1.94	1.85	1.77	1.72	1.67	1.63
.95		3.84	3.00	2.60	2.37	2.21	2.10	2.01	1.94	1.88
.975		5.02	3.69	3.12	2.79	2.57	2.41	2.29	2.19	2.11
.99		6.63	4.61	3.78	3.32	3.02	2.80	2.64	2.51	2.41
.995		7.88	5.30	4.28	3.72	3.35	3.09	2.90	2.74	2.62
.999		10.8	6.91	5.42	4.62	4.10	3.74	3.47	3.27	3.10

Quantiles of the Mann-Whitney Test Statistic

Table C-6 Quantiles of the Mann-Whitney Test Statistic

<i>n</i>	<i>p</i>	<i>m</i> = 2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2	.001	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	.005	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4
	.01	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	5
	.025	3	3	3	3	3	3	3	4	4	4	5	5	5	5	5	6	6	6	6
	.05	3	3	3	4	4	4	4	5	5	5	6	6	7	7	7	7	7	8	8
	.10	3	4	4	5	5	5	6	6	7	7	8	8	8	9	9	10	10	10	11
3	.001	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	7	7	7	7
	.005	6	6	6	6	6	6	6	7	7	7	8	8	8	8	9	9	9	10	10
	.01	6	6	6	6	6	7	7	8	8	8	9	9	9	10	10	11	11	11	12
	.025	6	6	6	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15
	.05	6	7	7	8	9	9	10	11	11	12	12	13	14	14	15	16	16	17	18
	.10	7	8	8	9	10	11	12	12	13	14	15	16	17	17	18	19	20	21	22
4	.001	10	10	10	10	10	10	10	10	11	11	11	12	12	12	13	13	14	14	14
	.005	10	10	10	10	11	11	12	12	13	13	14	14	15	16	16	17	17	18	19
	.01	10	10	10	11	12	12	13	14	14	15	16	16	17	18	18	19	20	20	21
	.025	10	10	11	12	13	14	15	15	16	17	18	19	20	21	22	22	23	24	25
	.05	10	11	12	13	14	15	16	17	18	19	20	21	22	23	25	26	27	28	29
	.10	11	12	14	15	16	17	18	20	21	22	23	24	26	27	28	29	31	32	33
5	.001	15	15	15	15	15	15	16	17	17	18	18	19	19	20	21	21	22	23	23
	.005	15	15	15	16	17	17	18	19	20	21	22	23	23	24	25	26	27	28	29
	.01	15	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
	.025	15	16	17	18	19	21	22	23	24	25	27	28	29	30	31	33	34	35	36
	.05	16	17	18	20	21	22	24	25	27	28	29	31	32	34	35	36	38	39	41
	.10	17	18	20	21	23	24	26	28	29	31	33	34	36	38	39	41	43	44	46
6	.001	21	21	21	21	21	21	23	24	25	26	26	27	28	29	30	31	32	33	34
	.005	21	21	22	23	24	25	26	27	28	29	31	32	33	34	35	37	38	39	40
	.01	21	21	23	24	25	26	28	29	30	31	33	34	35	37	38	40	41	42	44
	.025	21	23	24	25	27	28	30	32	33	35	36	38	39	41	43	44	46	47	49
	.05	22	24	25	27	29	30	32	34	36	38	39	41	43	45	47	48	50	52	54
	.10	23	25	27	29	31	33	35	37	39	41	43	45	47	49	51	53	56	58	60
7	.001	28	28	28	28	29	30	31	32	34	35	36	37	38	39	40	42	43	44	45
	.005	28	28	29	30	32	33	35	36	38	39	41	42	44	45	47	48	50	51	53
	.01	28	29	30	32	33	35	36	38	40	41	43	45	46	48	50	52	53	55	57
	.025	28	30	32	34	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63
	.05	29	31	33	35	37	40	42	44	46	48	50	53	55	57	59	62	64	66	68
	.10	30	33	35	37	40	42	45	47	50	52	55	57	60	62	65	67	70	72	75
8	.001	36	36	36	37	38	39	41	42	43	45	46	48	49	51	52	54	55	57	58
	.005	36	36	38	39	41	43	44	46	48	50	52	54	55	57	59	61	63	65	67
	.01	36	37	39	41	43	44	46	48	50	52	54	56	59	61	63	65	67	69	71
	.025	37	39	41	43	45	47	50	52	54	56	59	61	63	66	68	71	73	75	78
	.05	38	40	42	45	47	50	52	55	57	60	63	65	68	70	73	76	78	81	84
	.10	39	42	44	47	50	53	56	59	61	64	67	70	73	76	79	82	85	88	91
9	.001	45	45	45	47	48	49	51	53	54	56	58	60	61	63	65	67	69	71	72
	.005	45	46	47	49	51	53	55	57	59	62	64	66	68	70	73	75	77	79	82
	.01	45	47	49	51	53	55	57	60	62	64	67	69	72	74	77	79	82	84	86
	.025	46	48	50	53	56	58	61	63	66	69	72	74	77	80	83	85	88	91	94
	.05	47	50	52	55	58	61	64	67	70	73	76	79	82	85	88	91	94	97	100
	.10	48	51	53	58	61	64	68	71	74	77	81	84	87	91	94	98	101	104	108
10	.001	55	55	56	57	59	61	62	64	66	68	70	73	75	77	79	81	83	85	88
	.005	55	56	58	60	62	65	67	69	72	74	77	80	82	85	87	90	93	95	98
	.01	55	57	59	62	64	67	69	72	75	78	80	83	86	89	92	94	97	100	103
	.025	56	59	61	64	67	70	73	76	79	82	85	89	92	95	98	101	104	108	111
	.05	57	60	63	67	70	73	76	80	83	87	90	93	97	100	104	107	111	114	118
	.10	59	62	66	69	73	77	80	84	88	92	95	99	103	107	110	114	118	122	126

Table C-6 (Continued) Quantiles of the Mann-Whitney Test Statistic

n	p	m-2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
11	.001	66	66	67	69	71	73	75	77	79	82	84	87	89	91	94	96	99	101	104
	.005	66	67	69	72	74	77	80	83	85	88	91	94	97	100	103	106	109	112	115
	.01	66	68	71	74	76	79	82	85	89	92	95	98	101	104	108	111	114	117	120
	.025	67	70	73	76	80	83	86	90	93	97	100	104	107	111	114	118	122	125	129
	.05	68	72	75	79	83	86	90	94	98	101	105	109	113	117	121	124	128	132	136
	.10	70	74	78	82	86	90	94	98	103	107	111	115	119	124	128	132	136	140	145
12	.001	78	78	79	81	83	86	88	91	93	96	98	102	104	106	110	113	116	118	121
	.005	78	80	82	85	88	91	94	97	100	103	106	110	113	116	120	123	126	130	133
	.01	78	81	84	87	90	93	96	100	103	107	110	114	117	121	125	128	132	135	139
	.025	80	83	86	90	93	97	101	105	108	112	116	120	124	128	132	136	140	144	148
	.05	81	84	88	92	96	100	105	109	111	117	121	126	130	134	139	143	147	151	156
	.10	83	87	91	96	100	105	109	114	118	123	128	132	137	142	146	151	156	160	165
13	.001	91	91	93	95	97	100	103	106	109	112	115	118	121	124	127	130	134	137	140
	.005	91	93	95	99	102	105	109	112	116	119	123	126	130	134	137	141	145	149	152
	.01	92	94	97	101	104	108	112	115	119	123	127	131	135	139	143	147	151	155	159
	.025	93	96	100	104	108	112	116	120	125	129	133	137	142	146	151	155	159	164	168
	.05	94	98	102	107	111	116	120	125	129	134	139	143	148	153	157	162	167	172	176
	.10	96	101	105	110	115	120	125	130	135	140	145	150	155	160	166	171	176	181	186
14	.001	105	105	107	109	112	115	118	121	125	128	131	135	138	142	145	149	152	156	160
	.005	105	107	110	113	117	121	124	128	132	136	140	144	148	152	156	160	164	169	173
	.01	106	108	112	116	119	123	128	132	136	140	144	149	153	157	162	166	171	175	179
	.025	107	111	115	119	123	128	132	137	142	146	151	156	161	165	170	175	180	184	189
	.05	109	113	117	122	127	132	137	142	147	152	157	162	167	172	177	183	188	193	198
	.10	110	116	121	126	131	137	142	147	153	158	164	169	175	180	186	191	197	203	208
15	.001	120	120	122	125	128	133	135	138	142	145	149	153	157	161	164	168	172	176	180
	.005	120	123	126	129	133	137	141	145	150	154	158	163	167	172	176	181	185	190	194
	.01	121	124	128	132	136	140	145	149	154	158	163	168	172	177	182	187	191	196	201
	.025	122	126	131	135	140	145	150	155	160	165	170	175	180	185	191	196	201	206	211
	.05	124	128	133	139	144	149	154	160	165	171	176	182	187	193	198	204	209	215	221
	.10	126	131	137	143	148	154	160	166	172	178	184	189	195	201	207	213	219	225	231
16	.001	136	136	139	142	145	148	152	156	160	164	168	172	176	180	185	189	193	197	202
	.005	136	139	142	146	150	155	159	164	168	173	178	182	187	192	197	202	207	211	216
	.01	137	140	144	149	153	158	163	168	173	178	183	188	193	198	203	208	213	219	224
	.025	138	143	148	152	158	163	168	174	179	184	190	196	201	207	212	218	223	229	235
	.05	140	145	151	156	162	167	173	179	185	191	197	202	208	214	220	226	232	238	244
	.10	142	148	154	160	166	173	179	185	191	198	204	211	217	223	230	236	243	249	256
17	.001	153	154	156	159	163	167	171	175	179	183	188	192	197	201	206	211	215	220	224
	.005	153	156	160	164	169	173	178	183	188	193	198	203	208	214	219	224	229	235	240
	.01	154	158	162	167	172	177	182	187	192	198	203	209	214	220	225	231	236	242	247
	.025	156	160	165	171	176	182	188	193	199	205	211	217	223	229	235	241	247	253	259
	.05	157	163	169	174	180	187	193	199	205	211	218	224	231	237	243	250	256	263	269
	.10	160	166	172	179	185	192	199	206	212	219	226	233	239	246	253	260	267	274	281
18	.001	171	172	175	178	182	186	190	195	199	204	209	214	218	223	228	233	238	243	248
	.005	171	174	178	183	188	193	198	203	209	214	219	225	230	236	242	247	253	259	264
	.01	172	176	181	186	191	196	202	208	213	219	225	231	237	242	248	254	260	266	272
	.025	174	179	184	190	196	202	208	214	220	227	233	239	246	252	258	265	271	278	284
	.05	176	181	188	194	200	207	213	220	227	233	240	247	254	260	267	274	281	288	295
	.10	178	185	192	199	206	213	220	227	234	241	249	256	263	270	278	285	292	300	307
19	.001	190	191	194	198	202	206	211	216	220	225	231	236	241	246	251	257	262	268	273
	.005	191	194	198	203	208	213	219	224	230	236	242	248	254	260	265	272	278	284	290
	.01	192	195	200	206	211	217	223	229	235	241	247	254	260	266	273	279	285	292	298
	.025	193	198	204	210	216	223	229	236	243	249	256	263	269	276	283	290	297	304	310
	.05	195	201	208	214	221	228	235	242	249	256	263	271	278	285	292	300	307	314	321
	.10	198	205	212	219	227	234	242	249	257	264	272	280	288	295	303	311	319	326	334

Table C-6 (Continued) Quantiles of the Mann-Whitney Test Statistic

n	p	$m=2$	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
20	.001	210	211	214	218	223	227	232	237	243	248	253	259	265	270	276	281	287	293	299
	.005	211	214	219	224	229	235	241	247	253	259	265	271	278	284	290	297	303	310	316
	.01	212	216	221	227	233	239	245	251	258	264	271	278	284	291	298	304	311	318	325
	.025	213	219	225	231	238	245	251	259	266	273	280	287	294	301	309	316	323	330	338
	.05	215	222	229	236	243	250	258	265	273	280	288	295	303	311	318	326	334	341	349
	.10	218	226	233	241	249	257	265	273	281	289	297	305	313	321	330	338	346	354	362