

Statistical Tables

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R Commands

For each table the general command is given, with an example which reproduces the third entry of the first column of that table.

page	distribution	general	example
2	binomial	<code>pbinom(r, n, p)</code>	<code>pbinom(0, 9, 0.05)</code>
3i	normal	<code>pnorm(x)</code>	<code>pnorm(0.10)</code>
3ii	normal	<code>qnorm(p)</code>	<code>qnorm(0.975)</code>
4	χ^2	<code>qchisq(p, ν, lower=F)</code>	<code>qchisq(0.1, 3, lower=F)</code>
5	t	<code>qt(p, ν, lower=F)</code>	<code>qt(0.1, 3, lower=F)</code>
6	F	<code>qf(0.1, ν_1, ν_2, lower=F)</code>	<code>qf(0.1, 1, 4, lower=F)</code>
7	F	<code>qf(0.05, ν_1, ν_2, lower=F)</code>	<code>qf(0.05, 1, 4, lower=F)</code>
8	F	<code>qf(0.025, ν_1, ν_2, lower=F)</code>	<code>qf(0.025, 1, 4, lower=F)</code>
9	F	<code>qf(0.01, ν_1, ν_2, lower=F)</code>	<code>qf(0.01, 1, 4, lower=F)</code>
10	F	<code>qf(0.005, ν_1, ν_2, lower=F)</code>	<code>qf(0.005, 1, 4, lower=F)</code>
11	Wilcoxon	<code>qsignrank(p, n)</code>	<code>qsignrank(0.05, 10)</code>

Note the general form of the commands `qdist` and `pdist`.

Binomial Distribution Function for $n = 9$

This table gives $P(X \leq r)$ for $X \sim \text{Bin}(9, p)$

For $p \geq .5$ you may use the result

$$P(X \leq r) = 1 - P(Y \leq n - r - 1) \quad \text{with } Y \sim \text{Bin}(n, 1 - p)$$

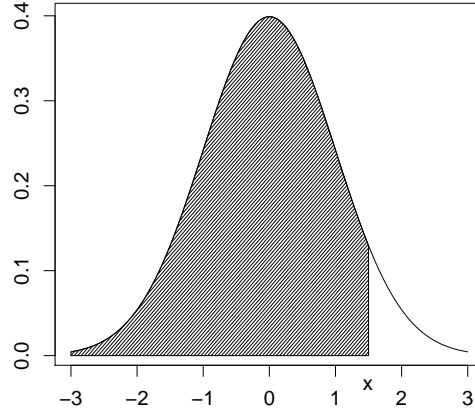
p	r								
	0	1	2	3	4	5	6	7	8
0.01	0.9135	0.9966	0.9999	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
0.03	0.7602	0.9718	0.9980	0.9999	1.0000	1.0000	1.0000	1.0000	1.0000
0.05	0.6302	0.9288	0.9916	0.9994	1.0000	1.0000	1.0000	1.0000	1.0000
0.07	0.5204	0.8729	0.9791	0.9977	0.9998	1.0000	1.0000	1.0000	1.0000
0.09	0.4279	0.8088	0.9595	0.9943	0.9995	1.0000	1.0000	1.0000	1.0000
0.11	0.3504	0.7401	0.9328	0.9883	0.9986	0.9999	1.0000	1.0000	1.0000
0.13	0.2855	0.6696	0.8991	0.9791	0.9970	0.9997	1.0000	1.0000	1.0000
0.15	0.2316	0.5995	0.8591	0.9661	0.9944	0.9994	1.0000	1.0000	1.0000
0.17	0.1869	0.5315	0.8139	0.9488	0.9902	0.9987	0.9999	1.0000	1.0000
0.19	0.1501	0.4670	0.7643	0.9270	0.9842	0.9977	0.9998	1.0000	1.0000
0.21	0.1199	0.4066	0.7115	0.9006	0.9760	0.9960	0.9996	1.0000	1.0000
0.23	0.0952	0.3509	0.6566	0.8696	0.9650	0.9935	0.9992	0.9999	1.0000
0.25	0.0751	0.3003	0.6007	0.8343	0.9511	0.9900	0.9987	0.9999	1.0000
0.27	0.0589	0.2548	0.5448	0.7950	0.9338	0.9851	0.9978	0.9998	1.0000
0.29	0.0458	0.2144	0.4898	0.7522	0.9130	0.9787	0.9965	0.9997	1.0000
0.31	0.0355	0.1788	0.4364	0.7065	0.8885	0.9702	0.9947	0.9994	1.0000
0.33	0.0272	0.1478	0.3854	0.6585	0.8602	0.9596	0.9922	0.9991	1.0000
0.35	0.0207	0.1211	0.3373	0.6089	0.8283	0.9464	0.9888	0.9986	0.9999
0.37	0.0156	0.0983	0.2924	0.5584	0.7928	0.9304	0.9843	0.9979	0.9999
0.39	0.0117	0.0790	0.2511	0.5078	0.7540	0.9114	0.9785	0.9969	0.9998
0.41	0.0087	0.0628	0.2134	0.4576	0.7122	0.8891	0.9710	0.9954	0.9997
0.43	0.0064	0.0495	0.1796	0.4087	0.6678	0.8634	0.9617	0.9935	0.9995
0.45	0.0046	0.0385	0.1495	0.3614	0.6214	0.8342	0.9502	0.9909	0.9992
0.47	0.0033	0.0296	0.1231	0.3164	0.5735	0.8015	0.9363	0.9875	0.9989
0.49	0.0023	0.0225	0.1001	0.2740	0.5246	0.7654	0.9196	0.9831	0.9984

Normal Distribution Function Tables

The first table gives

$$\Phi(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^x e^{-\frac{1}{2}t^2} dt$$

and this corresponds to the shaded area in the figure to the right. $\Phi(x)$ is the probability that a random variable, normally distributed with zero mean and unit variance, will be less than or equal to x . When $x < 0$ use $\Phi(x) = 1 - \Phi(-x)$, as the normal distribution with mean zero is symmetric about zero. To interpolate, use the formula



$$\Phi(x) \approx \Phi(x_1) + \frac{x - x_1}{x_2 - x_1} (\Phi(x_2) - \Phi(x_1))$$

Table 1

x	$\Phi(x)$	x	$\Phi(x)$	x	$\Phi(x)$	x	$\Phi(x)$	x	$\Phi(x)$	x	$\Phi(x)$
0.00	0.5000	0.50	0.6915	1.00	0.8413	1.50	0.9332	2.00	0.9772	2.50	0.9938
0.05	0.5199	0.55	0.7088	1.05	0.8531	1.55	0.9394	2.05	0.9798	2.55	0.9946
0.10	0.5398	0.60	0.7257	1.10	0.8643	1.60	0.9452	2.10	0.9821	2.60	0.9953
0.15	0.5596	0.65	0.7422	1.15	0.8749	1.65	0.9505	2.15	0.9842	2.65	0.9960
0.20	0.5793	0.70	0.7580	1.20	0.8849	1.70	0.9554	2.20	0.9861	2.70	0.9965
0.25	0.5987	0.75	0.7734	1.25	0.8944	1.75	0.9599	2.25	0.9878	2.75	0.9970
0.30	0.6179	0.80	0.7881	1.30	0.9032	1.80	0.9641	2.30	0.9893	2.80	0.9974
0.35	0.6368	0.85	0.8023	1.35	0.9115	1.85	0.9678	2.35	0.9906	2.85	0.9978
0.40	0.6554	0.90	0.8159	1.40	0.9192	1.90	0.9713	2.40	0.9918	2.90	0.9981
0.45	0.6736	0.95	0.8289	1.45	0.9265	1.95	0.9744	2.45	0.9929	2.95	0.9984
0.50	0.6915	1.00	0.8413	1.50	0.9332	2.00	0.9772	2.50	0.9938	3.00	0.9987

The inverse function $\Phi^{-1}(p)$ is tabulated below for various values of p .

Table 2

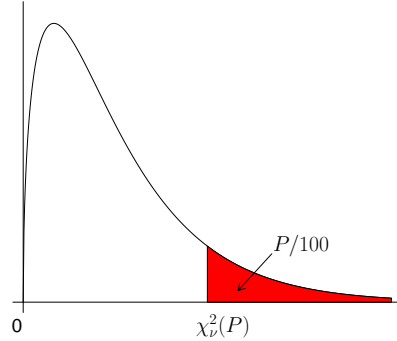
p	0.900	0.950	0.975	0.990	0.995	0.999	0.9995
$\Phi^{-1}(p)$	1.2816	1.6449	1.9600	2.3263	2.5758	3.0902	3.2905

Percentage Points of the χ^2 -Distribution

This table gives the percentage points $\chi_\nu^2(P)$ for various values of P and degrees of freedom ν , as indicated by the figure to the right, plotted in the case $\nu = 3$.

If X is a variable distributed as χ^2 with ν degrees of freedom, $P/100$ is the probability that $X \geq \chi_\nu^2(P)$.

For $\nu > 100$, $\sqrt{2X}$ is approximately normally distributed with mean $\sqrt{2\nu - 1}$ and unit variance.



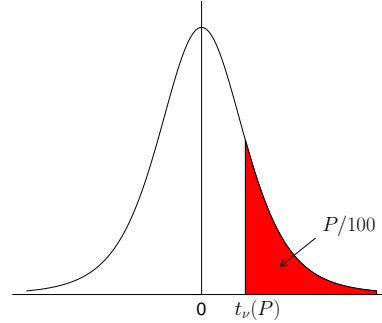
ν	Percentage points P						
	10	5	2.5	1	0.5	0.1	0.05
1	2.706	3.841	5.024	6.635	7.879	10.828	12.116
2	4.605	5.991	7.378	9.210	10.597	13.816	15.202
3	6.251	7.815	9.348	11.345	12.838	16.266	17.730
4	7.779	9.488	11.143	13.277	14.860	18.467	19.997
5	9.236	11.070	12.833	15.086	16.750	20.515	22.105
6	10.645	12.592	14.449	16.812	18.548	22.458	24.103
7	12.017	14.067	16.013	18.475	20.278	24.322	26.018
8	13.362	15.507	17.535	20.090	21.955	26.124	27.868
9	14.684	16.919	19.023	21.666	23.589	27.877	29.666
10	15.987	18.307	20.483	23.209	25.188	29.588	31.420
11	17.275	19.675	21.920	24.725	26.757	31.264	33.137
12	18.549	21.026	23.337	26.217	28.300	32.909	34.821
13	19.812	22.362	24.736	27.688	29.819	34.528	36.478
14	21.064	23.685	26.119	29.141	31.319	36.123	38.109
15	22.307	24.996	27.488	30.578	32.801	37.697	39.719
16	23.542	26.296	28.845	32.000	34.267	39.252	41.308
17	24.769	27.587	30.191	33.409	35.718	40.790	42.879
18	25.989	28.869	31.526	34.805	37.156	42.312	44.434
19	27.204	30.144	32.852	36.191	38.582	43.820	45.973
20	28.412	31.410	34.170	37.566	39.997	45.315	47.498
25	34.382	37.652	40.646	44.314	46.928	52.620	54.947
30	40.256	43.773	46.979	50.892	53.672	59.703	62.162
40	51.805	55.758	59.342	63.691	66.766	73.402	76.095
50	63.167	67.505	71.420	76.154	79.490	86.661	89.561
80	96.578	101.879	106.629	112.329	116.321	124.839	128.261

Percentage Points of the t -Distribution

This table gives the percentage points $t_\nu(P)$ for various values of P and degrees of freedom ν , as indicated by the figure to the right.

The lower percentage points are given by symmetry as $-t_\nu(P)$, and the probability that $|t| \geq t_\nu(P)$ is $2P/100$.

The limiting distribution of t as $\nu \rightarrow \infty$ is the normal distribution with zero mean and unit variance.



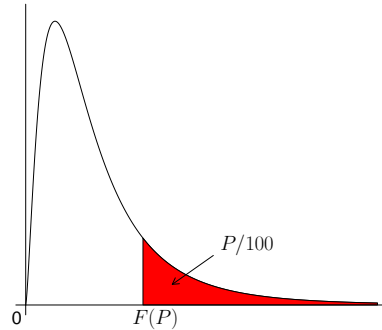
ν	Percentage points P						
	10	5	2.5	1	0.5	0.1	0.05
1	3.078	6.314	12.706	31.821	63.657	318.309	636.619
2	1.886	2.920	4.303	6.965	9.925	22.327	31.599
3	1.638	2.353	3.182	4.541	5.841	10.215	12.924
4	1.533	2.132	2.776	3.747	4.604	7.173	8.610
5	1.476	2.015	2.571	3.365	4.032	5.893	6.869
6	1.440	1.943	2.447	3.143	3.707	5.208	5.959
7	1.415	1.895	2.365	2.998	3.499	4.785	5.408
8	1.397	1.860	2.306	2.896	3.355	4.501	5.041
9	1.383	1.833	2.262	2.821	3.250	4.297	4.781
10	1.372	1.812	2.228	2.764	3.169	4.144	4.587
11	1.363	1.796	2.201	2.718	3.106	4.025	4.437
12	1.356	1.782	2.179	2.681	3.055	3.930	4.318
13	1.350	1.771	2.160	2.650	3.012	3.852	4.221
14	1.345	1.761	2.145	2.624	2.977	3.787	4.140
15	1.341	1.753	2.131	2.602	2.947	3.733	4.073
16	1.337	1.746	2.120	2.583	2.921	3.686	4.015
18	1.330	1.734	2.101	2.552	2.878	3.610	3.922
21	1.323	1.721	2.080	2.518	2.831	3.527	3.819
25	1.316	1.708	2.060	2.485	2.787	3.450	3.725
30	1.310	1.697	2.042	2.457	2.750	3.385	3.646
40	1.303	1.684	2.021	2.423	2.704	3.307	3.551
50	1.299	1.676	2.009	2.403	2.678	3.261	3.496
70	1.294	1.667	1.994	2.381	2.648	3.211	3.435
100	1.290	1.660	1.984	2.364	2.626	3.174	3.390
∞	1.282	1.645	1.960	2.326	2.576	3.090	3.291

10 Percent Points of the F -Distribution

This table gives the percentage points $F_{\nu_1, \nu_2}(P)$ for $P = 0.10$ and degrees of freedom ν_1, ν_2 , as indicated by the figure to the right.

The lower percentage points, that is the values $F'_{\nu_1, \nu_2}(P)$ such that the probability that $F \leq F'_{\nu_1, \nu_2}(P)$ is equal to $P/100$, may be found using the formula

$$F'_{\nu_1, \nu_2}(P) = 1/F_{\nu_2, \nu_1}(P)$$



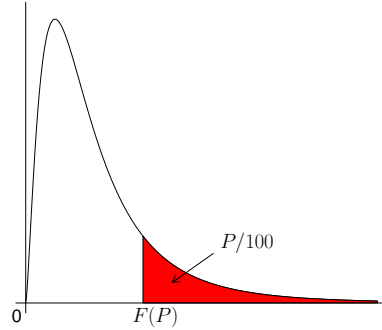
ν_2	ν_1								
	1	2	3	4	5	6	12	24	∞
2	8.526	9.000	9.162	9.243	9.293	9.326	9.408	9.450	9.491
3	5.538	5.462	5.391	5.343	5.309	5.285	5.216	5.176	5.134
4	4.545	4.325	4.191	4.107	4.051	4.010	3.896	3.831	3.761
5	4.060	3.780	3.619	3.520	3.453	3.405	3.268	3.191	3.105
6	3.776	3.463	3.289	3.181	3.108	3.055	2.905	2.818	2.722
7	3.589	3.257	3.074	2.961	2.883	2.827	2.668	2.575	2.471
8	3.458	3.113	2.924	2.806	2.726	2.668	2.502	2.404	2.293
9	3.360	3.006	2.813	2.693	2.611	2.551	2.379	2.277	2.159
10	3.285	2.924	2.728	2.605	2.522	2.461	2.284	2.178	2.055
11	3.225	2.860	2.660	2.536	2.451	2.389	2.209	2.100	1.972
12	3.177	2.807	2.606	2.480	2.394	2.331	2.147	2.036	1.904
13	3.136	2.763	2.560	2.434	2.347	2.283	2.097	1.983	1.846
14	3.102	2.726	2.522	2.395	2.307	2.243	2.054	1.938	1.797
15	3.073	2.695	2.490	2.361	2.273	2.208	2.017	1.899	1.755
16	3.048	2.668	2.462	2.333	2.244	2.178	1.985	1.866	1.718
17	3.026	2.645	2.437	2.308	2.218	2.152	1.958	1.836	1.686
18	3.007	2.624	2.416	2.286	2.196	2.130	1.933	1.810	1.657
19	2.990	2.606	2.397	2.266	2.176	2.109	1.912	1.787	1.631
20	2.975	2.589	2.380	2.249	2.158	2.091	1.892	1.767	1.607
25	2.918	2.528	2.317	2.184	2.092	2.024	1.820	1.689	1.518
30	2.881	2.489	2.276	2.142	2.049	1.980	1.773	1.638	1.456
40	2.835	2.440	2.226	2.091	1.997	1.927	1.715	1.574	1.377
50	2.809	2.412	2.197	2.061	1.966	1.895	1.680	1.536	1.327
100	2.756	2.356	2.139	2.002	1.906	1.834	1.612	1.460	1.214
∞	2.706	2.303	2.084	1.945	1.847	1.774	1.546	1.383	1.002

5 Percent Points of the F -Distribution

This table gives the percentage points $F_{\nu_1, \nu_2}(P)$ for $P = 0.05$ and degrees of freedom ν_1, ν_2 , as indicated by the figure to the right.

The lower percentage points, that is the values $F'_{\nu_1, \nu_2}(P)$ such that the probability that $F \leq F'_{\nu_1, \nu_2}(P)$ is equal to $P/100$, may be found using the formula

$$F'_{\nu_1, \nu_2}(P) = 1/F_{\nu_2, \nu_1}(P)$$



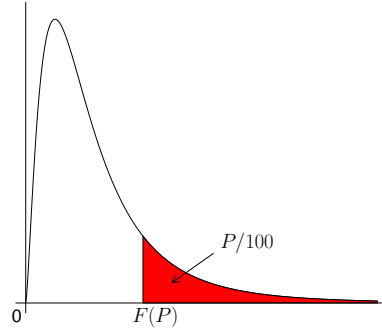
ν_2	ν_1								
	1	2	3	4	5	6	12	24	∞
2	18.513	19.000	19.164	19.247	19.296	19.330	19.413	19.454	19.496
3	10.128	9.552	9.277	9.117	9.013	8.941	8.745	8.639	8.526
4	7.709	6.944	6.591	6.388	6.256	6.163	5.912	5.774	5.628
5	6.608	5.786	5.409	5.192	5.050	4.950	4.678	4.527	4.365
6	5.987	5.143	4.757	4.534	4.387	4.284	4.000	3.841	3.669
7	5.591	4.737	4.347	4.120	3.972	3.866	3.575	3.410	3.230
8	5.318	4.459	4.066	3.838	3.687	3.581	3.284	3.115	2.928
9	5.117	4.256	3.863	3.633	3.482	3.374	3.073	2.900	2.707
10	4.965	4.103	3.708	3.478	3.326	3.217	2.913	2.737	2.538
11	4.844	3.982	3.587	3.357	3.204	3.095	2.788	2.609	2.404
12	4.747	3.885	3.490	3.259	3.106	2.996	2.687	2.505	2.296
13	4.667	3.806	3.411	3.179	3.025	2.915	2.604	2.420	2.206
14	4.600	3.739	3.344	3.112	2.958	2.848	2.534	2.349	2.131
15	4.543	3.682	3.287	3.056	2.901	2.790	2.475	2.288	2.066
16	4.494	3.634	3.239	3.007	2.852	2.741	2.425	2.235	2.010
17	4.451	3.592	3.197	2.965	2.810	2.699	2.381	2.190	1.960
18	4.414	3.555	3.160	2.928	2.773	2.661	2.342	2.150	1.917
19	4.381	3.522	3.127	2.895	2.740	2.628	2.308	2.114	1.878
20	4.351	3.493	3.098	2.866	2.711	2.599	2.278	2.082	1.843
25	4.242	3.385	2.991	2.759	2.603	2.490	2.165	1.964	1.711
30	4.171	3.316	2.922	2.690	2.534	2.421	2.092	1.887	1.622
40	4.085	3.232	2.839	2.606	2.449	2.336	2.003	1.793	1.509
50	4.034	3.183	2.790	2.557	2.400	2.286	1.952	1.737	1.438
100	3.936	3.087	2.696	2.463	2.305	2.191	1.850	1.627	1.283
∞	3.841	2.996	2.605	2.372	2.214	2.099	1.752	1.517	1.002

2.5 Percent Points of the F -Distribution

This table gives the percentage points $F_{\nu_1, \nu_2}(P)$ for $P = 0.025$ and degrees of freedom ν_1, ν_2 , as indicated by the figure to the right.

The lower percentage points, that is the values $F'_{\nu_1, \nu_2}(P)$ such that the probability that $F \leq F'_{\nu_1, \nu_2}(P)$ is equal to $P/100$, may be found using the formula

$$F'_{\nu_1, \nu_2}(P) = 1/F_{\nu_2, \nu_1}(P)$$



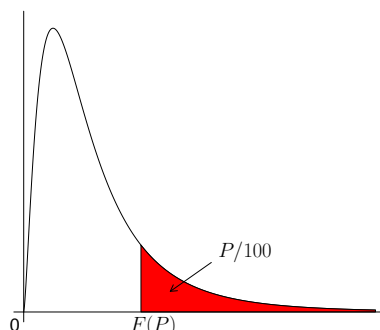
ν_2	ν_1								
	1	2	3	4	5	6	12	24	∞
2	38.506	39.000	39.165	39.248	39.298	39.331	39.415	39.456	39.498
3	17.443	16.044	15.439	15.101	14.885	14.735	14.337	14.124	13.902
4	12.218	10.649	9.979	9.605	9.364	9.197	8.751	8.511	8.257
5	10.007	8.434	7.764	7.388	7.146	6.978	6.525	6.278	6.015
6	8.813	7.260	6.599	6.227	5.988	5.820	5.366	5.117	4.849
7	8.073	6.542	5.890	5.523	5.285	5.119	4.666	4.415	4.142
8	7.571	6.059	5.416	5.053	4.817	4.652	4.200	3.947	3.670
9	7.209	5.715	5.078	4.718	4.484	4.320	3.868	3.614	3.333
10	6.937	5.456	4.826	4.468	4.236	4.072	3.621	3.365	3.080
11	6.724	5.256	4.630	4.275	4.044	3.881	3.430	3.173	2.883
12	6.554	5.096	4.474	4.121	3.891	3.728	3.277	3.019	2.725
13	6.414	4.965	4.347	3.996	3.767	3.604	3.153	2.893	2.595
14	6.298	4.857	4.242	3.892	3.663	3.501	3.050	2.789	2.487
15	6.200	4.765	4.153	3.804	3.576	3.415	2.963	2.701	2.395
16	6.115	4.687	4.077	3.729	3.502	3.341	2.889	2.625	2.316
17	6.042	4.619	4.011	3.665	3.438	3.277	2.825	2.560	2.247
18	5.978	4.560	3.954	3.608	3.382	3.221	2.769	2.503	2.187
19	5.922	4.508	3.903	3.559	3.333	3.172	2.720	2.452	2.133
20	5.871	4.461	3.859	3.515	3.289	3.128	2.676	2.408	2.085
25	5.686	4.291	3.694	3.353	3.129	2.969	2.515	2.242	1.906
30	5.568	4.182	3.589	3.250	3.026	2.867	2.412	2.136	1.787
40	5.424	4.051	3.463	3.126	2.904	2.744	2.288	2.007	1.637
50	5.340	3.975	3.390	3.054	2.833	2.674	2.216	1.931	1.545
100	5.179	3.828	3.250	2.917	2.696	2.537	2.077	1.784	1.347
∞	5.024	3.689	3.116	2.786	2.567	2.408	1.945	1.640	1.003

1 Percent Points of the F -Distribution

This table gives the percentage points $F_{\nu_1, \nu_2}(P)$ for $P = 0.01$ and degrees of freedom ν_1, ν_2 , as indicated by the figure to the right.

The lower percentage points, that is the values $F'_{\nu_1, \nu_2}(P)$ such that the probability that $F \leq F'_{\nu_1, \nu_2}(P)$ is equal to $P/100$, may be found using the formula

$$F'_{\nu_1, \nu_2}(P) = 1/F_{\nu_2, \nu_1}(P)$$



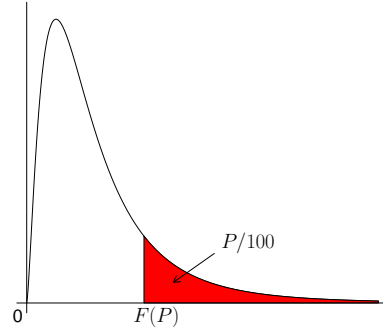
ν_2	ν_1								
	1	2	3	4	5	6	12	24	∞
2	98.503	99.000	99.166	99.249	99.299	99.333	99.416	99.458	99.499
3	34.116	30.817	29.457	28.710	28.237	27.911	27.052	26.598	26.125
4	21.198	18.000	16.694	15.977	15.522	15.207	14.374	13.929	13.463
5	16.258	13.274	12.060	11.392	10.967	10.672	9.888	9.466	9.020
6	13.745	10.925	9.780	9.148	8.746	8.466	7.718	7.313	6.880
7	12.246	9.547	8.451	7.847	7.460	7.191	6.469	6.074	5.650
8	11.259	8.649	7.591	7.006	6.632	6.371	5.667	5.279	4.859
9	10.561	8.022	6.992	6.422	6.057	5.802	5.111	4.729	4.311
10	10.044	7.559	6.552	5.994	5.636	5.386	4.706	4.327	3.909
11	9.646	7.206	6.217	5.668	5.316	5.069	4.397	4.021	3.602
12	9.330	6.927	5.953	5.412	5.064	4.821	4.155	3.780	3.361
13	9.074	6.701	5.739	5.205	4.862	4.620	3.960	3.587	3.165
14	8.862	6.515	5.564	5.035	4.695	4.456	3.800	3.427	3.004
15	8.683	6.359	5.417	4.893	4.556	4.318	3.666	3.294	2.868
16	8.531	6.226	5.292	4.773	4.437	4.202	3.553	3.181	2.753
17	8.400	6.112	5.185	4.669	4.336	4.102	3.455	3.084	2.653
18	8.285	6.013	5.092	4.579	4.248	4.015	3.371	2.999	2.566
19	8.185	5.926	5.010	4.500	4.171	3.939	3.297	2.925	2.489
20	8.096	5.849	4.938	4.431	4.103	3.871	3.231	2.859	2.421
25	7.770	5.568	4.675	4.177	3.855	3.627	2.993	2.620	2.169
30	7.562	5.390	4.510	4.018	3.699	3.473	2.843	2.469	2.006
40	7.314	5.179	4.313	3.828	3.514	3.291	2.665	2.288	1.805
50	7.171	5.057	4.199	3.720	3.408	3.186	2.562	2.183	1.683
100	6.895	4.824	3.984	3.513	3.206	2.988	2.368	1.983	1.427
∞	6.635	4.605	3.782	3.319	3.017	2.802	2.185	1.791	1.003

0.5 Percent Points of the F -Distribution

This table gives the percentage points $F_{\nu_1, \nu_2}(P)$ for $P = 0.005$ and degrees of freedom ν_1, ν_2 , as indicated by the figure to the right.

The lower percentage points, that is the values $F'_{\nu_1, \nu_2}(P)$ such that the probability that $F \leq F'_{\nu_1, \nu_2}(P)$ is equal to $P/100$, may be found using the formula

$$F'_{\nu_1, \nu_2}(P) = 1/F_{\nu_2, \nu_1}(P)$$



ν_2	ν_1								
	1	2	3	4	5	6	12	24	∞
2	198.501	199.000	199.166	199.250	199.300	199.333	199.416	199.458	199.500
3	55.552	49.799	47.467	46.195	45.392	44.838	43.387	42.622	41.828
4	31.333	26.284	24.259	23.155	22.456	21.975	20.705	20.030	19.325
5	22.785	18.314	16.530	15.556	14.940	14.513	13.384	12.780	12.144
6	18.635	14.544	12.917	12.028	11.464	11.073	10.034	9.474	8.879
7	16.236	12.404	10.882	10.050	9.522	9.155	8.176	7.645	7.076
8	14.688	11.042	9.596	8.805	8.302	7.952	7.015	6.503	5.951
9	13.614	10.107	8.717	7.956	7.471	7.134	6.227	5.729	5.188
10	12.826	9.427	8.081	7.343	6.872	6.545	5.661	5.173	4.639
11	12.226	8.912	7.600	6.881	6.422	6.102	5.236	4.756	4.226
12	11.754	8.510	7.226	6.521	6.071	5.757	4.906	4.431	3.904
13	11.374	8.186	6.926	6.233	5.791	5.482	4.643	4.173	3.647
14	11.060	7.922	6.680	5.998	5.562	5.257	4.428	3.961	3.436
15	10.798	7.701	6.476	5.803	5.372	5.071	4.250	3.786	3.260
16	10.575	7.514	6.303	5.638	5.212	4.913	4.099	3.638	3.112
17	10.384	7.354	6.156	5.497	5.075	4.779	3.971	3.511	2.984
18	10.218	7.215	6.028	5.375	4.956	4.663	3.860	3.402	2.873
19	10.073	7.093	5.916	5.268	4.853	4.561	3.763	3.306	2.776
20	9.944	6.986	5.818	5.174	4.762	4.472	3.678	3.222	2.690
25	9.475	6.598	5.462	4.835	4.433	4.150	3.370	2.918	2.377
30	9.180	6.355	5.239	4.623	4.228	3.949	3.179	2.727	2.176
40	8.828	6.066	4.976	4.374	3.986	3.713	2.953	2.502	1.932
50	8.626	5.902	4.826	4.232	3.849	3.579	2.825	2.373	1.786
100	8.241	5.589	4.542	3.963	3.589	3.325	2.583	2.128	1.485
∞	7.879	5.298	4.279	3.715	3.350	3.091	2.358	1.898	1.004

Percentage Points of the Wilcoxon Signed Rank Distribution

This table gives the lower percentage points of W^+ , the sum of the ranks of the positive observations in a ranking in order of increasing absolute magnitude of a random sample of size n from a continuous distribution which is symmetric about zero. The function tabulated $x(P)$ is the largest x such that $P(W^+ < x) \leq P/100$.

<i>n</i>	<i>P</i>					<i>n</i>	<i>P</i>				
	5	2.5	1	0.5	0.1		5	2.5	1	0.5	0.1
8	6	4	2	1	0	43	337	311	282	262	223
9	9	6	4	2	0	44	354	328	297	277	236
10	11	9	6	4	1	45	372	344	313	292	250
11	14	11	8	6	2	46	390	362	329	308	264
12	18	14	10	8	3	47	408	379	346	323	278
13	22	18	13	10	5	48	427	397	363	340	293
14	26	22	16	13	7	49	447	416	380	356	308
15	31	26	20	16	9	50	467	435	398	374	324
16	36	30	24	20	12	51	487	454	417	391	340
17	42	35	28	24	15	52	508	474	435	409	356
18	48	41	33	28	19	53	530	495	455	428	373
19	54	47	38	33	22	54	551	515	474	446	390
20	61	53	44	38	27	55	574	537	494	466	408
21	68	59	50	43	31	56	596	558	515	485	426
22	76	66	56	49	36	57	619	580	536	505	444
23	84	74	63	55	41	58	643	603	557	526	463
24	92	82	70	62	46	59	667	626	579	547	483
25	101	90	77	69	52	60	691	649	601	568	502
26	111	99	85	76	59	61	716	673	624	590	522
27	120	108	93	84	65	62	742	698	647	612	543
28	131	117	102	92	72	63	768	722	670	635	564
29	141	127	111	101	80	64	794	748	694	658	585
30	152	138	121	110	87	65	821	773	719	682	607
31	164	148	131	119	95	66	848	799	743	706	629
32	176	160	141	129	104	67	876	826	769	730	652
33	188	171	152	139	113	68	904	853	794	755	675
34	201	183	163	149	122	69	932	880	820	780	698
35	214	196	174	160	132	70	961	908	847	806	722
36	228	209	186	172	142	71	991	937	874	832	746
37	242	222	199	183	152	72	1021	965	902	859	771
38	257	236	212	195	163	73	1051	995	929	885	796
39	272	250	225	208	174	74	1082	1024	958	913	822
40	287	265	239	221	186	75	1113	1054	987	941	848
41	303	280	253	234	198	76	1145	1085	1016	969	874
42	320	295	267	248	210	77	1177	1116	1045	998	901
43	337	311	282	262	223	78	1210	1148	1076	1027	928