Menu

Studentized Range q Table

The following tables provide the critical values for $q(k, df, \alpha)$ when α = .10, .05, .025, 01, .005 and .= 001. See Unplanned Comparisons for ANOVA for more details.

Alpha 0.10

	k>																		
df	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	8.929	13.437	16.358	18.488	20.150	21.504	22.642	23.621	24.477	25.237	25.918	26.536	27.100	27.618	28.097	28.542	28.958	29.347	29.713
2	4.129	5.733	6.772	7.538	8.139	8.633	9.049	9.409	9.725	10.006	10.259	10.488	10.698	10.891	11.070	11.237	11.392	11.538	11.676
3	3.328	4.467	5.199	5.738	6.162	6.511	6.806	7.062	7.287	7.487	7.667	7.831	7.982	8.120	8.248	8.368	8.479	8.584	8.683
4	3.015	3.976	4.586	5.035	5.388	5.679	5.926	6.139	6.327	6.494	6.645	6.783	6.909	7.025	7.132	7.233	7.326	7.414	7.497
5	2.850	3.717	4.264	4.664	4.979	5.238	5.458	5.648	5.816	5.965	6.100	6.223	6.336	6.439	6.536	6.626	6.710	6.788	6.863
6	2.748	3.558	4.065	4.435	4.726	4.966	5.168	5.344	5.499	5.637	5.762	5.875	5.979	6.075	6.164	6.247	6.325	6.398	6.466
7	2.679	3.451	3.931	4.280	4.555	4.780	4.971	5.137	5.283	5.413	5.530	5.637	5.735	5.826	5.910	5.988	6.061	6.130	6.195
8	2.630	3.374	3.834	4.169	4.431	4.646	4.829	4.987	5.126	5.250	5.362	5.464	5.558	5.644	5.724	5.799	5.869	5.935	5.997
9	2.592	3.316	3.761	4.084	4.337	4.545	4.721	4.873	5.007	5.126	5.234	5.333	5.423	5.506	5.583	5.655	5.722	5.786	5.845
10	2.563	3.270	3.704	4.018	4.264	4.465	4.636	4.783	4.913	5.029	5.134	5.229	5.316	5.397	5.472	5.542	5.607	5.668	5.726
11	2.540	3.234	3.658	3.965	4.205	4.401	4.567	4.711	4.838	4.951	5.053	5.145	5.231	5.309	5.382	5.450	5.514	5.573	5.630
12	2.521	3.204	3.621	3.921	4.156	4.349	4.511	4.652	4.776	4.886	4.986	5.076	5.160	5.236	5.308	5.374	5.436	5.495	5.550
13	2.504	3.179	3.589	3.885	4.116	4.304	4.464	4.602	4.724	4.832	4.930	5.019	5.100	5.175	5.245	5.310	5.371	5.429	5.483
14	2.491	3.158	3.563	3.854	4.081	4.267	4.424	4.560	4.679	4.786	4.882	4.969	5.050	5.124	5.192	5.256	5.316	5.372	5.426
15	2.479	3.140	3.540	3.828	4.052	4.235	4.390	4.524	4.641	4.746	4.841	4.927	5.006	5.079	5.146	5.209	5.268	5.324	5.376
16	2.469	3.124	3.520	3.804	4.026	4.207	4.360	4.492	4.608	4.712	4.805	4.890	4.968	5.040	5.106	5.169	5.227	5.282	5.333
17	2.460	3.110	3.503	3.784	4.003	4.182	4.334	4.464	4.579	4.681	4.774	4.857	4.934	5.005	5.071	5.133	5.190	5.244	5.295
18	2.452	3.098	3.487	3.766	3.984	4.161	4.310	4.440	4.553	4.654	4.746	4.829	4.905	4.975	5.040	5.101	5.158	5.211	5.262
19	2.445	3.087	3.474	3.751	3.966	4.142	4.290	4.418	4.530	4.630	4.721	4.803	4.878	4.948	5.012	5.072	5.129	5.182	5.232
20	2.439	3.077	3.462	3.736	3.950	4.124	4.271	4.398	4.510	4.609	4.699	4.780	4.855	4.923	4.987	5.047	5.103	5.155	5.205
21	2.433	3.069	3.451	3.724	3.936	4.109	4.255	4.380	4.491	4.590	4.678	4.759	4.833	4.901	4.965	5.024	5.079	5.131	5.180
22	2.428	3.061	3.441	3.712	3.923	4.095	4.239	4.364	4.474	4.572	4.660	4.740	4.814	4.882	4.944	5.003	5.058	5.109	5.158
23	2.424	3.054	3.432	3.701	3.911	4.082	4.226	4.350	4.459	4.556	4.644	4.723	4.796	4.863	4.926	4.984	5.038	5.089	5.138
24	2.420	3.047	3.423	3.692	3.900	4.070	4.213	4.336	4.445	4.541	4.628	4.707	4.780	4.847	4.909	4.966	5.020	5.071	5.119
25	2.416	3.041	3.416	3.683	3.890	4.059	4.201	4.324	4.432	4.528	4.614	4.693	4.765	4.831	4.893	4.950	5.004	5.055	5.102

df	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
26	2.412	3.036	3.409	3.675	3.881	4.049	4.191	4.313	4.420	4.515	4.601	4.680	4.751	4.817	4.878	4.936	4.989	5.039	5.086
27	2.409	3.030	3.402	3.667	3.873	4.040	4.181	4.302	4.409	4.504	4.590	4.667	4.739	4.804	4.865	4.922	4.975	5.025	5.072
28	2.406	3.026	3.396	3.660	3.865	4.032	4.172	4.293	4.399	4.493	4.579	4.656	4.727	4.792	4.853	4.909	4.962	5.012	5.058
29	2.403	3.021	3.391	3.654	3.858	4.024	4.163	4.284	4.389	4.484	4.568	4.645	4.716	4.781	4.841	4.897	4.950	4.999	5.046
30	2.400	3.017	3.386	3.648	3.851	4.016	4.155	4.275	4.381	4.474	4.559	4.635	4.706	4.770	4.830	4.886	4.939	4.988	5.034
31	2.398	3.013	3.381	3.642	3.845	4.009	4.148	4.268	4.372	4.466	4.550	4.626	4.696	4.760	4.820	4.876	4.928	4.977	5.023
32	2.396	3.010	3.376	3.637	3.839	4.003	4.141	4.260	4.365	4.458	4.541	4.617	4.687	4.751	4.811	4.866	4.918	4.967	5.013
33	2.393	3.006	3.372	3.632	3.833	3.997	4.135	4.253	4.357	4.450	4.533	4.609	4.679	4.743	4.802	4.857	4.909	4.957	5.003
34	2.391	3.003	3.368	3.627	3.828	3.991	4.129	4.247	4.351	4.443	4.526	4.602	4.671	4.734	4.794	4.849	4.900	4.949	4.994
35	2.389	3.000	3.364	3.623	3.823	3.986	4.123	4.241	4.344	4.436	4.519	4.594	4.663	4.727	4.786	4.841	4.892	4.940	4.986
36	2.388	2.998	3.361	3.619	3.819	3.981	4.117	4.235	4.338	4.430	4.512	4.588	4.656	4.720	4.778	4.833	4.884	4.932	4.978
37	2.386	2.995	3.357	3.615	3.814	3.976	4.112	4.230	4.332	4.424	4.506	4.581	4.650	4.713	4.771	4.826	4.877	4.925	4.970
38	2.384	2.992	3.354	3.611	3.810	3.972	4.107	4.224	4.327	4.418	4.500	4.575	4.643	4.706	4.765	4.819	4.870	4.918	4.963
39	2.383	2.990	3.351	3.608	3.806	3.967	4.103	4.220	4.322	4.413	4.495	4.569	4.637	4.700	4.758	4.812	4.863	4.911	4.956
40	2.381	2.988	3.348	3.605	3.802	3.963	4.099	4.215	4.317	4.408	4.490	4.564	4.632	4.694	4.752	4.806	4.857	4.904	4.949
48	2.372	2.973	3.330	3.583	3.778	3.937	4.070	4.185	4.285	4.375	4.455	4.528	4.595	4.656	4.713	4.766	4.816	4.863	4.907
60	2.363	2.959	3.312	3.562	3.755	3.911	4.042	4.155	4.254	4.342	4.421	4.493	4.558	4.619	4.675	4.727	4.775	4.821	4.864
80	2.353	2.945	3.294	3.541	3.731	3.885	4.014	4.125	4.223	4.309	4.387	4.457	4.521	4.581	4.636	4.687	4.735	4.780	4.822
120	2.344	2.930	3.276	3.520	3.707	3.859	3.986	4.096	4.191	4.276	4.353	4.422	4.485	4.543	4.597	4.647	4.694	4.738	4.779
240	2.335	2.916	3.258	3.499	3.684	3.834	3.959	4.066	4.160	4.244	4.319	4.386	4.448	4.505	4.558	4.607	4.653	4.696	4.737
inf	2.326	2.902	3.240	3.478	3.661	3.808	3.931	4.037	4.129	4.211	4.285	4.351	4.412	4.468	4.519	4.568	4.612	4.654	4.694

df	20	22	24	26	28	30	32	34	36	38	40	50	60	70	80	90	100
1	29.71	30.39	30.99	31.54	32.04	32.5	32.93	33.33	33.71	34.06	34.38	35.79	36.91	37.83	38.62	39.3	39.91
2	11.68	11.93	12.16	12.36	12.55	12.73	12.89	13.04	13.18	13.31	13.44	13.97	14.40	14.75	15.05	15.31	15.54
3	8.683	8.864	9.029	9.177	9.314	9.440	9.557	9.666	9.768	9.864	9.954	10.34	10.65	10.91	11.12	11.31	11.48
4	7.497	7.650	7.789	7.914	8.029	8.135	8.234	8.326	8.412	8.493	8.569	8.806	9.156	9.373	9.557	9.718	9.860
5	6.863	7.000	7.123	7.236	7.340	7.435	7.523	7.606	7.683	7.756	7.825	8.118	8.353	8.548	8.715	8.859	8.988
6	6.466	6.593	6.708	6.812	6.908	6.996	7.078	7.155	7.227	7.294	7.358	7.630	7.848	8.029	8.184	8.319	8.438
7	6.195	6.315	6.422	6.521	6.611	6.695	6.773	6.845	6.913	6.976	7.036	7.294	7.500	7.672	7.818	7.946	8.059
8	5.997	6.111	6.214	6.308	6.395	6.475	6.549	6.618	6.683	6.744	6.801	7.048	7.245	7.409	7.550	7.672	7.780
9	5.845	5.956	6.055	6.146	6.229	6.306	6.378	6.444	6.507	6.566	6.621	6.859	7.050	7.208	7.343	7.461	7.566
10	5.726	5.833	5.930	6.017	6.098	6.173	6.242	6.307	6.368	6.425	6.479	6.709	6.895	7.048	7.180	7.295	7.396
11	5.630	5.734	5.828	5.914	5.992	6.065	6.132	6.196	6.255	6.310	6.363	6.588	6.768	6.918	7.047	7.158	7.258
12	5.550	5.652	5.744	5.827	5.904	5.976	6.042	6.103	6.161	6.215	6.267	6.487	6.663	6.810	6.936	7.045	7.142
13	5.483	5.583	5.673	5.755	5.830	5.900	5.965	6.025	6.082	6.135	6.186	6.402	6.575	6.719	6.842	6.949	7.045
14	5.426	5.524	5.612	5.693	5.767	5.836	5.899	5.959	6.014	6.067	6.116	6.329	6.499	6.641	6.762	6.868	6.961
15	5.376	5.473	5.560	5.639	5.713	5.780	5.843	5.901	5.956	6.008	6.057	6.266	6.433	6.573	6.692	6.796	6.888
16	5.333	5.428	5.515	5.593	5.665	5.732	5.793	5.851	5.905	5.956	6.004	6.210	6.376	6.513	6.631	6.734	6.825
17	5.295	5.389	5.474	5.552	5.623	5.689	5.750	5.806	5.860	5.910	5.958	6.162	6.325	6.461	6.577	6.679	6.769
18	5.262	5.355	5.439	5.515	5.585	5.650	5.711	5.767	5.820	5.870	5.917	6.113	6.280	6.414	6.529	6.630	6.719
19	5.232	5.324	5.407	5.483	5.552	5.616	5.676	5.732	5.784	5.833	5.880	6.079	6.239	6.372	6.486	6.585	6.674
20	5.205	5.296	5.378	5.453	5.522	5.586	5.645	5.700	5.752	5.801	5.847	6.044	6.203	6.335	6.447	6.546	6.633
24	5.119	5.208	5.287	5.360	5.427	5.489	5.546	5.600	5.650	5.697	5.741	5.933	6.086	6.214	6.324	6.419	6.503
30	5.034	5.120	5.197	5.267	5.332	5.392	5.447	5.499	5.547	5.593	5.636	5.821	5.969	6.093	6.198	6.291	6.372
40	4.949	5.032	5.107	5.174	5.236	5.294	5.347	5.397	5.444	5.488	5.529	5.708	5.850	5.969	6.071	6.160	6.238
60	4.864	4.944	5.015	5.081	5.141	5.196	5.247	5.295	5.340	5.382	5.422	5.593	5.730	5.844	5.941	6.026	6.102
120	4.779	4.656	4.924	4.987	5.044	5.097	5.146	5.192	5.235	5.275	5.313	5.476	5.606	5.715	5.808	5.888	5.960
inf	4.694	4.767	4.832	4.892	4.947	4.997	5.044	5.087	5.128	5.166	5.202	5.357	5.480	5.582	5.669	5.745	5.812

Alpha = 0.05

	42 AM							Stac	ciitizea i	tange q	1 aoic i 1	ceai Stat	istics Os	ing Exce	<i>,</i> 1				
	k>																		
df	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	17.969	26.976	32.819	37.082	40.408	43.119	45.397	47.357	49.071	50.592	51.957	53.194	54.323	55.361	56.320	57.212	58.044	58.824	59.558
2	6.085	8.331	9.798	10.881	11.734	12.435	13.027	13.539	13.988	14.389	14.749	15.076	15.375	15.650	15.905	16.143	16.365	16.573	16.769
3	4.501	5.910	6.825	7.502	8.037	8.478	8.852	9.177	9.462	9.717							10.980		
4	3.926	5.040	5.757	6.287	6.706	7.053	7.347	7.602	7.826	8.027	8.208	8.373	8.524	8.664	8.793	8.914	9.027	9.133	9.233
5	3.635	4.602	5.218	5.673	6.033	6.330	6.582	6.801	6.995	7.167	7.323	7.466	7.596	7.716	7.828	7.932	8.030	8.122	8.208
6	3.460	4.339	4.896	5.305	5.628	5.895	6.122	6.319	6.493	6.649	6.789	6.917	7.034	7.143	7.244	7.338	7.426	7.508	7.586
7	3.344	4.165	4.681	5.060	5.359	5.606	5.815	5.997	6.158	6.302	6.431	6.550	6.658	6.759	6.852	6.939	7.020	7.097	7.169
8	3.261	4.041	4.529	4.886	5.167	5.399	5.596	5.767	5.918	6.053	6.175	6.287	6.389	6.483	6.571	6.653	6.729	6.801	6.869
9	3.199	3.948	4.415	4.755	5.024	5.244	5.432	5.595	5.738	5.867	5.983	6.089	6.186	6.276	6.359	6.437	6.510	6.579	6.643
10	3.151	3.877	4.327	4.654	4.912	5.124	5.304	5.460	5.598	5.722	5.833	5.935	6.028	6.114	6.194	6.269	6.339	6.405	6.467
11	3.113	3.820	4.256	4.574	4.823	5.028	5.202	5.353	5.486	5.605	5.713	5.811	5.901	5.984	6.062	6.134	6.202	6.265	6.325
12	3.081	3.773	4.199	4.508	4.750	4.950	5.119	5.265	5.395	5.510	5.615	5.710	5.797	5.878	5.953	6.023	6.089	6.151	6.209
13	3.055	3.734	4.151	4.453	4.690	4.884	5.049	5.192	5.318	5.431	5.533	5.625	5.711	5.789	5.862	5.931	5.995	6.055	6.112
14	3.033	3.701	4.111	4.407	4.639	4.829	4.990	5.130	5.253	5.364	5.463	5.554	5.637	5.714	5.785	5.852	5.915	5.973	6.029
15	3.014	3.673	4.076	4.367	4.595	4.782	4.940	5.077	5.198	5.306	5.403	5.492	5.574	5.649	5.719	5.785	5.846	5.904	5.958
16	2.998	3.649	4.046	4.333	4.557	4.741	4.896	5.031	5.150	5.256	5.352	5.439	5.519	5.593	5.662	5.726	5.786	5.843	5.896
17	2.984	3.628	4.020	4.303	4.524	4.705	4.858	4.991	5.108	5.212	5.306	5.392	5.471	5.544	5.612	5.675	5.734	5.790	5.842
18	2.971	3.609	3.997	4.276	4.494	4.673	4.824	4.955	5.071	5.173	5.266	5.351	5.429	5.501	5.567	5.629	5.688	5.743	5.794
19	2.960	3.593	3.977	4.253	4.468	4.645	4.794	4.924	5.037	5.139	5.231	5.314	5.391	5.462	5.528	5.589	5.647	5.701	5.752
20	2.950	3.578	3.958	4.232	4.445	4.620	4.768	4.895	5.008	5.108	5.199	5.282	5.357	5.427	5.492	5.553	5.610	5.663	5.714
21	2.941	3.565	3.942	4.213	4.424	4.597	4.743	4.870	4.981	5.081	5.170	5.252	5.327	5.396	5.460	5.520	5.576	5.629	5.679
22	2.933	3.553	3.927	4.196	4.405	4.577	4.722	4.847	4.957	5.056	5.144	5.225	5.299	5.368	5.431	5.491	5.546	5.599	5.648
23	2.926	3.542	3.914	4.180	4.388	4.558	4.702	4.826	4.935	5.033	5.121	5.201	5.274	5.342	5.405	5.464	5.519	5.571	5.620
24	2.919	3.532	3.901	4.166	4.373	4.541	4.684	4.807	4.915	5.012	5.099	5.179	5.251	5.319	5.381	5.439	5.494	5.545	5.594
25	2.913	3.523	3.890	4.153	4.358	4.526	4.667	4.789	4.897	4.993	5.079	5.158	5.230	5.297	5.359	5.417	5.471	5.522	5.570
-		-								-									
df	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
26	2.907	3.514	3.880	4.141	4.345	4.511	4.652	4.773	4.880	4.975	5.061	5.139	5.211	5.277	5.339	5.396	5.450	5.500	5.548
27	2.902	3.506	3.870	4.130	4.333	4.498	4.638	4.758	4.864	4.959	5.044	5.122	5.193	5.259	5.320	5.377	5.430	5.480	5.528
28	2.897	3.499	3.861	4.120	4.322	4.486	4.625	4.745	4.850	4.944	5.029	5.106	5.177	5.242	5.302	5.359	5.412	5.462	5.509
29	2.892	3.493	3.853	4.111	4.311	4.475	4.613	4.732	4.837	4.930	5.014	5.091	5.161	5.226	5.286	5.342	5.395	5.445	5.491
30	2.888	3.486	3.845	4.102	4.301	4.464	4.601	4.720	4.824	4.917	5.001	5.077	5.147	5.211	5.271	5.327	5.379	5.429	5.475
31	2.884	3.481	3.838	4.094	4.292	4.454	4.591	4.709	4.812	4.905	4.988	5.064	5.134	5.198	5.257	5.313	5.365	5.414	5.460
32	2.881	3.475	3.832	4.086	4.284	4.445	4.581	4.698	4.802	4.894	4.976	5.052	5.121	5.185	5.244	5.299	5.351	5.400	5.445
33	2.877	3.470	3.825	4.079	4.276	4.436	4.572	4.689	4.791	4.883	4.965	5.040	5.109	5.173	5.232	5.287	5.338	5.386	5.432
34	2.874	3.465	3.820	4.072	4.268	4.428	4.563	4.680	4.782	4.873	4.955	5.030	5.098	5.161	5.220	5.275	5.326	5.374	5.420
35	2.871	3.461	3.814		4.261		4.555	4.671	4.773	4.863	4.945	5.020	5.088					5.362	
36	2.868	3.457	3.809	4.060	4.255	4.414		4.663	4.764	4.855	4.936	5.010	5.078						
37	2.865	3.453	3.804		4.249	4.407	4.540	4.655	4.756	4.846	4.927	5.001	5.069			5.243			
38	2.863	3.449	3.799		4.243	4.400		4.648	4.749	4.838	4.919	4.993	5.060						
39	2.861	3.445	3.795		4.237			4.641	4.741	4.831	4.911	4.985	5.052			5.225		5.322	
40	2.858	3.442	3.791	4.039	4.232		4.521	4.634	4.735	4.824	4.904	4.977	5.044			5.216			
48	2.843	3.420	3.764	4.008	4.197	4.351	4.481	4.592	4.690	4.777	4.856	4.927	4.993			5.161		5.256	
60	2.829	3.399	3.737	3.977	4.163	4.314		4.550	4.646	4.732	4.808	4.878	4.942						
80	2.814	3.377	3.711	3.947	4.129	4.277	4.402	4.509	4.603	4.686	4.761	4.829	4.892		5.003	5.052		5.142	
120	2.800	3.356	3.685	3.917	4.096	4.241	4.363	4.468	4.560	4.641	4.714	4.781	4.842		4.950	4.998		5.086	
240	2.786	3.335	3.659	3.887	4.063	4.205	4.324	4.427	4.517	4.596	4.668	4.733	4.792		4.897	4.944		5.030	
inf	2.772	3.314	3.633	3.858	4.030	4.170	4.286	4.387	4.474	4.552	4.622	4.685	4.743	4.796	4.845	4.891	4.934	4.974	5.012

df	20	22	24	26	28	30	32	34	36	38	40	50	60	70	80	90	100
1	59.56	60.91	62.12	63.22	64.23	65.15	66.01	66.81	67.56	68.26	68.92	71.73	73.97	75.82	77.4	78.77	79.98
2	16.77	17.13	17.45	17.75	18.02	18.27	18.5	18.72	18.92	19.11	19.28	20.05	20.66	21.16	21.59	21.96	22.29
3	11.24	11.47	11.68	11.87	12.05	12.21	12.36	12.50	12.63	12.75	12.87	13.36	13.76	14.08	14.36	14.61	14.82
4	9.233	9.418	9.584	9.736	9.875	10.00	10.12	10.23	10.34	10.44	10.53	10.93	11.24	11.51	11.73	11.92	12.09
5	8.208	8.368	8.512	8.643	8.764	8.875	8.979	9.075	9.165	9.250	9.330	9.674	9.949	10.18	10.38	10.54	10.69
6	7.587	7.730	7.861	7.979	8.088	8.189	8.283	8.370	8.452	8.529	8.601	8.913	9.163	9.370	9.548	9.702	9.839
7	7.170	7.303	7.423	7.533	7.634	7.728	7.814	7.895	7.972	8.043	8.110	8.400	8.632	8.824	8.989	9.133	9.261
8	6.870	6.995	7.109	7.212	7.307	7.395	7.477	7.554	7.625	7.693	7.756	8.029	8.248	8.430	8.586	8.722	8.843
9	6.644	6.763	6.871	6.970	7.061	7.145	7.222	7.295	7.363	7.428	7.488	7.749	7.958	8.132	8.281	8.410	8.526
10	6.467	6.582	6.686	6.781	6.868	6.948	7.023	7.093	7.159	7.220	7.279	7.529	7.730	7.897	8.041	8.166	8.276
11	6.326	6.436	6.536	6.628	6.712	6.790	6.863	6.930	6.994	7.053	7.110	7.352	7.546	7.708	7.847	7.968	8.075
12	6.209	6.317	6.414	6.503	6.585	6.660	6.731	6.796	6.858	6.916	6.970	7.205	7.394	7.552	7.687	7.804	7.909
13	6.112	6.217	6.312	6.398	6.478	6.551	6.620	6.684	6.744	6.800	6.854	7.083	7.267	7.421	7.552	7.667	7.769
14	6.029	6.132	6.224	6.309	6.387	6.459	6.526	6.588	6.647	6.702	6.754	6.979	7.159	7.309	7.438	7.550	7.650
15	5.958	6.059	6.149	6.233	6.309	6.379	6.445	6.506	6.564	6.618	6.669	6.888	7.065	7.212	7.339	7.449	7.546
16	5.897	5.995	6.084	6.166	6.241	6.310	6.374	6.434	6.491	6.544	6.594	6.810	6.984	7.128	7.252	7.360	7.457
17	5.842	5.940	6.027	6.107	6.181	6.249	6.313	6.372	6.427	6.479	6.529	6.741	6.912	7.054	7.176	7.283	7.377
18	5.794	5.890	5.977	6.055	6.128	6.195	6.258	6.316	6.371	6.422	6.471	6.680	6.848	6.989	7.109	7.213	7.307
19	5.752	5.846	5.932	6.009	6.081	6.147	6.209	6.267	6.321	6.371	6.419	6.626	6.792	6.930	7.048	7.152	7.244
20	5.714	5.807	5.891	5.968	6.039	6.104	6.165	6.222	6.275	6.325	6.373	6.576	6.740	6.877	6.994	7.097	7.187
24	5.594	5.683	5.764	5.838	5.906	5.968	6.027	6.081	6.132	6.181	6.226	6.421	6.579	6.710	6.822	6.920	7.008
30	5.475	5.561	5.638	5.709	5.774	5.833	5.889	5.941	5.990	6.037	6.080	6.267	6.417	6.543	6.650	6.744	6.827
40	5.358	5.439	5.513	5.581	5.642	5.700	5.753	5.803	5.849	5.893	5.934	6.112	6.255	6.375	6.477	6.566	6.645
60	5.241	5.319	5.389	5.453	5.512	5.566	5.617	5.664	5.708	5.750	5.789	5.958	6.093	6.206	6.303	6.387	6.462
120	5.126	5.200	5.266	5.327	5.382	5.434	5.481	5.526	5.568	5.607	5.644	5.802	5.929	6.035	6.126	6.205	6.275
inf	5.012	5.081	5.144	5.201	5.253	5.301	5.346	5.388	5.427	5.463	5.498	5.646	5.764	5.863	5.947	6.020	6.085

Alpha = 0.025

df	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	18	20
1	35.99	54.00	65.69	74.22	80.87	86.29	90.85	94.77	98.20	101.3	104.0	106.5	108.8	110.8	112.7	116.2	119.2
2	8.776	11.94	14.01	15.54	16.75	17.74	18.58	19.31	19.95	20.52	21.03	21.49	21.91	22.30	22.67	23.32	23.89
3	5.907	7.661	8.808	9.660	10.34	10.89	11.37	11.78	12.14	12.46	12.75	13.01	13.26	13.48	13.69	14.06	14.39
4	4.943	6.244	7.088	7.716	8.213	8.625	8.976	9.279	9.548	9.788	10.01	10.20	10.39	10.55	10.71	10.99	11.23
5	4.474	5.558	6.257	6.775	7.186	7.527	7.816	8.068	8.291	8.490	8.670	8.834	8.984	9.124	9.253	9.486	9.693
6	4.199	5.158	5.772	6.226	6.586	6.884	7.138	7.359	7.554	7.729	7.887	8.031	8.163	8.286	8.399	8.605	8.787
7	4.018	4.897	5.455	5.868	6.194	6.464	6.695	6.895	7.072	7.230	7.373	7.504	7.624	7.735	7.839	8.025	8.191
8	3.892	4.714	5.233	5.616	5.919	6.169	6.382	6.568	6.732	6.879	7.011	7.132	7.244	7.347	7.443	7.616	7.769
9	3.797	4.578	5.069	5.430	5.715	5.950	6.151	6.325	6.479	6.617	6.742	6.856	6.961	7.058	7.148	7.311	7.455
10	3.725	4.474	4.943	5.287	5.558	5.782	5.972	6.138	6.285	6.416	6.534	6.643	6.742	6.834	6.920	7.075	7.212
11	3.667	4.391	4.843	5.173	5.433	5.648	5.831	5.989	6.130	6.256	6.369	6.473	6.568	6.657	6.739	6.887	7.019
12	3.620	4.325	4.762	5.081	5.332	5.540	5.716	5.869	6.004	6.125	6.235	6.335	6.427	6.512	6.591	6.734	6.861
13	3.582	4.269	4.694	5.004	5.248	5.449	5.620	5.769	5.900	6.017	6.123	6.220	6.309	6.392	6.468	6.607	6.730
14	3.550	4.222	4.638	4.940	5.178	5.374	5.540	5.684	5.811	5.926	6.029	6.123	6.210	6.290	6.364	6.499	6.619
15	3.522	4.182	4.589	4.885	5.118	5.309	5.471	5.612	5.737	5.848	5.949	6.041	6.125	6.203	6.276	6.407	6.523
16	3.498	4.148	4.548	4.838	5.066	5.253	5.412	5.550	5.672	5.781	5.879	5.969	6.052	6.128	6.199	6.328	6.441
17	3.477	4.118	4.512	4.797	5.020	5.204	5.361	5.496	5.615	5.722	5.818	5.907	5.987	6.062	6.132	6.258	6.370
18	3.458	4.092	4.480	4.761	4.981	5.162	5.315	5.448	5.565	5.670	5.765	5.852	5.931	6.004	6.073	6.197	6.306
19	3.442	4.068	4.451	4.728	4.945	5.123	5.275	5.405	5.521	5.624	5.718	5.803	5.881	5.954	6.020	6.142	6.250
20	3.427	4.047	4.426	4.700	4.914	5.089	5.238	5.368	5.481	5.583	5.675	5.759	5.836	5.907	5.974	6.093	6.200
24	3.381	3.983	4.347	4.610	4.816	4.984	5.216	5.250	5.358	5.455	5.543	5.623	5.697	5.764	5.827	5.941	6.043
30	3.337	3.919	4.271	4.523	4.720	4.881	5.017	5.134	5.238	5.330	5.414	5.490	5.560	5.624	5.684	5.792	5.888
40	3.294	3.858	4.197	4.439	4.627	4.780	4.910	5.022	5.120	5.208	5.288	5.360	5.426	5.487	5.544	5.646	5.737
60	3.251	3.798	4.124	4.356	4.536	4.682	4.806	4.912	5.006	5.089	5.164	5.232	5.295	5.352	5.406	5.503	5.588
120	3.210	3.739	4.053	4.276	4.447	4.587	4.704	4.805	4.894	4.972	5.043	5.107	5.166	5.221	5.271	5.362	5.442
inf	3.170	3.682	3.984	4.197	4.361	4.494	4.605	4.700	4.784	4.858	4.925	4.985	5.041	5.092	5.139	5.224	5.299
df	20	22	24	26	28	30	32	34	36	38	40	50	60	70	80	90	100
df 1	20 119.2	22 121.9	24 124.3	26 126.5	28 128.6	30 130.4	32 132.1	34 133.7	36 135.2	38 136.6	40 137.9	50 143.6	60 148.1	70 151.8	80 154.9	90 157.7	100 160.0
df	20	22 121.9 24.41	24 124.3 24.87	26 126.5 25.29	28 128.6 25.67	30 130.4 26.03	32	34 133.7 26.66	36 135.2 26.95	38 136.6 27.22	40 137.9 27.47	50 143.6 28.55	60 148.1 29.42	70 151.8 30.13	80 154.9 30.74	90 157.7 31.27	100 160.0 31.74
df 1 2	20 119.2 23.89 14.39	22 121.9 24.41 14.69	24 124.3 24.87 14.95	26 126.5 25.29 15.19	28 128.6 25.67 15.41	30 130.4 26.03 15.62	32 132.1 26.35 15.81	34 133.7 26.66 15.99	36 135.2 26.95 16.15	38 136.6 27.22 16.31	40 137.9 27.47 16.46	50 143.6 28.55 17.08	60 148.1 29.42 17.59	70 151.8 30.13 18.00	80 154.9 30.74 18.36	90 157.7 31.27 18.67	100 160.0 31.74 18.95
df 1 2 3 4	20 119.2 23.89 14.39 11.23	22 121.9 24.41 14.69 11.46	24 124.3 24.87 14.95 11.66	26 126.5 25.29 15.19 11.84	28 128.6 25.67 15.41 12.00	30 130.4 26.03 15.62 12.16	32 132.1 26.35 15.81 12.30	34 133.7 26.66 15.99 12.44	36 135.2 26.95 16.15 12.56	38 136.6 27.22 16.31 12.68	40 137.9 27.47 16.46 12.79	50 143.6 28.55	60 148.1 29.42 17.59 13.65	70 151.8 30.13 18.00 13.96	80 154.9 30.74 18.36 14.23	90 157.7 31.27 18.67 14.47	100 160.0 31.74 18.95 14.68
df 1 2 3	20 119.2 23.89 14.39 11.23 9.693	22 121.9 24.41 14.69 11.46 9.878	24 124.3 24.87 14.95 11.66 10.04	26 126.5 25.29 15.19 11.84 10.20	28 128.6 25.67 15.41 12.00 10.34	30 130.4 26.03 15.62 12.16 10.47	32 132.1 26.35 15.81 12.30 10.59	34 133.7 26.66 15.99 12.44 10.70	36 135.2 26.95 16.15 12.56 10.80	38 136.6 27.22 16.31 12.68 10.91	40 137.9 27.47 16.46 12.79 11.00	50 143.6 28.55 17.08 13.27 11.40	60 148.1 29.42 17.59 13.65 11.72	70 151.8 30.13 18.00 13.96 11.99	80 154.9 30.74 18.36 14.23 12.21	90 157.7 31.27 18.67 14.47 12.41	100 160.0 31.74 18.95
df 1 2 3 4 5	20 119.2 23.89 14.39 11.23 9.693 8.787	22 121.9 24.41 14.69 11.46 9.878 8.949	24 124.3 24.87 14.95 11.66 10.04 9.097	26 126.5 25.29 15.19 11.84 10.20 9.231	28 128.6 25.67 15.41 12.00 10.34 9.355	30 130.4 26.03 15.62 12.16 10.47 9.469	32 132.1 26.35 15.81 12.30 10.59 9.575	34 133.7 26.66 15.99 12.44 10.70 9.674	36 135.2 26.95 16.15 12.56 10.80 9.767	38 136.6 27.22 16.31 12.68 10.91 9.855	40 137.9 27.47 16.46 12.79 11.00 9.938	50 143.6 28.55 17.08 13.27 11.40 10.30	60 148.1 29.42 17.59 13.65 11.72 10.58	70 151.8 30.13 18.00 13.96 11.99 10.81	80 154.9 30.74 18.36 14.23 12.21 11.02	90 157.7 31.27 18.67 14.47 12.41 11.19	100 160.0 31.74 18.95 14.68 12.59 11.35
df 1 2 3 4 5 6	20 119.2 23.89 14.39 11.23 9.693 8.787 8.191	22 121.9 24.41 14.69 11.46 9.878 8.949 8.339	24 124.3 24.87 14.95 11.66 10.04 9.097 8.473	26 126.5 25.29 15.19 11.84 10.20 9.231 8.595	28 128.6 25.67 15.41 12.00 10.34 9.355 8.708	30 130.4 26.03 15.62 12.16 10.47 9.469 8.812	32 132.1 26.35 15.81 12.30 10.59 9.575 8.909	34 133.7 26.66 15.99 12.44 10.70 9.674 8.999	36 135.2 26.95 16.15 12.56 10.80 9.767 9.084	38 136.6 27.22 16.31 12.68 10.91 9.855 9.164	40 137.9 27.47 16.46 12.79 11.00 9.938 9.239	50 143.6 28.55 17.08 13.27 11.40 10.30 9.563	60 148.1 29.42 17.59 13.65 11.72 10.58 9.822	70 151.8 30.13 18.00 13.96 11.99 10.81 10.04	80 154.9 30.74 18.36 14.23 12.21 11.02 10.23	90 157.7 31.27 18.67 14.47 12.41 11.19 10.38	100 160.0 31.74 18.95 14.68 12.59 11.35 10.53
df 1 2 3 4 5 6 7	20 119.2 23.89 14.39 11.23 9.693 8.787 8.191 7.769	22 121.9 24.41 14.69 11.46 9.878 8.949 8.339 7.907	24 124.3 24.87 14.95 11.66 10.04 9.097 8.473 8.031	26 126.5 25.29 15.19 11.84 10.20 9.231 8.595 8.145	28 128.6 25.67 15.41 12.00 10.34 9.355 8.708 8.250	30 130.4 26.03 15.62 12.16 10.47 9.469 8.812 8.346	32 132.1 26.35 15.81 12.30 10.59 9.575 8.909 8.436	34 133.7 26.66 15.99 12.44 10.70 9.674 8.999 8.520	36 135.2 26.95 16.15 12.56 10.80 9.767 9.084 8.599	38 136.6 27.22 16.31 12.68 10.91 9.855 9.164 8.673	40 137.9 27.47 16.46 12.79 11.00 9.938 9.239 8.743	50 143.6 28.55 17.08 13.27 11.40 10.30 9.563 9.044	60 148.1 29.42 17.59 13.65 11.72 10.58 9.822 9.286	70 151.8 30.13 18.00 13.96 11.99 10.81 10.04 9.487	80 154.9 30.74 18.36 14.23 12.21 11.02 10.23 9.660	90 157.7 31.27 18.67 14.47 12.41 11.19 10.38 9.810	100 160.0 31.74 18.95 14.68 12.59 11.35 10.53 9.944
df 1 2 3 4 5 6 7 8	20 119.2 23.89 14.39 11.23 9.693 8.787 8.191 7.769 7.455	22 121.9 24.41 14.69 11.46 9.878 8.949 8.339 7.907 7.585	24 124.3 24.87 14.95 11.66 10.04 9.097 8.473 8.031 7.702	26 126.5 25.29 15.19 11.84 10.20 9.231 8.595 8.145 7.809	28 128.6 25.67 15.41 12.00 10.34 9.355 8.708 8.250 7.908	30 130.4 26.03 15.62 12.16 10.47 9.469 8.812 8.346 7.999	32 132.1 26.35 15.81 12.30 10.59 9.575 8.909 8.436 8.084	34 133.7 26.66 15.99 12.44 10.70 9.674 8.999 8.520 8.163	36 135.2 26.95 16.15 12.56 10.80 9.767 9.084 8.599 8.237	38 136.6 27.22 16.31 12.68 10.91 9.855 9.164 8.673 8.307	40 137.9 27.47 16.46 12.79 11.00 9.938 9.239 8.743 8.373	50 143.6 28.55 17.08 13.27 11.40 10.30 9.563 9.044 8.657	60 148.1 29.42 17.59 13.65 11.72 10.58 9.822 9.286 8.885	70 151.8 30.13 18.00 13.96 11.99 10.81 10.04 9.487 9.076	80 154.9 30.74 18.36 14.23 12.21 11.02 10.23 9.660 9.238	90 157.7 31.27 18.67 14.47 12.41 11.19 10.38 9.810 9.381	100 160.0 31.74 18.95 14.68 12.59 11.35 10.53 9.944 9.507
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