

### Critical Values of the $t$ Distribution

df	2-tailed testing			1-tailed testing		
	"			"		
	0.1	0.05	0.01	0.1	0.05	0.01
5	2.015	2.571	4.032	1.476	2.015	3.365
6	1.943	2.447	3.707	1.440	1.943	3.143
7	1.895	2.365	3.499	1.415	1.895	2.998
8	1.860	2.306	3.355	1.397	1.860	2.896
9	1.833	2.262	3.250	1.383	1.833	2.821
10	1.812	2.228	3.169	1.372	1.812	2.764
11	1.796	2.201	3.106	1.363	1.796	2.718
12	1.782	2.179	3.055	1.356	1.782	2.681
13	1.771	2.160	3.012	1.350	1.771	2.650
14	1.761	2.145	2.977	1.345	1.761	2.624
15	1.753	2.131	2.947	1.341	1.753	2.602
16	1.746	2.120	2.921	1.337	1.746	2.583
17	1.740	2.110	2.898	1.333	1.740	2.567
18	1.734	2.101	2.878	1.330	1.734	2.552
19	1.729	2.093	2.861	1.328	1.729	2.539
20	1.725	2.086	2.845	1.325	1.725	2.528
21	1.721	2.080	2.831	1.323	1.721	2.518
22	1.717	2.074	2.819	1.321	1.717	2.508
23	1.714	2.069	2.807	1.319	1.714	2.500
24	1.711	2.064	2.797	1.318	1.711	2.492
25	1.708	2.060	2.787	1.316	1.708	2.485
26	1.706	2.056	2.779	1.315	1.706	2.479
27	1.703	2.052	2.771	1.314	1.703	2.473
28	1.701	2.048	2.763	1.313	1.701	2.467
29	1.699	2.045	2.756	1.311	1.699	2.462
30	1.697	2.042	2.750	1.310	1.697	2.457
40	1.684	2.021	2.704	1.303	1.684	2.423
50	1.676	2.009	2.678	1.299	1.676	2.403
60	1.671	2.000	2.660	1.296	1.671	2.390
80	1.664	1.990	2.639	1.292	1.664	2.374
100	1.660	1.984	2.626	1.290	1.660	2.364
120	1.658	1.980	2.617	1.289	1.658	2.358
4	1.645	1.960	2.576	1.282	1.645	2.327

**t-Table for Estimating p Values  
(2-tailed testing)**

p	df																			
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
0.500	0.727	0.718	0.711	0.706	0.703	0.700	0.697	0.695	0.694	0.692	0.691	0.690	0.689	0.688	0.688	0.687	0.686	0.686	0.685	0.685
0.450	0.819	0.808	0.800	0.794	0.790	0.786	0.783	0.781	0.779	0.777	0.776	0.774	0.773	0.772	0.771	0.771	0.770	0.769	0.769	0.768
0.400	0.920	0.906	0.896	0.889	0.883	0.879	0.876	0.873	0.870	0.868	0.866	0.865	0.863	0.862	0.861	0.860	0.859	0.858	0.858	0.857
0.350	1.031	1.013	1.001	0.993	0.986	0.980	0.976	0.972	0.969	0.967	0.965	0.963	0.961	0.960	0.958	0.957	0.956	0.955	0.954	0.953
0.300	1.156	1.134	1.119	1.108	1.100	1.093	1.088	1.083	1.079	1.076	1.074	1.071	1.069	1.067	1.066	1.064	1.063	1.061	1.060	1.059
0.250	1.301	1.273	1.254	1.240	1.230	1.221	1.214	1.209	1.204	1.200	1.197	1.194	1.191	1.189	1.187	1.185	1.183	1.182	1.180	1.179
0.200	1.476	1.440	1.415	1.397	1.383	1.372	1.363	1.356	1.350	1.345	1.341	1.337	1.333	1.330	1.328	1.325	1.323	1.321	1.319	1.318
0.150	1.699	1.650	1.617	1.592	1.574	1.559	1.548	1.538	1.530	1.523	1.517	1.512	1.508	1.504	1.500	1.497	1.494	1.492	1.489	1.487
0.100	2.015	1.943	1.895	1.860	1.833	1.812	1.796	1.782	1.771	1.761	1.753	1.746	1.740	1.734	1.729	1.725	1.721	1.717	1.714	1.711
0.095	2.055	1.980	1.929	1.893	1.865	1.844	1.827	1.812	1.801	1.791	1.782	1.775	1.768	1.762	1.757	1.753	1.748	1.745	1.741	1.738
0.090	2.098	2.019	1.966	1.928	1.899	1.877	1.859	1.844	1.832	1.821	1.812	1.805	1.798	1.792	1.786	1.782	1.777	1.773	1.770	1.767
0.085	2.143	2.060	2.005	1.965	1.935	1.911	1.893	1.877	1.864	1.854	1.844	1.836	1.829	1.823	1.817	1.812	1.808	1.804	1.800	1.797
0.080	2.191	2.104	2.046	2.004	1.973	1.948	1.928	1.912	1.899	1.887	1.878	1.869	1.862	1.855	1.850	1.844	1.840	1.835	1.832	1.828
0.075	2.242	2.151	2.090	2.046	2.013	1.987	1.966	1.949	1.935	1.923	1.913	1.904	1.897	1.890	1.884	1.878	1.873	1.869	1.865	1.861
0.070	2.297	2.201	2.136	2.090	2.055	2.028	2.007	1.989	1.974	1.962	1.951	1.942	1.934	1.926	1.920	1.914	1.909	1.905	1.900	1.896
0.065	2.357	2.255	2.187	2.138	2.101	2.073	2.050	2.031	2.016	2.002	1.991	1.981	1.973	1.965	1.959	1.953	1.947	1.942	1.938	1.934
0.060	2.422	2.313	2.241	2.189	2.150	2.120	2.096	2.076	2.060	2.046	2.034	2.024	2.015	2.007	2.000	1.994	1.988	1.983	1.978	1.974
0.055	2.492	2.377	2.300	2.245	2.204	2.172	2.146	2.125	2.108	2.093	2.081	2.070	2.060	2.052	2.045	2.038	2.032	2.027	2.022	2.017
<b>0.050</b>	2.571	2.447	2.365	2.306	2.262	2.228	2.201	2.179	2.160	2.145	2.131	2.120	2.110	2.101	2.093	2.086	2.080	2.074	2.069	2.064
0.045	2.658	2.525	2.436	2.373	2.327	2.290	2.261	2.237	2.218	2.201	2.187	2.175	2.164	2.154	2.146	2.139	2.132	2.126	2.120	2.115
0.040	2.757	2.612	2.517	2.449	2.398	2.359	2.328	2.303	2.282	2.264	2.249	2.235	2.224	2.214	2.205	2.197	2.189	2.183	2.177	2.172
0.035	2.870	2.712	2.608	2.535	2.480	2.437	2.404	2.376	2.353	2.334	2.318	2.304	2.291	2.280	2.271	2.262	2.254	2.247	2.241	2.235
0.030	3.003	2.829	2.715	2.634	2.574	2.527	2.491	2.461	2.436	2.415	2.397	2.382	2.368	2.356	2.346	2.336	2.328	2.320	2.313	2.307
0.025	3.163	2.969	2.841	2.752	2.685	2.634	2.593	2.560	2.533	2.510	2.490	2.473	2.458	2.445	2.433	2.423	2.414	2.405	2.398	2.391
0.020	3.365	3.143	2.998	2.896	2.821	2.764	2.718	2.681	2.650	2.624	2.602	2.583	2.567	2.552	2.539	2.528	2.518	2.508	2.500	2.492
0.015	3.634	3.372	3.203	3.085	2.998	2.932	2.879	2.836	2.801	2.771	2.746	2.724	2.706	2.689	2.674	2.661	2.649	2.639	2.629	2.620
<b>0.010</b>	4.032	3.707	3.499	3.355	3.250	3.169	3.106	3.055	3.012	2.977	2.947	2.921	2.898	2.878	2.861	2.845	2.831	2.819	2.807	2.797
0.005	4.773	4.317	4.029	3.833	3.690	3.581	3.497	3.428	3.372	3.326	3.286	3.252	3.222	3.197	3.174	3.153	3.135	3.119	3.104	3.091
0.001	6.869	5.959	5.408	5.041	4.781	4.587	4.437	4.318	4.221	4.140	4.073	4.015	3.965	3.922	3.883	3.850	3.819	3.792	3.768	3.745
0.0005	7.976	6.788	6.082	5.617	5.291	5.049	4.863	4.716	4.597	4.499	4.417	4.346	4.286	4.233	4.187	4.146	4.110	4.077	4.047	4.021
0.0001	11.178	9.082	7.885	7.120	6.594	6.211	5.921	5.694	5.513	5.363	5.239	5.134	5.044	4.966	4.897	4.837	4.784	4.736	4.693	4.654
0.00005	12.893	10.261	8.783	7.851	7.215	6.757	6.412	6.143	5.928	5.753	5.607	5.484	5.379	5.288	5.209	5.139	5.077	5.022	4.972	4.927
0.00001	17.897	13.555	11.215	9.783	8.827	8.150	7.647	7.261	6.954	6.706	6.502	6.330	6.184	6.058	5.949	5.854	5.769	5.694	5.626	5.566
0.000005	20.591	15.260	12.437	10.731	9.605	8.812	8.227	7.779	7.426	7.142	6.907	6.711	6.545	6.402	6.278	6.170	6.074	5.989	5.913	5.845
0.000001	28.478	20.048	15.767	13.257	11.637	10.516	9.701	9.085	8.603	8.218	7.903	7.642	7.421	7.232	7.069	6.927	6.802	6.691	6.593	6.504

**t-Table for Estimating p Values  
(1-tailed testing)**

p	df																			
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
0.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.450	0.132	0.131	0.130	0.130	0.129	0.129	0.129	0.128	0.128	0.128	0.128	0.128	0.128	0.127	0.127	0.127	0.127	0.127	0.127	0.127
0.400	0.267	0.265	0.263	0.262	0.261	0.260	0.260	0.259	0.259	0.258	0.258	0.258	0.257	0.257	0.257	0.257	0.257	0.256	0.256	0.256
0.350	0.408	0.404	0.402	0.399	0.398	0.397	0.396	0.395	0.394	0.393	0.393	0.392	0.392	0.392	0.391	0.391	0.391	0.390	0.390	0.390
0.300	0.559	0.553	0.549	0.546	0.543	0.542	0.540	0.539	0.538	0.537	0.536	0.535	0.534	0.534	0.533	0.533	0.532	0.532	0.532	0.531
0.250	0.727	0.718	0.711	0.706	0.703	0.700	0.697	0.695	0.694	0.692	0.691	0.690	0.689	0.688	0.688	0.687	0.686	0.686	0.685	0.685
0.200	0.920	0.906	0.896	0.889	0.883	0.879	0.876	0.873	0.870	0.868	0.866	0.865	0.863	0.862	0.861	0.860	0.859	0.858	0.858	0.857
0.150	1.156	1.134	1.119	1.108	1.100	1.093	1.088	1.083	1.079	1.076	1.074	1.071	1.069	1.067	1.066	1.064	1.063	1.061	1.060	1.059
0.100	1.476	1.440	1.415	1.397	1.383	1.372	1.363	1.356	1.350	1.345	1.341	1.337	1.333	1.330	1.328	1.325	1.323	1.321	1.319	1.318
0.095	1.516	1.478	1.451	1.432	1.418	1.406	1.397	1.389	1.383	1.377	1.373	1.369	1.365	1.362	1.359	1.357	1.354	1.352	1.350	1.349
0.090	1.558	1.517	1.489	1.469	1.454	1.442	1.432	1.424	1.417	1.411	1.406	1.402	1.398	1.395	1.392	1.389	1.387	1.385	1.383	1.381
0.085	1.602	1.559	1.529	1.508	1.492	1.479	1.468	1.460	1.453	1.447	1.441	1.437	1.433	1.429	1.426	1.424	1.421	1.419	1.417	1.415
0.080	1.649	1.603	1.572	1.549	1.532	1.518	1.507	1.498	1.490	1.484	1.478	1.474	1.469	1.466	1.462	1.459	1.457	1.454	1.452	1.450
0.075	1.699	1.650	1.617	1.592	1.574	1.559	1.548	1.538	1.530	1.523	1.517	1.512	1.508	1.504	1.500	1.497	1.494	1.492	1.489	1.487
0.070	1.753	1.700	1.664	1.638	1.619	1.603	1.591	1.580	1.572	1.565	1.558	1.553	1.548	1.544	1.540	1.537	1.534	1.531	1.529	1.526
0.065	1.810	1.754	1.715	1.687	1.666	1.650	1.636	1.626	1.616	1.609	1.602	1.596	1.591	1.587	1.583	1.579	1.576	1.573	1.570	1.568
0.060	1.873	1.812	1.770	1.740	1.718	1.700	1.686	1.674	1.664	1.656	1.649	1.642	1.637	1.632	1.628	1.624	1.621	1.618	1.615	1.612
0.055	1.941	1.874	1.830	1.797	1.773	1.754	1.738	1.726	1.715	1.706	1.699	1.692	1.686	1.681	1.677	1.672	1.669	1.665	1.662	1.660
<b>0.050</b>	2.015	1.943	1.895	1.860	1.833	1.812	1.796	1.782	1.771	1.761	1.753	1.746	1.740	1.734	1.729	1.725	1.721	1.717	1.714	1.711
0.045	2.098	2.019	1.966	1.928	1.899	1.877	1.859	1.844	1.832	1.821	1.812	1.805	1.798	1.792	1.786	1.782	1.777	1.773	1.770	1.767
0.040	2.191	2.104	2.046	2.004	1.973	1.948	1.928	1.912	1.899	1.887	1.878	1.869	1.862	1.855	1.850	1.844	1.840	1.835	1.832	1.828
0.035	2.297	2.201	2.136	2.090	2.055	2.028	2.007	1.989	1.974	1.962	1.951	1.942	1.934	1.926	1.920	1.914	1.909	1.905	1.900	1.896
0.030	2.422	2.313	2.241	2.189	2.150	2.120	2.096	2.076	2.060	2.046	2.034	2.024	2.015	2.007	2.000	1.994	1.988	1.983	1.978	1.974
0.025	2.571	2.447	2.365	2.306	2.262	2.228	2.201	2.179	2.160	2.145	2.131	2.120	2.110	2.101	2.093	2.086	2.080	2.074	2.069	2.064
0.020	2.757	2.612	2.517	2.449	2.398	2.359	2.328	2.303	2.282	2.264	2.249	2.235	2.224	2.214	2.205	2.197	2.189	2.183	2.177	2.172
0.015	3.003	2.829	2.715	2.634	2.574	2.527	2.491	2.461	2.436	2.415	2.397	2.382	2.368	2.356	2.346	2.336	2.328	2.320	2.313	2.307
<b>0.010</b>	3.365	3.143	2.998	2.896	2.821	2.764	2.718	2.681	2.650	2.624	2.602	2.583	2.567	2.552	2.539	2.528	2.518	2.508	2.500	2.492
0.005	4.032	3.707	3.499	3.355	3.250	3.169	3.106	3.055	3.012	2.977	2.947	2.921	2.898	2.878	2.861	2.845	2.831	2.819	2.807	2.797
0.001	5.893	5.208	4.785	4.501	4.297	4.144	4.025	3.930	3.852	3.787	3.733	3.686	3.646	3.610	3.579	3.552	3.527	3.505	3.485	3.467
0.0005	6.869	5.959	5.408	5.041	4.781	4.587	4.437	4.318	4.221	4.140	4.073	4.015	3.965	3.922	3.883	3.850	3.819	3.792	3.768	3.745
0.0001	9.678	8.025	7.063	6.442	6.010	5.694	5.453	5.263	5.111	4.985	4.880	4.791	4.714	4.648	4.590	4.539	4.493	4.452	4.415	4.382
0.00005	11.178	9.082	7.885	7.120	6.594	6.211	5.921	5.694	5.513	5.363	5.239	5.134	5.044	4.966	4.897	4.837	4.784	4.736	4.693	4.654
0.00001	15.547	12.032	10.103	8.907	8.102	7.527	7.097	6.765	6.501	6.287	6.109	5.959	5.832	5.722	5.627	5.543	5.469	5.402	5.343	5.290
0.000005	17.897	13.555	11.215	9.783	8.827	8.150	7.647	7.261	6.954	6.706	6.502	6.330	6.184	6.058	5.949	5.854	5.769	5.694	5.626	5.566
0.000001	24.771	17.830	14.241	12.110	10.720	9.752	9.043	8.504	8.082	7.743	7.464	7.233	7.036	6.869	6.723	6.597	6.485	6.386	6.297	6.218