

# Critical values of $t$ for two-tailed tests

Significance level ( $\alpha$ )

Degrees of freedom ( $df$ )	0.2	0.15	0.1	0.05	0.025	0.01	0.005	0.001	0.0005
1	3.078	4.165	6.314	12.706	25.452	63.657	127.321	636.619	1273.239
2	1.886	2.282	2.920	4.303	6.205	9.925	14.089	31.599	44.705
3	1.638	1.924	2.353	3.182	4.177	5.841	7.453	12.924	16.326
4	1.533	1.778	2.132	2.776	3.495	4.604	5.598	8.610	10.306
5	1.476	1.699	2.015	2.571	3.163	4.032	4.773	6.869	7.976
6	1.440	1.650	1.943	2.447	2.969	3.707	4.317	5.959	6.788
7	1.415	1.617	1.895	2.365	2.841	3.499	4.029	5.408	6.082
8	1.397	1.592	1.860	2.306	2.752	3.355	3.833	5.041	5.617
9	1.383	1.574	1.833	2.262	2.685	3.250	3.690	4.781	5.291
10	1.372	1.559	1.812	2.228	2.634	3.169	3.581	4.587	5.049
11	1.363	1.548	1.796	2.201	2.593	3.106	3.497	4.437	4.863
12	1.356	1.538	1.782	2.179	2.560	3.055	3.428	4.318	4.716
13	1.350	1.530	1.771	2.160	2.533	3.012	3.372	4.221	4.597
14	1.345	1.523	1.761	2.145	2.510	2.977	3.326	4.140	4.499
15	1.341	1.517	1.753	2.131	2.490	2.947	3.286	4.073	4.417
16	1.337	1.512	1.746	2.120	2.473	2.921	3.252	4.015	4.346
17	1.333	1.508	1.740	2.110	2.458	2.898	3.222	3.965	4.286
18	1.330	1.504	1.734	2.101	2.445	2.878	3.197	3.922	4.233
19	1.328	1.500	1.729	2.093	2.433	2.861	3.174	3.883	4.187
20	1.325	1.497	1.725	2.086	2.423	2.845	3.153	3.850	4.146
21	1.323	1.494	1.721	2.080	2.414	2.831	3.135	3.819	4.110
22	1.321	1.492	1.717	2.074	2.405	2.819	3.119	3.792	4.077
23	1.319	1.489	1.714	2.069	2.398	2.807	3.104	3.768	4.047
24	1.318	1.487	1.711	2.064	2.391	2.797	3.091	3.745	4.021
25	1.316	1.485	1.708	2.060	2.385	2.787	3.078	3.725	3.996
26	1.315	1.483	1.706	2.056	2.379	2.779	3.067	3.707	3.974
27	1.314	1.482	1.703	2.052	2.373	2.771	3.057	3.690	3.954
28	1.313	1.480	1.701	2.048	2.368	2.763	3.047	3.674	3.935
29	1.311	1.479	1.699	2.045	2.364	2.756	3.038	3.659	3.918
30	1.310	1.477	1.697	2.042	2.360	2.750	3.030	3.646	3.902
40	1.303	1.468	1.684	2.021	2.329	2.704	2.971	3.551	3.788
50	1.299	1.462	1.676	2.009	2.311	2.678	2.937	3.496	3.723
60	1.296	1.458	1.671	2.000	2.299	2.660	2.915	3.460	3.681
70	1.294	1.456	1.667	1.994	2.291	2.648	2.899	3.435	3.651
80	1.292	1.453	1.664	1.990	2.284	2.639	2.887	3.416	3.629
100	1.290	1.451	1.660	1.984	2.276	2.626	2.871	3.390	3.598
1000	1.282	1.441	1.646	1.962	2.245	2.581	2.813	3.300	3.492
Infinite	1.282	1.440	1.645	1.960	2.241	2.576	2.807	3.291	3.481

# Critical values of $t$ for one-tailed tests

Significance level ( $\alpha$ )

Degrees of freedom ( $df$ )	0.2	0.15	0.1	0.05	0.025	0.01	0.005	0.001	0.0005
1	1.376	1.963	3.078	6.314	12.706	31.821	63.657	318.309	636.619
2	1.061	1.386	1.886	2.920	4.303	6.965	9.925	22.327	31.599
3	0.978	1.250	1.638	2.353	3.182	4.541	5.841	10.215	12.924
4	0.941	1.190	1.533	2.132	2.776	3.747	4.604	7.173	8.610
5	0.920	1.156	1.476	2.015	2.571	3.365	4.032	5.893	6.869
6	0.906	1.134	1.440	1.943	2.447	3.143	3.707	5.208	5.959
7	0.896	1.119	1.415	1.895	2.365	2.998	3.499	4.785	5.408
8	0.889	1.108	1.397	1.860	2.306	2.896	3.355	4.501	5.041
9	0.883	1.100	1.383	1.833	2.262	2.821	3.250	4.297	4.781
10	0.879	1.093	1.372	1.812	2.228	2.764	3.169	4.144	4.587
11	0.876	1.088	1.363	1.796	2.201	2.718	3.106	4.025	4.437
12	0.873	1.083	1.356	1.782	2.179	2.681	3.055	3.930	4.318
13	0.870	1.079	1.350	1.771	2.160	2.650	3.012	3.852	4.221
14	0.868	1.076	1.345	1.761	2.145	2.624	2.977	3.787	4.140
15	0.866	1.074	1.341	1.753	2.131	2.602	2.947	3.733	4.073
16	0.865	1.071	1.337	1.746	2.120	2.583	2.921	3.686	4.015
17	0.863	1.069	1.333	1.740	2.110	2.567	2.898	3.646	3.965
18	0.862	1.067	1.330	1.734	2.101	2.552	2.878	3.610	3.922
19	0.861	1.066	1.328	1.729	2.093	2.539	2.861	3.579	3.883
20	0.860	1.064	1.325	1.725	2.086	2.528	2.845	3.552	3.850
21	0.859	1.063	1.323	1.721	2.080	2.518	2.831	3.527	3.819
22	0.858	1.061	1.321	1.717	2.074	2.508	2.819	3.505	3.792
23	0.858	1.060	1.319	1.714	2.069	2.500	2.807	3.485	3.768
24	0.857	1.059	1.318	1.711	2.064	2.492	2.797	3.467	3.745
25	0.856	1.058	1.316	1.708	2.060	2.485	2.787	3.450	3.725
26	0.856	1.058	1.315	1.706	2.056	2.479	2.779	3.435	3.707
27	0.855	1.057	1.314	1.703	2.052	2.473	2.771	3.421	3.690
28	0.855	1.056	1.313	1.701	2.048	2.467	2.763	3.408	3.674
29	0.854	1.055	1.311	1.699	2.045	2.462	2.756	3.396	3.659
30	0.854	1.055	1.310	1.697	2.042	2.457	2.750	3.385	3.646
40	0.851	1.050	1.303	1.684	2.021	2.423	2.704	3.307	3.551
50	0.849	1.047	1.299	1.676	2.009	2.403	2.678	3.261	3.496
60	0.848	1.045	1.296	1.671	2.000	2.390	2.660	3.232	3.460
70	0.847	1.044	1.294	1.667	1.994	2.381	2.648	3.211	3.435
80	0.846	1.043	1.292	1.664	1.990	2.374	2.639	3.195	3.416
100	0.845	1.042	1.290	1.660	1.984	2.364	2.626	3.174	3.390
1000	0.842	1.037	1.282	1.646	1.962	2.330	2.581	3.098	3.300
Infinite	0.842	1.036	1.282	1.645	1.960	2.326	2.576	3.090	3.291