

J.3 Student's t Distribution

Unlike Table C.3 that collapsed all normal distributions into a single standard normal distribution, Table C.4 represents a summary of partial CDFs for a number of t distributions. Each row of this table summarizes a different t distribution as indicated by its degrees of freedom ($n - 1$). The body of the table presents t_0 values that represent cutoff points for various probabilities ranging from 0.10 to 0.0025 for one tail and 0.20 to 0.005 for two tails and that are tabulated as various columns. For example, if $n = 20$, then $df = 19$ and for $P(-t_0 \leq t \leq t_0) = 0.95$, the table value t_0 would be 2.093. This value is found as the intersection of the row labeled “19” and the column headed “0.05” (2-tail). This means that -2.093 and 2.093 cut off 0.025 in each tail of the distribution. For $P(t \leq t_0) = 0.10$, the table value t_0 would be -1.328 . Left tail values are negative. For $P(t \geq t_0) = 0.10$, the table value t_0 would be $+1.328$. For $P(t \leq t_0) = 0.90$, the table value t_0 would again be $+1.328$. For more examples see Chapters 4 and 6. Notice that the limit of the t distribution family (where $df = \infty$) is the standard normal distribution (Z). The values in the last row of Table C.4 can also be found using Table C.3.



	1-tail	0.10	0.05	0.025	0.0125	0.01	0.0083	0.00625	0.005	0.00416	0.0025	
	2-tail	0.20	0.10	0.050	0.0250	0.02	0.0166	0.01250	0.010	0.00833	0.0050	2-tail
df: 1		3.078	6.314	12.706	25.452	31.821	38.188	50.923	63.657	76.390	127.3	df: 1
2		1.886	2.920	4.303	6.205	6.965	7.649	8.860	9.925	10.886	14.09	2
3		1.638	2.353	3.182	4.177	4.541	4.857	5.392	5.841	6.232	7.453	3
4		1.533	2.132	2.776	3.495	3.747	3.961	4.315	4.604	4.851	5.598	4
5		1.476	2.015	2.571	3.163	3.365	3.534	3.810	4.032	4.219	4.773	5
6		1.440	1.943	2.447	2.969	3.143	3.287	3.521	3.707	3.863	4.317	6
7		1.415	1.895	2.365	2.841	2.998	3.128	3.335	3.499	3.636	4.029	7
8		1.397	1.860	2.306	2.752	2.896	3.016	3.206	3.355	3.479	3.833	8
9		1.383	1.833	2.262	2.685	2.821	2.933	3.111	3.250	3.364	3.690	9
10		1.372	1.812	2.228	2.634	2.764	2.870	3.038	3.169	3.277	3.581	10
11		1.363	1.796	2.201	2.593	2.718	2.820	2.981	3.106	3.208	3.497	11
12		1.356	1.782	2.179	2.560	2.681	2.779	2.934	3.055	3.153	3.428	12
13		1.350	1.771	2.160	2.533	2.650	2.746	2.896	3.012	3.107	3.372	13
14		1.345	1.761	2.145	2.510	2.624	2.718	2.864	2.977	3.069	3.326	14
15		1.341	1.753	2.131	2.490	2.602	2.694	2.837	2.947	3.036	3.286	15
16		1.337	1.746	2.120	2.473	2.583	2.673	2.813	2.921	3.008	3.252	16
17		1.333	1.740	2.110	2.458	2.567	2.655	2.793	2.898	2.984	3.222	17
18		1.330	1.734	2.101	2.445	2.552	2.639	2.775	2.878	2.963	3.197	18
19		1.328	1.729	2.093	2.433	2.539	2.625	2.759	2.861	2.944	3.174	19
20		1.325	1.725	2.086	2.423	2.528	2.613	2.744	2.845	2.927	3.153	20
21		1.323	1.721	2.080	2.414	2.518	2.601	2.732	2.831	2.912	3.135	21
22		1.321	1.717	2.074	2.405	2.508	2.591	2.720	2.819	2.899	3.119	22
23		1.319	1.714	2.069	2.398	2.500	2.582	2.710	2.807	2.886	3.104	23
24		1.318	1.711	2.064	2.391	2.492	2.574	2.700	2.797	2.875	3.091	24
25		1.316	1.708	2.060	2.385	2.485	2.566	2.692	2.787	2.865	3.078	25

	1-tail	0.10	0.05	0.025	0.0125	0.01	0.0083	0.00625	0.005	0.00416	0.0025	
	2-tail	0.20	0.10	0.050	0.0250	0.02	0.0166	0.01250	0.010	0.00833	0.0050	1-tail
												2-tail
df: 26		1.315	1.706	2.056	2.379	2.479	2.559	2.684	2.779	2.856	3.067	df: 26
27		1.314	1.703	2.052	2.373	2.473	2.552	2.676	2.771	2.847	3.057	27
28		1.313	1.701	2.048	2.368	2.467	2.546	2.669	2.763	2.839	3.047	28
29		1.311	1.699	2.045	2.364	2.462	2.541	2.663	2.756	2.832	3.038	29
30		1.310	1.697	2.042	2.360	2.457	2.536	2.657	2.750	2.825	3.030	30
31		1.309	1.696	2.040	2.356	2.453	2.531	2.652	2.744	2.818	3.022	31
32		1.309	1.694	2.037	2.352	2.449	2.526	2.647	2.738	2.812	3.015	32
33		1.308	1.692	2.035	2.348	2.445	2.522	2.642	2.733	2.807	3.008	33
34		1.307	1.691	2.032	2.345	2.441	2.518	2.638	2.728	2.802	3.002	34
35		1.306	1.690	2.030	2.342	2.438	2.515	2.633	2.724	2.797	2.996	35
36		1.306	1.688	2.028	2.339	2.434	2.511	2.629	2.719	2.792	2.990	36
37		1.305	1.687	2.026	2.336	2.431	2.508	2.626	2.715	2.788	2.985	37
38		1.304	1.686	2.024	2.334	2.429	2.505	2.622	2.712	2.783	2.980	38
39		1.304	1.685	2.023	2.331	2.426	2.502	2.619	2.708	2.780	2.976	39
40		1.303	1.684	2.021	2.329	2.423	2.499	2.616	2.704	2.776	2.971	40
41		1.303	1.683	2.020	2.327	2.421	2.496	2.613	2.701	2.772	2.967	41
42		1.302	1.682	2.018	2.325	2.418	2.494	2.610	2.698	2.769	2.963	42
43		1.302	1.681	2.017	2.323	2.416	2.491	2.607	2.695	2.766	2.959	43
44		1.301	1.680	2.015	2.321	2.414	2.489	2.605	2.692	2.763	2.956	44
45		1.301	1.679	2.014	2.319	2.412	2.487	2.602	2.690	2.760	2.952	45
46		1.300	1.679	2.013	2.317	2.410	2.485	2.600	2.687	2.757	2.949	46
47		1.300	1.678	2.012	2.315	2.408	2.483	2.597	2.685	2.755	2.946	47
48		1.299	1.677	2.011	2.314	2.407	2.481	2.595	2.682	2.752	2.943	48
49		1.299	1.677	2.010	2.312	2.405	2.479	2.593	2.680	2.750	2.940	49
50		1.299	1.676	2.009	2.311	2.403	2.477	2.591	2.678	2.747	2.937	50
51		1.298	1.675	2.008	2.310	2.402	2.476	2.589	2.676	2.745	2.934	51
52		1.298	1.675	2.007	2.308	2.400	2.474	2.588	2.674	2.743	2.932	52
53		1.298	1.674	2.006	2.307	2.399	2.472	2.586	2.672	2.741	2.929	53
54		1.297	1.674	2.005	2.306	2.397	2.471	2.584	2.670	2.739	2.927	54
55		1.297	1.673	2.004	2.304	2.396	2.469	2.583	2.668	2.737	2.925	55
56		1.297	1.673	2.003	2.303	2.395	2.468	2.581	2.667	2.735	2.923	56
57		1.297	1.672	2.002	2.302	2.394	2.467	2.579	2.665	2.733	2.920	57
58		1.296	1.672	2.002	2.301	2.392	2.465	2.578	2.663	2.732	2.918	58
59		1.296	1.671	2.001	2.300	2.391	2.464	2.577	2.662	2.730	2.916	59
60		1.296	1.671	2.000	2.299	2.390	2.463	2.575	2.660	2.729	2.915	60
61		1.296	1.670	2.000	2.298	2.389	2.462	2.574	2.659	2.727	2.913	61
62		1.295	1.670	1.999	2.297	2.388	2.461	2.573	2.657	2.726	2.911	62
63		1.295	1.669	1.998	2.296	2.387	2.460	2.571	2.656	2.724	2.909	63
64		1.295	1.669	1.998	2.295	2.386	2.459	2.570	2.655	2.723	2.908	64
65		1.295	1.669	1.997	2.295	2.385	2.458	2.569	2.654	2.721	2.906	65
66		1.295	1.668	1.997	2.294	2.384	2.457	2.568	2.652	2.720	2.904	66
67		1.294	1.668	1.996	2.293	2.383	2.456	2.567	2.651	2.719	2.903	67
68		1.294	1.668	1.995	2.292	2.382	2.455	2.566	2.650	2.718	2.902	68
69		1.294	1.667	1.995	2.291	2.382	2.454	2.565	2.649	2.716	2.900	69
70		1.294	1.667	1.994	2.291	2.381	2.453	2.564	2.648	2.715	2.899	70
71		1.294	1.667	1.994	2.290	2.380	2.452	2.563	2.647	2.714	2.897	71
72		1.293	1.666	1.993	2.289	2.379	2.451	2.562	2.646	2.713	2.896	72
73		1.293	1.666	1.993	2.289	2.379	2.450	2.561	2.645	2.712	2.895	73
74		1.293	1.666	1.993	2.288	2.378	2.450	2.560	2.644	2.711	2.894	74
75		1.293	1.665	1.992	2.287	2.377	2.449	2.559	2.643	2.710	2.892	75

	1-tail	0.10	0.05	0.025	0.0125	0.01	0.0083 $\bar{3}$	0.00625	0.005	0.00416 $\bar{6}$	0.0025	
	2-tail	0.20	0.10	0.050	0.0250	0.02	0.0166 $\bar{6}$	0.01250	0.010	0.00833 $\bar{3}$	0.0050	1-tail
												2-tail
df: 76		1.293	1.665	1.992	2.287	2.376	2.448	2.559	2.642	2.709	2.891	df: 76
77		1.293	1.665	1.991	2.286	2.376	2.447	2.558	2.641	2.708	2.890	77
78		1.292	1.665	1.991	2.285	2.375	2.447	2.557	2.640	2.707	2.889	78
79		1.292	1.664	1.990	2.285	2.374	2.446	2.556	2.640	2.706	2.888	79
80		1.292	1.664	1.990	2.284	2.374	2.445	2.555	2.639	2.705	2.887	80
81		1.292	1.664	1.990	2.284	2.373	2.445	2.555	2.638	2.705	2.886	81
82		1.292	1.664	1.989	2.283	2.373	2.444	2.554	2.637	2.704	2.885	82
83		1.292	1.663	1.989	2.283	2.372	2.443	2.553	2.636	2.703	2.884	83
84		1.292	1.663	1.989	2.282	2.372	2.443	2.553	2.636	2.702	2.883	84
85		1.292	1.663	1.988	2.282	2.371	2.442	2.552	2.635	2.701	2.882	85
86		1.291	1.663	1.988	2.281	2.370	2.442	2.551	2.634	2.701	2.881	86
87		1.291	1.663	1.988	2.281	2.370	2.441	2.551	2.634	2.700	2.880	87
88		1.291	1.662	1.987	2.280	2.369	2.441	2.550	2.633	2.699	2.880	88
89		1.291	1.662	1.987	2.280	2.369	2.440	2.549	2.632	2.699	2.879	89
90		1.291	1.662	1.987	2.280	2.368	2.440	2.549	2.632	2.698	2.878	90
91		1.291	1.662	1.986	2.279	2.368	2.439	2.548	2.631	2.697	2.877	91
92		1.291	1.662	1.986	2.279	2.368	2.439	2.548	2.630	2.697	2.876	92
93		1.291	1.661	1.986	2.278	2.367	2.438	2.547	2.630	2.696	2.876	93
94		1.291	1.661	1.986	2.278	2.367	2.438	2.547	2.629	2.695	2.875	94
95		1.291	1.661	1.985	2.277	2.366	2.437	2.546	2.629	2.695	2.874	95
96		1.290	1.661	1.985	2.277	2.366	2.437	2.546	2.628	2.694	2.873	96
97		1.290	1.661	1.985	2.277	2.365	2.436	2.545	2.627	2.693	2.873	97
98		1.290	1.661	1.984	2.276	2.365	2.436	2.545	2.627	2.693	2.872	98
99		1.290	1.660	1.984	2.276	2.365	2.435	2.544	2.626	2.692	2.871	99
100		1.290	1.660	1.984	2.276	2.364	2.435	2.544	2.626	2.692	2.871	100
110		1.289	1.659	1.982	2.272	2.361	2.431	2.539	2.621	2.687	2.865	110
120		1.289	1.658	1.980	2.270	2.358	2.428	2.536	2.617	2.683	2.860	120
130		1.288	1.657	1.978	2.268	2.355	2.425	2.533	2.614	2.679	2.856	130
140		1.288	1.656	1.977	2.266	2.353	2.423	2.530	2.611	2.676	2.852	140
150		1.287	1.655	1.976	2.264	2.351	2.421	2.528	2.609	2.674	2.849	150
160		1.287	1.654	1.975	2.263	2.350	2.419	2.526	2.607	2.671	2.847	160
170		1.287	1.654	1.974	2.261	2.348	2.418	2.525	2.605	2.669	2.844	170
180		1.286	1.653	1.973	2.260	2.347	2.417	2.523	2.603	2.668	2.842	180
190		1.286	1.653	1.973	2.259	2.346	2.415	2.522	2.602	2.666	2.840	190
200		1.286	1.653	1.972	2.258	2.345	2.414	2.520	2.601	2.665	2.838	200
250		1.285	1.651	1.969	2.255	2.341	2.410	2.516	2.596	2.659	2.832	250
300		1.284	1.650	1.968	2.253	2.339	2.407	2.513	2.592	2.656	2.828	300
350		1.284	1.649	1.967	2.251	2.337	2.406	2.511	2.590	2.653	2.825	350
400		1.284	1.649	1.966	2.250	2.336	2.404	2.509	2.588	2.651	2.823	400
450		1.283	1.648	1.965	2.249	2.335	2.403	2.508	2.587	2.650	2.821	450
500		1.283	1.648	1.965	2.248	2.334	2.402	2.507	2.586	2.649	2.820	500
550		1.283	1.648	1.964	2.248	2.333	2.401	2.506	2.585	2.648	2.818	550
600		1.283	1.647	1.964	2.247	2.333	2.401	2.505	2.584	2.647	2.817	600
650		1.283	1.647	1.964	2.247	2.332	2.400	2.505	2.583	2.646	2.817	650
700		1.283	1.647	1.963	2.246	2.332	2.400	2.504	2.583	2.646	2.816	700
750		1.283	1.647	1.963	2.246	2.331	2.399	2.504	2.582	2.645	2.815	750
800		1.283	1.647	1.963	2.246	2.331	2.399	2.503	2.582	2.645	2.815	800
900		1.282	1.647	1.963	2.245	2.330	2.398	2.503	2.581	2.644	2.814	900
1000		1.282	1.646	1.962	2.245	2.330	2.398	2.502	2.581	2.644	2.813	1000
∞		1.282	1.645	1.960	2.241	2.326	2.394	2.498	2.576	2.638	2.807	∞