

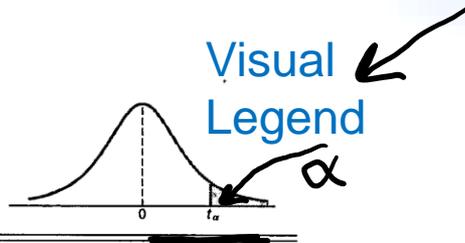
# VI5 - Sampling Distribution Theory - Part 10

- ❑ T probability table (table of critical values)
- ❑ How to use it
- ❑ Practice examples

Course: Statistical Testing & Regression  
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Table A.4 Student t-Distribution Probability Table



$\alpha$  is area to the Right of t along the x axis

Table A.4 Critical Values of the t-Distribution

$v$	0.40	0.30	0.20	0.15	0.10	0.05	0.025
1	0.325	0.727	1.376	1.963	3.078	6.314	12.706
2	0.289	0.617	1.061	1.386	1.886	2.920	4.303
3	0.277	0.584	0.978	1.250	1.638	2.353	3.182
4	0.271	0.569	0.941	1.190	1.533	2.132	2.776
5	0.267	0.559	0.920	1.156	1.476	2.015	2.571
6	0.265	0.553	0.906	1.134	1.440	1.943	2.447
7	0.263	0.549	0.896	1.119	1.415	1.895	2.365
8	0.262	0.546	0.889	1.108	1.397	1.860	2.306
9	0.261	0.543	0.883	1.100	1.383	1.833	2.262
10	0.260	0.542	0.879	1.093	1.372	1.812	2.228
11	0.260	0.540	0.876	1.088	1.363	1.796	2.201
12	0.259	0.539	0.873	1.083	1.356	1.782	2.179
13	0.259	0.538	0.870	1.079	1.350	1.771	2.160
14	0.258	0.537	0.868	1.076	1.345	1.761	2.145
15	0.258	0.536	0.866	1.074	1.341	1.753	2.131
16	0.258	0.535	0.865	1.071	1.337	1.746	2.120
17	0.257	0.534	0.863	1.069	1.333	1.740	2.110
18	0.257	0.534	0.862	1.067	1.330	1.734	2.101
19	0.257	0.533	0.861	1.066	1.328	1.729	2.093
20	0.257	0.533	0.860	1.064	1.325	1.725	2.086
21	0.257	0.532	0.859	1.063	1.323	1.721	2.080
22	0.256	0.532	0.858	1.061	1.321	1.717	2.074
23	0.256	0.532	0.858	1.060	1.319	1.714	2.069
24	0.256	0.531	0.857	1.059	1.318	1.711	2.064
25	0.256	0.531	0.856	1.058	1.316	1.708	2.060
26	0.256	0.531	0.856	1.058	1.315	1.706	2.056
27	0.256	0.531	0.855	1.057	1.314	1.703	2.052
28	0.256	0.530	0.855	1.056	1.313	1.701	2.048
29	0.256	0.530	0.854	1.055	1.311	1.699	2.045
30	0.256	0.530	0.854	1.055	1.310	1.697	2.042
40	0.255	0.529	0.851	1.050	1.303	1.684	2.021
60	0.254	0.527	0.848	1.045	1.296	1.671	2.000
120	0.254	0.526	0.845	1.041	1.289	1.658	1.980
$\infty$	0.253	0.524	0.842	1.036	1.282	1.645	1.960

values of t.

Also known as critical values of t.

Denoted as  $t_\alpha$

**Q: What is value of t with  $\alpha = 0.20$  to the right and 8 df?**

$t = 0.889$



Table A.4 (continued) Critical Values of the  $t$ -Distribution

$v$	$\alpha$						
	0.02	0.015	0.01	0.0075	0.005	0.0025	0.0005
1	15.894	21.205	31.821	42.433	63.656	127.321	636.578
2	4.849	5.643	6.965	8.073	9.925	14.089	31.600
3	3.482	3.896	4.541	5.047	5.841	7.453	12.924
4	2.999	3.298	3.747	4.088	4.604	5.598	8.610
5	2.757	3.003	3.365	3.634	4.032	4.773	6.869
6	2.612	2.829	3.143	3.372	3.707	4.317	5.959
7	2.517	2.715	2.998	3.203	3.499	4.029	5.408
8	2.449	2.634	2.896	3.085	3.355	3.833	5.041
9	2.398	2.574	2.821	2.998	3.250	3.690	4.781
10	2.359	2.527	2.764	2.932	3.169	3.581	4.587
11	2.328	2.491	2.718	2.879	3.106	3.497	4.437
12	2.303	2.461	2.681	2.836	3.055	3.428	4.318
13	2.282	2.436	2.650	2.801	3.012	3.372	4.221
14	2.264	2.415	2.624	2.771	2.977	3.326	4.140
15	2.249	2.397	2.602	2.746	2.947	3.286	4.073
16	2.235	2.382	2.583	2.724	2.921	3.252	4.015
17	2.224	2.368	2.567	2.706	2.898	3.222	3.965
18	2.214	2.356	2.552	2.689	2.878	3.197	3.922
19	2.205	2.346	2.539	2.674	2.861	3.174	3.883
20	2.197	2.336	2.528	2.661	2.845	3.153	3.850
21	2.189	2.328	2.518	2.649	2.831	3.135	3.819
22	2.183	2.320	2.508	2.639	2.819	3.119	3.792
23	2.177	2.313	2.500	2.629	2.807	3.104	3.768
24	2.172	2.307	2.492	2.620	2.797	3.091	3.745
25	2.167	2.301	2.485	2.612	2.787	3.078	3.725
26	2.162	2.296	2.479	2.605	2.779	3.067	3.707
27	2.158	2.291	2.473	2.598	2.771	3.057	3.689
28	2.154	2.286	2.467	2.592	2.763	3.047	3.674
29	2.150	2.282	2.462	2.586	2.756	3.038	3.660
30	2.147	2.278	2.457	2.581	2.750	3.030	3.646
40	2.123	2.250	2.423	2.542	2.704	2.971	3.551
60	2.099	2.223	2.390	2.504	2.660	2.915	3.460
120	2.076	2.196	2.358	2.468	2.617	2.860	3.373
$\infty$	2.054	2.170	2.326	2.432	2.576	2.807	3.290



# Practice

1) Find value of  $t$  such that 15% of area is to right for  $n = 15$

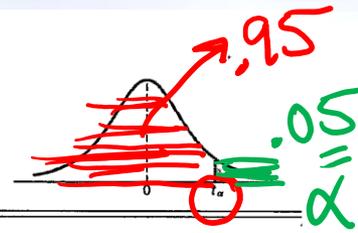
$$df = n - 1 = 15 - 1 = 14$$

$$t_{0.15} = 1.076$$

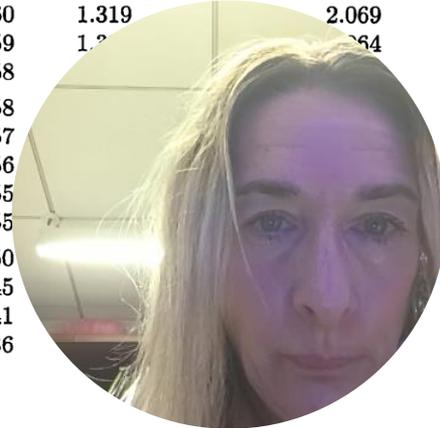
2) Find value of  $t$  with  $n = 4$  that has 95% of area to the left.

$$df = n - 1 = 4 - 1 = 3 = v$$

$$t_{.05} = 2.353$$

Table A.4 Critical Values of the *t*-Distribution

$v$	$\alpha$						
	0.40	0.30	0.20	0.15	0.10	0.05	0.025
1	0.325	0.727	1.376	1.963	3.078	6.314	12.706
2	0.289	0.617	1.061	1.386	1.886	2.920	4.303
3	0.277	0.584	0.978	1.250	1.638	2.353	3.182
4	0.271	0.569	0.941	1.190	1.533	2.132	2.776
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8	0.262	0.546	0.889	1.108	1.397	1.860	2.306
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25	0.256	0.531	0.856	1.058	1.315	1.708	2.060
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27	0.256	0.531	0.855	1.057	1.313	1.704	2.055
28	0.256	0.530	0.855	1.056	1.312	1.702	2.053
29	0.256	0.530	0.854	1.055	1.311	1.701	2.051
30	0.256	0.530	0.854	1.055	1.310	1.699	2.050
40	0.255	0.529	0.851	1.050	1.307	1.695	2.045
60	0.254	0.527	0.848	1.045	1.303	1.690	2.041
120	0.254	0.526	0.845	1.041	1.300	1.687	2.036
$\infty$	0.253	0.524	0.842	1.036	1.299	1.684	2.032



# Practice

3) Find value of *t* for 17 degrees of freedom that has an area of 0.01 to the left.

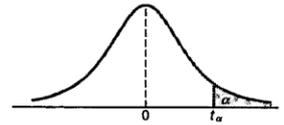


Table A.4 Critical Values of the *t*-Distribution

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6	0.265	0.553	0.906	1.134	1.440	1.943	2.447
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8	0.262	0.546	0.889	1.108	1.397	1.860	2.306

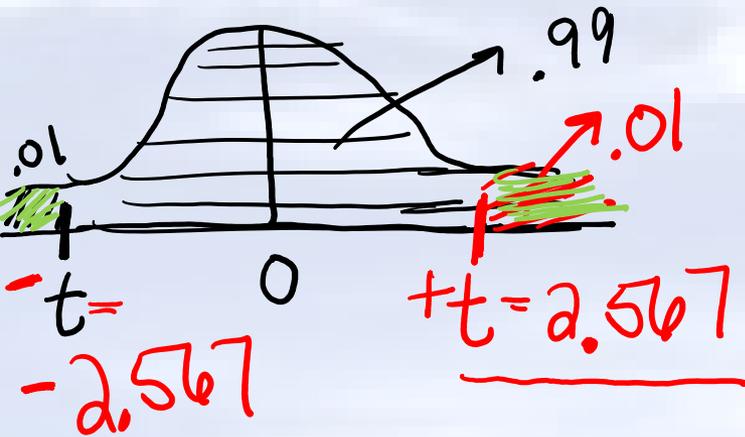


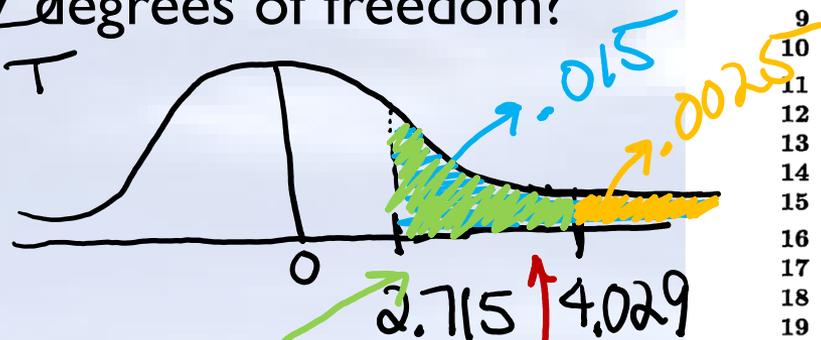
Table A.4 (continued) Critical Values of the *t*-Distribution

<i>v</i>	$\alpha$						
	0.02	0.015	0.01	0.0075	0.005	0.0025	0.0005
1	15.894	21.205	31.821	42.433	63.656	127.321	636.578
2	4.849	5.643	6.965	8.073	9.925	14.089	31.600
3	3.482	3.896	4.541	5.047	5.841	7.453	12.924
4	2.999	3.298	3.747	4.088	4.604	5.598	8.610
5	2.757	3.003	3.365	3.634	4.032	4.773	6.869
6	2.612	2.829	3.143	3.372	3.707	4.317	5.959
7	2.517	2.715	2.998	3.203	3.499	4.029	5.408
8	2.449	2.634	2.896	3.085	3.355	3.833	5.041
9	2.398	2.574	2.821	2.998	3.250		4.781
10	2.359	2.527	2.764	2.932	3.169		4.578
11	2.328	2.491	2.718	2.879	3.119		4.414
12	2.303	2.461	2.681	2.836	3.078		4.278
13	2.282	2.436	2.650	2.801	3.043		4.165
14	2.264	2.415	2.624	2.771	3.013		4.068
15	2.249	2.397	2.602	2.746	2.987		3.984
16	2.235	2.382	2.583	2.724	2.964		3.911
<u>17</u>	2.224	2.368	<u>2.567</u>	2.706	2.943		3.847
18	2.214	2.356	2.552	2.689	2.925		3.792
19	2.205	2.346	2.539	2.674	2.910		3.745
20	2.197	2.336	2.528	2.661	2.896		3.704



# Practice

4) What is the area under the T distribution between  $t = 2.715$  and  $t = 4.029$  for 7 degrees of freedom?



$$= .015 - .0025$$

$$= .0125$$

Table A.4 (continued) Critical Values of the  $t$ -Distribution

$v$	$\alpha$						
	0.02	0.015	0.01	0.0075	0.005	0.0025	0.0005
1	15.894	21.205	31.821	42.433	63.656	127.321	636.578
2	4.849	5.643	6.965	8.073	9.925	14.089	31.600
3	3.482	3.896	4.541	5.047	5.841	7.453	12.924
4	2.999	3.298	3.747	4.088	4.604	5.598	8.610
5	2.757	3.003	3.365	3.634	4.032	4.773	6.869
6	2.612	2.829	3.143	3.372	3.707	4.317	5.959
7	2.517	2.715	2.998	3.203	3.499	4.029	5.408
8	2.449	2.634	2.896	3.085	3.355	3.833	5.041
9	2.398	2.574	2.821	2.998	3.250	3.690	4.781
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11	2.328	2.491	2.718	2.879	3.106	3.497	4.437
12	2.303	2.461	2.681	2.836	3.055	3.428	4.318
13	2.282	2.436	2.650	2.801	3.012	3.372	4.221
14	2.264	2.415	2.624	2.771	2.977	3.326	4.140
15	2.249	2.397	2.602	2.746	2.947	3.286	4.073
16	2.235	2.382	2.583	2.724	2.921	3.252	4.015
17	2.224	2.368	2.567	2.706	2.898	3.222	3.965
18	2.214	2.356	2.552	2.689	2.878	3.197	3.922
19	2.205	2.346	2.539	2.674	2.861	3.174	3.883
20	2.197	2.336	2.528	2.661	2.845	3.153	3.850
21	2.189	2.328	2.518	2.649	2.831	3.135	3.819
22	2.183	2.320	2.508	2.639	2.819	3.119	3.792
23	2.177	2.313	2.500	2.629	2.807	3.104	3.768
24	2.172	2.307	2.492	2.620	2.797	3.091	3.745
25	2.167	2.301	2.485	2.612	2.787	3.079	3.725
26	2.162	2.296	2.479	2.605	2.779	3.070	3.707
27	2.158	2.291	2.473	2.598	2.771	3.062	3.691
28	2.154	2.286	2.467	2.592	2.764	3.055	3.676
29	2.150	2.282	2.462	2.586	2.757	3.048	3.662
30	2.147	2.278	2.457	2.581	2.751	3.042	3.649
40	2.123	2.250	2.423	2.542	2.704	3.000	3.583
60	2.099	2.223	2.390	2.504	2.664	2.967	3.526
120	2.076	2.196	2.358	2.468	2.628	2.935	3.478
$\infty$	2.054	2.170	2.326	2.432	2.591	2.903	3.435





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**THE END**

