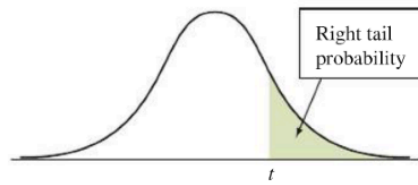


Section 8.3. Confidence Intervals to Estimate a Population Mean

1. A class survey for first-year college students at a certain university asked, “About how many minutes do you study on a typical weeknight?” Based on 35 responses from first year students at this university, the mean study time was 137 minutes and that the standard deviation was 65 minutes.
 - a. What is the population?
 - b. What is the variable of interest?
 - c. Is the variable quantitative or categorical?
 - d. What is the parameter of interest?
 - e. What are the appropriate symbols for 137, 35, and 65?
 - f. Use the survey result to give a 95% confidence interval for the mean study time of all first-year students.
 - g. Complete the sentence: We are 95% confident that
 - h. Find a 99% confidence interval for the mean study time of all first-year students. How does this interval compare to the 95% interval?

2. To study the metabolism of insects, researchers fed cockroaches measured amounts of sugar solution. Five roaches fed the sugar D-glucose and dissected after 10 hours had the following amounts (in micrograms) of D-glucose in their hindguts: 55.95, 68.24, 52.73, 21.5, and 23.78. Assume that the responses come from a normal distribution. Compute a 95% confidence interval for the mean amount (in micrograms) of the D-glucose in the hindguts.
 - a. What is the population?
 - b. What is the variable of interest?
 - c. Is the variable quantitative or categorical?
 - d. What is the parameter of interest?
 - e. Find a 95% confidence interval.
 - f. Interpret the 95% confidence interval in the language of the problem.

**Table B** t Distribution Critical Values

Confidence Level						
	80%	90%	95%	98%	99%	99.8%
Right-Tail Probability						
df	$t_{.100}$	$t_{.050}$	$t_{.025}$	$t_{.010}$	$t_{.005}$	$t_{.001}$
1	3.078	6.314	12.706	31.821	63.656	318.289
2	1.886	2.920	4.303	6.965	9.925	22.328
3	1.638	2.353	3.182	4.541	5.841	10.214
4	1.533	2.132	2.776	3.747	4.604	7.173
5	1.476	2.015	2.571	3.365	4.032	5.894
6	1.440	1.943	2.447	3.143	3.707	5.208
7	1.415	1.895	2.365	2.998	3.499	4.785
8	1.397	1.860	2.306	2.896	3.355	4.501
9	1.383	1.833	2.262	2.821	3.250	4.297
10	1.372	1.812	2.228	2.764	3.169	4.144
11	1.363	1.796	2.201	2.718	3.106	4.025
12	1.356	1.782	2.179	2.681	3.055	3.930
13	1.350	1.771	2.160	2.650	3.012	3.852
14	1.345	1.761	2.145	2.624	2.977	3.787
15	1.341	1.753	2.131	2.602	2.947	3.733
16	1.337	1.746	2.120	2.583	2.921	3.686
17	1.333	1.740	2.110	2.567	2.898	3.646
18	1.330	1.734	2.101	2.552	2.878	3.611
19	1.328	1.729	2.093	2.539	2.861	3.579
20	1.325	1.725	2.086	2.528	2.845	3.552
21	1.323	1.721	2.080	2.518	2.831	3.527
22	1.321	1.717	2.074	2.508	2.819	3.505
23	1.319	1.714	2.069	2.500	2.807	3.485
24	1.318	1.711	2.064	2.492	2.797	3.467
25	1.316	1.708	2.060	2.485	2.787	3.450
26	1.315	1.706	2.056	2.479	2.779	3.435
27	1.314	1.703	2.052	2.473	2.771	3.421
28	1.313	1.701	2.048	2.467	2.763	3.408
29	1.311	1.699	2.045	2.462	2.756	3.396
30	1.310	1.697	2.042	2.457	2.750	3.385
40	1.303	1.684	2.021	2.423	2.704	3.307
50	1.299	1.676	2.009	2.403	2.678	3.261
60	1.296	1.671	2.000	2.390	2.660	3.232
80	1.292	1.664	1.990	2.374	2.639	3.195
100	1.290	1.660	1.984	2.364	2.626	3.174
∞	1.282	1.645	1.960	2.326	2.576	3.091