Math 153 - Homework

Name _____

December 1, 2016

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (10 points) Nine 1.5-volt ALDI brand Ultracell batteries and nine 1.5-volt Energizer brand batteries were selected at random. Each battery was used in a device that produced pulses of light. The numbers of pulses required to drain each battery from 1.5 v to 0.8 v are shown in the following table.

Ultracell	638	645	636	651	639	649	654	627	644
Energizer	519	513	477	540	415	529	571	569	536

(a) What assumption(s) must be made in order to construct confidence intervals for the mean number of pulses required for each brand?

(b) Construct a 90% confidence interval estimate for the mean number of pulses to drain the Ultracell batteries.

(c) Construct a 90% confidence interval estimate for the mean number of pulses to drain the Energizer batteries.

(d) Do your interval estimates overlap? What do you think this says about the means for the two brands?

2. (15 points) Forty-five full-time PSC students were selected at random and asked how many hours per week they spend studying outside of class. The results are shown below.

0	0	0	1	1.5	2	2	2	2
2	2	2.5	3	3	3.5	3.5	4	4
4.5	5	5	6	6	6	6	7	7
7	8	8	8	8	9	9	10	10
10	10	12	14	14	15	20	20	25

(a) Compute a 90% confidence interval estimate for the mean number of hours studied per week by a full-time PSC student. State your conclusion in a full sentence.

(b) A professor claims that PSC students study, on average, at least 15 hours per week. Test the professor's claim at the level $\alpha = 0.05$. State the null and alternative hypotheses, the critical values, the test statistic, and the P-value. Draw and state a conclusion about the original claim (in a complete sentence).

(c) College and university professors generally expect full-time students to spend at least 24 hours per week studying. Are professors' expectations unrealistic? Support your answer with evidence.