Group Work - Week 9

1 The data file "bears.csv" on D2L contains measurements of a random sample of bears from a national park. Harsh winters can be hard on a bear population, especially older bears. Park officials want to know if the mean bear age is different than the usual mean of 55 months.

(a) What are the null and alternative hypotheses for a test on this claim? Is this a one-sided or two-sided test? Is the claim represented by the null or alternative hypothesis?

(b) Using the data set, conduct a test at the $\alpha = 0.05$ level of significance of the claim that the bear population has a different mean age of 55 months. Be sure to state your conclusion in the context of the question.

2 A manufacturer of flash drives wants to know if there is a difference in the reliability of their drives used in extreme conditions. A sample of 15 drives used in cold conditions (< 32°F) had a mean lifespan of 41.9 months with a standard deviation of 6.3. A sample of 15 drives used in hot conditions (> 99°F) had a mean lifespan of 38.4 months with a standard deviation of 5.9. Assume lifespans of flash drive are normally distributed.

(a) What are the null and alternative hypotheses for a test on this claim? Is this a one-sided or two-sided test? Are these independent or dependent samples? Are the requirements for a hypothesis test satisfied?

(b) Conduct an hypothesis test at the $\alpha = 0.05$ level of significance. Be sure to state your conclusion in the context of the question.

(c) Calculate the appropriate confidence interval. Does the inference from the confidence interval match the results of the hypothesis test?

3 Researchers are interested in whether meditation can lower blood pressure in people that have high blood pressure. They conduct a study on 45 patients with high blood pressure (systolic blood pressure > 20), measuring their systolic blood pressure at baseline and after 30 minutes of meditation. The file "meditation_bp.csv" on D2L contains the data.

(a) What are the null and alternative hypotheses for a test on this claim? Is this a one-sided or two-sided test? Are these independent or dependent samples? Are the requirements for a hypothesis test satisfied?

(b) Conduct an hypothesis test at the $\alpha = 0.01$ level of significance. Be sure to state your conclusion in the context of the question.

(c) Calculate the appropriate confidence interval. Does the inference from the confidence interval match the results of the hypothesis test?