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Assignment 9

Due: Friday December 4, 2020 11:59 PM (Atlantic Standard Time)

Assignment description

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After you have completed the assignment, please save, scan, or take photos of your work and upload your files to the questions below. Crowdmark accepts PDF, JPG, and PNG file formats.

Q1 (2 points)

Suppose you are planning a study to compare the difference of two exercise regimens on weight loss. Your goal is to calculate a 95% confidence interval for the difference between the two regimens in mean weight loss having a total width of 6 lbs. Previous studies have estimated that the standard deviation of weight loss on the regimens is 10 lbs. How many people would you plan for each regimen group?

Q2 (4 points)

An observational study gathered data on the rate of progression of multiple sclerosis in patients diagnosed with the disease at different ages. Differences in the mean rate of progression were tested among several groups that differed by age-of-diagnosis using ANOVA. The results gave $P = 0.12$. From the following list, choose all of the correct conclusions that follow from this result (Borenstein 1997). Explain the basis of your answers.

- (a) The mean rate of progression does not differ among age groups.
- (b) The study has failed to show a difference among means of age groups, but the existence of a difference cannot be ruled out.
- (c) If a difference among age groups exists, then it is probably small.

(d) If the study had included a large sample size, it probability would have detected a significant difference among age groups.

Q3 (2 points)

Answer the questions based on the following ANOVA table.

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Treatment	3	2.641	0.8804	20.31	7e-10 ***
Residuals	80	?	?		

(a) Fill in the missing values indicated by a question mark.

(b) How many measurements are there in the study?

Q4 (6 points)

The accompanying table presents mean cone size (mass) of lodgepole pine in 16 study sites in three types of environments in western North America (Edelaar and Benkman 2006). The three environments were islands of lodgepole pines in which pine squirrels were absent (an "island" here refers to a patch of lodgepole pine surrounded by other habitat and separated from the large tracts of contiguous lodgepole pine forests), island with squirrels present, and sites within the large areas of extensive lodgepole pines ("mainland") that all have squirrels.

Habitat type	Raw data (g)	Mean	SD
Island, squirrels absent	9.6, 9.4, 8.9, 8.8, 8.5, 8.2	8.90	0.53
Island, squirrels present	6.8, 6.6, 6.0, 5.7, 5.3	6.08	0.62
Mainland, squirrels present	6.7, 6.4, 6.2, 5.7, 5.6	6.12	0.47

(a) Use these data, carry out a test of the differences among the means of all three groups. State the null and alternative hypotheses, cite the test statistic value or P-value and state your conclusion in the context.

(b) Use the Tukey-Kramer test to find out which pairs of groups are significantly different.