

Name: \_\_\_\_\_

## Problem Set 8

- I. To motivate citizens to conserve gasoline, the EPA is considering mounting a nationwide conservation campaign. However, before doing so on a national level, it decides to conduct an experiment to evaluate the effectiveness of the campaign. For the experiment, the conservation campaign is conducted in a small but representative geographical area. Twelve families are randomly selected from the area, and the amount of gasoline they use is monitored for one month prior to the advertising campaign and for one month following the campaign. Using the following data, conduct a statistical analysis to test whether or not the campaign affected average gas consumption. **DO THIS PROBLEM USING SPSS FIRST, THEN REANALYZE DATA BY HAND.** [30 pts.]

<u>EPA Advertising campaign</u>		
<u>Family</u>	<u>Before the campaign (gal/ms.)</u>	<u>After the campaign (gal/ms.)</u>
A	55	48
B	43	38
C	51	53
D	62	58
E	35	36
F	48	42
G	58	55
H	45	40
I	48	49
J	54	50
K	56	58
L	32	25

- What is the biological hypothesis being tested?
- What statistical test is being conducted?
- What is the biological conclusion? Phrase your answer in a complete sentence with supporting statistics in parenthesis.

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II. Recently, an endogenous brain neurotransmitter called Galanin has been discovered that appears to specifically affect one's desire to eat foods with high fat content. The more of this naturally occurring neurotransmitter an individual possesses, the higher is his or her craving for high-fat foods. Recently, a drug company developed an experimental drug that blocks Galanin without affecting the appetite for healthier foods. A neuroscientist at the drug company believes that the experimental drug will be very useful for controlling obesity. More specifically, he believes that a daily regimen of this drug will result in eating foods with less fat and thereby promote weight loss. An experiment is conducted in which 15 obese female volunteers are randomly selected and given the experimental drug for 6 months. Baseline and ending weights are recorded for each subject. These weights are shown in the following table: DO THIS PROBLEM USING SPSS FIRST, THEN REANALYZE DATA BY HAND. [30 pts.]

Subject	Baseline Weight (lb)	Ending Weight (lb)
1	278	256
2	132	123
3	99	105
4	128	117
5	118	110
6	109	112
7	120	108
8	386	326
9	298	234
10	119	112
11	125	125
12	134	126
13	123	117
14	247	220
15	109	113

- a. What is the biological hypothesis being tested?
- b. What statistical test is being conducted?
- c. What is the biological conclusion? Phrase your answer in a complete sentence with supporting statistics in parenthesis.

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- III. A physiologist has the hypothesis that hormone X is important in producing sexual behavior. To investigate the hypothesis, 20 male rats were randomly sampled and then randomly assigned to two groups. The animals in group one were injected with hormone X and then were placed in individual housing with a sexually receptive female. The animals in group two were given a similar treatment except they were injected with a placebo solution. The numbers of matings were counted over a 20 minute period. The results are shown in the following table: DO THIS PROBLEM USING SPSS FIRST, THEN REANALYZE DATA BY HAND. [30 pts.]

Subject	Hormone X	Placebo
1	8	5
2	10	6
3	12	3
4	6	4
5	6	7
6	7	8
7	9	6
8	8	5
9	7	4
10	11	8

- What is the biological hypothesis being tested?
- What statistical test is being conducted?
- What is the biological conclusion? Phrase your answer in a complete sentence with supporting statistics in parenthesis.

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*This problem does not require you to test hypotheses – so don't even try to do what you have been doing so far on this homework assignment!!!!!!!!!!!!!!!!!!!!!!*

- IV. In a study of measuring bill length of the dusky flycatcher, Johnson (1966) found that the bill length for the males has a mean of  $8.14 \pm 0.02$  and a coefficient of variation of 4.67%. On the basis of this information, infer how many specimens must have been used. **DO THIS PROBLEM BY HAND.** [10 pts.]