

## Class Activity #10

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

1. A researcher wished to test the effect of the addition of extra calcium to yogurt on the “tastiness” of yogurt. The thought being that when extra calcium is added to the yogurt, it would be less desirable in taste. A collection of 200 adult volunteers was randomly divided into two groups of 100 subjects each. Group 1 tasted yogurt containing the extra calcium. Group 2 tasted yogurt from the same batch as group 1 but without the added calcium. Both groups rated the flavor on a scale of 1 to 10, 1 being “very unpleasant” and 10 being “very pleasant.”

Suppose the researcher wanted to test if the mean ratings for the yogurt with the extra calcium were less than the mean ratings for the yogurt without extra calcium. Set  $\alpha = 0.05$

Given below is the Minitab output for this test.

### Two-Sample T-Test and CI

Sample	N	Mean	StDev
extra calcium	100	6.20	1.83
w/o extra calcium	100	7.00	2.00

Difference =  $\mu (1) - \mu (2)$

Estimate for difference: -0.800

95% CI for difference: (-1.33, -0.27)

T-Test of difference = 0 (vs <): T-Value = -2.95 P-Value = 0.0018 DF = 196

a) What is the parameter that we are creating a confidence interval for & testing?

b) What is the value of the point estimate for the confidence interval (hint: that is the value of  $\bar{x}_1 - \bar{x}_2$ )?

c) What is the confidence interval indicating about the average taste of yogurt one versus the average taste of yogurt 2?

d) What are the null and alternative hypotheses for the test that was run above?

e) Should we reject the null or not?

f) Based on this output, would the researcher conclude that the extra calcium had a significant effect on the taste of the yogurt?

2. "The water diet" requires the dieter to drink two cups of water every half hour from when he gets up until he goes to bed, but otherwise allows him to eat whatever he likes. Four adult volunteers agree to test the diet. They are weighed prior to beginning the diet and after six weeks on the diet. The weights (in pounds) are

Person	1	2	3	4
Weight before six weeks	180	125	240	150
Weight after the diet	170	130	215	152

a) Create a new data set difference = after -before

b) Calculate the mean and standard deviation of the new data set

c) Calculate the test statistic under the alternative hypothesis if difference is zero.

d) Give the range of p-value, should we reject the null hypothesis under  $\alpha = 0.05$

e) Based on the test, what can we say about the effectiveness of the diet?

f) Calculate a 95% confidence interval for the mean difference between the before and the after weight for the 4 subjects.

g) Is this consistent with the hypothesis test?