

Pledge:

4/9/2008  
Dr. Lunsford

MATH 171  
Quiz 4

Name: \_\_\_\_\_  
50 Points Possible

Please show all work on this quiz. Please be sure to show all calculator input. You will not get full credit if calculator input is not shown.

**Problem I.** In 1960, census results indicated that the age at which American men first married had a mean of 23.3 years. It is widely suspected that young men today are waiting longer to get married. State the hypotheses we would use to test this conjecture. Clearly identify the population parameter you are testing and also indicate which hypothesis is the conjecture. (8 points)

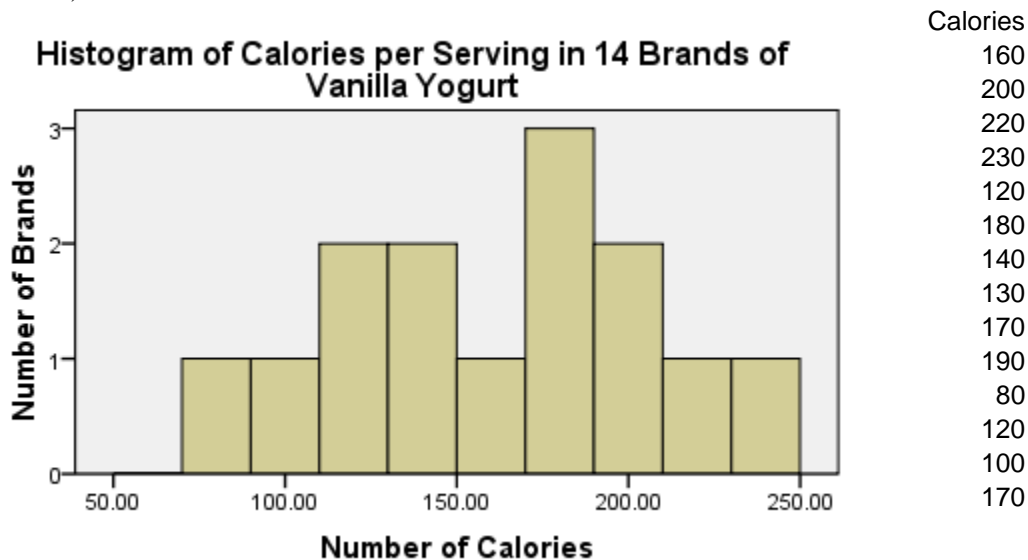
**Problem II.** Suppose we performed a one-sample t-test with the following hypotheses:  $H_0 : \mu = 30$  versus  $H_a : \mu \neq 30$  for an unknown population mean  $\mu$ . Using a random sample of size 15, our data yield a t-test statistic of  $t = -1.3$ . Please answer the following: (17 points total)

(a) Find the p-value of the test and draw a picture that graphically shows the both test statistic and p-value. (8 points)

(b) Is the result of this test significant at the  $\alpha = 0.10$  level? What will be the conclusion of this test (in terms of the hypotheses) at the  $\alpha = 0.10$  level? (5 points)

(c) Will a 90% confidence interval for  $\mu$  computed using the random sample contain the number 30? Why or why not? (4 points)

**Problem III.** Consumer Reports tested 14 brands of vanilla yogurt and found the following numbers of calories per serving. Below you are given a histogram of the calories per serving for the 14 brands. Please answer the following questions. (25 points total)



- (a) What is the population of interest in this problem? (3 points)
- (b) What is the variable we are measuring on the population? (3 points)
- (c) Assume we have a random sample from the population. What other assumption is needed in order to use a one-sample t-procedure (i.e. either a t-test or a t-interval). Please be sure to state the assumption in the context of this problem. Do you think this assumption is satisfied? Why or why not? You should refer to the histogram above in your explanation. (5 points)

(d) What is the value of the standard error of the sample mean? (4 points)

(e) Suppose we test the hypotheses  $H_0 : \mu = 120$  versus  $H_a : \mu \neq 120$  where  $\mu$  is the mean number of calories in a serving of vanilla yogurt for all brands of vanilla yogurt. Find the test statistic and p-value of the test. (6 points)

Test statistic= \_\_\_\_\_  
P-Value= \_\_\_\_\_

(f) State the conclusion of the hypothesis test in part (e) in the context of this problem. (4 points)