

Pledge:

4/10/2009
Dr. Lunsford

MATH 171
Quiz 5

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 women first married had a mean of 22.3 years. It is widely suspected that young women today are waiting longer to get married. To test this conjecture you find the average age, when they married, for a SRS of 30 young married American women is 25.3 years. Please answer the following: (8 points)

(a) 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. (6 points)

(b) Are the data you are given in the direction of the alternative hypothesis or not? Clearly identify the data and why it is or is not in the direction of the alternative hypothesis. (2 points)

Problem II. Suppose we performed a one-sample t-test with the following hypotheses: $H_0 : \mu = 40$ versus $H_a : \mu \neq 40$ for an unknown population mean μ . Using a random sample of size 15, our data yield a t-test statistic of $t = -0.9$. Please answer the following: (15 points total)

(a) Find the p-value of the test and draw a picture that graphically shows **both** the test statistic and the 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) True or False (circle one) A 90% confidence interval for μ computed using the same random sample will contain the number 40? (2 points)

Problem III. In a discussion of the education level of the American workforce, a pessimist says, “The average young person can’t even balance a checkbook.” The National Assessment of Adult Literacy (NAAL) survey indicates that a score of 289 or higher on its quantitative test reflects skills that include those needed to balance a checkbook. The NAAL administered the test to a random sample of 1001 young American men (aged 19 to 24). Their mean score was 279, a bit below the checkbook-balancing level. The standard deviation of the scores was 103. Please answer the following questions. (27 points total)

(a) Please describe the population of interest in this problem. (3 points)

(b) What is the variable being measured on the population? Is it quantitative or categorical? (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? (5 points)

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

(e) Suppose we test the hypotheses

$$H_0 : \mu = 289 \text{ versus } H_a : \mu < 289$$

where μ is the mean score on the NAAL for all young American men aged 19 to 24.

Which of these hypotheses corresponds to the pessimist’s conjecture? (2 points)

(f) Conduct the test in part (e). Clearly show your calculator input, the test statistic, and the p-value of the test. (6 points)

Test statistic=_____

P-Value=_____

(g) What is your conclusion in the context of this problem, i.e. is the pessimist correct? You should justify your answer based on the value of your p-value in part (f). (4 points)