

Pledge:

3/27/2009
Dr. Lunsford

MATH 171
Quiz 4

Name: Solution
40 Points Possible

Please show all work on this quiz. Please be sure to show all calculator input.

Problem I. The average height of 18-year-old American women is 64.2 inches. You conjecture that this year's female graduates from your school district are shorter, on average, than the national average. You measure a SRS of 18 female graduates from your high school district and find that $\bar{x} = 63.1$ inches. State the null and alternative hypotheses you would use to test your conjecture. Clearly indicate the meaning of the parameter in the hypotheses in context. Also indicate which hypothesis corresponds to the conjecture. (5 points)

$H_0: \mu = 64.2$ in. where μ is the mean height of all female graduates this year from my school district.
Conjecture $\rightarrow H_a: \mu < 64.2$ in.

Problem II. A machine manufactures precision parts. Suppose a quality control inspector randomly selects 9 parts manufactured by this machine and computes a 95% confidence interval for the mean diameter of all parts manufactured by the machine to be from 40.167 centimeters (cm) to 40.193 cm. Please answer the following questions: (15 points total)

(a) What was the value of the mean diameter of the nine parts selected by the inspector? (2 points)

40.18 cm $\leftarrow \frac{40.167 + 40.193}{2}$

(b) What is the margin of error for the confidence interval? (2 points)

0.013 cm $\leftarrow \frac{40.193 - 40.167}{2}$

(c) The machine is working properly if it produces precision parts that have a diameter of 40.2 cm, on average. Based on the confidence interval given above, do you think the machine is working properly or not? Briefly explain. (3 points)

No because 40.2 cm is not in the confidence interval and we are 95% confident that the true mean diameter of the parts is in the interval.

(c) Please write "true" or "false," according to which is correct, in the blank provided next to each statement. (2 points each, 4 total)

False There is a 95% chance that the true mean of all parts manufactured by this machine is in the interval (40.167 cm, 40.193 cm).

True There is a 100% chance that the mean of the sample of 9 parts is in the interval (40.167 cm, 40.193 cm).

(d) To decrease the margin of error of the confidence interval should the inspector increase or decrease or not change each of the following (while keeping all other values the same)? (2 points each, 4 total)

Confidence level: increase decrease not change (please circle one)

Sample size: increase decrease not change (please circle one)

