

Math 153 - Quiz 11

May 4, 2017

Name key  
Score \_\_\_\_\_

Show all work to receive full credit. Supply explanations when necessary.

1. (10 points) A new process has been developed to produce synthetic diamonds. Six synthetic diamonds are randomly selected from a large batch that were produced by the new process. Their weights, in karats, are given below.

.061, 0.52, 0.48, 0.57, 0.54, 0.46

- (a) Find a 95% confidence interval estimate for the mean weight of diamonds produced by the new process.

T Interval

$$\bar{x} = 0.53$$

$$s = 0.056$$

$$(0.47138, 0.58862)$$

WE ARE 95% CONFIDENT THAT THE MEAN WEIGHT IS BETWEEN 0.47 AND 0.59 KARATS.

- (b) The developers of the process claim that it produces diamonds that weigh more than 0.5 karats, on average. You wish to test the developer's claim. What are your null and alternative hypotheses?

CLAIM:  $\mu > 0.5$   
 COUNTER:  $\mu \leq 0.5$

$H_0: \mu = 0.5$   
 $H_1: \mu > 0.5$

- (c) Test the developer's claim in part (b) at the level  $\alpha = 0.05$ . Find the P-value and state your conclusion.

T-Test

$$t = 1.3156$$

$$P\text{-value} = 0.1227$$

SINCE  $P\text{-value} > \alpha$ , WE DO NOT REJECT  $H_0$ . EVIDENCE DOES NOT SUPPORT THE ORIGINAL CLAIM.

- (d) How does your confidence interval in part (b) support your conclusion in part (c)?

→ SINCE 0.5 IS IN THE CONFIDENCE INTERVAL, THE EVIDENCE DOES NOT SUPPORT THE DEVELOPER'S CLAIM.

- (e) What important assumptions did you make in solving the problems above?

THE WEIGHTS ARE NORMALLY DISTRIBUTED.