

A.P. Statistics
Assignment 7.8

Remember to show your thinking through your work.

- 1) Describe in simple terms what a Type I error is (yes, again).

- 2) Describe in simple terms what a Type II error is.

- 3) In each of the following situations, a significance test for a population mean μ is called for. State the null hypothesis H_0 and the alternative hypothesis H_a in each case. Then, describe in context what constitutes a Type I error and what constitutes a Type II error.

- (a) Experiments on learning in animals sometimes measure how long it takes a mouse to find its way through a maze. The mean time is 18 seconds for one particular maze. A researcher thinks that a loud noise will cause the mice to complete the maze faster. She measures how long each of 10 mice takes with a noise as stimulus.

- (b) The examinations in a large history class are scaled after grading so that the mean score is 50. A self-confident teaching assistant thinks that his students have a higher mean score than the class as a whole. His students this semester can be considered a sample from the population of all students he might teach, so he compares their mean score with 50.

- (c) The Census Bureau reports that households spend an average of 31% of their total spending on housing. A homebuilders association in Cleveland wonders if the national finding applies in their area. They interview a sample of 40 households in the Cleveland metropolitan area to learn what percent of their spending goes toward housing.

4) You have an SRS of size $n = 9$ from a normal distribution with $\sigma = 1$. You wish to test

$$H_0: \mu = 0$$

$$H_a: \mu > 0$$

You decide to reject H_0 if $\bar{x} > 0$ and to accept H_0 otherwise.

(a) Find the probability of a Type I error.

(b) Describe a Type II error.