

Name _____

*Due: Apr 22

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**Solve the problem.**

- 1) A revenue department is under orders to reduce the time small business owners spend filling out pension form ABC-5500. Previously the average time spent on the form was 6.3 hours. In order to test whether the time to fill out the form has been reduced, a sample of 53 small business owners who annually complete the form was randomly chosen, and their completion times recorded. The mean completion time for ABC-5500 form was 6.1 hours with a standard deviation of 2.6 hours. In order to test that the time to complete the form has been reduced, state the appropriate null and alternative hypotheses. 1) _____
- A) $H_0: \mu > 6.3$ B) $H_0: \mu = 6.3$ C) $H_0: \mu = 6.3$ D) $H_0: \mu = 6.3$
 $H_a: \mu < 6.3$ $H_a: \mu \neq 6.3$ $H_a: \mu > 6.3$ $H_a: \mu < 6.3$
- 2) Researchers have claimed that the average number of headaches per student during a semester of Statistics is 10. Statistics students believe the average is higher. In a sample of $n = 24$ students the mean is 15 headaches with a deviation of 2. Which of the following represent the null and alternative hypotheses necessary to test the students' belief? 2) _____
- A) $H_0: \mu < 10$ vs. $H_a: \mu = 10$ B) $H_0: \mu = 10$ vs. $H_a: \mu < 10$
C) $H_0: \mu = 10$ vs. $H_a: \mu \neq 10$ D) $H_0: \mu = 10$ vs. $H_a: \mu > 10$

- 5) A large university is interested in learning about the average time it takes students to drive to campus. The university sampled 238 students and asked each to provide the amount of time they spent traveling to campus. The sample mean is 25 mins, sample standard deviation is 1 min. This variable, travel time, was then used to conduct a test of hypothesis. The goal was to determine if the average travel time of all the university's students differed from 20 minutes. Find the large-sample rejection region for the test of interest to the college when using a level of significance of 0.05.

A) Reject H_0 if $z < -1.96$ or $z > 1.96$.

B) Reject H_0 if $z < -1.96$.

C) Reject H_0 if $z > 1.645$.

D) Reject H_0 if $z < -1.645$ or $z > 1.645$.

Perform a 2 tail test

Write down 4 steps

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- 6) State University uses thousands of fluorescent light bulbs each year. The brand of bulb it currently uses has a mean life of 940 hours. A competitor claims that its bulbs, which cost the same as the brand the university currently uses, have a mean life of more than 940 hours. The university has decided to purchase the new brand if, when tested, the evidence supports the manufacturer's claim at the .01 significance level. Suppose 99 bulbs were tested with the following results: $\bar{x} = 962$ hours, $s = 77$ hours. Find the rejection region for the test of interest to the State University.

Perform a 1 tail test

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 7) A consumer product magazine recently ran a story concerning the increasing prices of digital cameras. The story stated that digital camera prices dipped a couple of years ago, but now are beginning to increase in price because of added features. According to the story, the average price of all digital cameras a couple of years ago was \$215.00. A random sample of $n = 22$ cameras was recently taken and entered into a spreadsheet. It was desired to test to determine if that average price of all digital cameras is now more than \$215.00. Find a rejection region appropriate for this test if we are using $\alpha = 0.05$.

A) Reject H_0 if $t > 1.721$

B) Reject H_0 if $t > 1.717$

C) Reject H_0 if $t > 2.080$ or $t < -2.080$

D) Reject H_0 if $t > 1.725$

Perform 2 tail test

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- 8) A sample of 8 measurements, randomly selected from a normally distributed population, resulted in the following summary statistics: $\bar{x} = 5.2$, $s = 1.1$. Test the null hypothesis that the mean of the population is 4 against the alternative hypothesis $\mu \neq 4$. Use $\alpha = .05$.

Perform 2-tail test

- 9) A method currently used by doctors to screen women for possible breast cancer fails to detect cancer in 15% of women who actually have the disease. A new method has been developed that researchers hope will be able to detect cancer more accurately. A random sample of 60 women known to have breast cancer were screened using the new method. Of these, the new method failed to detect cancer in 7. Calculate the test statistic used by the researchers for the corresponding test of hypothesis. Use $\alpha = .05$.

Perform 2 tail test.

13) a. Complete the table.

	x_i	y_i	x_i^2	$x_i y_i$
	2	3		
	5	2		
	3	4		
	8	0		
Totals	$\Sigma x_i =$	$\Sigma y_i =$	$\Sigma x_i^2 =$	$\Sigma x_i y_i =$

b. Find SS_{xy} , SS_{xx} , β_1 , $\bar{x}$, $\bar{y}$, and $\hat{\beta}_0$.

c. Write the equation of the least squares line.

14) Consider the following pairs of measurements:

x	1	3	4	6	7
y	3	6	8	12	13

a. Construct a scattergram for the data.

b. What does the scattergram suggest about the relationship between x and y ?

c. Find the least squares estimates of β_0 and β_1 .

d. Plot the least squares line on your scattergram. Does the line appear to fit the data well?

15) Calculate SSE and s^2 for $n = 30$, $SS_{yy} = 100$, $SS_{xy} = 60$, and $\hat{\beta}_1 = .8$.

16) Calculate SSE and s^2 for $n = 25$, $\Sigma y^2 = 950$, $\Sigma y = 65$, $SS_{xy} = 3000$, and $\hat{\beta}_1 = .2$.

every 3 months, and C items twice a year. Calculate the total counts and the counts per day by classification. The company works 5 days per week and 50 weeks per year.

Classification	Number of Items	Count Frequency per Year	Number of Counts per Year	% of Total Counts	Counts per Day
A					
B					
C					
Total counts per year					
Work days per year					
Total counts per day					

Answer. Counts per day A = 53; B = 26; C = 18

- 12.10. A company does an ABC analysis of its inventory and calculates that out of 10,000 items, 19% can be classified as A items, 30% as B items, and the remainder as C items. A decision is made that A items are to be cycle counted twice a month, B items every 3 months, and C items once a year. Calculate the total counts and the counts per day by classification. There are 250 working days per year.

Classification	Number of Items	Count Frequency per Year	Number of Counts per Year	% of Total Counts	Counts per Day
A					
B					
C					
Total counts per year					
Work days per year					
Total counts per day					

CASE STUDY 12.1

CostMart Warehouse

Amy Gordon could not have been more pleased when she was first appointed as the new inventory management supervisor for the CostMart regional warehouse. She had previously worked part time as a clerk in the local CostMart Department Store while she finished her university degree. After she got the degree, she was named as the section head in charge of roughly one-fourth of the store. Now, a year later, she started to wonder about that old adage, "Be careful what you ask for—you just might get it."