

Name \_\_\_\_\_

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

- 1) The data below are the final exam scores of 10 randomly selected statistics students and the number of hours they studied for the exam. Calculate the correlation coefficient  $r$ .

Hours, $x$	5	7	4	10	4	6	6	7	8	5
Scores, $y$	63	78	58	86	64	76	83	88	88	69

- A) 0.761                                      B) 0.991                                      C) 0.654                                      D) 0.847

- 2) The data below are the number of absences and the final grades of 9 randomly selected students from a statistics class. Find the equation of the regression line for the given data.

Number of absences, $x$	0	3	6	4	9	2	15	8	5
Final grade, $y$	98	86	80	82	71	92	55	76	82

- A)  $\hat{y} = -2.75x - 96.14$                       B)  $\hat{y} = -2.75x + 96.14$                       C)  $\hat{y} = -96.14x + 2.75$                       D)  $\hat{y} = 96.14x - 2.75$

**Solve the problem.**

- 3) The data below are the temperatures on randomly chosen days during a summer class and the number of absences on those days. What is the best predicted value for  $y$  given  $x = 101$ ?

Temperature, $x$	72	85	91	90	88	98	75	100	80
Number of absences, $y$	3	7	10	10	8	15	4	15	5

- A) 16    B) 17    C) 18    D) 15

- 4) Compute the sum of the residuals of the least-squares line for the given data.

Temperature, $x$	72	85	91	90	88	98	75	100	80
Number of absences, $y$	3	7	10	10	8	15	4	15	5

- A) 1    B) 1.036                                        C) 0    D) 2.097

- 5) A hypothesis test is a "two-tailed" if the alternative hypothesis contains a \_\_\_\_\_ sign.

- A) +    B) >    C) <    D)  $\neq$

**A hypothesis test is to be performed. Determine the null and alternative hypotheses.**

6) At one school, the average amount of time that tenth-graders spend watching television each week is 21.6 hours. The principal introduces a campaign to encourage the students to watch less television. One year later, the principal wants to perform a hypothesis test to determine whether the average amount of time spent watching television per week has decreased.

A)  $H_0 : \mu = 21.6$  hours

$H_a : \mu < 21.6$  hours

C)  $H_0 : \mu = 21.6$  hours

$H_a : \mu > 21.6$  hours

B)  $H_0 : \mu < 21.6$  hours

$H_a : \mu = 21.6$  hours

D)  $H_0 : \mu = 21.6$  hours

$H_a : \mu \leq 21.6$  hours

7) Find the critical value for a two-tailed test with  $\alpha = 0.10$ .

A)  $\pm 1.28$

B)  $\pm 1.96$

C)  $\pm 1.645$

D)  $\pm 2.575$

**For the given hypothesis test, explain the meaning of a Type I error, a Type II error, or a correct decision as specified.**

8) In the past, the mean running time for a certain type of flashlight battery has been 8.5 hours. The manufacturer has introduced a change in the production method and wants to perform a hypothesis test to determine whether the mean running time has increased as a result. The hypotheses are:

$H_0 : \mu = 8.5$  hours

$H_a : \mu > 8.5$  hours

Explain the meaning of a Type I error.

A) Concluding that  $\mu > 8.5$  hours when in fact  $\mu = 8.5$  hours

B) Concluding that  $\mu = 8.5$  hours when in fact  $\mu > 8.5$  hours

C) Concluding that  $\mu > 8.5$  hours when in fact  $\mu > 8.5$  hours

D) Concluding that  $\mu < 8.5$  hours when in fact  $\mu > 8.5$  hours

9) You wish to test the claim that  $\mu > 10$  at a level of significance of  $\alpha = 0.05$  and are given sample statistics  $n = 50$ ,  $\bar{x} = 10.3$ , and  $\sigma = 1.2$ . Compute the value of the test statistic. Round your answer to two decimal places.

A) 0.98

B) 1.77

C) 2.31

D) 3.11

10) Find the standardized test statistic  $t$  for a sample with  $n = 20$ ,  $\bar{x} = 12.4$ ,  $s = 2.0$ , and  $\alpha = 0.05$  if  $H_a : \mu < 12.8$ . Round your answer to three decimal places.

A) -0.872

B) -0.894

C) -1.265

D) -1.233

11) A survey claims that 9 out of 10 doctors (i.e., 90%) recommend brand Z for their patients who have children. To test this claim against the alternative that the actual proportion of doctors who recommend brand Z is less than 90%, a random sample of 100 doctors results in 94 who indicate that they recommend brand Z. The test statistic in this problem is approximately:

A) 1.83

B) -1.33

C) 1.67

D) 1.33

- 12) Suppose you want to test the claim that  $\mu < 65.4$ . Given a sample size of  $n = 35$  and a level of significance of  $\alpha = 0.01$ , when should you reject  $H_0$ ?
- A) Reject  $H_0$  if the standardized test statistic is less than  $-2.33$ .
  - B) Reject  $H_0$  if the standardized test statistic is less than  $-1.28$ .
  - C) Reject  $H_0$  if the standardized test statistic is less than  $-1.96$ .
  - D) Reject  $H_0$  if the standardized test is less than  $-2.575$ .
- 13) The mean age of bus drivers in Chicago is greater than 55.9 years. If a hypothesis test is performed, how should you interpret a decision that rejects the null hypothesis?
- A) There is sufficient evidence to support the claim  $\mu > 55.9$ .
  - B) There is sufficient evidence to reject the claim  $\mu > 55.9$ .
  - C) There is not sufficient evidence to support the claim  $\mu > 55.9$ .
  - D) There is not sufficient evidence to reject the claim  $\mu > 55.9$ .
- 14) When the results of a hypothesis test are determined to be statistically significant, then we \_\_\_\_\_ the null hypothesis.
- A) Reject
  - B) Compartmentalize
  - C) Polarize
  - D) Fail to reject

**SHORT ANSWER. Write your answer in the space provided or on a separate sheet of paper.**

- 15) A trucking firm suspects that the mean lifetime of a certain tire it uses is less than 31,000 miles. To check the claim, the firm randomly selects and tests 54 of these tires and gets a mean lifetime of 30,380 miles with a standard deviation of 1200 miles. At  $\alpha = 0.05$ , test the trucking firm's claim.
- 16) A local group claims that the police issue at least 60 speeding tickets a day in their area. To prove their point, they randomly select two weeks. Their research yields the number of tickets issued for each day. The data are listed below. At  $\alpha = 0.01$ , test the group's claim.
- 70 48 41 68 69 55 70 57 60 83  
32 60 72 58
- 17) A coin is tossed 1000 times and 570 heads appear. At  $\alpha = 0.05$ , test the claim that this is not a biased coin.
- 18) Managers rate employees according to job performance and attitude. The results for several randomly selected employees are given below. Use the given data to create a scatterplot, find the correlation coefficient, and equation of the regression line. Round the final values to three significant digits, if necessary. What is the best predicted job performance rating for a person whose attitude rating is 68?

Performance	59	63	65	69	58	77	76	69	70	64
Attitude	72	67	78	82	75	87	92	83	87	78