

Name\_\_\_\_\_

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

Provide an appropriate response.

- 1) A good estimator of a parameter has which of the following properties? 1) \_\_\_\_\_  
 I) the standard error of the estimator is small  
 II) the estimator is unbiased  
 III) the estimator has a high confidence level  
 A) both I and II  
 B) II only  
 C) I only  
 D) all of these  
 E) III only
- 2) In a survey of 500 residents, 300 were opposed to the use of the photo-cop for issuing traffic tickets. Find a 95% confidence interval for the population proportion who are opposed to the use of the photo-cop for issuing traffic tickets if the standard error of the estimate is 0.022. 2) \_\_\_\_\_  
 A) (0.578, 0.622)  
 B) (300, 500)  
 C) none of these  
 D) (0.557, 0.643)  
 E) (0.564, 0.636)
- 3) A 90% confidence interval for the mean percentage of airline reservations being canceled on the day of the flight is (1.3%, 5.1%). What is the point estimate of the mean percentage of reservations that are canceled on the day of the flight? 3) \_\_\_\_\_  
 A) 5.10%      B) 3.20%      C) 2.55%      D) 3.80%      E) 1.90%
- 4) In 2006, the General Social Survey asked 917 respondents "how much do you favor or oppose requiring car makers to make cars and trucks that use less gasoline?" Their responses are given in the table below. Based on these responses, find a point estimate for the population proportion who either strongly favor or favor requiring car makers to make cars and trucks that use less gasoline. 4) \_\_\_\_\_

Strongly Favor	645
Favor	197
Neither Favor nor Oppose	52
Oppose	14
Strongly Oppose	9

- A) none of these  
 B) 0.84  
 C) 0.70  
 D) 0.21  
 E) 0.92

- 5) In a survey of 500 residents, 300 were opposed to the use of the photo-cop for issuing traffic tickets. The standard error of the estimate is found to be 0.022. Find the margin of error that corresponds to a 95% confidence interval. 5) \_\_\_\_\_
- A) none of these  
B) 0.043  
C) 0.40  
D) 0.035  
E) 0.60
- 6) In monitoring lead in the air after an explosion at a battery factory, it is found that the amounts of lead (in ug/m<sup>3</sup>) over a 6 day period had a standard error of 1.91. Find the margin of error that corresponds to a 95% confidence interval. 6) \_\_\_\_\_
- A) 95  
B) 3.74  
C) 1.91  
D) 5.65  
E) none of these
- 7) In a Quinnipiac University Poll of registered voters nationwide taken in June of 2007, 43% of those polled blamed oil companies the most for the recent increase in gasoline prices. The margin of error at the 95% confidence level for this point estimate is 2.4%. Construct a 95% confidence level for the population proportion who blame oil companies for the recent increase in gasoline prices. 7) \_\_\_\_\_
- A) (0.383, 0.477)  
B) cannot be determined from the information given  
C) (0.382, 0.478)  
D) (0.368, 0.492)  
E) (0.406, 0.454)
- 8) A 95% confidence interval for a population mean has a margin of error of 3.9. If the sample mean is 54.6, obtain the 95% confidence interval. 8) \_\_\_\_\_
- A) from 46.8 to 62.4  
B) from 52.64 to 56.56  
C) from 50.7 to 54.6  
D) from 50.7 to 58.5  
E) from 46.96 to 62.24
- 9) In a survey of 500 residents, 300 were opposed to the use of the photo-cop for issuing traffic tickets. The standard error of the estimate is found to be 0.022. Find the margin of error that corresponds to a 95% confidence interval. 9) \_\_\_\_\_
- A) 0.043  
B) 0.60  
C) none of these  
D) 0.40  
E) 0.035

Find the standard error

- 10) Out of 400 trials, 60 turned out positive. Find the standard error for the sample proportion. 10) \_\_\_\_\_
- A) 0.0649      B) 0.0358      C) 0.0215      D) 0.0721      E) 0.0179

Provide an appropriate response.

- 11) In 2006, the General Social Survey asked respondents how many hours they spent per week on the internet. The sample mean was 5.74 and the standard error of this estimate is 0.20. Construct a 95% confidence interval for the population mean number of hours spent per week on the internet. 11) \_\_\_\_\_
- A) (5.22, 6.26)      B) (5.54, 5.94)      C) (5.35, 6.13)      D) (3.78, 7.7)      E) (5.34, 6.14)

Find the margin of error

- 12) In a survey of 280 adults over 50, 75% said they were taking vitamin supplements. Find the margin of error for this survey if we want a 99% confidence in our estimate of the percentage of adults over 50 who take vitamin supplements. 12) \_\_\_\_\_
- A) 5.07%      B) 13.3%      C) 6.03%      D) 6.66%      E) 7.00%

Use the given degree of confidence and sample data to construct a confidence interval for the population proportion.

- 13) When 293 college students are randomly selected and surveyed, it is found that 114 own a car. 13) \_\_\_\_\_
- Construct a 99% confidence interval for the percentage of all college students who own a car.
- A) (34.2%, 43.6%)  
B) (31.6%, 46.2%)  
C) (33.3%, 44.5%)  
D) (31.6%, 44.5%)  
E) (32.3%, 45.5%)

Provide an appropriate response.

- 14) The real estate industry claims that it is the best and most effective system to market residential real estate. A survey of randomly selected home sellers in Illinois found that a 95% confidence interval for the proportion of homes that are sold by a real estate agent is 69% to 81%. Interpret the interval in this context 14) \_\_\_\_\_
- A) We are 95% confident that between 69% and 81% of homes in this survey are sold by a real estate agent.  
B) 95% of all homes in Illinois are sold by a real estate agent.  
C) In 95% of the years, between 69% and 81% of homes in Illinois are sold by a real estate agent.  
D) We are 95% confident, based on this sample, that between 69% and 81% of all homes in Illinois are sold by a real estate agent.  
E) 95% of all random samples of home sellers in Illinois will show that between 69% and 81% of homes are sold by a real estate agent.

Determine the margin of error in estimating the population parameter.

- 15) Based on a sample of 39 randomly selected years, a 90% confidence interval for the mean annual precipitation in one city is from 42.8 inches to 45.2 inches. 15) \_\_\_\_\_
- A) 2.4 inches  
B) 0.60 inches  
C) 0.10 inches  
D) 0.32 inches  
E) 1.2 inches

Examine the given statement, then identify whether the statement is a null hypothesis, an alternative hypothesis or neither.

- 16) The percentage of viewers tuned to FOX News is equal to 85%. 16) \_\_\_\_\_
- A) Neither      B) Alternative hypothesis      C) Null hypothesis

Construct the requested confidence interval from the supplied information.

- 17) A savings and loan association needs information concerning the checking account balances of its local customers. A random sample of 14 accounts was checked and yielded a mean balance of \$664.14 and a standard deviation of \$297.29. Find a 98% confidence interval for the true mean checking account balance for local customers. 17) \_\_\_\_\_
- A) (\$455.65, \$872.63)  
B) (\$455.65, \$835.76)  
C) (\$492.52, \$835.76)  
D) (\$453.56, \$874.72)  
E) (\$493.71, \$834.57)

Select the most appropriate answer.

- 18) Which of the following statements is false? 18) \_\_\_\_\_
- A) The P-value is between 0 and 1.  
B) The P-value assumes  $H_a$  is true.  
C) The P-value represents the probability of obtaining the observed value or one even more extreme.  
D) The smaller the P-value, the stronger the evidence is against  $H_0$ .

Find the P-value for the indicated hypothesis test.

- 19) In a sample of 47 adults randomly selected from one town, it is found that 9 of them have been exposed to a particular strain of the flu. Find the P-value for a test of the claim that the proportion of all adults in the town that have been exposed to this strain of the flu is 8%. 19) \_\_\_\_\_
- A) 0.08                      B) 0.03                      C) 0.05                      D) 0.005                      E) 0.002

Select the most appropriate answer.

- 20) Given  $H_a \neq p_0$ . What is the P-value if the test statistics is calculated to be  $z = 0.58$ ? 20) \_\_\_\_\_
- A) 0.11                      B) 0.28                      C) 0.22                      D) 0.05                      E) 0.56

For the given sample data and null hypothesis, compute the value of the test statistic,  $z$

- 21) 410 people were asked if they were satisfied with their jobs. 37% of the responses were affirmative.  $H_0: p = 0.30$  21) \_\_\_\_\_
- A) 2.61                      B) 0.04                      C) 4.12                      D) 0.15                      E) 3.09

Provide an appropriate response.

- 22) An online computer support company claims that their mean call-back time is less than 30 minutes. A random sample of 36 calls has a sample mean of 28.5 minutes and a standard deviation of 3.5 minutes. Calculate the test statistic  $t$  for testing the company's claim. 22) \_\_\_\_\_
- A) None of these  
B) -2.57  
C) -1.69  
D) 2.57  
E) -15.43

State conclusion to significance test in terms of the null hypothesis

- 23) A journal article reports that 34% of American fathers take no responsibility for child care. A researcher claims that the figure is higher for fathers in a particular town. A random sample of 233 fathers from this town yielded 96 who did not help with child care. Do the data provide sufficient evidence to conclude that in this town the proportion is higher than 0.34? Use a 0.05 significance level. 23) \_\_\_\_\_

$$H_0: p = 0.34 \quad H_a: p > 0.34.$$

$$\alpha = 0.05$$

$$\text{Test statistic: } z = 2.32. \quad P\text{-Value} = 0.0102$$

State your conclusion in terms of the  $H_0$ .

- A) Since the P-value  $< \alpha$ , we can conclude that the proportion of fathers who take no responsibility for childcare is 41%.
- B) Since the P-value  $< \alpha$ , we can conclude that the proportion of fathers who take no responsibility for childcare is higher than 34% in this town.
- C) Since the P-value  $< 0.34$ , we are unable to conclude that the proportion of fathers who take no responsibility for childcare is higher than 34% in this town.
- D) Since the P-value  $< 0.34$ , we can conclude that the proportion of fathers who take no responsibility for childcare is higher than 34% in this town.
- E) Since the P-value  $< \alpha$ , we are unable to conclude that the proportion of fathers who take no responsibility for childcare is higher than 34% in this town.

Assume that a simple random sample has been selected from a normally distributed population. State the final conclusion.

- 24) Test the claim that for the population of female college students at a particular university, the mean weight is given by  $\mu = 132$  lb. Sample data are summarized as  $n = 20$ ,  $\bar{x} = 137$  lb, and  $s = 14.2$  lb. 24) \_\_\_\_\_  
Use a significance level of  $\alpha = 0.1$ .

$$H_0: \mu = 132 \quad H_a: \mu \neq 132$$

State your conclusion about  $H_0$ .

- A)  $t = -1.57$ , do not reject  $H_0$
- B)  $t = 1.57$ , reject  $H_0$
- C)  $z = 1.57$ , do not reject  $H_0$
- D)  $t = 7.04$ , reject  $H_0$
- E)  $t = 1.57$ , do not reject  $H_0$

Classify the significance test as two-tailed, left-tailed, or right-tailed.

- 25) The owner of a football team claims that the average attendance at games is over 80,000, and he is therefore justified in moving the team to a city with a larger stadium. An independent investigator will conduct a significance test to determine whether his claim is accurate. 25) \_\_\_\_\_

- A) Left-tailed
- B) Two-tailed
- C) Middle-tailed
- D) Right-tailed
- E) None of these

Select the most appropriate answer.

26) Rejecting a true  $H_0$

26) \_\_\_\_\_

- A) is a correct decision.
- B) is a Type II error.
- C) is a Type I error.
- D) has probability  $1 - \beta$  of occurring.
- E) has probability  $\beta$  of occurring.

Classify the conclusion of the significance test as a Type I error, a Type II error, or No error.

27) A manufacturer claims that the mean amount of juice in its 16 ounce bottles is 16.1 ounces. A consumer advocacy group wants to perform a significance test to determine whether the mean amount is actually less than this. The hypotheses are:

27) \_\_\_\_\_

$$H_0: \mu = 16.1 \text{ ounces}$$

$$H_a: \mu < 16.1 \text{ ounces}$$

Suppose that the results of the sample lead to rejection of the null hypothesis. Classify that conclusion as a Type I error, a Type II error, or a correct decision, if in fact the mean amount of juice,  $\mu$ , is less than 16.1 ounces.

- A) Type I error                      B) No error                      C) Type II error

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

28) A health insurer has determined that the "reasonable and customary" fee for a certain medical procedure is \$1200. They suspect that the average fee charged by one particular clinic for this procedure is higher than \$1200. The insurer performs a significance test to determine whether their suspicion is correct using  $\alpha = 0.05$ . The hypotheses are:

28) \_\_\_\_\_

$$H_0: \mu = \$1200$$

$$H_a: \mu > \$1200$$

If the P-value is 0.09 and a decision error is made, what type of error is it? Explain.

- A) Type I error. We conclude that the average fee charged for the procedure is not higher than \$1200 when it actually is higher.
- B) Type I error. We conclude that the average fee charged for the procedure is higher than \$1200 when it actually is not higher.
- C) Type II error. We conclude that the average fee charged for the procedure is higher than \$1200 when it actually is not higher.
- D) Type II error. We conclude that the average fee charged for the procedure is not higher than \$1200 when it actually is higher.

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

Perform a significance test for a population proportion using the P-value approach.

- 29) A manufacturer considers his production process to be out of control when defects exceed 3%. In a random sample of 80 items, the defect rate is 5% but the manager claims that this is only a sample fluctuation and production is not really out of control. At the 0.01 level of significance, do the data provide sufficient evidence that the percentage of defects exceeds 3%?

a) Assumptions:

b) Hypothesis:

c) Test statistic:

d) P-value:

e) Conclusion:

Provide an appropriate response.

- 30) You work for a credit card company. You are assigned to estimate the proportion of the accounts in which a customer applied for and received a card but never used it. For a random sample of 20 customers, 3 never used it. Find a 90% confidence interval for the population proportion.

a) Find the point estimate

b) Calculate the standard error

c) Calculate the margin of error

d) What is the z value that corresponds to 90% confidence level

e) Find the 90% confidence interval

f) Can you conclude that fewer than half the people who received the credit card never used it?