

Exam: 350364RR - Sampling Distributions and Estimation and Hypothesis Testing

When you have completed your exam and reviewed your answers, click **Submit Exam**. Answers will not be recorded until you hit **Submit Exam**. If you need to exit before completing the exam, click **Cancel Exam**.

Questions 1 to 20: Select the best answer to each question. Note that a question and its answers may be split across a page break, so be sure that you have seen the *entire* question and *all* the answers before choosing an answer.

1. If a teacher wants to test her belief that more than five students in college classes typically receive A as a grade, she'll perform _____-tail testing of a mean.
- A. two
 - B. right
 - C. one
 - D. left
2. With larger and larger numbers of categories in chi-square tests, the chi-square distribution takes on the shape of the _____ distribution.
- A. Poisson
 - B. binomial
 - C. normal
 - D. t -
3. What's the rejection region for a two-tailed test when $\alpha = 0.05$?
- A. $|z| > 1.645$
 - B. $z > 2.575$
 - C. $|z| > 2.575$
 - D. $|z| > 1.96$
4. Which of the following statements about hypothesis testing is *false*?
- A. In both the one-tailed and two-tailed tests, the rejection region is one contiguous interval on the number line.
 - B. The test will never confirm the null hypothesis, only fail to reject the null hypothesis.
 - C. The rejection region is always given in units of standard deviations from the mean.
 - D. A Type I error is the chance that the researcher rejects the null hypothesis when in fact the null hypothesis is true.
5. Determine which of the following four population size and sample size combinations would *not* require the use of the finite population correction factor in calculating the standard error.
- A. $N = 1500$; $n = 300$
 - B. $N = 15,000$; $n = 1,000$
 - C. $N = 2500$; $n = 75$
 - D. $N = 150$; $n = 25$

6. The average length of stay at a popular hotel chain is 4.5 days. A random sample of 20 hotels in the chain had a mean length of stay of 3.8 days and a standard deviation of 1.2 days. Estimate μ , the mean length of stay at all hotels in the chain, with 90% confidence.

- A. $3.9 \pm .645$
- B. $2.8 \pm .664$
- C. $3.2 \pm .464$
- D. $3.8 \pm .464$

7. Find the p -value of the test

$H_0 : \mu = 100$ when $H_a : \mu > 100$ and $z = 2.17$

- A. .0150
- B. .0193
- C. .0199
- D. .0251

8. Which element of a test of a hypothesis is used to decide whether to reject the null hypothesis in favor of the alternative hypothesis?

- A. Test statistic
- B. Level of significance
- C. Rejection region
- D. Conclusion

9. Construct a 90% confidence interval for p for a random sample of size $n = 121$ yielded $\hat{p} = .88$.

- A. $9.2 \pm .182$
- B. $8.8 \pm .698$
- C. $8.9 \pm .145$
- D. $8.8 \pm .049$

10. Assuming $N = 10,000$, $n = 4,000$, and $s = 50$, compute the standard error of \bar{x} using the finite population correction factor.

- A. .6124
- B. .5931
- C. .6024
- D. .6358

11. In a random sample of 1,971 homeowners, 414 had purchased their home within the past year. Five years ago, 10% of homeowners had purchased their home within the past year. Using $\alpha = .01$, find the population mean of homeowners who had purchased their home within the past year.

- A. 16.27
- B. 15.96
- C. 16.96
- D. 16.48

12. A researcher wants to carry out a hypothesis test involving the mean for a sample of $n = 20$. While the true value of the population standard deviation is unknown, the researcher is reasonably sure that the population is normally distributed. Given this information, which of the following statements would be *correct*?

- A.** The t -test should be used because α and μ are unknown.
- B.** The researcher should use the z -test because the population is assumed to be normally distributed.
- C.** The t -test should be used because the sample size is small.
- D.** The researcher should use the z -test because the sample size is less than 30.

13. In a study on college dropout rates, researchers found one factor that influenced the decision to drop out was expected GPA for a student who studied 2 hours per day. In a sample of 307 college students who studied 2 hours per day, the mean GPA was 3.11 and the standard deviation was .66. Provide an interval estimate for the true population mean GPA, μ using a confidence coefficient of 0.98.

- A.** 3.02; 3.20
- B.** 2.99; 3.02
- C.** 3.64; 3.94
- D.** 3.06; 3.26

14. A random sample of 10 employees is selected from a large firm. For the 10 employees, the number of days each was absent during the past month was found to be 0, 2, 4, 2, 5, 1, 7, 3, 2, and 4. Of the following values, which would you use as the point estimate for the average number of days absent for all the firm's employees?

- A.** 3
- B.** 4
- C.** 30
- D.** 2.5

15. What sample size is required from a very large population to estimate a population proportion within 0.05 with 95% confidence? Don't assume any particular value for p .

- A.** 38
- B.** 385
- C.** 271
- D.** 757

16. Find the p -value of the test

$H_0 : \mu = 7$ when $H_a : \mu \neq 7$ and $z = 120$

- A.** .1151
- B.** .1620
- C.** .1365
- D.** .2302

17. Find $z_{\alpha/2}$ when $\alpha = .01$

- A. 2.576
- B. 1.282
- C. 1.96
- D. 1.645

18. Determine the power for the following test of hypothesis.

$H_0 : \mu = 950$ vs. $H_1 : \mu \neq 950$, given that $\mu = 1,000$, $\alpha = 0.10$, $\sigma = 200$, and $n = 25$.

- A. 0.4938
- B. 0.5062
- C. 0.3465
- D. 0.6535

19. A company that develops artificial intelligence designed to detect false statements has developed a program that police officers can use to determine whether a criminal suspect is lying or not. According to the company, the AI can detect false statements correctly 75% of the time. What are the null and alternative hypothesis for testing the claim that the AI detects false statements as claimed by the company?

- A. $H_0 : p = .99, H_a : p \neq .99$
- B. $H_0 : p = .25, H_a : p \neq .25$
- C. $H_0 : p = .01, H_a : p \neq .01$
- D. $H_0 : p = .75, H_a : p \neq .75$

20. What type of test will be performed?

H is $p = 0.45$ and H_1 is $p \neq 0.45$

- A. Two-tail testing of a proportion
- B. Two-tail testing of a mean
- C. One-tail testing of a mean
- D. One-tail testing of a proportion

End of exam