STAT 2361\STAT 2311
Chapters 8&9 Additional Problems

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Circle the correct answer

1. For the interval estimation of μ when σ is unknown, the proper distribution to use is
   - **a.** The standard normal distribution.
   - **b.** The t distribution with n degrees of freedom.
   - **c.** The t distribution with n + 1 degrees of freedom.
   - **d.** The t distribution with n – 1 degrees of freedom.
2. An estimate of a population parameter that provides an interval of values believed to contain the value of the parameter is known as the
   - **a.** confidence level
   - **b.** interval estimate
   - **c.** parameter value
   - **d.** population estimate
3. If an interval estimate is said to be constructed at the 90% confidence level, the confidence coefficient would be
   - **a.** 0.1
   - **b.** 0.95
   - **c.** 0.9
   - **d.** 0.05
4. Which of the following p-values will lead us to reject the null hypothesis if the level of significance equals 0.05?
   - **a.** 0.065
   - **b.** 0.150
   - **c.** 0.100
   - **d.** 0.001
5. If a hypothesis test leads to the rejection of the null hypothesis
   - **a.** a Type I error may have been committed
   - **b.** a Type II error must have been committed
   - **c.** a Type II error may have been committed
   - **d.** a Type I error must have been committed
6. The level of significance in hypothesis testing is the probability of
   - **a.** accepting a true null hypothesis
   - **b.** accepting a false null hypothesis
   - **c.** rejecting a true null hypothesis
   - **d.** None of these alternatives is correct.

7. From a population with a variance of 900, a sample of 225 items is selected. At 95% confidence, the margin of error is
   a) 15
   b) 2
   c) 3.92
   d) 4

Show your work

8. It is known that the population **variance** equals 625. With a 0.99 probability, find the sample size that needs to be taken if the desired margin of error is 10 or less.
9. A random survey of 25 accountant's shows that their sample mean earnings is $60,000 with a standard deviation of $10,000.
   a. What is the point estimate of the population mean earnings of an accountant?
   b. Construct a 90% confidence interval of the population mean earnings?
   Of the 25 accountants surveyed, 10 were auditors.
   c. What is the point estimate of the population proportion of auditors?
   d. Construct a 90% confidence interval of the population proportion?

10. The manager of the dairy section of a large supermarket selected a random sample of 250 eggs cartons and found that 30 cartons had at least one broken egg. Let p denote the proportion of all cartons which have at least one broken egg.
    a. Find a point estimate for p and also construct a 90% confidence interval for p.
    b. Based on the preliminary estimate for p from the above sample, find the minimum sample size needed to estimate the population proportion p with 98% confidence. The estimate must be accurate to within .02 of p.

11. Suppose that a random survey of 36 BZU students found that the sample average amount of time they spend on the Facebook each day is 5.2 hours with a sample standard deviation of 1.8 hours.
    a. What is the point estimate for the population average amount of time teenagers spend on the Facebook each day?
    b. Find and interpret the 99% confidence interval for the average amount of time a BZU student spends on the Facebook each day.

12. A company has just installed a new machine. The company wants to estimate the number defective items produced by this machine. A preliminary sample of 200 parts produced by this machine showed that 14 are defective. How large a sample should the company select

so that the 99% confidence interval for p is within 0.02 of the population proportion?

13. A local health center noted that in a sample of 400 patients 80 were referred to them by the local hospital.

a. Provide a 95% confidence interval for all the patients who are referred to the health center by the hospital.

b. What size sample would be required to estimate the proportion of hospital referrals with a margin of error of 0.04 or less at 95% confidence?

14. You are given the following information obtained from a random sample of 4 observations.

36 50 36 55 55 45 38

You want to determine whether or not the mean of the population from which this sample was taken is significantly greater than 40.

a. Find the point estimate for the population mean.

b. Find the point estimate for the population standard deviation.

c. State the null and the alternative hypotheses.

d. Determine the test statistic.

e. Use 10% significance level to determine whether or not the mean of the population is significantly greater than 40.

15. Your statistics instructor believes that the average grade on the statistics final examination (Summer 2020) was at least 74. To test the instructor's claim, you as a student select sample of 25 final examinations. The average grade in the sample was 70 with a standard deviation of 10.

a. State the null and alternative hypotheses.

b. Using the critical value approach, test the hypotheses at the 1% level of significance.

c. Using the *p*-value approach, test the hypotheses at the 5% level of significance.

16. A student believes that no more than 15% of the students who finish a statistics course get a grade of 90 or above (an A grade). A random sample of 75 students was taken. Fifteen students in the sample received A's.

a. State the null and alternative hypotheses.

b. Using the critical value approach, test the hypotheses at the 1% level of significance.

c. Using the *p*-value approach, test the hypotheses at the 1% level of significance