DISCUSSION SECTION NUMBER_____

STATISTICS 2023 NAME IN PRINT _____

EXAM THREE SIGNATURE_____

SPRING 1997 SS OR OSU ID_____

Retain this exam for grade verification after it is graded and returned to you.

TRUE OR FALSE. Answer with a capital T or F. (3 points each)

_____ 1. The center value in a confidence interval is called the standard error of the point estimator.

_____ 2. In a hypothesis test the set of values which are possible for the test statistic is known if the null hypothesis is a true statement.

_____ 3. The null hypothesis would be rejected with a reasonable error rate if the z test statistic value was equal to six and the alternative hypothesis indicated a two-tail test.

_____ 4. In a left-tail hypothesis test based on a large sample the rejection rule associated with an error rate of 5% would be, "Reject the null hypothesis if the test statistic is greater than 1.645.

_____ 5. A 90% confidence interval to estimate a population parameter would be wider than a 99% interval to estimate the same population parameter if both the intervals were constructed from the same sample.

_____ 6. If the p-value of a hypothesis test is larger than the stated significance level of the hypothesis test then the null hypothesis should be rejected at the stated significance level.

_____ 7. The decision in a hypothesis test is whether to reject the null hypothesis or reject the alternative hypothesis.

_____ 8. If the null hypothesis in a hypothesis test is rejected then the conclusion is that the sample data supports the parameter values stated in the alternative hypothesis.

_____ 9. In a hypothesis test the standard error for the point estimate for the population proportion can be based on the hypothesized value of the parameter or the standard error can be based on the observed proportion in the sample data.

FILL IN THE BLANK. State the answer on the line. (3 points each)

_____ 10. If an interval estimator associated with 90% confidence to estimate the population mean is (4.3, 14.8) what is the numerical value of the point estimate for the population mean?

_____ 11. If an interval estimator associated with 95% confidence to estimate the population mean from a large sample is (176.48, 223.52) what is the numerical value of the standard error of the point estimate for the population mean?

_____ 12. If a researcher is constructing a 99% confidence interval from a sample of fifteen observations what is the numerical value of the t-multiplier that would be in the bound of error for this confidence interval?

_____ 13. If a political pollster estimates the proportion of support for a political candidate with a 98% confidence interval from a sample of 100 observations and the observed proportion of support in the sample was 0.38 how wide is the resulting interval estimate? Round to four digits past the decimal.

_____ 14. An engineer needs to estimate the average cost of building a certain type of bridge. If the engineer wants to estimate the average bridge cost to within $1000 with 95% confidence and the range of costs for that type of bridge is $12,000 how many bridges should be included in the sample?

_____ 15. If from a sample of 100 observations the sample mean is 53 and the sample standard deviation is 18 what is the 95% confidence interval based on this sample to estimate the population mean from which the sample was drawn? State the numbers in your answer to three digits past the decimal.

_____ 16. If you constructed two different confidence intervals from the same sample of data to estimate a population parameter, one associated with 90% confidence and the other with 98% confidence, which interval would be wider? Answer 90 or 98.

_____ 17. If you have a sample of 10 observations, 5 of which are equal to 20 and 5 of which are equal to 40, what is the numerical value of the point estimate for the population mean based on this sample?

_____ 18. If the sample standard deviation is 968 from a sample of 1600 observations, what is the estimated standard error for the point estimator for the population mean based on this sample?

FILL IN THE BLANK. State the answer on the line. (3 points each)

_____ 19. In a two-tail hypothesis test based on a large sample, if the numerical value of the test statistic is equal to 2.74 what is the p-value for this hypothesis test?

_____ 20. In a left-tail hypothesis test based on 12 observations the test statistic must be less than what value for the null hypothesis to be rejected at the 1% significance level?

_____ 21. In a right-tail hypothesis test based on a large sample if the p-value is 0.0594 what is the numerical value of the test statistic?

_____ 22. Suppose you have a one-tail hypothesis test with a p-value equal to 0.0228, what would the p-value be for a two-tail hypothesis test based on the same sample?

_____ 23. What error rate is the researcher willing to tolerate when rejecting the null hypothesis if for a two-tail test based on twenty observations the rejection rule is to reject the null hypothesis when the test statistic is less than –2.093 or more than 2.093?

_____ 24. What is the numerical value of the estimate for the population variance if a data set with fifty observations yields a sum of squares of 3,432 and a sum of 137? State your answer with two digits past the decimal.

_____ 25. What two values is the p-value between for a two-tail hypothesis test based on twenty-four observations if the calculated test statistic value is 2.6?

_____ 26. In a two-tail hypothesis test based on 28 degrees of freedom the magnitude of the test statistic must exceed what value for the null hypothesis to be rejected at the 10% significance level?

HYPOTHESIS TEST QUESTIONS. State the answer on the line. (3 points each)

A manufacturer of rose bush fertilizer claims that the fertilizer promotes bush growth of at least 4 inches per month during the growing season. A horticulture research group has tested this claim with regular applications of fertilizer on 64 rose bushes. The average growth observed for the rose bushes in the study was 3.7 inches on average per month for the growing season. The standard deviation of the growth rates for the rose bushes in the study was 1.2 inches. Use this information to answer the questions on this page.

_____ 27. State the appropriate alternative hypothesis that the horticulture research group should use if they are interested in disproving the claim of the fertilizer manufacturer.

_____ 28. What is the value of the test statistic to test the fertilizer manufacturer's claim?

_____ 29. What is the name of the distribution of the test statistic that indicates the set of values possible for the test statistic if in fact the fertilizer manufacturer's claim is true?

_____ 30. If you assume this is a left-tail hypothesis test with a test statistic value of -2.6 what is the error rate the horticulture research group must tolerate if in fact they claim that the fertilizer manufacturer's claim is false?

_____ 31. If the horticulture research group thinks that their error rate in this left-tail test must not exceed 5% then the test statistic must be less than what numerical value for them to conclude that the fertilizer manufacturer's claim is false?

_____ 32. If the p-value in this hypothesis test is 9% and the significance level identified by the horticulture research group is 5% then what is the decision for the hypothesis test? Answer YES is the null hypothesis would be rejected; answer NO if the null hypothesis would not be rejected.

_____ 33. If the p-value in this hypothesis test is 9% and the significance level identified by the horticulture research group is 5% then what conclusion does the horticulture research group draw? Answer YES is the data disproves the fertilizer manufacturer's claim; answer NO if the data does not disprove the fertilizer manufacturer's claim.