

STATISTICS 2023

NAME IN INK _____

FINAL EXAM

SIGNATURE IN INK _____

SPRING 1998

SS NUMBER IN INK _____

TRUE OR FALSE. Answer with a capital T or F.

(3 points each)

_____ 1. Point estimates for parameters are always wrong and statistical procedures can be used to estimate their typical mistakes.

_____ 2. A confidence interval provides a reasonable or plausible set of values for the parameter being estimated.

_____ 3. A null hypothesis is probably false if the observed value of the test statistic is an unlikely value in the set of possible values which occur when the null hypothesis is true.

_____ 4. If a 95% confidence interval procedure is used to estimate a parameter there is a 5% chance that an interval will be generated that does not contain the true value of the parameter being estimated.

_____ 5. A point estimate for the parameter being estimated is used as the center of an interval estimate.

_____ 6. If a Z hypothesis test generates a test statistic value which is more than 5 in magnitude the null hypothesis would be not be rejected with any reasonable error rate.

_____ 7. If a small sample is used to test hypotheses about the population mean then the sample data must be assumed to be normally distributed.

_____ 8. Statistical procedures can not be used to analyze qualitative variables which have words as the values of the variable.

_____ 9. If the p-value of a hypothesis test is almost one then the null hypothesis should definitely be rejected.

_____ 10. Point estimators are always wrong but interval estimators provide a span of values that always contains the true value of the parameter being estimated.

_____ 11. If in a two-tail hypothesis test on the population mean the observed Z test statistic value is 1.27 what is the p -value of the test?

_____ 12. If a sample with one-hundred observations gives a sum equal to 1260 and a sum of squares equal to 32,607 what is the value of the point estimate for the population mean?

_____ 13. If a sample with one-hundred observations gives a sum equal to 1260 and a sum of squares equal to 32,607 what is the value of the point estimate for the population standard deviation?

_____ 14. If the p -value in a two-tail hypothesis test based on a large sample is 0.0292 what is the magnitude of the test statistic?

_____ 15. If a sample has 5 values, (12, 31, 16, 27, 24) then what is the value of the sample variance?

_____ 16. If the rejection rule for a 5% significance level in a hypothesis test on a small sample is, "Reject H_0 if the test statistic is less than -1.714 " how many observations are in the sample on which the hypothesis test is based?

_____ 17. If the rejection region for a two-tailed hypothesis test based on eleven observations is below -3.169 and above 3.169 what is the significance level of the hypothesis test?

_____ 18. If a confidence interval to estimate the difference between two populations means is $(-12.4, 35.4)$ then what is the numerical value of the point estimate for the difference between the population means?

_____ 19. If two samples with one-hundred observations each resulted in sample variances equal to 89 and 162 what is the numerical value of the standard error of the point estimate for the difference between the means of the populations from which these samples were drawn? Round your answer to two digits past the decimal.

A tax reform group wants to compare the average annual property tax on houses in an urban setting with equally valued houses in a rural setting. Fifteen houses were randomly sampled from the urban tax role and fifteen houses were randomly sampled from the rural tax role. The average annual tax observed for urban and rural settings are given below along with the variances of each of the samples. Use this information to answer the questions on this page.

URBAN (sample ONE)

RURAL (sample TWO)

$$\bar{x}_1 = \$235.00$$

$$\bar{x}_2 = \$242.50$$

$$s_1^2 = \$50.00$$

$$s_2^2 = \$85.00$$

_____ 20. What is the appropriate alternative hypothesis if the research question is, "Do the data indicate that the average annual property tax for houses in an urban setting is less than the average annual property tax for houses in a rural setting?"

_____ 21. What is the numerical value of the test statistic that would be used to attempt to support the alternative hypothesis described in the above question?

_____ 22. If the average annual property tax for houses in an urban setting is equal to the average annual property tax for houses in a rural setting what is the name of the distribution of the test statistic?

_____ 23. In this situation the null hypothesis would be rejected at the 1% significance level if the observed test statistic value is less than what value? The answer is a negative number.

_____ 24. If the p-value of this hypothesis test is 0.08 would one conclude that the average annual property tax for houses in an urban setting is less than the average annual property tax for houses in a rural setting at a 5% significance level? Answer with YES or NO.

