STATISTICS 2023 **NAME, IN INK (print)**_____

EXAM THREE **SIGNATURE, IN INK**_____

FALL 2009 **CWID NUMBER, IN INK**_____

Once this exam is graded and returned to you retain it for grade verification.

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

_____ 1. The general form of confidence intervals that estimate the population mean is the point estimate for the mean plus and minus a z-value that is associated with a right tail area that is half of the alpha value for the interval.

_____ 2. The standard errors for point estimates indicate the mistake made by the point estimates when they are used to estimate parameters and increase in magnitude as the sample size increases.

_____ 3. One percent of all the confidence intervals generated from the 99% confidence interval equation do not contain the value of the parameter that is estimated by the interval.

_____ 4. Population parameters are estimated from sample statistics, also called point estimates, that are calculated from observed data.

_____ 5. The decision in an hypothesis test is whether to reject or not reject the alternative hypothesis and the conclusion in the hypothesis test is whether or not the data supports the null hypothesis.

_____ 6. In an hypothesis test if the value of the Z test statistic is equal to 8.2 then the null hypothesis could not be rejected for any reasonable error rate.

_____ 7. The p-value of a hypothesis test is the probability that the null hypothesis is false and that the alternative hypothesis is true.

Questions on the t-table. **State the answer on the line. (3 points each)**

_____ 8. What is the P($t > 3.355$) if df=8?

_____ 9. State the value of t_o, if the P($-t_o < t < t_o$)=.90 and the df=14.

_____ 10. P($t < -1.812$)=?, if the df=10

STATE THE ANSWER. State the answer on the line given. (3 points each)

_____ 11. What is the p-value of a right-tail hypothesis test based on a Z test value of 1.56?

_____ 12. If a 99% confidence interval to estimate a population mean is (5.6, 8.4) what is the value of the point estimate for the population mean?

_____ 13. If the Z test statistic in a two tail hypothesis test is the value -1.4 what is the p-value of the test?

_____ 14. What is the value of the Z test statistic if the p-value in a left-tail hypothesis test based on a large sample is equal to 0.0322?

_____ 15. If a 95% confidence interval based on a large sample to estimate a population mean is (657.94, 899.02) then what is the value of the standard error of the point estimate for the population mean?

_____ 16. If a random sample of 8 observations of interest rates on bank loans is comprised of the following data, 7%, 5%, 9%, 3%, 2%, 11%, 9%, and 4% what is the value of the sample standard deviation? Round your answer to two digits past the decimal.

_____ 17. If a random sample of 80 observations produces a sum of squares equal to 35,298.2 and a sum equal to 1,184 what is the numerical value of the point estimate for the population variance?

_____ 18. How many adult female coyotes would have to be sampled in order to estimate their average weight with a 95% confidence interval that is 3 pounds wide? Assume that a preliminary sample of 8 observations provided a standard deviation of the weights for adult female coyotes is 2.6 pounds.

_____ 19. If the rejection region in a two-tail hypothesis test based on a sample with 19 observations drawn from a population whose variance is unknown is below –2.552 and above 2.552 what is the maximum error rate of rejecting a true null hypothesis which this researcher will tolerate?

STATE THE ANSWER. State the answer on the line given. (3 points each)

An advertiser on the web is interested in estimating the mean number of links that a visitor would use from a certain website. Assume that a random sample of 12 visits to a certain web site was examined. The number of links used from the website for these 12 visits are: 6, 9, 2, 4, 6, 8, 9, 1, 10, 4, 5, and 8. Use this information to answer the next five questions.

_____ 20. What is the numerical value of the point estimate for the mean number of links used from the website?

_____ 21. What is the numerical value of the point estimate for the standard deviation of the number of links used from the website? Round your answer to two digits past the decimal.

_____ 22. What is the numerical value of the estimated standard error for the point estimate for the mean number of links used from the website? Round your answer to two digits past the decimal.

_____23. Assume that the estimated standard error of the point estimate for the mean number of links used from the website is 0.9. What is the numerical value of the bound of error for a 95% confidence interval to estimate the mean number of links used from the web site? State four digits past the decimal. State your answer with four digits past the decimal.

_____24. If the estimated standard error for the point estimate for the mean number of links used from the web site is 0.9, what is the numerical value of the test statistic to test whether the mean number of links used from the website is 5.1 links?

Confusion currently exists with the count of the votes cast in the 2009 election in Afghanistan. There were a large number of votes not counted due to improperly marked ballots. The election officials sampled 4,500 ballots to estimate the proportion of ballots improperly marked in a specific section of the country. Out of the 4,500 ballots sampled there were 1,305 identified as improperly marked. Use this information to answer the remaining questions on this page.

_____ 25. Based on this sample what is the numerical value of the point estimate for the proportion of improperly marked ballots in that specific section of the country?

_____ 26. What is the numerical value of the estimated standard error for the point estimate for the proportion of improperly marked ballots in that specific section of the country? Round your answer to five digits past the decimal.

_____ 27. If the estimated standard error of the point estimate for the proportion of improperly marked ballots in that section of the country is 0.007, what is the numerical value of the bound of error for a 95% confidence interval to estimate the proportion of improperly marked ballots in that specific area of the country? State your answer with five digits past the decimal.

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

Researchers at Yellowstone, a national park in the United States, are studying the changes in mean weight of gray foxes in the park. In one year of research, they sampled 256 gray foxes. The average weight of the observed gray foxes is 21.25 lbs with a standard deviation of 1.6 lbs. Use this information to answer the questions on this page.

_____ 28. State the alternative hypothesis if the research question is, "Do the data support the idea that the mean weight of gray fox in Yellowstone exceeds 21 lbs?"

_____ 29. State the numerical value of the test statistic that would result from this situation.

_____ 30. What is the name of the distribution that represents the set of possible test statistic values if in fact the mean weight of gray fox in Yellowstone does equal 21 lbs?

_____ 31. The null hypothesis in this situation would be rejected at the 5% level of significance if the test statistic is more than what value?

_____ 32. Assume that the value of the test statistic in this situation was 2.8. Describe the p-value of the hypothesis test in a probability statement. Such as, P( ).

_____ 33. Assume that the value of the test statistic in this situation was 2.8. What is the p-value associated with the test statistic value of 2.8 in this situation?