ECON 1008 - Practice Final Exam

TIME ALLOWED : 2 HOURS

True and False

1. The sum of squared deviations of each data value from the mean will always be zero.

   A) True B) False

2. The standard deviation is not affected by extremely small or extremely large values.

   A) True B) False

3. The 25th percentile of a distribution gives the value of our random variable below which lie 25% of the data points.

   A) True B) False

4. When we have a level of significance of 10% then 90% of the sample means of a specified sample size selected from a population will lie within plus and minus 1.96 standard deviations of the hypothesized population mean.

   A) True B) False

5. The best estimate of the population parameter, μ, is the calculated sample average.

   A) True B) False

6. The correlation coefficient is restricted between 0 and 1.

   A) True B) False

7. If we observe two populations and exactly know what their variances are then we should use the t-test.

   A) True B) False

8. If we are testing for the difference between two population means and assume that the two populations have equal but unknown standard deviations, the variances are pooled to compute the best estimated variance.

   A) True B) False

9. The z-distribution is the same as the standard normal distribution and is distributed as $N(0, 1)$.

   A) True B) False

10. Consider two normally distributed random variables, X and Y, with the same mean. Since they have the same mean then their medians must also be the same.

    A) True B) False

Multiple Choice Questions

11. The sampling distribution of the sample mean is,

    A. is unconditionally normally distributed.

    B. normally distributed if and only if the population distribution is normal.

    C. required so that we can get a point estimate for our population parameter of interest.

    D. is only normally distributed if sample size is sufficiently large.

12. The numbers of hours worked (per week) by a group of statistics students are shown below.

Number of Hours	Frequency
0-9	100
10-19	50
20-29	70
30-39	30

    The percentage of students working twenty to twenty-nine hours is

    A. 95

    B. 380

    C. 28

    D. 100

13. Renee surveyed a sample of students. For each student she asked "How many times did you send a text message between the time you awakened today and 6 pm.?" Renee then organized the responses into a grouped frequency distribution as is shown below.

Class	Frequency
0 to less than 4	1
4 to less than 8	3
8 to less than 12	1
12 to less than 16	5

    The number of students who sent fewer than eight text messages between the time they awakened and 6 PM is

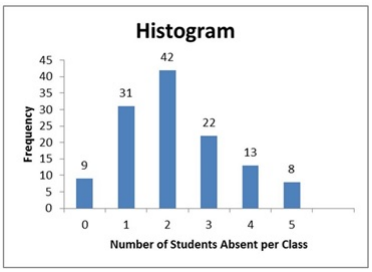
    A. 7

    B. 3

    C. 0.30

    D. 4

14. A statistics professor kept attendance records for his 125 days of class, recording the number of absent students for each of the 125 class days. These data are displayed in the following chart, where frequency represents the number of class days.



For how many statistics classes was atleast one person absent?

A. 116

B. 15

C. 5

D. 225

15. A researcher has collected the following sample data: 3 6 12 2 2

The means of these five values is

A. 2

B. 5

C. 3

D. 12

16. For the data in question 15, the median is

A. 2

B. 3

C. 5

D. 12

17. A sample of the monthly amounts spent for food by a family of four receiving food stamps approximates a Normal distribution. The sample mean is \$150 and the standard deviation is \$20. Using the Empirical Rule, about 99.7 percent of the monthly food expenditures are between what two amounts?

A. \$130 and \$170

B. \$110 and \$190

C. \$90 and \$210

D. $100 and $200

18. Which of the following three statements about probability is true?

    A. Probabilities may be anywhere in the range between –1.0 and +1.0.

    B. A probability = 0 means that the event cannot possibly occur.

    C. A probability = -0.90 indicates a high probability of a negative outcome.

    D. None of the above statements are true.

19. The sampling error in estimating the population mean is calculated as follows,

    A. μ

    B. $\bar{X} - \mu$

    C. $\sum X_i - \mu$

    D. Both B and C

20. The mean annual incomes of certified welders are normally distributed with the mean of $50,000 and a standard deviation of $2,000. The ship building association wishes to find out whether their welders earn more than $50,000 annually. Which of the following is the alternate hypothesis?

    A. $H_1 : \mu = \$50,000$

    B. $H_1 : \mu > \$50,000$

    C. $H_1 : \mu < \$50,000$

    D. $H_1 : \mu \neq \$50,000$

21. How is the t distribution similar to the standard z distribution?

    A. Both are discrete distributions.

    B. Both are skewed distributions.

    C. Both are families of distributions.

    D. Both are continuous distributions.

22. Based on the Nielsen ratings, the local CBS affiliate claims its 11 p.m. newscast reaches 41% of the viewing audience in the area. In a survey of 100 viewers, 36% indicated that they watch the late evening news on this local CBS station. What is the test statistic?

    A. 1.02

    B. 2.01

    C. -1.02

D. Cannot be calculated

23. Based on your answer in question 22, what is your conclusion about CBS's claim? Use a 0.05 level of significance

    A. Reject the null hypothesis and conclude true proportion is 36%.

    B. Fail to reject the null hypothesis and conclude that CBS claim is correct

    C. Fail to reject the null hypothesis and conclude the true proportion is 36%

    D. We don't have enough information to answer this question.

24. A hypothesis regarding the weight of newborn infants at a community hospital is that the mean is 6.6 pounds. A sample of seven infants is randomly selected and their weights at birth are recorded as 9.0, 7.3, 6.0, 8.8, 6.8, 8.4, and 6.6 pounds. The null hypothesis is _____.

    A. $H_0 : \mu = 6.6$

    B. $H_0 : \mu \geq 6.6$

    C. $H_0 : \mu \leq 6.6$

    D. $H_0 : \mu \neq 6.6$

25. Based on the information given in question 24, under a level of significance of 5% what is the critical t-value?

    A. -2.365

    B. ± 1.96

    C. ± 2.447

    D. ± 2.365

26. Based on the information in question 24 and 25 calculate the test statistic. (Sample Variance = 1.385)

    A. 2.160

    B. - 2.081

    C. 0.3774

    D. 6

27. Consider the following simple linear regression model: $\hat{Y} = b_0 + b_1 X$. In this model, b_1 represents

    A. the predicted value of Y.

    B. variation around the line of regression.

    C. the change in Y per unit change in X.

    D. the proportion of the variation in Y explained by variations in X.

28. Consider the following estimated regression equation: $\hat{Y} = 16 - 0.5X$. What is the predicted value of Y when $X = 16$?

    A. 8

    B. -3.5

    C. -0.5

    D. 248

29. If the correlation coefficient between two variables, X and Y, equals 1, what can be said of the variables X and Y?

    A. The variables are not related.

    B. The variables are perfectly positively correlated.

    C. A 1 unit change in X will cause a 1 unit change in Y.

    D. The variables are perfectly related but in the opposite direction.

30. A researcher wants to investigate the impact of smoking during pregnancy on birth weight of babies born to mother who smoke. What is the key independent variable of interest?

    A. Birth Weight

    B. Number of cigarettes smoked during pregnancy

    C. Race of the mother

    D. Education of the mother

31. The mean, as a measure of central location, would be inappropriate for which one of the following?

    A. Height of students in out statistics class.

    B. Incomes of professors in the business school.

    C. Race of mothers of babies born last year in the US

    D. None of the above.

32. Which of the following measures have to be unique?

    A. Mode

    B. Median and Mode

    C. Mean and Median

    D. All of the above

33. The mean weight of trucks traveling on a particular section of highway I-475 is not known. A state highway inspector needs an estimate of the population mean. He selects and weighs a random sample of 49 trucks and finds the mean weight is 15.8 tons. The population standard deviation is 3.8 tons. What is the 95% confidence interval for the population mean?

    A. 14.7 and 16.9

    B. 13.2 and 17.6

    C. 10.0 and 20.0

    D. 16.1 and 18.1

34. A bank wishes to estimate the mean credit card balance owed by its customers. The population standard deviation is estimated to be $300. If a 98% confidence interval is used and an interval of $75 is desired, how many customers should be sampled?

    A. 87

    B. 212

    C. 629

    D. 44

35. A university surveyed recent graduates of the English Department for their starting salaries. Four hundred graduates returned the survey. The average salary was $25,000, with a standard deviation of $2,500. What is the best point estimate of the population mean?

    A. $2,500

    B. $25,000

    C. $400

    D. Cannot be determined.

Short Questions

1. The admissions officer for the graduate programs at the University of Adelaide believes that the average score on an exam at his university is significantly higher than the national average of 1300. Assume that the population standard deviation is 125 and that a random sample of 25 scores had an average of 1375.

    (a) State the appropriate null and alternative hypotheses.

    (b) Calculate the value of the test statistic and set up the rejection region. What is your conclusion?

    (c) Calculate the p-value.