|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1) The statement that determines if the null hypothesis is rejected or not is called the**

|  | A.  critical value |
| --- | --- |
|  | B.  alternate hypothesis  |
|  | C.  test statistic  |
|  | D.  decision rule |
|  |  |

 |
| **2) What are the critical z-values for a two-tailed hypothesis test if the significant level = 0.01?**

|  | A.  ± 1.65 |
| --- | --- |
|  | B.  ± 2.58 |
|  | C.  ± 2.33  |
|  | D.  ± 1.96  |
|  |  |

 |
| **3) If the decision is to reject the null hypothesis of no difference between two population parameters, z distribution at the .01 significant level, what is the correct statement of the alternate hypothesis and rejection region?**

|  | A.  µ1 > µ2; z > 2.33  |
| --- | --- |
|  | B.  µ1 > µ2; z < negative 2.33  |
|  | C.  µ1 ≠ µ2 ; z > 1.96 and z < negative 1.96  |
|  | D.  µ1 ≠ µ2 ; z > 2.58 and z < negative 2.58 |
|  |  |

 |
| **4) The Roman Senate has become concerned about the loyalty of the army in Gaul commanded by Julius Caesar. They claim that, of the 80,000 men in the army, at least 28,000 are foreign barbarians. Caesar believes there are fewer barbarians, so the Senate should not worry. He polls one legion of 1,000 men and finds that 340 of them are barbarians. What is the test statistic for this hypothesis test?**

|  | A.  (0.34-0.35)/0.063 |
| --- | --- |
|  | B.  (0.35-0.34)/0.2275 |
|  | C.  (0.34-0.35)/0.015 |
|  | D.  (0.35-0.34)/100 |
|  |  |

 |
| **5) Doi Winery has two wine shops in the neighboring towns of Seamen and Batavia. The favorite wine, as advertised, is Raspberry wine. A survey of 300 customers at the Seamen store revealed that 225 individuals preferred the Raspberry wine while 290 out of 400 in Batavia preferred the same flavor. To test the hypothesis that there was no difference in preferences in the two towns, what is the alternate hypothesis?**

|  | A.  µ1 ≠ µ2 |
| --- | --- |
|  | B.  µ1 = µ2  |
|  | C.  µ1 > µ2  |
|  | D.  µ1 < µ2 |
|  |  |

 |
| **6) A statistician was setting up a hypothesis test with a level of significance dictated by upper management. However, she was concerned that the test she wished to perform might have unacceptable large possibilities of Type II error, ß. Which of the following would solve this problem?**

|  | A.  Convince upper management to reduce the level of significance of the test.  |
| --- | --- |
|  | B.  Convince upper management to use a smaller *p*-value. |
|  | C.  Convince upper management to use a larger sample. |
|  | D.  Convince upper management to use a larger *p*-value. |
|  |  |

 |
| **7) You are conducting a two-tailed test of means but your software package only calculates a one-tailed p-value equal to 0.13. The actual p-value for your test is**

|  | A.  need a table to calculate this value. |
| --- | --- |
|  | B.  0.26 |
|  | C.  0.065 |
|  | D.  0.13 |
|  |  |

 |
| **8) If the paired differences are normal in a test of mean differences, then the distribution used for testing is the**

|  | A.  F distribution |
| --- | --- |
|  | B.  Chi-Square |
|  | C.  normal distribution |
|  | D.  Student t distribution |
|  |  |

 |
| **9) Cake manufacturer Little Diva’s wants to increase the shelf life of its easy-to-fix cupcake mixes. Company’s records indicate that the average shelf life of the mix is 230 days. A new, improved cupcake mix was developed and a sample of 10 boxes of the cupcake mix had these shelf lives (in days): 231, 233, 232, 233, 228, 231, 234, 229, 235, and 232. If the standard deviation was .67 and at the 0.025 significant level, has the shelf life of the cupcake mix increased?**

|  | A.  No, because 231.8 is quite close to 230.  |
| --- | --- |
|  | B.  Yes, because computed *t* is less than the critical value.  |
|  | C.  Yes, because computed *t* is greater than the critical value. |
|  | D.  No, because computed *t* lies in the region of acceptance.  |
|  |  |

 |
| **10) Golf balls that are properly manufactured will have a rebound height of 42 inches when dropped by a testing machine from a height of 5 feet. The quality control inspector is concerned that a new manufacturing machine is not properly calibrated and that the resulting golf balls are falling short of the desired height. At random, 100 golf balls were selected for a test. The test results indicated that the rebound height was 41.6 inches with a standard deviation of 0.5. At the .05 significant level, what is the result of the test?**

|  | A.  A larger test sample is needed. |
| --- | --- |
|  | B.  There is a significant difference; the golf balls are defected. |
|  | C.  There is no significant difference. |
|  | D.  A decision regarding a significant difference cannot be made. |
|  |  |

 |
| **11) One hundred women were polled and 60 reported successfully communicating an automobile problem to an auto repairman. A sample of 150 men had 95 reporting the same success. The value of the test statistic for a test of the equality of proportions is**

|  | A.  0.2702. |
| --- | --- |
|  | B.  0.7293. |
|  | C.  -0.5319. |
|  | D.  -0.419. |
|  |  |

 |
| **12) In a test for the equality of two variances (two-tailed), when the populations are normal, a 5% level of significance was used. Sample sizes were n1 = 13 and n2 = 10. The upper critical value for the test is**

|  | A.  =FINV(1-0.025, 13, 10). |
| --- | --- |
|  | B.  =FINV(0.025, 12, 9). |
|  | C.  =FINV(0.05, 12, 9). |
|  | D.  =FINV(0.025, 13, 10). |
|  |  |

 |
| **13) The owner of a bottling company is considering buying a new bottling machine. He has been testing two different machines that are being considered. After collecting 300 samples from each machine over several weeks, he was able to conduct a two sample z test.<p>He decided to utilize a 0.05 significant level for the test. The test was to address the claim that the mean weight of the bottles filled by the Orno machine was greater than the mean weight of the bottles filled by the Edne machine. The test statistics was 2.21. What is the decision regarding the hypothesis?**

|  | A.  This is a two tail test and the critical value for the test is 1.96. |
| --- | --- |
|  | B.  Reject the null hypothesis; there is a significant difference. |
|  | C.  There is not enough data available to answer the question. |
|  | D.  Accept the null hypothesis; there is not a significant difference. |
|  |  |

 |
| **14) Accounting procedures allow a business to evaluate their inventory at LIFO (Last In First Out) or FIFO (First In First Out). A manufacturer evaluated its finished goods inventory (in $ thousands) for five products both ways. Based on the following results, is LIFO more effective in keeping the value of his inventory lower?**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |

| **Product** | **FIFO (F)** | **LIFO (L)** |
| --- | --- | --- |
| 1 | 225 | 221 |
| 2 | 119 | 100 |
| 3 | 100 | 113 |
| 4 | 212 | 200 |
| 5 | 248 | 245 |

 |  |

**The 5% level of significance was selected for the t value. This example is what type of test?**

|  | A.  Test of proportions.  |
| --- | --- |
|  | B.  Two sample test of means.  |
|  | C.  One sample test of means.  |
|  | D.  Paired *t*-test. |
|  |  |

 |
| **15) When is it appropriate to use the paired difference t-test?**

|  | A.  Two dependent samples are compared |
| --- | --- |
|  | B.  Any two samples are compared  |
|  | C.  Four samples are compared at once  |
|  | D.  Two independent samples are compared  |
|  |  |

 |
| **16) What is the critical value for a one-tailed hypothesis test in which a null hypothesis is tested at the 5% level of significance based on two samples, both sample sizes are 13?**

|  | A.  2.064  |
| --- | --- |
|  | B.  1.711 |
|  | C.  1.708  |
|  | D.  2.060  |
|  |  |

 |
| **17) A consumer researcher is testing the difference between two proportions at the 0.05 level of significance. The researcher was utilizing the z distribution for the test. If the computed test statistic z value was 1.12, what was the decision?**

|  | A.  Reserve judgment. |
| --- | --- |
|  | B.  Do not reject the null hypothesis. |
|  | C.  Reject the null hypothesis. |
|  | D.  Take a larger sample. |
|  |  |

 |
| **18) When testing for differences between two means, the Behrens-Fisher problem arises when the sample populations are**

|  | A.  are non-normal and have unequal variances. |
| --- | --- |
|  | B.  normal with equal variances. |
|  | C.  are normal with unequal variances. |
|  | D.  are non-normal and have equal variances. |
|  |  |

 |
| **19) Watson’s TV claims that their televisions have the best performance record on the market. They advertise that after 3 years only 10% of their sold televisions have had any type of repairs. The president of the company wanted to confirm that this statement was correct. To do this, a sample of 60 sets was taken of sets that had been sold and were at least 3 years old. Twelve percent of these television sets had been in for repair. The null hypothesis is that there is no difference between the stated percent and the sample data. At the .05 significant level, what can we conclude about the null hypothesis?**

|  | A.  The difference is too close to be able to decide. |
| --- | --- |
|  | B.  The null hypothesis is rejected and the difference is significant. |
|  | C.  The data fails to reject the null hypothesis. |
|  | D.  The sample is too small to be able to decide. |
|  |  |

 |
| **20) New college business graduates are finding it difficult to get a job. A business journal has reported that only one in five graduates is able to find a job within 6 months of their graduation. A report by the University of Phoenix indicated that out of a survey of 300 recent business graduates, 75 had jobs. You are a business major at the University of Phoenix and have a concern about getting a job. Based on this data, will a graduate of the University of Phoenix have a better chance of getting a job in the first 6 months after graduation? Use the .05 significant level for the test.**

|  | A.  The business journal information is incorrect. |
| --- | --- |
|  | B.  No, there is not a significant difference. |
|  | C.  Cannot be predicted based on this data. |
|  | D.  Yes, there is a significant difference.  |
|  |  |

 |
| **21) The accountant for Thomas’s Furniture Store is concerned regarding the outstanding receivable owed the company. There has been a cash flow problem and it is believed that the slow collection of accounts receivable is partially the blame. The accountant believes that 40% of the present accounts are more than 4 months behind in making payments. To be able to make a decision regarding this belief, a random sample of 100 accounts was taken. It was found that 37 accounts were more than 4 months late. Did the sample data confirm the accountant’s belief? Use the .05 significant level for the statistical test.**

|  | A.  The accountant needed to take a larger sample. |
| --- | --- |
|  | B.  There is not enough evidence to confer or deny the belief. |
|  | C.  The accountant belief is not conferred. |
|  | D.  The accountant belief is conferred. |
|  |  |

 |
| **22) Blake’s Mortgage Company utilizes four different appraisers for the purpose of determining the value of a house. There is a concern by the company’s owner that the appraisers are not providing the same estimates. She wants to determine if there is a difference between the four appraisers. Six houses were selected and each appraiser provided an appraisal for each of the six houses. What would be the best statistical test to use for the analysis of this data?**

|  | A.  An ANOVA |
| --- | --- |
|  | B.  A paired *t*-test |
|  | C.  Kruskal-Wallis test |
|  | D.  Chi square test |
|  |  |

 |
| **23) The F distribution is utilized with the ANOVA test. There are some basic assumptions associated with the distribution. Which of these assumptions is NOT valid?**

|  | A.  Its values cannot be negative. |
| --- | --- |
|  | B.  It is negatively skewed. |
|  | C.  It is a continuous distribution. |
|  | D.  There is a family of distributions. |
|  |  |

 |
| **24) In the metro area there are four major supermarket chains. To determine if there was a difference between these stores, regarding their pricing of food, a consumer group did a test. In the Eastgate area of town, each of the supermarket chains has a store. Twenty-five common household items were selected for the test. These items were purchased at each of the four stores and the prices were compared. To analyze this data, what would be the best statistical test to use?**

|  | A.  Chi square |
| --- | --- |
|  | B.  Regression correlation |
|  | C.  Two sample test |
|  | D.  ANOVA |
|  |  |

 |
| **25) Each Christmas season there is a hot toy that everyone must have, especially if you are under the age of nine. This prized toy can be purchased at many different types of stores. A consumer group wanted to determine if there was a difference in price for the toy depending on where the toy was purchased. Is the price of this toy the same for the different stores or is there a difference? In the Cincinnati area there are three main stores of concern: Wal-Mart, Meijer, and Toys R Us. Data was collected from different stores around the city. Prices will vary depending on the location of the store. The collected data is as follows (in dollars):**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |

| **Wal-Mart** | **Meijer** | **Toys R Us** |
| --- | --- | --- |
| 15 | 18 | 20 |
| 12 | 17 | 19 |
| 12 | 14 | 16 |
| 14 | 15 | 20 |
| 13 | 17 | 19 |

 |  |

**Conduct an ANOVA analysis of the data. Is there a significant difference between the three stores?**

|  | A.  There is a significant difference between the three stores. |
| --- | --- |
|  | B.  The sample needs to be larger to be able to answer the question. |
|  | C.  There is not a significant difference between the three stores. |
|  | D.  A *t*-test would have been a better test. |
|  |  |

 |
| **26) Totto, an automobile manufacturer, has designed a radically new engine and wants to recommend the grade of gasoline that will have the best fuel economy. The four grades are: regular, below regular, premium, and super premium. The test car made three trial runs on the test track using each of the four grades and the miles per gallon were recorded. At the 0.05 level, what is the critical value of F used to test the hypothesis that the miles per gallon for each fuel are the same?**

|  | A.  12.00 |
| --- | --- |
|  | B.  1.96 |
|  | C.  4.07 |
|  | D.  2.33 |
|  |  |

 |
| **27) Robinson, a large department store, wanted to example to look at which credit cards were being utilized for purchases. A sample of 18 credit card sales was taken and recorded. The amounts charged for each of three different credit cards, MasterCard, Visa, and Discover, were: six MasterCard sales, seven Visa sales, and five Discover sales. The store used an ANOVA to test if the mean sales for each credit card were equal. What are the degrees of freedom for the F statistic?**

|  | A.  6 in the numerator, 15 in the denominator |
| --- | --- |
|  | B.  18 in the numerator, 3 in the denominator  |
|  | C.  3 in the numerator, 18 in the denominator  |
|  | D.  2 in the numerator, 15 in the denominator |

 |
| **28) The chi-square has**

|  | A.  a uniform distribution |
| --- | --- |
|  | B.  one distribution |
|  | C.  two distributions |
|  | D.  a family of distributions |
|  |  |

 |
| **29) What nonparametric test is used when the assumptions for the parametric analysis of variance (ANOVA) cannot be met? Its purpose is to test whether three or more populations are equal. The data must be at least ordinal scaled.**

|  | A.  ANOVA  |
| --- | --- |
|  | B.  Students' *t*  |
|  | C.  Kruskal-Wallis  |
|  | D.  Mann-Whitney  |
|  |  |

 |
| **30) The chi-square distribution becomes more symmetrical as**

|  | A.  degrees of freedom increase |
| --- | --- |
|  | B.  degrees of freedom decrease |
|  | C.  number of variables increase |
|  | D.  the chi-square value increases |
|  |  |

 |
| **31) Seamen’s Manufacturing has five hundred employees at its plant. These employees are divided into three main groups: administration, clerical, and labor. The company is looking at making some changes to it retirement plan that is available for employees. There are three plans beginning considered. The 500 employees were surveyed regarding their preferences for the various retirement plans. The president is concerned if there is a relationship between the person position in the company and which retirement plan was preferred. Utilize the chi square distribution at the .05 significant level, and determine if there is a relationship between position in company and the retirement plan selected.**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |

| **Position** | **Plan A** | **Plan B** | **Plan C** |
| --- | --- | --- | --- |
| Labor | 170 | 50 | 30 |
| Clerical | 30 | 110 | 30 |
| Administration | 20 | 20 | 40 |

 |  |
|  | A.  The calculated test result of 7.94 is greater than the critical value, so accept the null hypothesis. |
|  | B.  The calculated test result of 7.94 is greater than the critical value, so reject the null hypothesis. |
|  | C.  The calculated test result of 7.94 is less than the critical value, so accept the null hypothesis. |
|  | D.  The calculated test result of 7.94 is less than the critical value, so reject the null hypothesis. |
|  |  |

 |
| **32) The city of Denver has several golf courses around the city. The Recreational Park manager is trying to set the schedule for the employees at these courses. His concern is that he wants to have enough staff to handle the daily demands but to not be overstaffed. He has concerns about the next year’s budget and is trying to curb expenses where possible. To be able to make a decision regarding staffing, he collected data regarding the number of rounds of golf played during the week. The weekend was excluded because the weekends are always very busy. He wanted to see if there was a significant difference between the days of the week in terms of rounds being played. If there was a difference, then he could use this information to help make staffing decisions. The result of the data collection is as follows:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |

| **Day of Week** | **Rounds** |
| --- | --- |
| Monday | 150 |
| Tuesday | 90 |
| Wednesday | 120 |
| Thursday | 100 |
| Friday | 140 |

 |  |

**What is the result of the statistical test? Can the manager’s staff schedule vary for different days of the week? Use the chi square distribution at the .05 significant level.**

|  | A.  No, there is a significant difference between days of the week. |
| --- | --- |
|  | B.  No, there is not a significant difference between days of the week. |
|  | C.  Yes, there is a significant difference between days of the week. |
|  | D.  Yes, there is no difference between days of the week. |
|  |  |

 |
| **33) The reason the computed chi-square value is positive is because the difference between the observed and expected frequencies is**

|  | A.  always positive |
| --- | --- |
|  | B.  uniform |
|  | C.  squared |
|  | D.  linear |
|  |  |

 |
| **34) To determine whether four population means are equal, a sample from each population was selected at random and using the Kruskal-Wallis test, H was computed to be 2.11. What is your decision at the 0.05 level of risk?**

|  | A.  Reject the null hypothesis because 2.11 > critical value of 1.96 |
| --- | --- |
|  | B.  Reject the null hypothesis because 7.815 is > 2.11  |
|  | C.  Fail to reject the null hypothesis because 0.05 < 2.11  |
|  | D.  Fail to reject the null hypothesis because 2.11 < 7.815 |
|  |  |

 |
| **35) Clermont Savings and Loan has four branches located throughout the county. The activity level at these four branches appears to be different but the manger needs verification. Turnover rate, how quickly money is withdrawn from an account after being deposited, was selected as the variable to be measured. A total sample of 22 accounts was collected from the four Branches. The Kruskal-Wallis test, at the .01 significant level, was selected for the statistical analysis. The null hypothesis being tested was that the population distribution between the four branches is identical. The test statistics was H = 12.453. What is the correct interpretation of this result?**

|  | A.  More information is needed to be able to make a decision. |
| --- | --- |
|  | B.  A different test needs to be used for the analysis. |
|  | C.  The null hypothesis is accepted. |
|  | D.  The null hypothesis is rejected. |
|  |  |

 |
| **36) Corny’s Feed Company markets four different mixtures of feed for chickens. These feeds have different combinations of ingredients. One question that the manager is often asked by customers is if there is a difference between the four feeds in terms of weight gain. To be able to address this question an analysis was done of the four feeds. They contacted a local farmer to conduct a test regarding the four feeds. There were 28 chickens selected for the test. These chickens were divided into four groups, with each group receiving one of the feeds. The statistical test selected for the analysis was the Kruskal-Wallis test and the .05 significant level was used for the test. The test result was H 4.65. This indicates that**

|  | A.  the feeds are the same |
| --- | --- |
|  | B.  some of the feeds are different |
|  | C.  the feeds are different |
|  | D.  the feeds need to be tested some more before a decision can be made |

 |
| **37) Based on the regression equation, we can**

|  | A.  measure the association between two variables |
| --- | --- |
|  | B.  predict the value of the independent variable given a value of the dependent variable  |
|  | C.  predict the value slope of the line |
|  | D.  predict the value of the dependent variable given a value of the independent variable |
|  |  |

 |
| **38) What is the range of values for a coefficient of correlation?**

|  | A.  Unlimited range  |
| --- | --- |
|  | B.  –1.0 to +1.0 inclusive  |
|  | C.  0 to +1.0 |
|  | D.  –3 to +3 inclusive  |
|  |  |

 |
| **39) A simple linear regression generated a correlation coefficient of 0.01. This tells us that**

|  | A.  we shall reject the null at less than a 5% significance level.  |
| --- | --- |
|  | B.  the two variables barely relate to each other. |
|  | C.   SSR is almost zero. |
|  | D.  SSE is almost zero. |
|  |  |

 |
| **40) What randomness exists in the linear regression model?**

|  | A.  None of these |
| --- | --- |
|  | B.  The randomness of the dependent variable, the Y's |
|  | C.  The randomness from the explanatory variables, the X's |
|  | D.  The randomness from what is unexplained, the error |
|  |  |

 |
| **41) The Ohio Electric Company is investigating electric consumption by single family homes based on the number of rooms. The investigators wanted to determine the relationship between number of rooms and electric consumption in kilowatt-hours (thousands). A sample of 12 homes was selected and the data is as follows:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |

| **Number of Rooms** | **Kilowatt-Hours** |  | **Number of Rooms** | **Kilowatt-Hours** |
| --- | --- | --- | --- | --- |
| 10 | 10 |  | 8 | 9 |
| 9 | 8 |  | 10 | 11 |
| 7 | 6 |  | 10 | 9 |
| 12 | 13 |  | 8 | 9 |
| 8 | 7 |  | 6 | 7 |
| 11 | 12 |  | 5 | 6 |

 |  |

**What percent of the variation is explained by the variable, number of rooms?**

|  | A.  .901 |
| --- | --- |
|  | B.  .812 |
|  | C.  .451 |
|  | D.  .949 |
|  |  |

 |
| **42) A researcher was investigating the relationship between the variables grades in high school and grades in college. The investigator wanted to determine if a relationship existed and if so, to what extent. A regression analysis was perform on the data and the correlation value was r = .71. Based on this finding, which statement is correct?**

|  | A.  The researcher was able to explain about 80 percent of the variation in the problem by this variable. |
| --- | --- |
|  | B.  The researcher was able to explain about 50 percent of the variation in the problem by this variable. |
|  | C.  The researcher was able to explain about 71% of the variation in the problem by this variable. |
|  | D.  The researcher was able to explain about 36 percent of the variation in the problem by this variable.  |
|  |  |

 |
| **43) When an insurance company is going to write a new home owner policy, one concern is the distance between the house and the nearest fire department station. This is one factor that goes in to determining the cost of the insurance for the home owner. ETB Insurance Company wants to determine if there is a relationship between the distance to a fire station and the amount of fire damage to a house. A random sample of 50 claims was selected for analysis. The correlation coefficient was 0.78. Which is the correct interpretation and recommendation?**

|  | A.  The strong relationship indicates that distance to a fire station is a reasonable factor to be considered when determining insurance rates. |
| --- | --- |
|  | B.  The strong inverse relationship indicates that distance to a fire station is a reliable variable to consider as a factor in determining insurance rates. |
|  | C.  There is not a strong enough relationship so as to be able to use distance to a firehouse as a factor in determining insurance rates. |
|  | D.  The variable, distance to a fire station, is able to explain 78% of the variation in the problem and so it is a reasonable factor to use in determining insurance rates. |
|  |  |

 |
| **44) Thomas and Thomas, a large plumbing company in Louisville, has a huge staff of plumbers that are utilized on contractual projects. Before a plumber is hired, an aptitude test must be taken and passed. After a plumber is hired they are evaluated on their performance. Each plumber receives a job performance score based on their individual production. The production manager wants to determine if there is a relationship between the performance score and the aptitude test score. Additionally, the manager wanted to investigate the influence that being a union member has on performance (coded as 1 union member and 0 nonmembers). An analysis of 20 plumbers was conducted. The resulting equation was Performance = 28.1 + 4.85 Aptitude + 20.5 Union. What is your interpretation of this analysis?**

|  | A.  These variables are not a good predictor of performance. |
| --- | --- |
|  | B.  Being a union member increases the typical performance by 20.5. |
|  | C.  The aptitude test is not a significant variable in this equation and needs to be eliminated as a variable. |
|  | D.  The company would be wise to discourage union membership. |
|  |  |

 |
| **45) In the least squares equation, Y' = 12 + 25X the value of 25 indicates**

|  | A.  the *X* factor |
| --- | --- |
|  | B.  for each unit increase in *X*, *Y* increases by 25 |
|  | C.  the *Y* intercept |
|  | D.  for each unit increase in *Y*, *X* increases by 25 |
|  |  |

 |
| **46) Conducting a multiple regression analysis, the residual analysis is used to test the requirement that**

|  | A.  the variation in the residuals is the same for all fitted values of *Y*` |
| --- | --- |
|  | B.  the number of independent variables included in the analysis is correct  |
|  | C.  the independent variables are the direct cause of the dependent variable  |
|  | D.  prediction error is minimized |
|  |  |

 |
| **47) If the net regression coefficients in the population are significantly different from zero, what can be included?**

|  | A.  Good predictions are not possible. |
| --- | --- |
|  | B.  No relationship exists between the dependent variable and any of the independent variables. |
|  | C.  Very strong correlations exist among the variables. |
|  | D.  At least one of the net regression coefficients is not equal to zero. |
|  |  |

 |
| **48) Which of the following statements about multiple regression is TRUE?**

|  | A.   The coefficient of multiple determination is calculated by taking the ratio of the regression sum of squares over the total sum of squares and subtracting that value from 1. |
| --- | --- |
|  | B.   The total sum of squares in a regression model will never exceed the regression sum of squares. |
|  | C.   A multiple regression is called multiple because it has several data points. |
|  | D.   If we have taken into account all relevant explanatory factors, the residuals from a multiple regression should be random.  |

 |
| **49) Given the trend equation Y' = 24 + 0.6t (base year = 2006), what would be the forecast value for 2010?**

|  | A.  32 |
| --- | --- |
|  | B.  27 |
|  | C.  25 |
|  | D.  31 |
|  |  |

 |
| **50) The following linear trend equation was developed for the annual sales of the Tractor Manufacturing Company. Y' = 355 + 50t (in $ thousands). How much are sales increasing by?**

|  | A.  $6,000 per year  |
| --- | --- |
|  | B.  $5,000 per month  |
|  | C.  $50,000 per year |
|  | D.  $500,000 per year  |
|  |  |

 |
| **51) If a quarterly seasonal index is 0.66, it implies that**

|  | A.  the quarter's sales are 66% of the yearly average |
| --- | --- |
|  | B.  the quarter's sales are 66% of the year total sales |
|  | C.  the quarter's sales are 6% above the yearly average |
|  | D.  the other three quarter percentages will total 34% |
|  |  |

 |
| **52) An analysis of graduates from a local business college was performed to determine if there was a relationship between GPA and starting salary of recent graduates. It was believed that a higher GPA would result in a higher starting salary. The analysis of data collected from recent graduates produced the following correlation matrix.**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |

|  | **Salary** | **GPA** |
| --- | --- | --- |
|  | 0.902 |  |
| Business | 0.911 | 0.851 |

 |  |

**Which statement is correct regarding the interpretation of the analysis?**

|  | A.  GPA is explaining about 50% of the variation. |
| --- | --- |
|  | B.  The belief that there is a relationship between GPA and starting salary is incorrect. |
|  | C.  The belief that there is a relationship between GPA and starting salary is correct. |
|  | D.  Nothing can be stated based on this data analysis. |
|  |  |

 |
| **53) The owner of a local construction company that specializes in outdoor structures desires to make a prediction regarding the next business year sales. Expansion of the business is one possible decision that could be made. It has been determined that the business needs to be at least $8 million dollars in annual sales before expansion could be considered. The following is data for the past 6 years. (Sales in millions of dollars.)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |

| **Year** | **Sales** | **Year** | **Sales** |
| --- | --- | --- | --- |
| 2004 | 7.45 | 2007 | 7.94 |
| 2005 | 7.83 | 2008 | 7.76 |
| 2006 | 8.07 | 2009 | 7.90 |

 |  |

**The statistical analysis of the data produced this least square trend equation. Y' = 7.634 + 0.05457t What should the owner's decision be regarding expansion in 2010?**

|  | A.  Expansion decision could go either way based on data |
| --- | --- |
|  | B.  Expansion should be considered |
|  | C.  Cannot make a decision based on this data |
|  | D.  Expansion should be delayed |
|  |  |

 |
| **54) With the increased cost in fuel, there has been a shift in the buying habits of new car purchasers. A local car dealer was interested in determining if there was a significant difference in fuel efficiencies between three sizes of car: compact, midsize and large. The manager did a random sample of 27 cars. An ANOVA was used as the analysis tool using a significant level of .01. The results of the ANOVA were as follows:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |

| **Source of Variation** | **SS** | **df** | **MS** | **F** | **p-value** |
| --- | --- | --- | --- | --- | --- |
| Between Groups | 130.44 | 2 | 65.22 | 7.97 | 0.00017 |
| Within Groups | 196.24 | 24 | 8.18 |  |  |
| Total | 326.68 | 36 |  |  |  |

 |  |

**The manger’s decision would be**

|  | A.  the mean fuel efficiency of the car cannot be compared |
| --- | --- |
|  | B.  to accept the null hypothesis; there is not a significant difference between cars |
|  | C.  to reject the null hypothesis; there is a significant difference between cars |
|  | D.  this was not the correct test for this data; a series of student t tests would have been better |

 |