1. Which of the following statements are true?
   I. An outlier will always have a large residual.
   II. A point is influential if removing it changes the regression model.

   A. I only B. II only C. I & II D. Neither is true

2. If P(A) = 0.50 and P(B) = 0.40, what is P(A or B) if A and B are independent?

   A. 0 B. 0.70 C. 0.20 D. 0.90 E. None of these

3. A concert promoter wants to survey managers at concert locations around the country to ask their opinion about how to improve concert attendance. The promoter groups the concert locations into 20 different geographic zones, randomly selects 5 zones and surveys all managers in those 5 zones. The type of sampling method used is:
   A. Simple random sample
   B. Stratified random sample
   C. Cluster sample
   D. Systematic sample

4. A 2011 Harris poll said that 84% of adults in the United States have Internet access. Three adults are selected at random. Find the probability at least one of the three adults has Internet access.

   A. 0.9959 B. 0.4073 C. 0.0215 D. 0.5927 E. None of these

5. It is difficult to accurately determine a person's body fat without immersing him or her in water. Hoping to find easier ways to estimate a person's body fat, researchers immersed 20 male subjects and recorded their body fat percent, measured their waist and recorded their weights.
   It was found that *Predicted % of body fat* = -27.4 + 0.25 (*weight*) and $R^2 = 48.5\%$
   It was also determined that *Predicted % of body fat* = -62.6 + 2.22 (*waist*) with the variability in percent of body fat due to waist size equal to 78.7%. Which measure is a better predictor of the percent of body fat?
   A. Waist
   B. Weight
   C. They are equally good predictors
   D. Can't be determined from this data

Use the following information for questions 6-7
A U.S. pharmaceutical company conducted a survey of adult males. 32% of the males surveyed had high cholesterol (event A). 27% of the males surveyed had high blood pressure (event B). In the sample 52% of the males had normal cholesterol and normal blood pressure.

6. What is the probability an adult male has high cholesterol and high blood pressure.

A. 0.0864 B. 0.59 C. 0.11 D. 0.48 E. None of these

7. Given that a male has high blood pressure, what is the probability he has high cholesterol?

A. 0.4074 B. 0.3438 C. 0.32 D. 0.11 E. None of these

8. Suppose the IQR of the SAT test was calculated to be 200 points. 75% of the students scored more than 500. Which of the following statements is **correct**:
    A. 50% of the SAT scores lie between 300 and 500.
    B. The median of the SAT scores is 500.
    C. 50% of the SAT scores lie between 500 and 700.
    D. There is not enough information provided

9. In automotive repair, experience has shown that a rough-running engine can be attributed to bad ignition wires 35% of the time, bad spark plugs 80% of the time, and both problems 20% of the time. Given that a mechanic has already determined that the spark plugs are bad, what is the probability that the wires are bad?

    A. 0.25 B. 0.57 C. 0.95 D. 0.28

10. Suppose we wish to estimate the mean selling price of a college textbook. What sample size should be chosen to find the mean price with a margin of error of no more than $4, at a 95% confidence level? Suppose we know from prior studies the standard deviation is $24

    A. 138 B. 12 C. 139 D. 98 E. None of these

11. A survey found that among a sample of 150 adults living in California, 11.9% smoke. A hypothesis test was conducted to test whether the rate of smoking in California is less than the national rate of 18%. A test statistic of $z = -1.94$ was found. When testing at the 1% significance level, which is the most appropriate conclusion?
    A. There is not sufficient evidence to conclude that the rate of smoking in California is less than the national rate of 18%.
    B. There is sufficient evidence to conclude that the rate of smoking in California is less than the national rate of 18%.
    C. There is sufficient evidence to prove that the rate of smoking in California is 18%
    D. The conclusion cannot be determined from the information given.

12. Suppose 40% of adults in the U.S. say they get their financial advice from family members. A random sample of 8 adults is selected. What is the probability at least 2 of the 8 say they get their financial advice from family members?

    A. 0.3154 B. 0.6846 C. 0.8936 D. 0.2090 E. None of these

13. Which of the following is a **true** statement regarding the comparison of t-distributions to the standard normal distribution?
    A. The normal distribution is symmetrical whereas the t- distributions are slightly skewed.
    B. As the degrees of freedom increases, the t-distribution approaches the standard normal curve.
    C. The shape of the standard normal distribution changes as the sample size increases, but the shape of the t-distribution does not change.
    D. The total area under the t-distribution is larger than the total area under the standard normal distribution

14. Assume that SAT scores are normally distributed with mean of 500 and standard deviation 100. What proportion of scores will fall between 550 and 625?

    A. 0.75 B. 0.2029 C. 0.7734 D. 0.8106 E. None of these

Use the following information for questions 15-16
A study was conducted to investigate the relationship between fat content and number of calories for a random sample of breakfast cereals. The data was analyzed to produce the results below:

The regression equation is: Calories = 97.1 + 9.65 (Fat) correlation = 0.791

15. What percent of variability in calories can be explained by the regression model?

    A. 9.65% B. 7.91% C. 88.94% D. 62.57% E. 97.1%

16. Suppose for a particular cereal the residual is calculated to be -3. Which of the following is a correct statement?
    A. The model over-predicts the calorie content for this cereal.
    B. The model under-predicts the calorie content for this cereal.
    C. There must be a mistake: it is not possible to have a negative residual.
    D. Not enough information provided.

17. A certain population follows a normal distribution. Data is collected to test the hypotheses
    $H_0 : \mu = 30 \quad vs. H_a : \mu \neq 30$
    You obtain a P-value of 0.013. Which of the following is correct?
    A. A 99% confidence interval for μ will include the value 30
    B. A 95% confidence interval for μ will include the value 30
    C. A 90% confidence interval for μ will include the value 30
    D. Not enough information is provided

Use the following information for questions 22-23
A homebuilder's association lobbying for various home subsidy programs argued that, during periods of high interest rates, the number of building permits issued decreased drastically, which in turn reduced the availability of new housing. Data relating housing loan interest rates and the number of building approvals (thousands), were collected.
The following regression equation was obtained:
Building Approvals (1000s) = 239.5 – 8.06(Interest rate)

18. A correct interpretation of the slope is:
    A. For each 1percent increase in interest rate, the number of building approvals (1000s) decreases by 239.5
    B. For each 1000 building approvals, the interest rate decreases by 8.06 percent
    C. For each 1percent increase in interest rate, the number of building approvals (1000s) decreases by 8.06.
    D. For each 1000 building approvals, the interest rate decreases by 239.5.

19. When the interest rate was 5 percent the number of building approvals (in 1000s) was 210. Calculate the residual.

A. 205 B. 10.8 C. -10.8 D. 199.2 E. None of the above

20. In testing the hypotheses $H_0 : p = 0.4 \quad Ha : p \neq 0.4$
The test statistic is found to be 1.87. Which of the following is the correct p-value?

A. 0.9693 B. 0.0307 C. 0.0614 D. 0.3446 E. None of these

21. For 14 year old boys, the distribution of blood cholesterol is normal with mean 170 mg/dl and standard deviation 30 mg/dl. What is the value of the first quartile for this distribution?

A. 0.67 B. -0.67 C. 149.9 D. 190.1 E. None of these

22. A company is sued for job discrimination because only 12% of the newly hired candidates were female when 32% of all applicants were female. The null hypothesis is that there is no discrimination (p=0.32).
Which statement correctly describes a Type II error for this situation?
    A. There is no Type II error possible in this context.
    B. It is decided the company is discriminating when, in fact, it is.
    C. It is decided the company is not discriminating when, in fact, it is.
    D. It is decided the company is discriminating when, in fact, it is not.

23. Owners of a store that sells CDs want to estimate the mean amount of time a customer remains in the store. A random sample of 30 customers was observed, and found to have a sample mean time of 12.77 minutes in the store with a standard deviation of 3.45 minutes. Which of the following is a 99% confidence interval for the true mean time a customer will remain in the store?
    A. (11.1474, 14.3926)
    B. (11.0044, 14.5356)
    C. (11.0378, 14.5022)
    D. (11.0340, 14.5060)
    E. None of the above

24. The length of time an adult spends exercising each week has a skewed distribution with a mean of 45 minutes and a standard deviation of 11.5 minutes. A random sample of 90 adults is selected. What is the probability that the mean time the 90 adults spend exercising each week is between 42.7 and 48.5 minutes?

A. 0.9900 B. 0.8389 C. 0.1972 D. 0.9694 E. none of the above