

**MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.**

- 1) Marital status of each member of a randomly selected group of adults is an example of what type of variable?  
A) Categorical variable      B) Numerical variable      C) Neither
- 2) The average number of hours spent completing statistics homework for a randomly selected group of statistics students is an example of what type of variable?  
A) Categorical variable      B) Numerical variable      C) Neither
- 3) A recent report showed there were 49 accidents involving pedestrians in City A and 62 accidents involving pedestrians in City B this year. The mayor of City A claims that his city is safer for pedestrians than City B. What information is missing that might contradict this claim?  
A) The total number of pedestrians in both City A and City B  
B) The number of crosswalks in both City A and City B  
C) The number of accidents that do not involve pedestrians in both City A and City B  
D) The number of accidents involving pedestrians from the previous year
- 4) A group of students is divided into two groups. One group listens to classical music while taking a math test and the other group takes the test in silence. The average test scores of the two groups are compared to see whether listening to music during a math test has an effect on scores.  
A) Observational study      B) Controlled experiment
- 5) Consider the following statement: "Researchers conducted a large observational study and determined that children who participated in school music programs scored higher on math exams in later grades than those who did not." Suppose that upon hearing this a politician states that all children should participate in school music programs. What is wrong with the politician's statement?  
A) The politician confused correlation with causation.  
B) The controlled experiment was not double-blinded.  
C) There was a placebo effect.  
D) This study exhibits bias.
- 6) The distribution of marital status of a randomly selected group of adults would best be visualized by which plot?  
A) Boxplot      B) Histogram      C) Scatterplot      D) Bar chart

Use the following information to answer the questions 7-9.

A group of researchers is interested in whether UCLA students would generally consider themselves happy. They waited outside of each entrance of Ackerman Union after it had been selected at random from a list of all the buildings at UCLA. They stopped every 10th person who walked into the building and did the following:

(1) asked if the person was a UCLA student. (2) if the person was a UCLA student, then researchers asked whether the person was happy and recorded the student's answer and major. (3) If the person was not a UCLA student, the researchers thanked the person for stopping and no other questions were asked.

They eventually recorded the responses of 100 UCLA students and discovered that 85 said they were "happy."

7) This is called a(n)

A) Anecdotal study

B) Observational study

C) Experimental study

D) None of these

8) The population of interest to the researchers is

A) All UCLA students

B) All UCLA students who go into Ackerman Union

C) All persons who go into Ackerman Union

D) All persons on campus

9) The sample is

A) 100 persons who went into Ackerman Union

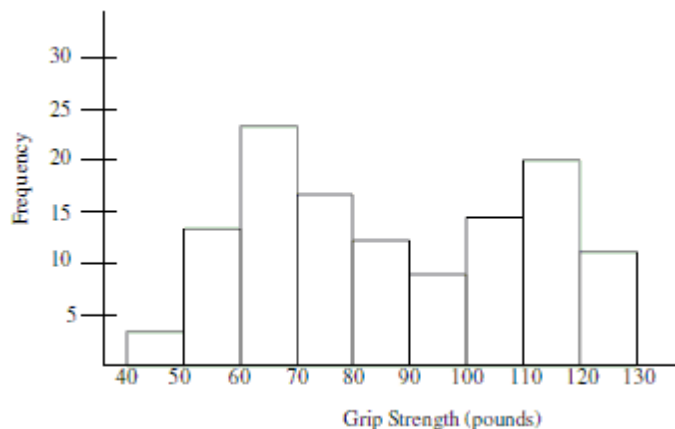
B) 85 happy students

C) 100 UCLA students who went into Ackerman Union

D) All persons who talked to the researchers.

10) Data was collected on hand grip strength of adults. The histogram below summarizes the data.

Which statement is true about the distribution of the data shown in the graph?



A) The graph shows evidence that two different groups may have been combined into one data set.

B) The graph is useless because it is bimodal.

C) The best estimate of typical grip strength is 80-90 pounds because it is in the center of the distribution.

D) There must have been a mistake made in data set because the distribution should be bell-shaped.

- 11) The mean price of a pound of ground beef in 75 cities in the Midwest is \$2.11 and the standard deviation is \$0.56. Suppose the histogram of the data shows that the distribution is unimodal and symmetrical. A local grocer is selling a pound of ground beef for \$3.50. What is this price in standard units? Assuming the Empirical Rule applies, would this price be unusual or not? Round to the nearest hundredth.

A)  $z = 2.48$ ; This is unusually expensive ground beef.  
 B)  $z = -2.48$ ; This price would not be unusual.  
 C)  $z = 2.48$ ; This price would not be unusual.  
 D)  $z = -2.48$ ; This is unusually inexpensive ground beef.

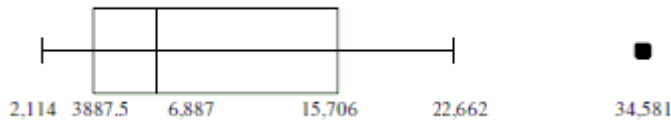
Use the side-by-side boxplots below to answer questions 12-13.

The boxplots summarize the number of sentenced prisoners by state in the Midwest and West.

Midwest



West



- 12) Pick the statement that best describes the shape of the distribution for the states in the West.
- A) The data appears to be left-skewed with large variability.  
 B) The data appears to be right-skewed with a possible outlier.  
 C) The data appears to be roughly symmetrical with a possible outlier.
- 13) Using the boxplot for the Midwest, determine which of the following statements about the distribution **cannot** be justified.
- A) About 75% of the Midwest states had 4,322 or more prisoners.  
 B) There are much more states with 6887 to 15,706 prisoners than states with 3887.5 to 6887 prisoners.  
 C) The interquartile range of West states is about 11,819.  
 D) The range of the boxplot for the West states is 32,467.

Use the five-number summaries below to answer questions 14-17.

A group of elementary school students is given a reading test and the scores are reported by reading grade level.

Five number summaries

Boys: 2.0 -- 3.9 -- 4.3 -- 4.9 -- 6.0

Girls: 2.8 -- 3.8 -- 4.5 -- 5.2 -- 5.9

- 14) Which group had the highest score?

A) Boys                                      B) Girls                                      C) They are equal

- 15) Which group had the greater range?

A) Boys                                      B) Girls                                      C) They are equal

- 16) Which group had the greater interquartile range?

A) Boys                                      B) Girls                                      C) They are equal

- 17) Which group generally performed better on this test?
- A) Boys
  - B) Girls
  - C) The groups performed equally well
- 18) Which one of the following best describes the relationship between the correlation and the slope of the regression line modeling the relationship between X and Y ?
- A) The correlation between X and Y equals the slope of the regression line modeling the relationship between X and Y .
  - B) The sign of the correlation between X and Y is the same as the sign of the slope of the regression line modeling the relationship between X and Y .
  - C) When the correlation between X and Y is zero, the slope of the regression line modeling the relationship between X and Y is negative.
  - D) The correlation between X and Y is not related to the slope of the regression line modeling the relationship between X and Y .

**Use the following information to answer questions 19-20. The following linear regression model can be used to predict ticket sales at a popular water park.**

Ticket sales per hour =  $-631.25 + 11.25(\text{current temperature in } ^\circ\text{F})$

- 19) What is the predicted number of tickets sold per hour if the temperature is  $86^\circ\text{F}$ ? Round to the nearest whole ticket.
- A) About 336 tickets
  - B) About 252 tickets
  - C) About 276 tickets
  - D) About 301 tickets

- 20) Choose the statement that best states the meaning of the slope in this context.
- A) The slope tells us that if ticket sales are decreasing there must have been a drop in temperature.
  - B) The slope tells us that a one degree increase in temperature is associated with an average increase in ticket sales of 11.25 tickets.
  - C) The slope tells us that high temperatures are causing more people to buy tickets to the water park.
  - D) None of the above
- 21) A horticulturist conducted an experiment on 110 thirty-six inch plant boxes to see if the amount of plant food given to the plant boxes was associated with the number of tomatoes harvested from the plants. The mean amount of plant food given was 27.8 milliliters with a standard deviation of 2.1 milliliters. The mean number of tomatoes harvested was 7.5 with a standard deviation of 1.5. The correlation coefficient was 0.7691. Use the information given to calculate the slope of the linear model that predicts the number of tomatoes harvested from the amount of plant food given. Round to the nearest hundredth.
- A) -7.50
  - B) 0.55
  - C) 1.08
  - D) The slope cannot be determined without the actual data.
- 22) In the NBA, the correlation between "steals per game" and "blocked shots per game" is found to be 0.8045. Choose the statement that is true about the coefficient of determination.
- A) The coefficient of determination,  $r^2$ , is equal to approximately 0.6472.
  - B) The coefficient of determination states that about 64.72% of the variation in the blocked shots per game is explained by steals per game.
  - C) When given as a percent, the coefficient of determination is always between 0 and 100%.
  - D) All of the above are true statements.
- 23) If two numerical variables X and Y have a correlation coefficient of 0.90, what percentage of one variable can be accounted for by the other variable?
- A) 45%
  - B) 81%
  - C) 90%
  - D) The answer will depend on which one you designate as the response variable.