

Name _____
AP Statistics

Date _____
Period _____

Unit 3 - Hw 2

- 1) Which of the following statements about the correlation r are true?
- I. When $r = 0$, there is no relationship between the variables.
 - II. When $r = .5$, 50% of the variables are closely related.
 - III. When $r = 1$, there is a perfect cause-and-effect relationship between the variables.
- (A) I only
(B) II only
(C) III only
(D) I, II, and III
(E) All the statements are false.
- 2) Suppose the correlation between two variables is $-.57$. If each of the y -scores is multiplied by -1 , which of the following is true about the new scatterplot?
- (A) It slopes up to the right, and the correlation is $-.57$.
(B) It slopes up to the right, and the correlation is $+.57$.
(C) It slopes down to the right, and the correlation is $-.57$.
(D) It slopes down to the right, and the correlation is $+.57$.
(E) None of the above is true.
- 3) Which of the following statements about the correlation r are true?
- I. The correlation and the slope of the regression line have the same sign.
 - II. A correlation of $-.35$ and a correlation of $+.35$ show the same degree of clustering around the regression line.
 - III. A correlation of $.75$ indicates a relationship that is 3 times as linear as one for which the correlation is only $.25$.
- (A) I and II
(B) I and III
(C) II and III
(D) I, II, and III
(E) None of the above gives the complete set of true responses.
- 4) If every woman married a man who was exactly 2 inches taller than she, what would the correlation between the heights of married men and women be?
- (A) Somewhat negative
(B) 0
(C) Somewhat positive
(D) Nearly 1
(E) 1

- 5) Which of the following statements about the correlation r are true?
- I. It is not affected by changes in the measurement units of the variables.
 - II. It is not affected by which variable is called x and which is called y .
 - III. It is not affected by extreme values.
- (A) I and II
(B) I and III
(C) II and III
(D) I, II, and III
(E) None of the above gives the complete set of true responses.

- 6) A study of department chairperson ratings and student ratings of the performance of high school statistics teachers reports a correlation of $r = 1.15$ between the two ratings. From this information we can conclude that
- (A) chairpersons and students tend to agree on who is a good teacher.
(B) chairpersons and students tend to disagree on who is a good teacher.
(C) there is little relationship between chairperson and student ratings of teachers.
(D) there is strong association between chairperson and student ratings of teachers, but it would be incorrect to infer causation.
(E) a mistake in arithmetic has been made.

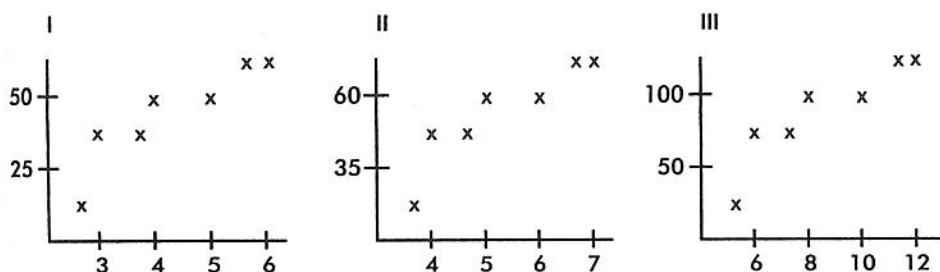
- 7) Suppose the correlation is negative. Given two points from the scatterplot, which of the following is possible?
- I. The first point has a larger x -value and a smaller y -value than the second point.
 - II. The first point has a larger x -value and a larger y -value than the second point.
 - III. The first point has a smaller x -value and a larger y -value than the second point.
- (A) I only
(B) II only
(C) III only
(D) I and III
(E) I, II, and III

- 8) A data set with 5 points has a correlation of 0.8 and a linear regression line with a slope of 0.8. Which of the following statements are true?
- I. A sixth point can be added so that the resulting slope is 1.
 - II. A sixth point can be added so that the resulting correlation is 1.
 - III. A sixth point can be added so that the resulting slope is -1 .
 - IV. A sixth point can be added so that the resulting correlation is -1 .
- A. I and III
B. II and IV
C. I and II
D. III and IV
E. I, II, III, and IV

9) A delivery service places packages into large containers before flying them across the country. These filled containers vary greatly in their weight. Suppose the delivery service's airplanes always transport two such containers on each flight. The two containers are chosen so their combined weight is close to, but does not exceed, a specified weight limit. A random sample of flights with these containers is taken, and the weight of each of the two containers on each selected flight is recorded. The weights of the two containers on the same flight

- (A) will have a correlation of 0
- (B) will have a negative correlation
- (C) will have a positive correlation that is less than 1
- (D) will have a correlation of 1
- (E) cannot be determined from the information given

10) Consider the following three scatterplots:

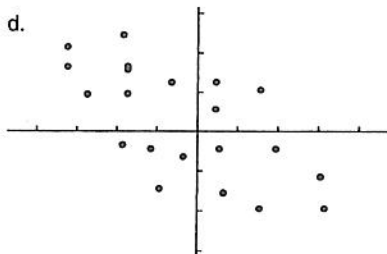
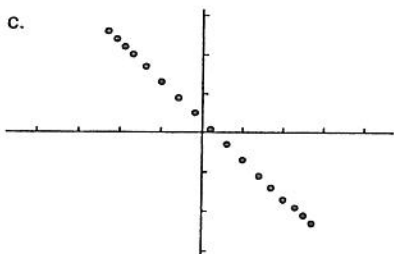
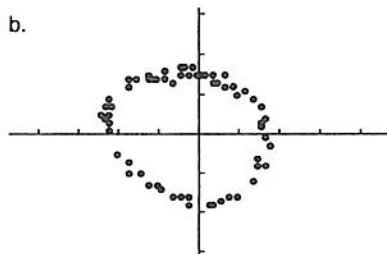
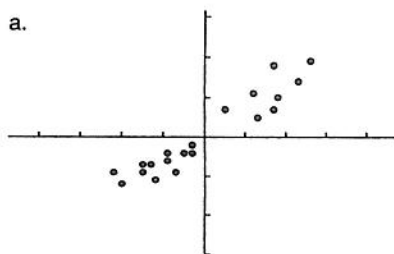


Which has the greatest correlation coefficient?

- (A) I
- (B) II
- (C) III
- (D) They all have the same correlation coefficient.
- (E) This question cannot be answered without additional information.

Free Response

1) Estimate r , the correlation coefficient, for each of the following graphs:



- 2) Each year of Governor Jones's tenure, the crime rate has decreased in a linear fashion. In fact, $r = -0.8$. It appears that the governor has been effective in reducing the crime rate. Comment.

- 3) A bivariate relationship between x and y has a correlation of r . The least-squares regression line for the data has a slope of m . Discuss the relationship between r and m . If 3 is added to each value of x , how does this relationship change? If each value of x was multiplied by 3, how does this relationship change?