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

Suppose you were to collect data for the pair of given variables in order to make a scatterplot. Determine for each variable if it is the explanatory variable, the response variable, or whether it could be both.

   1) Teacher: weekly salary, teacher: years of experience   1) _____
         A) Teacher: weekly salary: both
             Teacher: years of experience: both
         B) Teacher: weekly salary: response
             Teacher: years of experience: explanatory
         C) Teacher: weekly salary: both
             Teacher: years of experience: explanatory
         D) Teacher: weekly salary: explanatory
             Teacher: years of experience: both
         E) Teacher: weekly salary: explanatory
             Teacher: years of experience: response

Suppose you are to form a scatterplot by collecting data for the given pair of variables. Determine the likely direction, form, and strength.

   2) Depth, water pressure   2) _____
         A) Positive, straight, strong
         B) Negative, straight, moderate
         C) Positive, nonlinear, moderate
         D) Negative, nonlinear, moderate
         E) Positive, no form, strong

Determine whether the scatterplot shows little or no association, a negative association, a positive association, a linear association, a moderately strong association, or a very strong association (multiple associations are possible).
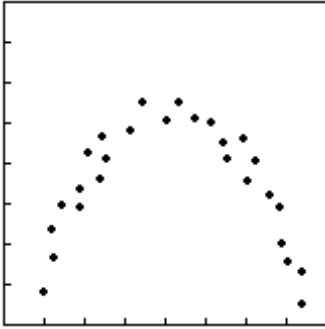
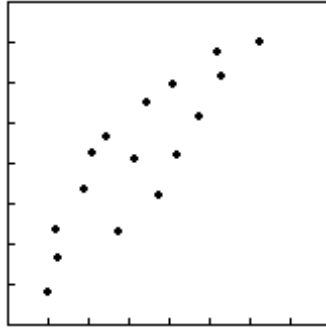   3)   3) _____
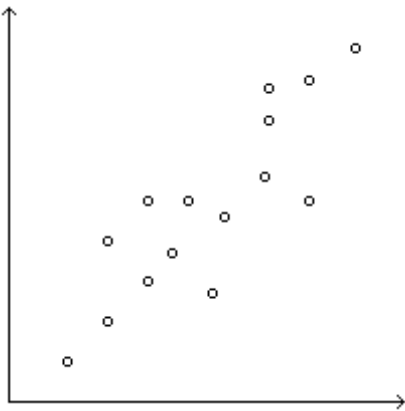
         A) Linear association
         B) Linear association, moderately strong association
         C) Positive association, moderately strong association
         D) Positive association
         E) Positive association, moderately strong association, linear association

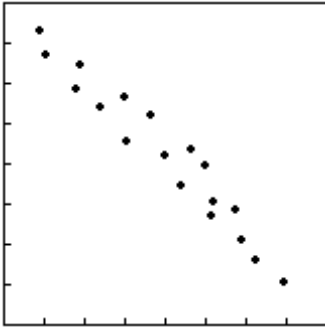Several scatterplots are given with calculated correlations. Which is which?
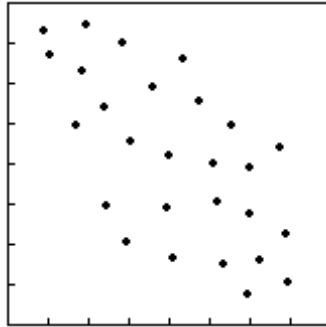
2)

3)

4)

a) -0.928, b) -0.411, c) 0.002, d) 0.711

A) 1d, 2a, 3b, 4c
B) 1a, 2b, 3c, 4d
C) 1b, 2c, 3d, 4a
D) 1c, 2a, 3d, 4c
E) 1c, 2d, 3a, 4b

Find the correlation.

5) A study was conducted to compare the average time spent in the lab each week versus course grade for computer students. The results are recorded in the table below.

5) _____

Number of hours spent in lab	Grade (percent)
10	96
11	51
16	62
9	58
7	89
15	81
16	46
10	51

A) 0.371   B) 0.462   C) 0.017   D) -0.335   E) -0.284

Solve the problem.
6) A science instructor assigns a group of students to investigate the linear relationship between the   6) _____
pH of the water of a river and its water's hardness (measured in grains). Some students wrote these
conclusions: "My correlation of -0.94 shows that there is almost no association between pH of the
water and water's hardness." Is the interpretation of the correlation appropriate?
   A) Yes: a correlation of -0.94 shows a weak relation in a negative direction.
   B) Yes: pH and hardness of water do not have the same units.
   C) No: a correlation of -0.94 shows a strong relation in a negative direction.
   D) No: correlation is always positive.
   E) No: the pH and the hardness of the water are data collected from the same river.

7) A survey was conducted in 20 counties to determine the percentage of teenagers who had used   7) _____
marijuana and other drugs. Data shown on the following scatterplot indicate a correlation of 0.945
between the percent of teens who have used marijuana and the percent who have used other drugs.
Describe the association.
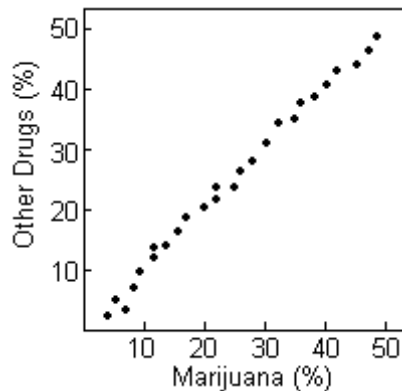
   A) I am not familiar with any of these drugs. Therefore, I cannot understand
   B) Strong linear relation in a positive direction
   C) Strong curved relation in a positive direction
   D) No evidence of relation
   E) Weak linear relation in a positive direction

8) Data collected from students in Statistics classes included their heights (in inches) and weights (in pounds). For the students' heights and weights, the correlation is 0.636. Suppose the variable weight is recorded in kilograms rather than in pounds. What will be the correlation?

8) _____
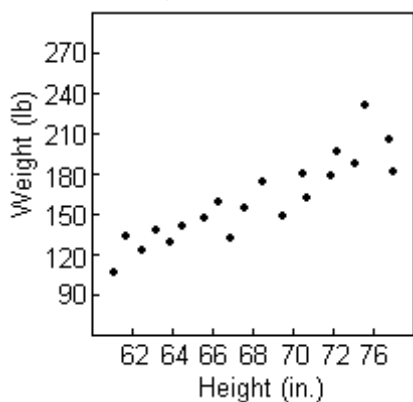
A) 0.636
B) 0.636 in./kg
C) 0.636 kg/in.
D) -0.636
E) 1.401 in./kg

Find the lurking variable.

9) A study shows that the amount of chocolate consumed in Canada and the number of automobile accidents is positively related. Find the lurking variable, if there is one.

9) _____

A) Children
B) Vacation
C) Population growth
D) Speed
E) No lurking variable

Provide an appropriate response.

10) All but one of the statements below contain a mistake. Which one could be true?

10) _____

A) The correlation between age and weight of a newborn baby is r = 0.83 ounces per day.
B) The correlation between blood alcohol level and reaction time is r = 0.73.
C) The correlation between a person's age and vision (20/20?) is r = -1.04.
D) The correlation between the species of tree and its height is r = 0.56.
E) There is a high correlation between cigarette smoking and gender.

Tell what the residual plot indicates about the appropriateness of the linear model that was fit to the data.
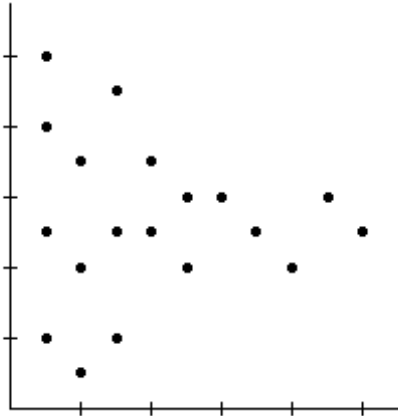
11)

11) _____

        A) Model is not appropriate. The relationship is nonlinear.
        B) Model is appropriate.
        C) Model may not be appropriate. The spread is changing.

Answer the question appropriately.
12) If you create a regression model for estimating the price of a salad based upon its weight (oz), which is the slope most likely to be?

12) _____

    A) 2,000   B) 0.2   C) 200,000   D) 2,000,000   E) 200

13) A random sample of records of electricity usage of homes gives the amount of electricity used in July and size (in square feet) of 135 homes. A regression was done to predict the amount of electricity used (in kilowatt-hours) from size. The residuals plot indicated that a linear model is appropriate. Do you think the slope is positive or negative? Why?

13) _____

    A) Negative. Larger homes should use less electricity.
    B) Positive. More square feet indicates more houses.
    C) Positive. The larger the number of houses the more electricity used.
    D) Negative. Smaller homes should use less electricity.
    E) Positive. Larger homes should use more electricity.

Use the model to make the appropriate prediction.
14) A golf ball is dropped from 15 different heights (in inches) and the height of the bounce is recorded (in inches.) The regression analysis gives the model $\hat{bounce} = -0.2 + 0.72$ drop. Predict the height of the bounce if dropped from 81 inches.

14) _____

    A) 58.32 inches
    B) 58.12 inches
    C) 58.52 inches
    D) 112.78 inches
    E) 81.52 inches

Answer the question appropriately.

15) A random sample of records of electricity usage of homes in the month of July gives the amount of electricity used and size (in square feet) of 135 homes. A regression was done to predict the amount of electricity used (in kilowatt-hours) from size. The residuals plot indicated that a linear model is appropriate. The model is $\widehat{usage}$ = 1254 + 0.7 size. What would a negative residual mean for people living in a house that is 2284 square feet?

   A) Their house is bigger than expected.
   B) They are using less electricity than expected.
   C) They are using the least amount of electricity of all of the houses sampled.
   D) They are using more electricity than expected.
   E) Their house is smaller than expected.

16) A golf ball is dropped from 15 different heights (in inches) and the height of the bounce is recorded (in inches.) The regression analysis gives the model $\widehat{bounce}$ = -0.5 + 0.72 drop. A golf ball dropped from 82 inches bounced 60.54 inches. What is the residual for this bounce height.?

   A) 2 inches
   B) -2 inches
   C) 61.04 inches
   D) 1.44 inches
   E) 3 inches

Use the given data to find the equation of the regression line. Round to 3 significant digits, if necessary.

17) Ten Ford Escort classified ads were selected. The age and prices of several used Ford Escorts are given in the table.

Age (years)	Price
1	$10,000
2	$8500
2	$8000
3	$6000
3	$5900
4	$5800
4	$5000
5	$3000
6	$2000
6	$1900

   A) $\widehat{price}$ = -1580 + 11300 age
   B) $\widehat{price}$ = 10000 - 1600 age
   C) $\widehat{price}$ = 7.05 - 0.000616 age
   D) $\widehat{price}$ = 11300 - 1580 age
   E) $\widehat{price}$ = 7200 - 692 age

Answer the question appropriately.

18) When using midterm exam scores to predict a student's final grade in a class, the student would prefer to have a

    A) residual equal to zero, because that means the student's final grade is exactly what we would predict with the model.

    B) positive residual, because that means the student's final grade is lower than we would predict with the model.

    C) negative residual, because that means the student's final grade is lower than we would predict with the model.

    D) negative residual, because that means the student's final grade is higher than we would predict with the model.

    E) positive residual, because that means the student's final grade is higher than we would predict with the model.

18) _____

Solve the problem.

19) Another company's sales increase by the same percent each year. This growth is . . .

    A) exponential   B) linear   C) power

19) _____

20) What is the meaning 45 in the exponential model $\hat{y} = 45(1.7)^x$?

    A) 45% growth   B) none of these   C) 0.45% growth   D) 145% growth

20) _____

21) What is the percent decay in the exponential model $\hat{y} = 127(0.67)^x$?

    A) 33   B) 167   C) 67   D) 127

21) _____

22) Wildlife researchers collected measurements on the diameter and length (both in millimeters) of the horns of a sample of pygmy antelopes. The power regression model to predict the length was $\widehat{Length} = 24.13\,Diameter^{0.66}$. According to this model, how long is the horn of an antelope with a horn diameter of 25 mm?

    A) 68.41 mm   B) 398.15 mm   C) 201.93 mm   D) 24.13 mm

22) _____