Use the following information to answer Questions 1-5.

In many fast food restaurants, there is a strong correlation between a menu item’s fat content (measured in grams) and its calorie content. We want to investigate this relationship. Using all of the food menu items at a well-known fast food restaurant, the fat content and calorie contents were measured. We decide to fit the least-squares regression line to the data, with fat content(*x*) as the explanatory variable and (*y*)as the response variable. A scatterplot of the data (with regression line included), and a summary of the data are provided. One of the menu items is a hamburger with 107 grams of fat and 1410 calories.



*r* = 0.979; (correlation between *x* and *y*)

 = 40.35 grams ; (mean of the values of *x*)

 = 662.88 calories ; (mean of the values of *y*)

= 27.99 grams ; (standard deviation of the values of *x*)

= 324.90 calories ; (standard deviation of the values of *y*)

**1**. The slope of the least-squares regression line is

a. – 11.36.

\* b. 11.36.

c. 0.979.

d. 16.08.

**2**. The intercept of the least-squares regression line is

\* a. 204.50.

b. 662.88.

c. –662.88.

d. none of the above.

**3**. We might feel comfortable using the least-squares regression equation to predict calories of foods with

\* a. roughly between 0 and 110 grams of fat.

b. roughly between 0 and 40 grams of fat.

c. more than 120 grams of fat.

d. cannot be determined from the information provided.

**4**. The least-squares line would predict that the calories in 30 grams of fat would be

a. 450.3

\* b. 545.3

c. 540.5

d. 300.8

**5**. Refer to the example data point (107 grams, 1410 calories). What is the residual corresponding to this observation?

a. 10 calories

b. 10 grams

c. –10 grams

\* d. –10 calories

**6**. The correlation between the height and weight of children aged 6 to 9 is found to be about   
*r* = 0.8. Suppose we use the height *x* of a child to predict the weight *y* of the child. We conclude

a. the least-squares regression line of *y* on *x* would have a slope of 0.8.

b. the least-squares regression line of *y* on *x* would have an intercept of 0.8.

c. height is generally 80% of a child’s weight.

\* d. the fraction of variation in weights explained by the least-squares regression line of weight on height is 0.64.

**7**. The least-squares regression line is

a. the line that is used to make predictions about the outcome.

b. the line that makes the sum of the squares of the vertical distances of the data points from the line (the sum of squared residuals) as small as possible.

c. the line such that half of the data points fall above the line and half fall below the line.

\* d. Both a and b

**8**. For which of the following scatterplots would the correlation be close to 1?

a.



\* b.



c.



d. All of the above, because in each plot the points lie on a well-defined line or curve.

**9**. A researcher obtained the average SAT scores of all students in each of the 50 states, and the average teacher salaries in each of the 50 states. She found a negative correlation between these variables. The researcher concluded that a lurking variable must be present. By lurking variable she means

\* a. a variable that is not among the variables studied but which affects the response variable.

b. the true cause of a response.

c. any variable that produces a large residual.

d. the true variable, which is explained by the explanatory variable.