Making Predictions. *In Exercises 5–8, let the predictor variable x be the first variable given. Use the given data to find the regression equation and the best predicted value of the response variable. Be sure to follow the prediction procedure summarized in Figure 10-5.*

5. Old Faithful For 40 eruptions of the Old Faithful geyser in Yellowstone National Park, duration times (sec) were recorded along with the time intervals (min) after the eruptions. The linear correlation coefficient is $r = 0.687$ and the regression equation is $\hat{y} = 47.4 + 0.180x$, where x represents duration time. The mean of the 40 duration times is 245.0 sec and the mean of the 40 interval times is 91.4 min. What is the best predicted interval time following an eruption with a duration time of 120 min?

6. Old Faithful For 40 eruptions of the Old Faithful geyser in Yellowstone National Park, duration times (sec) were recorded along with the heights (ft) of the eruptions. The linear correlation coefficient is $r = 0.0915$ and the regression equation is $\hat{y} = 119 + 0.0331x$, where x represents duration time. The mean of the 40 duration times is 245.0 sec and the mean of the 40 heights is 127.2 ft. What is the best predicted height of an eruption with a duration time of 120 min?

7. Heights of Fathers and Sons The heights (in inches) of a sample of 10 father/son pairs of subjects were measured. The linear correlation coefficient is $r = 0.149$ and the regression equation is $\hat{y} = 66.8 + 0.016x$, where x represents the father's height. The mean of the 10 father heights is 69.7 in. and the mean of the 10 son heights is 68.0 in. What is the best predicted height of a son who has a father with a height of 72.0 in.?

8. Cereal Killers The amounts of sugar (grams of sugar per gram of cereal) and calories (per gram of cereal) were recorded for a sample of 16 different cereals. The linear correlation coefficient is $r = 0.765$ and the regression equation is $\hat{y} = 3.46 + 1.01x$, where x represents the amount of sugar. The mean of the 16 amounts of sugar is 0.295 grams and the mean of the 16 calorie counts is 3.76. What is the best predicted calorie count for a cereal with a measured sugar amount of 0.40 g?

Finding the Equation of the Regression Line. *In Exercises 9 and 10, use the given data to find the equation of the regression line. Examine the scatterplot and identify a characteristic of the data that is ignored by the regression line.*

9.

x	10	8	13	9	11	14	6	4	12	7	5
y	9.14	8.14	8.74	8.77	9.26	8.10	6.13	3.10	9.13	7.26	4.74

10.

x	10	8	13	9	11	14	6	4	12	7	5
y	7.46	6.77	12.74	7.11	7.81	8.84	6.08	5.39	8.15	6.42	5.73

11. Effects of an Outlier Refer to the Minitab-generated scatterplot given in Exercise 11 of Section 10-2.

a. Using the pairs of values for all 10 points, find the equation of the regression line.

b. After removing the point with coordinates (10, 10), use the pairs of values for the remaining 9 points and find the equation of the regression line.

c. Compare the results from parts (a) and (b).

12. Effects of Clusters Refer to the Minitab-generated scatterplot given in Exercise 12 of Section 10-2.

a. Using the pairs of values for all 8 points, find the equation of the regression line.