• In Section 10-4 we discussed methods for constructing prediction intervals, which are helpful in judging the accuracy of predicted values. We also introduced the concept of total variation, with components of explained and unexplained variation. The coefficient of determination r^2 gives us the proportion of the variation in the response variable (y) that can be explained by the linear correlation between x and y.

• Section 10-5 includes methods for finding a multiple regression equation, which expresses the relationship of a response variable to two or more predictor variables. We also described methods for finding the value of the multiple coefficient of determination R^2, the adjusted R^2, and a P-value for the overall significance of the equation. Those values are helpful for comparing different multiple regression equations as well as finding the best multiple regression equation. Because of the nature of the calculations involved in this section, the methods are based on the interpretation of results from computer software.

• In Section 10-6 we presented basic methods for finding a mathematical function that can be used to describe a nonlinear relationship between two variables.

Chapter Quick Quiz

The exercises are based on the following sample data obtained from different second-year medical students who took blood pressure measurements of the same person (based on data from Marc Triola, MD).

Systolic	138	130	135	140	120
Diastolic	82	91	100	100	80

1. If you plan to use a 0.05 significance level in a test of a correlation between the systolic and diastolic readings, what are the critical values of r?

2. The linear correlation coefficient r is found to be 0.585. What should you conclude?

3. The sample data result in a linear correlation coeffient of $r = 0.585$ and the regression equation $\hat{y} = -1.99 + 0.698x$. What is the best predicted diastolic reading given a systolic reading of 125, and how was it found?

4. Repeat the preceding exercise assuming that the linear correlation coefficient is $r = 0.989$.

5. Given that the linear correlation coefficient r is found to be 0.585, what is the proportion of the variation in diastolic blood pressure that is explained by the linear relationship between systolic and diastolic blood pressure?

6. True or false: If there is no linear correlation between systolic and diastolic blood pressure, then those two variables are not related in any way.

7. True or false: If the sample data lead us to the conclusion that there is sufficient evidence to support the claim of a linear correlation between systolic and diastolic blood pressure, then we could also conclude that systolic blood pressure causes diastolic blood pressure.

8. If each systolic reading is exactly twice the diastolic reading, what is the value of the linear correlation coefficient r?

9. If you had computed the value of the linear correlation coefficient to be 3.335, what should you conclude?

10. If the sample data were to result in the scatterplot shown here, what is the value of the linear correlation coefficient r?