a. Calculate the coefficient of determination.
b. What does the statistic calculated in part (a) tell you?
c. Determine the least squares line.
d. Interpret the coefficients.
e. What rate plan would you suggest?

4.70 A real estate developer of single-family dwellings across the country is in the process of developing plans for the next several years. An analyst for the company believes that interest rates are likely to increase but remain at low levels. To help make decisions about the number of homes to build, the developer acquired the monthly bank prime rate and the number of new single-family homes sold monthly (thousands) from 1963 to 2009. (Source: Federal Reserve Statistics and U.S. Census Bureau.)

Calculate the coefficient of determination. Explain what this statistic tells you about the relationship between the prime bank rate and the number of single-family homes sold.

4.71 When the price of crude oil increases, do oil companies drill more oil wells? To determine the strength and nature of the relationship, an economist recorded the price of a barrel of domestic crude oil (West Texas crude) and the number of exploratory oil wells drilled for each month from 1973 to 2009. Analyze the data and explain what you have discovered. (Source: U.S. Department of Energy)

4.72 One way of measuring the extent of unemployment is through the help wanted index, which measures the number of want ads in the nation’s newspapers. The higher the index, the greater the demand for workers. Another measure is the unemployment rate among insured workers. An economist wanted to know whether these two variables are related and, if so, how. He acquired the help wanted index and unemployment rates for each month between 1951 and 2006 (last year available). Determine the strength and direction of the relationship. (Source: U.S. Department of Labor Statistics)

4.73 A manufacturing firm produces its products in batches using sophisticated machines and equipment. The general manager wanted to investigate the relationship between direct labor costs and the number of units produced per batch. He recorded the data from the last 30 batches. Determine the fixed and variable labor costs.

4.74 A manufacturer has recorded its cost of electricity and the total number of hours of machine time for each of 52 weeks. Estimate the fixed and variable electricity costs.

4.75 The chapter-opening example showed that there is a linear relationship between a baseball team’s payroll and the number of wins. This raises the question, are success on the field and attendance related? If the answer is no, then profit-driven owners may not be inclined to spend money to improve their teams. The statistics practitioner recorded the number of wins and the average home attendance for the 2009 baseball season.

a. Calculate whichever parameters you wish to help guide baseball owners.
b. Estimate the marginal number of tickets sold for each additional game won.

4.76 Refer to Exercise 4.75. The practitioner also recorded the average away attendance for each team. Visiting teams take a share of the gate, so every owner should be interested in this analysis.

a. Are visiting team attendance figures related to number of wins?
b. Estimate the marginal number of tickets sold for each additional game won.

4.77 The number of wins and payrolls for the each team in the National Basketball Association (NBA) in the 2008–2009 season were recorded.

a. Determine the marginal cost of one more win.
b. Calculate the coefficient of determination and describe what this number tells you.

4.78 The number of wins and payrolls for each team in the National Football League (NFL) in the 2009–2010 season were recorded.

a. Determine the marginal cost of one more win.
b. Calculate the coefficient of determination and describe what this number tells you.

4.79 The number of wins and payrolls for each team in the National Hockey League (NHL) in the 2008–2009 season were recorded.

a. Determine the marginal cost of one more win.
b. Calculate the coefficient of determination and describe what this number tells you.

4.80 We recorded the home and away attendance for the NBA for the 2008–2009 season.

a. Analyze the relationship between the number of wins and home attendance.
b. Perform a similar analysis for away attendance.

4.81 Refer to Exercise 4.77. The relatively weak relationship between the number of wins and home attendance may be explained by the size of the arena each team plays in. The ratio of home attendance to the arena’s capacity was calculated. Is percent of capacity more strongly related to the number of wins than average home attendance? Explain.