4. Time and Motion In a physics experiment at Doane College, a soccer ball was thrown upward from the bed of a moving truck. The table below lists the time (sec) that has lapsed from the throw and the height (m) of the soccer ball. What do you conclude about the relationship between time and height? What horrible mistake would be easy to make if the analysis is conducted without a scatterplot?

Time (sec)	0.0	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8
Height (m)	0.0	1.7	3.1	3.9	4.5	4.7	4.6	4.1	3.3	2.1

5. Multiple Regression with Old Faithful Refer to the sample data given in Exercise 1 and find the multiple regression equation with the response (y) variable of "interval-after" time and predictor (x) variables of duration and "interval-before" time. Identify the value of the multiple coefficient of determination R^2, the adjusted R^2, and the P-value representing the overall significance of the multiple regression equation. Use a 0.05 significance level and determine whether the regression equation can be used to predict the time interval after an eruption given the duration of the eruption and the time interval before that eruption.

Cumulative Review Exercises

Please be aware that some of the following problems may require knowledge of concepts presented in previous chapters.

Effectiveness of Diet. ***Listed below are weights (lb) of subjects before and after the Zone diet. (Data are based on results from "Comparison of the Atkins, Ornish, Weight Watchers, and Zone Diets for Weight Loss and Heart Disease Risk Reduction," by Dansinger et al.,* Journal of the American Medical Association, *Vol. 293, No. 1.) Use the data for Exercises 1–5.***

Before	183	212	177	209	155	162	167	170
After	179	198	180	208	159	155	164	166

1. Diet Clinical Trial: Statistics Find the mean and standard deviation of the "before − after" differences.

2. Diet Clinical Trial: *z* Score Using only the weights before the diet, identify the highest weight and convert it to a z score. In the context of these sample data, is that highest value an "unusual" weight? Why or why not?

3. Diet Clinical Trial: Hypothesis Test Use a 0.05 significance level to test the claim that the diet is effective.

4. Diet Clinical Trial: Confidence Interval Construct a 95% confidence interval estimate of the mean weight of subjects before the diet. Write a brief statement interpreting the confidence interval.

5. Diet Clinical Trial: Correlation Use the before/after weights listed above.

a. Test for a correlation between the before and after weights.

b. If each subject were to weigh exactly the same after the diet as before, what would be the value of the linear correlation coefficient?

c. If all subjects were to lose 5% of their weight from the diet, what would be the value of the linear correlation coefficient found from the before/after weights?

d. What do the preceding results suggest about the suitability of correlation as a tool for testing the effectiveness of the diet?

6. Birth Weights Birth weights in the United States are normally distributed with a mean of 3420 g and a standard deviation of 495 g.

a. What percentage of babies are born with a weight greater than 3500 g?