Chapter 25

2. Chocolate A candy maker surveyed chocolate bars available in a local supermarket and found the following least squares regression model:

Calories (predicted) = 28.4 + 11.37 *Fat*(g) + 2.91 *Sugar*(g).

a) The hand-crafted chocolate she makes has 15g of fat and 20g of sugar. How many calories does the model predict for a serving?
b) In fact, a laboratory test shows that her candy has 227 calories per serving. Find the residual corresponding to this candy. (Be sure to include the units.)
c)What does that residual say about her candy?

25. Fifty states Use the data set on various measures of the 50 United States. The *Murder* rate is per 100,000, *HS Graduation* rate is in %, *Income* is per capita income in dollars, *Illiteracy* rate is per 1000, and *Life Expectancy* is in years. Find a regression model for *Life Expectancy* with three predictor variables by trying all four of the possible models.
a) Which model appears to do the best?
b) Would you leave all three predictors in this model?
c) Does this model mean that by changing the levels of the predictors in this equation, we could affect life expectancy in that state? Explain.
d) Be sure to check the conditions for multiple regression. What do you conclude?

21. Body fat, revisited The data set on body fat contains 15 body measurements on 250 men from 22 to 81 years old. Is average *%Body Fat* related to *Weight*? Use Minitab to make a scatterplot and simple regression.
a)Is the coefficient of *%Body Fat* on *Weight* statistically distinguishable from 0? (Perform a hypothesis test.)
b)What does the slope coefficient mean in this regression?

We saw before that the slopes of both *Waist* size and *Height* are statistically significant when entered into a multiple regression equation. What happens if we add *Weight* to that regression? Recall that we've already checked the assumptions and conditions for regression on *Waist* size and *Height* earlier in the chapter. Use Minitab to get the output for regression on *Waist*, *Height*, and *%Body Fat*.

c) Interpret the slope for *Weight*. How can the coefficient for *Weight* in this model be negative when its coefficient was positive in the simple regression model?
d)What does the P-value for *Height* mean in this regression? (Perform the hypothesis test.)