Chapter 3: Examining Relationships

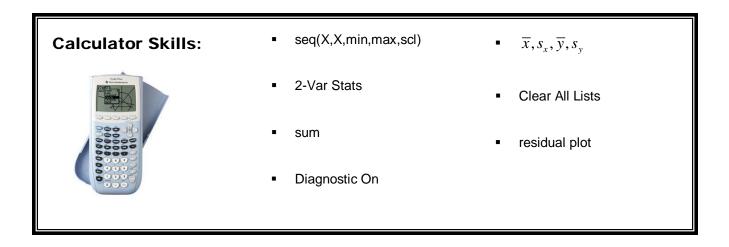
Key Vocabulary:

- response variable
- explanatory variable
- independent variable
- dependent variable
- scatterplot
- positive association
- negative association
- linear
- correlation
- r-value

- regression line
- mathematical model
- least-squares regression line
- \hat{y} "y-hat"
- SSM
- SSE
- r²

CHAPTER 3

- coefficient of determination
 residuals
- residuals
- influential observation



3.1 Scatterplots and Correlation (pp.171-199)

- 1. What is the difference between a response variable and an explanatory variable?
- 2. How are response and explanatory variables related to *dependent* and *independent* variables?
- 3. When is it appropriate to use a *scatterplot* to display data?
- 4. Which variable always appears on the horizontal axis of a scatterplot?
- 5. You can describe the overall pattern of a scatterplot by the...

- 6. Explain the difference between a *positive association* and a *negative association*.
- 7. How can quantitative data which belongs to different categories be differentiated on a scatterplot?
- 8. What does *correlation* measure?
- 9. Explain why two variables must both be *quantitative* in order to find the *correlation* between them.
- 10. What is true about the relationship between two variables if the *r*-value is:
 - a. Near 0?
 - b. Near 1?
 - c. Near -1?
 - d. Exactly 1?
 - e. Exactly -1?
- 11. Is correlation resistant to extreme observations? Explain.
- 12. What does it mean if two variables have high correlation?
- 13. What does it mean if two variables have weak correlation?
- 14. What does it mean if two variables have no correlation?

3.2 Least-Squares Regression (pp.199-233)

- 1. In what way is a *regression line* a *mathematical model*?
- 2. What is *extrapolation* and why is this dangerous?
- 3. What is a *least-squares regression line*?
- 4. What is the formula for the equation of the *least-squares regression line*?
- 5. The *least-squares regression line* always passes through the point ...
- 6. What is a *residual*?
- 7. How can you calculate *residuals* on your calculator and use this to produce a *residual plot*?
- 8. If a *least-squares regression line* fits the data well, what characteristics should the *residual plot* exhibit?
- 9. How is the *coefficient of determination* defined?
- 10. What is the formula for calculating the *coefficient of determination*?
- 11. If $r^2 = 0.95$, what can be concluded about the relationship between x and y?

3.3 Correlation and Regression Wisdom (pp.233-251)

- 1. What are three limitations of correlation and regression?
- 2. Under what conditions does an outlier become an *influential observation*?
- 3. What is a *lurking variable*?
- 4. Why does association not imply causation?

