# Learning objectives

After reading this chapter and doing the exercises, you should be able to:

1. Understand how regression analysis can be used to develop an equation that estimates mathematically how two variables are related.
2. Understand the differences between the regression model, the regression equation, and the estimated regression equation.
3. Know how to fit an estimated regression equation to a set of sample data based upon the least-squares method.
4. Determine how good a fit is provided by the estimated regression equation and compute the sample correlation coefficient from the regression analysis output.
5. Understand the assumptions necessary for statistical inference and be able to test for a significant relationship.
6. Know how to develop confidence interval estimates of the mean value of $Y$ and an individual value of $Y$ for a given value of $X$.
7. Learn how to use a residual plot to make a judgment as to the validity of the regression assumptions, recognise outliers and identify influential observations.
8. Use the Durbin-Watson test to test for autocorrelation.
9. Know the definition of the following terms:
   independent and dependent variable
   simple linear regression
   regression model
   regression equation and estimated regression equation
   scatter diagram
   coefficient of determination
   standard error of the estimate
   confidence interval
   prediction interval
   residual plot
   standardized residual plot
   outlier
   influential observation
   leverage