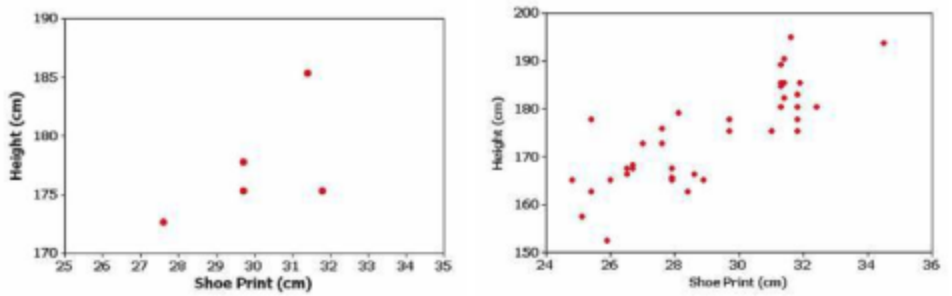
Explore!

Because it is always wise to explore sample data before applying a formal statistical procedure, we should use a scatterplot to explore the paired data visually. Figure 10-1(a) shows the scatterplot of the shoe/height data from Table 10-1. The scatterplot suggests that there might be a pattern, but it isn't very strong. Also, there are no outliers, which are points far away from all the other points. Figure 10-1(b) shows the scatterplot of all 40 pairs of shoe print and height measurements from Data Set 2 in Appendix B. Because Figure 10-1(b) includes more sample data, it gives us a better picture of the relationship between the two variables. Figure 10-1(b) shows that there is a pattern of points tending to rise as they move farther to the right, but the pattern does not appear to be very distinct. Again, there are no outliers.



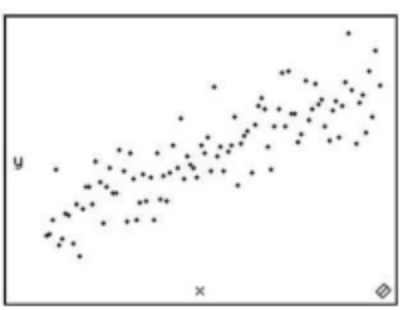
(a) (b)

Figure 10-1 Minitab Scatterplots

Interpreting Scatterplots

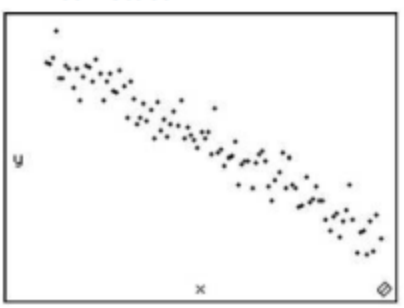
Figure 10-2 shows four scatterplots with different characteristics. The scatterplot in Figure 10-2(a) shows a distinct straight-line, or linear, pattern. We say that there is a *positive* linear correlation between x and y, since as the x-values increase, the

ActivStats



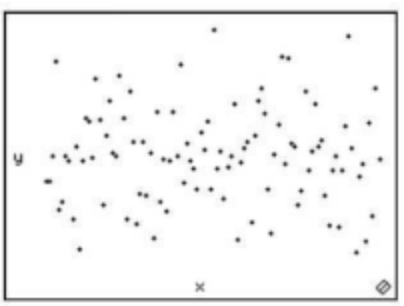
(a) Positive correlation: $r = 0.851$

ActivStats



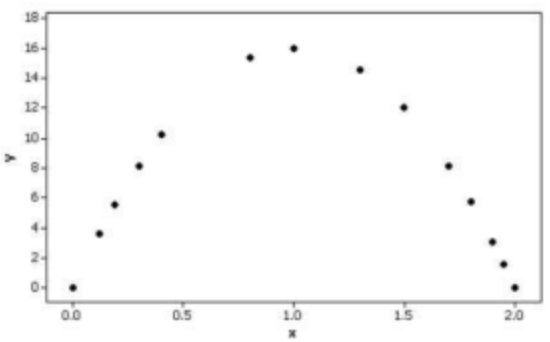
(b) Negative correlation: $r = -0.965$

ActivStats



(c) No correlation: $r = 0$

Minitab



(d) Nonlinear relationship: $r = -0.087$

Figure 10-2 Scatterplots

Speeding Out-of-Towners Ticketed More?

Are police more likely to issue a ticket to a speeding driver who is out-of-town than to a local driver? George Mason University researchers Michael Makowsky and Thomas Stratmann addressed this question by examining more than 60,000 warnings and tickets issued by Massachusetts police in one year. They found that out-of-town drivers from Massachusetts were 10% more likely to be ticketed than local drivers, and the 10% figure rose to 20% for out-of-state drivers. They also found a statistical association between a town's finances and speeding tickets. When compared to local drivers, out-of-town drivers had a 37% greater chance of being ticketed when speeding in a town in which voters had rejected a proposition to raise taxes more than the 2.5% amount allowed by state law. Such analyses can be conducted using methods of correlation and regression.