a. The table below lists IQ scores from 10 sets of twins, but technology was used to simulate the data. Use the methods of Section 10-2 to test for a linear correlation between the IQ scores of the first-born twins and the IQ scores of the second-born twins. Use a significance level of 0.10.

First-Born Twin	121	113	91	118	81	77	80	90	103	95
Second-Born Twin	108	110	79	111	138	96	100	80	102	109

b. Many technologies (including STATDISK, Minitab, Excel, StatCrunch, and the TI-83/84 Plus calculator) have a feature that allows you to randomly generate data from a normally distributed population with any mean and standard deviation. Use a technology to randomly generate IQ scores for each of 10 pairs of twins, as in the above table. Using your own simulated IQ scores, test for a linear correlation between the IQ scores of the first-born twin and the IQ scores of the second-born twin. Use a significance level of 0.10.

c. For the test conducted in part (b), a type I error is the mistake of rejecting a true null hypothesis, which, in this case, is to conclude that there is a linear correlation when in reality there is no linear correlation. What proportion of simulated sets of twins should result in a type I error? Repeat part (b) to verify that this proportion is approximately correct.

from data TO DECISION

Critical Thinking: Is replication validation?

The Chapter Problem includes Table 10-1, which lists shoe print lengths and heights for five male subjects. The data in Table 10-1 are from Data Set 2 in Appendix B. Data Set 2 lists a few different measurements from a sample of 19 males and 21 females. Listed below are foot lengths (cm) and heights (cm) for a sample of 50 males used in an anthropometric survey conducted by the U.S. Army. The data are paired according to their corresponding positions. The first male has a foot length of 26.0 cm and a height of 173.5 cm, the second male has a foot length of 29.0 cm and a height of 183.0 cm, and so on.

Foot Length (cm)

26.0	29.0	25.4	27.1	24.0	26.3	26.5	27.2	27.3	27.1
26.8	27.2	26.5	25.1	25.5	25.3	26.9	28.2	26.5	28.1
27.7	25.9	26.0	28.5	27.9	26.9	26.0	24.4	26.4	28.5
25.2	26.0	27.3	27.1	29.7	28.9	29.7	25.7	28.8	25.2
29.0	26.7	26.3	27.8	27.7	27.2	26.7	29.0	28.6	27.1

Height (cm)

173.5	183.0	172.6	178.3	166.9	175.8	178.8	182.9	174.5	164.3
169.8	172.7	173.4	168.4	166.7	168.0	178.5	188.5	184.1	170.2
173.8	173.2	173.9	187.7	172.5	170.4	174.8	164.7	169.9	176.1
167.1	164.4	173.9	174.9	184.5	195.4	184.4	160.1	184.6	167.2
193.4	186.2	169.4	174.0	173.9	171.9	172.2	177.6	189.7	173.0

Analyzing the Results

1. Use the given data to construct a scatterplot, then use the methods of Section 10-2 to test for a linear correlation between foot length and height. Compare the results to those found using the foot lengths and heights of the 19 males listed in Data Set 2 in Appendix B.

2. Use the given data to find the equation of the regression line. Let the response (y) variable be height. Compare the results to those found using the foot lengths and heights of the 19 males listed in Data Set 2 in Appendix B.

3. It was noted in the Chapter Problem that you can estimate a person's height by dividing foot length by 0.15. (An equivalent calculation is to estimate height by multiplying foot length by 6.67.) How does this rule compare to the use of a regression equation?