Now we refer to Table A-9 to find the critical values of ± 0.786 (based on $\alpha = 0.05$ and $n = 7$). Because the test statistic $r_s = 0.429$ is between the critical values of -0.786 and 0.786, we fail to reject the null hypothesis. There is not sufficient evidence to support a claim of a correlation between quality and price. Based on the given sample data, it appears that you don't necessarily get better quality by paying more.

Example 2 Large Sample Case

Refer to the measured systolic and diastolic blood pressure measurements of 40 randomly selected females in Data Set 1 in Appendix B and use a 0.05 significance level to test the claim that among women, there is a correlation between systolic blood pressure and diastolic blood pressure.

Solution

Requirement check The data are a simple random sample. ✓

Test Statistic The value of the rank correlation coefficient is $r_s = 0.505$, which can be found by using technology.

Critical Values Because there are 40 pairs of data, we have $n = 40$. Because n exceeds 30, we find the critical values from Formula 13-1 instead of Table A-9. With $\alpha = 0.05$ in two tails, we let $z = 1.96$ to get the critical values of -0.314 and 0.314, as shown below.

$$r_s = \frac{\pm 1.96}{\sqrt{40 - 1}} = \pm 0.314$$

The test statistic of $r_s = 0.505$ is not between the critical values of -0.314 and 0.314, so we reject the null hypothesis of $r_s = 0$. There is sufficient evidence to support the claim that among women, there is a correlation between systolic blood pressure and diastolic blood pressure.

Detecting Nonlinear Patterns Rank correlation methods sometimes allow us to detect relationships that we cannot detect with the methods of Chapter 10. See the accompanying scatterplot that shows an S-shaped pattern of points suggesting that there is a correlation between x and y. The methods of Chapter 10 result in the linear correlation coefficient of $r = 0.590$ and critical values of ± 0.632, suggesting that

NONLINEAR PATTERN