double approximately every 18 months. In the table below, the first row lists different years and the second row lists the number of transistors (in thousands) for different years.

1971	1974	1978	1982	1985	1989	1993	1997	2000	2002	2003	2007	2011
2.3	5	29	120	275	1180	3100	7500	42,000	220,000	410,000	789,000	2,600,000

a. Assuming that Moore's law is correct and transistors per square inch double every 18 months, which mathematical model best describes this law: linear, quadratic, logarithmic, exponential, power? What specific function describes Moore's law?

b. Which mathematical model best fits the listed sample data?

c. Compare the results from parts (a) and (b). Does Moore's law appear to be working reasonably well?

18. Sum of Squares Criterion In addition to the value of R^2, another measurement used to assess the quality of a model is the *sum of squares of the residuals.* Recall from Section 10-3 that a residual is the difference between an observed y value and the value of y predicted from the model, which is denoted as $\hat{y}$. Better models have smaller sums of squares. Refer to the data in Table 10-7.

a. Find $\Sigma(y - \hat{y})^2$, the sum of squares of the residuals resulting from the linear model.

b. Find the sum of squares of residuals resulting from the quadratic model.

c. Verify that according to the sum of squares criterion, the quadratic model is better than the linear model.

Chapter 10 Review

The core content of this chapter focuses on a correlation between two variables, so much of the chapter deals with paired data. Section 9-4 includes methods for forming inferences from two dependent samples, so Section 9-4 also deals with paired data, but this chapter and Section 9-4 have fundamentally different objectives. Consider the table below with the two different scenarios that follow to see the basic difference between them.

x	75	83	66	90	55
y	87	83	69	92	72

Scenario 1: Dependent Samples The data in the table represent measurements of strength. The variable x is the measurement *before* a training program and y is the measurement of the same person *after* a training program. Here, the issue is whether the training program is effective, so we want to test the hypothesis that the sample differences are from a population with a mean that is less than 0, indicating that the posttraining scores are higher than the pretraining scores. The methods of Section 9-4 apply.

Scenario 2: Paired Sample Data The data in the table are measurements from a sample of five subjects. The x values are scores on a test of depth perception, and the y values are the times (sec) required to complete a particular task. Here, the issue is whether there is a correlation between the two variables, and the methods of this chapter apply. The following is a brief review of those methods.

- Section 10-2 includes methods for using scatterplots and the linear correlation coefficient r to determine whether there is sufficient evidence to support a claim of a linear correlation between two variables.

- In Section 10-3 we presented methods for finding the equation of the regression line that best fits a graph of the paired data. When the regression line fits the data reasonably well, the regression equation can be used to predict the value of a variable, given some value of the other variable.