EXTRAPOLATION Using a line or its equation to approximate a value outside the range of known values is called **linear extrapolation**.

EXAMPLE 2 Extrapolate using an equation

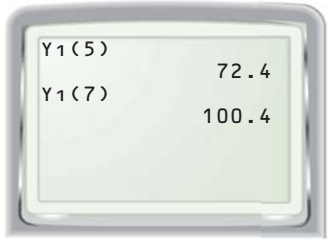
CD SINGLES Look back at Example 1.

a. Use the equation from Example 1 to approximate the number of CD singles shipped in 1998 and in 2000.

b. In 1998 there were actually 56 million CD singles shipped. In 2000 there were actually 34 million CD singles shipped. *Describe* the accuracy of the extrapolations made in part (a).

Solution

a. Evaluate the equation of the best-fitting line from Example 1 for $x = 5$ and $x = 7$.



The model predicts about 72 million CD singles shipped in 1998 and about 100 million CD singles shipped in 2000.

b. The differences between the predicted number of CD singles shipped and the actual number of CD singles shipped in 1998 and 2000 are 16 million CDs and 66 million CDs, respectively. The difference in the actual and predicted numbers increased from 1998 to 2000. So, the equation of the best-fitting line gives a less accurate prediction for the year that is farther from the given years.

ACCURACY As Example 2 illustrates, the farther removed an x-value is from the known x-values, the less confidence you can have in the accuracy of the predicted y-value. This is true in general but not in every case.

GUIDED PRACTICE for Examples 1 and 2

1. **HOUSE SIZE** The table shows the median floor area of new single-family houses in the United States during the period 1995–1999.

Year	1995	1996	1997	1998	1999
Median floor area (square feet)	1920	1950	1975	2000	2028

a. Find an equation that models the floor area (in square feet) of a new single-family house as a function of the number of years since 1995.

b. Predict the median floor area of a new single-family house in 2000 and in 2001.

c. Which of the predictions from part (b) would you expect to be more accurate? *Explain* your reasoning.