

## Lesson 8-8

### Example 1 Make Predictions from a Best-Fit Line

**CHILDREN** The table shows the age (in months) and the height (in inches) of infants.

Age (months)	Height (in.)
2	19
8	23
1	21.5
12	22.5
5	20
6	22.25

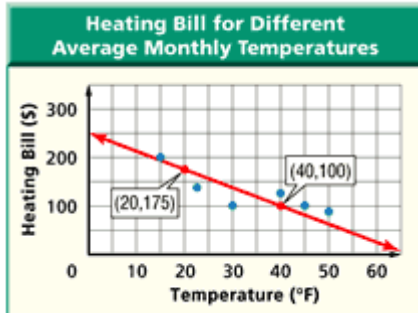
**a. Make a scatter plot and draw a best-fit line for the data.**

**b. Use the best-fit line to predict the height of a 16 month old child.**

Extend the line so that you can find the  $y$  value for an  $x$  value of 16. The  $y$  value for 16 is about 29. So, a prediction for the height of a 16 month old child is approximately 29 inches.

## Example 2 Make Predictions from an Equation

**HEATING BILL** The scatter plot shows the relationship between average monthly temperature during the winter and the corresponding heating bill for that month.



a. Write an equation in slope-intercept form for the best-fit line.

### Step 1

First, select two points on the line and find the slope.

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} && \text{Definition of slope} \\ &= \frac{175 - 100}{20 - 40} && (x_1, y_1) = (40, 100); (x_2, y_2) = (20, 175) \\ &= -3.75 && \text{Simplify.} \end{aligned}$$

### Step 2

Next, find the y-intercept.

$$\begin{aligned} y &= mx + b && \text{Slope-intercept form} \\ 100 &= -3.75(40) + b && \text{Replace } (x, y) \text{ with } (40, 100) \text{ and } m \text{ with } -3.75. \\ 250 &= b && \text{Simplify.} \end{aligned}$$

### Step 3

Write the equation.

$$\begin{aligned} y &= mx + b && \text{Slope-intercept form} \\ y &= -3.75x + 250 && \text{Replace } m \text{ with } -3.75 \text{ and } b \text{ with } 250. \end{aligned}$$

b. Predict the monthly heating bill for a winter month having average temperature of 10°F.

$$\begin{aligned} y &= -3.75x + 250 && \text{Write the equation of the best-fit line.} \\ y &= -3.75(10) + 250 && \text{Replace } x \text{ with } 10. \\ y &= 212.5 && \text{Simplify.} \end{aligned}$$

A prediction for the monthly heating bill for a winter month in which the average temperature is 10° F is \$212.50.