REAL-LIFE PROBLEMS In a real-life context, a line's slope can represent an average rate of change. The *y*-intercept in a real-life context is often an initial value.

EXAMPLE 3 **TAKS REASONING: Multi-Step Problem**

BIOLOGY The body length *y* (in inches) of a walrus calf can be modeled by $y = 5x + 42$ where *x* is the calf's age (in months).
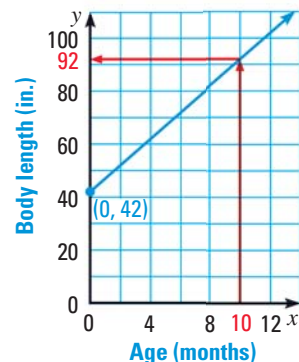
• Graph the equation.

• Describe what the slope and *y*-intercept represent in this situation.

• Use the graph to estimate the body length of a calf that is 10 months old.

Solution

STEP 1 **Graph** the equation.

STEP 2 **Interpret** the slope and *y*-intercept. The slope, 5, represents the calf's rate of growth in inches per month. The *y*-intercept, 42, represents a newborn calf's body length in inches.

ANOTHER WAY
You can check the result you obtained from the graph by substituting 10 for *x* in $y = 5x + 42$ and simplifying.

STEP 3 **Estimate** the body length of the calf at age 10 months by starting at 10 on the *x*-axis and moving up until you reach the graph. Then move left to the *y*-axis. At age 10 months, the body length of the calf is about 92 inches.

✓ **GUIDED PRACTICE** for Example 3

10. **WHAT IF?** In Example 3, suppose that the body length of a fast-growing calf is modeled by $y = 6x + 48$. Repeat the steps of the example for the new model.

DEFINE X-INTERCEPT
An *x*-intercept is sometimes defined as a *point* where a graph intersects the *x*-axis, not the *x*-coordinate of such a point.

STANDARD FORM The **standard form** of a linear equation is $Ax + By = C$ where *A* and *B* are not both zero. You can graph an equation in standard form by identifying and plotting the *x*- and *y*-intercepts. An **x-intercept** is the *x*-coordinate of a point where a graph intersects the *x*-axis.

KEY CONCEPT *For Your Notebook*

Using Standard Form to Graph an Equation

STEP 1 **Write** the equation in standard form.

STEP 2 **Identify** the *x*-intercept by letting $y = 0$ and solving for *x*. Use the *x*-intercept to plot the point where the line crosses the *x*-axis.

STEP 3 **Identify** the *y*-intercept by letting $x = 0$ and solving for *y*. Use the *y*-intercept to plot the point where the line crosses the *y*-axis.

STEP 4 **Draw** a line through the two points.