



EXAMPLE 3 Predict using an equation

SOFTBALL The table shows the number of participants in U.S. youth softball during the period 1997–2001. Predict the year in which the number of youth softball participants reaches 1.2 million.

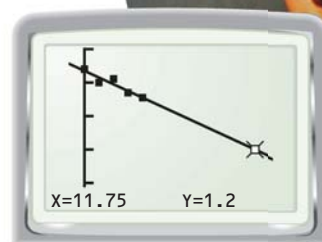
Year	1997	1998	1999	2000	2001
Participants (millions)	1.44	1.4	1.411	1.37	1.355

Solution

STEP 1 Perform linear regression. Let x represent the number of years since 1997, and let y represent the number of youth softball participants (in millions). The equation for the best-fitting line is approximately $y = -0.02x + 1.435$.

STEP 2 Graph the equation of the best-fitting line. Trace the line until the cursor reaches $y = 1.2$. The corresponding x -value is shown at the bottom of the calculator screen.

► There will be 1.2 million participants about 12 years after 1997, or in 2009.



ANOTHER WAY

You can also predict the year by substituting 1.2 for y in the equation and solving for x :

$$y = 0.02x + 1.435$$

$$1.2 = -0.02x + 1.435$$

$$x = 11.75$$



GUIDED PRACTICE for Example 3

2. **SOFTBALL** In Example 3, in what year will there be 1.25 million youth softball participants in the U.S.?

ZERO OF A FUNCTION A **zero of a function** $y = f(x)$ is an x -value for which $f(x) = 0$ (or $y = 0$). Because $y = 0$ along the x -axis of the coordinate plane, a zero of a function is an x -intercept of the function's graph.

KEY CONCEPT

For Your Notebook

Relating Solutions of Equations, x -Intercepts of Graphs, and Zeros of Functions

In Chapter 3 you learned to solve an equation like $2x - 4 = 0$:

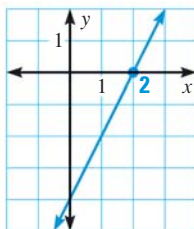
$$2x - 4 = 0$$

$$2x = 4$$

$$x = 2$$

The solution of $2x - 4 = 0$ is 2.

In Chapter 4 you found the x -intercept of the graph of a function like $y = 2x - 4$:



Now you are finding the zero of a function like $f(x) = 2x - 4$:

$$f(x) = 0$$

$$2x - 4 = 0$$

$$x = 2$$

The zero of $f(x) = 2x - 4$ is 2.