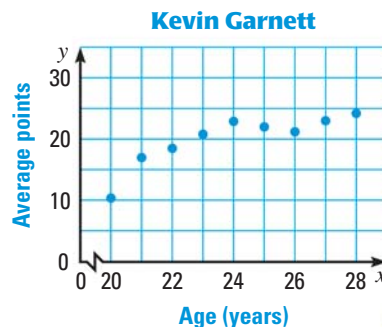
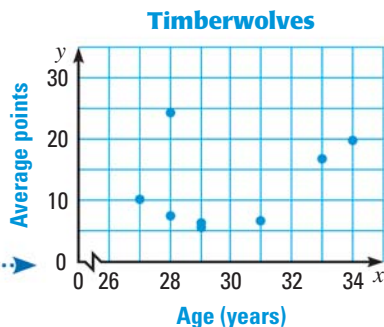


EXAMPLE 3 Use the vertical line test

BASKETBALL The first graph below plots average points per game versus age at the end of the 2003–2004 NBA regular season for the 8 members of the Minnesota Timberwolves with the highest averages. The second graph plots average points per game versus age for one team member, Kevin Garnett, over his first 9 seasons. Are the relations shown by the graphs functions? Explain.



READING GRAPHS

The zigzag symbol on the horizontal axis of each graph indicates that values of x were skipped.

Solution

The team graph *does not* represent a function because vertical lines at $x = 28$ and $x = 29$ each intersect the graph at more than one point. The graph for Kevin Garnett *does* represent a function because no vertical line intersects the graph at more than one point.



GUIDED PRACTICE for Example 3

3. **WHAT IF?** In Example 3, suppose that Kevin Garnett averages 24.2 points per game in his tenth season as he did in his ninth. If the relation given by the second graph is revised to include the tenth season, is the relation still a function? *Explain.*

EQUATIONS IN TWO VARIABLES Many functions can be described by an **equation in two variables**, such as $y = 3x - 5$. The input variable (in this case, x) is called the **independent variable**. The output variable (in this case, y) is called the **dependent variable** because its value *depends* on the value of the input variable.

An ordered pair (x, y) is a **solution** of an equation in two variables if substituting x and y in the equation produces a true statement. For example, $(2, 1)$ is a solution of $y = 3x - 5$ because $1 = 3(2) - 5$ is true. The **graph** of an equation in two variables is the set of all points (x, y) that represent solutions of the equation.

KEY CONCEPT

For Your Notebook

Graphing Equations in Two Variables

To graph an equation in two variables, follow these steps:

- STEP 1** Construct a table of values.
- STEP 2** Plot enough points from the table to recognize a pattern.
- STEP 3** Connect the points with a line or a curve.