

# 8-4 Equations as Functions (Pages 392–395)

You can write equations that represent functions in **functional notation**:  $f(x)$ . You read this symbol as  $f$  of  $x$ . You can think of  $f(x)$  as another way to write the  $y$ -value in an ordered pair. To find the value of  $f(x)$ , substitute the given  $x$ -value for  $x$  in the equation.

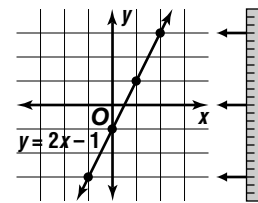
## EXAMPLES

**A** Solve  $y = 2x - 1$  if the domain is  $\{-1, 0, 1, 2\}$ . Is this equation a function?

Make a table of the domain and corresponding range values.

| $x$ | $y$                 | $(x, y)$   |
|-----|---------------------|------------|
| -1  | $2(-1) - 1$ or $-3$ | $(-1, -3)$ |
| 0   | $2(0) - 1$ or $-1$  | $(0, -1)$  |
| 1   | $2(1) - 1$ or $1$   | $(1, 1)$   |
| 2   | $2(2) - 1$ or $3$   | $(2, 3)$   |

Graph the ordered pairs and use the vertical line test to determine if the equation is a function.



Since no vertical line passes through more than one point on the graph for each value of  $x$ , the equation is a function.

If  $f(x) = 2x - 1$  and  $g(x) = x^2$ , find each of the following.

**B**  $f(5)$

$$\begin{aligned} f(5) &= 2(5) - 1 \\ &= 10 - 1 \\ &= 9 \end{aligned}$$

**C**  $g(-7)$

$$\begin{aligned} g(-7) &= (-7)^2 \\ &= 49 \end{aligned}$$

**D**  $3[f(4)]$

$$\begin{aligned} 3[f(4)] &= 3[2(4) - 1] \\ &= 3[8 - 1] \\ &= 3[7] \text{ or } 21 \end{aligned}$$

## Try These Together

- Solve  $y = x^2$  if the domain is  $\{-2, -1, 0, 1\}$ . Is this equation a function?
- If  $h(x) = -3x + 8$ , find  $h(-4)$ .

## PRACTICE

For each equation, solve for the domain  $= \{-3, 1, 3, 4\}$  and determine if the equation is a function.

- $y = 2x + 1$
- $y = -3x + 5$
- $y = 4x - 3$

Given  $f(x) = x + 3$ ,  $g(x) = 6x - 1$ , and  $h(x) = x^2 + 2$ , find each value.

- $f(-4)$
- $h(2)$
- $g(0)$
- $h(-6)$
- $g\left(\frac{1}{2}\right)$
- $g(-3)$
- $f(0.8)$
- $4[g(5)]$



**14. Standardized Test Practice** Given  $f(x) = 3x - 8$ , evaluate  $f(-4)$ .

- A** -36      **B** -20      **C** 4      **D** 96

**Answers:** 1.  $(-2, 4), (-1, 1), (0, 0), (1, 1), (3, 9), (4, 16)$ ; yes 2. 20 3.  $a. (-3, -5), (1, 3), (3, 7), (4, 9)$  b. yes 4.  $a. (-3, 14), (1, 2), (3, -4), (4, -7)$  b. yes 5.  $(-3, -15), (1, 1), (3, 9), (4, 16)$ ; yes 6. -1 7. 6 8. -1 9. 38 10. 2 11. -19 12. 3.8 13. 116 14. B