

Function Notation

A linear function can be written in the form $y = mx + b$. By naming a linear function f , you can also write the function using **function notation**.

$$f(x) = mx + b \quad \text{Function notation}$$

The notation $f(x)$ is another name for y . If f is a function, and x is in its domain, then $f(x)$ represents the output of f corresponding to the input x . You can use letters other than f to name a function, such as g or h .

Example 1 Evaluate the function for the given value of x .

a. $f(x) = 2x + 5; x = 7$

$$\begin{aligned} f(7) &= 2(7) + 5 && \text{Substitute 7 for } x. \\ &= 14 + 5 && \text{Multiply.} \\ &= 19 && \text{Add.} \end{aligned}$$

▶ When $x = 7$, $f(x) = 19$.

b. $g(x) = 4x - x^2; x = -3$

$$\begin{aligned} g(-3) &= 4(-3) - (-3)^2 && \text{Substitute } -3 \text{ for } x. \\ &= -12 - 9 && \text{Multiply.} \\ &= -21 && \text{Subtract.} \end{aligned}$$

▶ When $x = -3$, $g(x) = -21$.

Example 2 Determine whether the ordered pair is a solution of the equation.

a. $h(x) = 8 + x; (-6, 2)$

$$\begin{aligned} 2 &\stackrel{?}{=} 8 + (-6) && \text{Substitute } -6 \text{ for } x \\ &&& \text{and } 2 \text{ for } h(x). \\ 2 &= 2 \quad \checkmark && \text{Add.} \end{aligned}$$

▶ So, $(-6, 2)$ is a solution.

b. $p(x) = |3x - 1|; (-2, -7)$

$$\begin{aligned} -7 &\stackrel{?}{=} |3(-2) - 1| && \text{Substitute } -2 \text{ for } x \\ &&& \text{and } -7 \text{ for } p(x). \\ -7 &\stackrel{?}{=} |-7| && \text{Evaluate.} \\ -7 &\neq 7 \quad \times && \text{Evaluate.} \end{aligned}$$

▶ So, $(-2, -7)$ is *not* a solution.

Practice

Check your answers at BigIdeasMath.com.

Evaluate the function for the given value of x .

1. $f(x) = x + 9; x = 8$

2. $g(x) = 6 - 5x; x = -1$

3. $h(x) = 4x + 3; x = 10$

4. $n(x) = -x - 4; x = -2$

5. $p(x) = -\frac{3}{4}x^2; x = 6$

6. $q(x) = x^2 - 11x; x = 4$

7. $k(x) = x^2 + 7x - 1; x = -3$

8. $h(x) = |3x - 8|; x = 1$

9. $f(x) = |x| + 2; x = -15$

Determine whether the ordered pair is a solution of the equation.

10. $f(x) = 3x + 5; (-1, 2)$

11. $h(x) = 7x - 2; (-3, -19)$

12. $g(x) = -x^2 + x + 5; (-5, 25)$

13. $n(x) = x^2 - 6x - 1; (4, -7)$

14. $h(x) = |x| - 14; (-4, 10)$

15. $p(x) = |-9x - 2|; (0, 2)$

16. **TICKETS** The function $C(x) = 49.5x + 19.5$ represents the cost (in dollars) of buying x concert tickets. How much does it cost to buy four tickets? How many tickets can you buy with \$465?