

# 3.3

## Function Notation

For use with Exploration 3.3

**Essential Question** How can you use function notation to represent a function?

### 1 EXPLORATION: Matching Functions with Their Graphs

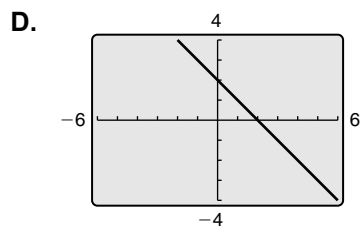
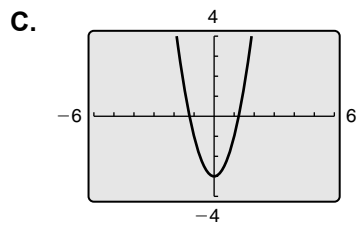
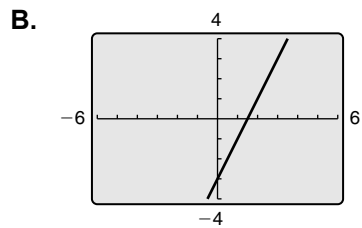
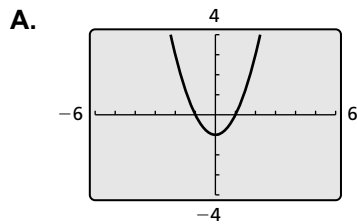
Work with a partner. Match each function with its graph.

a.  $f(x) = 2x - 3$

b.  $g(x) = -x + 2$

c.  $h(x) = x^2 - 1$

d.  $j(x) = 2x^2 - 3$



**3.3** Function Notation (continued)**2** **EXPLORATION:** Evaluating a Function

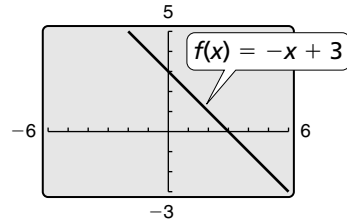
Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

Work with a partner. Consider the function

$$f(x) = -x + 3.$$

Locate the points  $(x, f(x))$  on the graph.

Explain how you found each point.



a.  $(-1, f(-1))$

b.  $(0, f(0))$

c.  $(1, f(1))$

d.  $(2, f(2))$

**Communicate Your Answer**

3. How can you use function notation to represent a function? How are standard notation and function notation similar? How are they different?

*Standard Notation*

$$y = 2x + 5$$

*Function Notation*

$$f(x) = 2x + 5$$

**3.3****Practice**

For use after Lesson 3.3

**Notes:****Worked-Out Examples****Example #1****Evaluate the function when  $x = -2$ ,  $0$ , and  $5$ .**

$$h(x) = -2x + 9$$

$$h(-2) = -2(-2) + 9$$

$$= 4 + 9$$

$$= 13$$

$$h(x) = -2x + 9$$

$$h(0) = -2(0) + 9$$

$$= 0 + 9$$

$$= 9$$

$$h(x) = -2x + 9$$

$$h(5) = -2(5) + 9$$

$$= -10 + 9$$

$$= -1$$

**Example #2****MODELING WITH MATHEMATICS** The function  $C(x) = 17.5x - 10$  represents the cost (in dollars) of buying  $x$  tickets to the orchestra with a \$10 coupon.

- How much does it cost to buy five tickets?
- How many tickets can you buy with \$130?

- $C(x) = 17.5x - 10$

$$C(5) = 17.5(5) - 10$$

$$= 87.5 - 10$$

$$= 77.5$$

It costs \$77.50 to buy five tickets.

- $C(x) = 17.5x - 10$

$$130 = 17.5x - 10$$

$$\begin{array}{r} + 10 \\ \hline 140 = 17.5x \end{array}$$

$$140 = 17.5x$$

$$\frac{140}{17.5} = \frac{17.5x}{17.5}$$

$$8 = x$$

You can buy 8 tickets with \$130.

**3.3 Practice (continued)****Practice A**

In Exercises 1–6, evaluate the function when  $x = -4$ ,  $0$ , and  $2$ .

1.  $f(x) = -x + 4$

2.  $g(x) = 5x$

3.  $h(x) = 7 - 2x$

4.  $s(x) = 12 - 0.25x$

5.  $t(x) = 6 + 3x - 2$

6.  $u(x) = -2 - 2x + 7$

7. Let  $n(t)$  be the number of DVDs you have in your collection after  $t$  trips to the video store. Explain the meaning of each statement.

a.  $n(0) = 8$

b.  $n(3) = 14$

c.  $n(5) > n(3)$

d.  $n(7) - n(2) = 10$

In Exercises 8–11, find the value of  $x$  so that the function has the given value.

8.  $b(x) = -3x + 1$ ;  $b(x) = -20$

9.  $r(x) = 4x - 3$ ;  $r(x) = 33$

10.  $m(x) = -\frac{3}{5}x - 4$ ;  $m(x) = 2$

11.  $w(x) = \frac{5}{6}x - 3$ ;  $w(x) = -18$

**3.3 Practice (continued)**

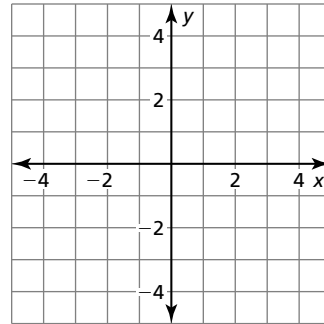
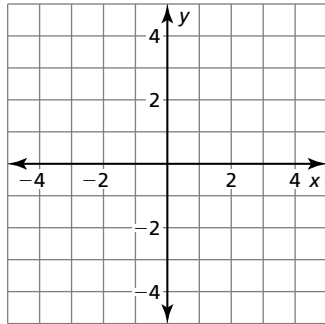
In Exercises 12 and 13, graph the linear function.

12.  $s(x) = \frac{1}{2}x - 2$

13.  $t(x) = 1 - 2x$

<b>x</b>	-4	-2	0	2	4
<b>s(x)</b>					

<b>x</b>	-2	-1	0	1	2
<b>t(x)</b>					



14. The function  $B(m) = 50m + 150$  represents the balance (in dollars) in your savings account after  $m$  months. The table shows the balance in your friend's savings account. Who has the better savings plan? Explain.

Month	Balance
2	\$330
4	\$410
6	\$490

## Practice B

In Exercises 1–3, evaluate the function when  $x = -2, 0,$  and  $5$ .

1.  $f(x) = 1.5x + 1$                       2.  $g(x) = 11 - 3x + 2$                       3.  $h(x) = -3 - x - 2$

4. Let  $g(x)$  be the percent of your friends with a landline phone  $x$  years after 2000.

Explain the meaning of each statement.

a.  $g(0) = 100$

b.  $g(5) = g(6)$

c.  $g(10) = m$

d.  $g(11) > g(12)$

In Exercises 5–8, find the value of  $x$  so that the function has the given value.

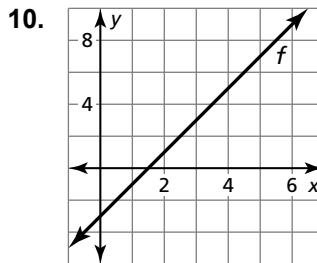
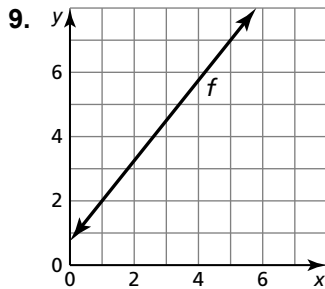
5.  $f(x) = 8x - 7; f(x) = 17$

6.  $g(x) = -4x + 7; g(x) = 27$

7.  $f(x) = \frac{1}{3}x - 1; f(x) = 9$

8.  $h(x) = 6 - \frac{2}{3}x; h(x) = -2$

In Exercises 9 and 10, find the value of  $x$  so that  $f(x) = 7$ .



In Exercises 11–14, graph the linear function.

11.  $h(x) = -\frac{3}{2}x + 4$

12.  $p(x) = \frac{1}{4}x - 1$

13.  $v(x) = -5 + 2x$

14.  $k(x) = 4 - 3x$

15. The function  $C(x) = 35x + 75$  represents the labor cost (in dollars) for Bob's Auto Repair to replace your alternator, where  $x$  is the number of hours. The table shows sample labor costs from its main competitor, Budget Auto Repair. The alternator is estimated to take 5 hours of labor. Which company would you hire? Explain.

<b>Hours</b>	1	2	3
<b>Cost</b>	\$90	\$130	\$170