

11-2

Study Guide and Intervention

Functions

A **function** connects an input number, x , to an output number, $f(x)$, by a rule. To find the value of a function for a certain number, substitute the number into the rule in place of x , and simplify.

EXAMPLE 1 Find $f(5)$ if $f(x) = 2 + 3x$.

$$f(x) = 2 + 3x$$

Write the function.

$$f(5) = 2 + 3(5) \text{ or } 17$$

Substitute 5 for x into the function rule and simplify.

$$\text{So, } f(5) = 17.$$

* Replace the x with the number in parenthesis

$2 + 3x$ means

2 plus 3 times x or 2 plus 3 times 5

You can organize the input, rule and output of a function using a function table.

$$2 + 3 \cdot 5$$

EXAMPLE 2 Complete the function table for $f(x) = 2x + 4$.

Substitute each value of x , or input, into the function rule. Then simplify to find the output.

$$f(x) = 2x + 4$$

$$f(-1) = 2(-1) + 4 \text{ or } 2$$

$$f(0) = 2(0) + 4 \text{ or } 4$$

$$f(1) = 2(1) + 4 \text{ or } 6$$

$$f(2) = 2(2) + 4 \text{ or } 8$$

Input x	Rule $2x + 4$	Output $f(x)$
-1	$2(-1) + 4$	2
0	$2(0) + 4$	4
1	$2(1) + 4$	6
2	$2(2) + 4$	8

EXERCISES

Find each function value.

1. $f(1)$ if $f(x) = x + 3$

$$f(1) = 1 + 3 = 4$$

$$f(1) = 4$$

2. $f(6)$ if $f(x) = 2x$

$$f(6) = 2 \cdot 6 = 12$$

$$f(6) = 12$$

3. $f(4)$ if $f(x) = 5x - 4$

$$f(4) = 5 \cdot 4 - 4 = 20 - 4 = 16$$

$$f(4) = 16$$

4. $f(9)$ if $f(x) = -3x + 10$

$$f(9) = -3 \cdot 9 + 10$$

$$f(9) = -27 + 10$$

$$f(9) = -17$$

5. $f(-2)$ if $f(x) = 4x - 1$

$$f(-2) = 4 \cdot -2 - 1$$

$$f(-2) = -8 - 1$$

$$f(-2) = -9$$

6. $f(-5)$ if $f(x) = -2x + 8$

$$f(-5) = -2 \cdot -5 + 8$$

$$f(-5) = 10 + 8$$

$$f(-5) = 18$$

Complete each function table.

7. $f(x) = x - 10$

x	$x - 10$	$f(x)$
-1	$-1 - 10$	-11
0	$0 - 10$	-10
1	$1 - 10$	-9
2	$2 - 10$	-8

8. $f(x) = 2x + 6$

x	$2x + 6$	$f(x)$
-3	$2 \cdot -3 + 6$	0
-1	$2 \cdot -1 + 6$	4
2	$2 \cdot 2 + 6$	10
4	$2 \cdot 4 + 6$	14

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

x	$2 - 3x$	$f(x)$
-2	$2 - 3 \cdot -2$	8
0	$2 - 3 \cdot 0$	2
3	$2 - 3 \cdot 3$	-7
4	$2 - 3 \cdot 4$	-10

11-2**Practice: Skills****Functions****Find each function value.**

1. $f(2)$ if $f(x) = x + 4$

2. $f(9)$ if $f(x) = x - 8$

3. $f(3)$ if $f(x) = 2x + 2$

4. $f(6)$ if $f(x) = 2x - 5$

5. $f(-7)$ if $f(x) = 3x + 6$

6. $f(8)$ if $f(x) = 3x - 10$

7. $f(-5)$ if $f(x) = 4x + 2$

8. $f(-3)$ if $f(x) = -4x - 4$

9. $f(-4)$ if $f(x) = -5x - 3$

Complete each function table.

10. $f(x) = x + 7$

x	$x + 7$	$f(x)$
-1		
0		
1		
2		

11. $f(x) = x - 13$

x	$x - 13$	$f(x)$
-2		
-1		
2		
3		

12. $f(x) = 2x + 8$

x	$2x + 8$	$f(x)$
-3		
-1		
0		
4		

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

x	$2x - 3$	$f(x)$
-2		
2		
5		
8		

14. $f(x) = 3x + 4$

x	$3x + 4$	$f(x)$
-4		
-2		
1		
3		

15. $f(x) = 7 - 3x$

x	$7 - 3x$	$f(x)$
-3		
-1		
3		
5		

16. $f(x) = 4x + 5$

x	$4x + 5$	$f(x)$
-4		
-1		
2		
6		

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

x	$1 - 4x$	$f(x)$
-2		
0		
3		
5		

18. $f(x) = 6x - 2$

x	$6x - 2$	$f(x)$
-5		
-3		
2		
7		