

Lesson 1.2: Function Notation

In algebra, symbols such as x and y are used to represent numbers. To represent functions, we often use symbols such as $f(x)$ and $g(x)$. For example, we may write:

$$f(x) = x^2 - 3x - 4$$

The symbol, $f(x)$ is read "f of x", and means that the expression which follows contains x as a variable. This notation is useful because it simplifies recording the values of the function for several values of x . For example, $f(6)$ means to substitute 6 for x everywhere x occurs in the expression.

$$\begin{aligned} f(x) &= x^2 - 3x - 4 \\ f(6) &= 6^2 - 3(6) - 4 \\ &= 36 - 18 - 4 \\ &= 14 \end{aligned}$$

Example 1

If $f(x) = 3x^2 - x - 6$, find $f(2)$.

Example 2

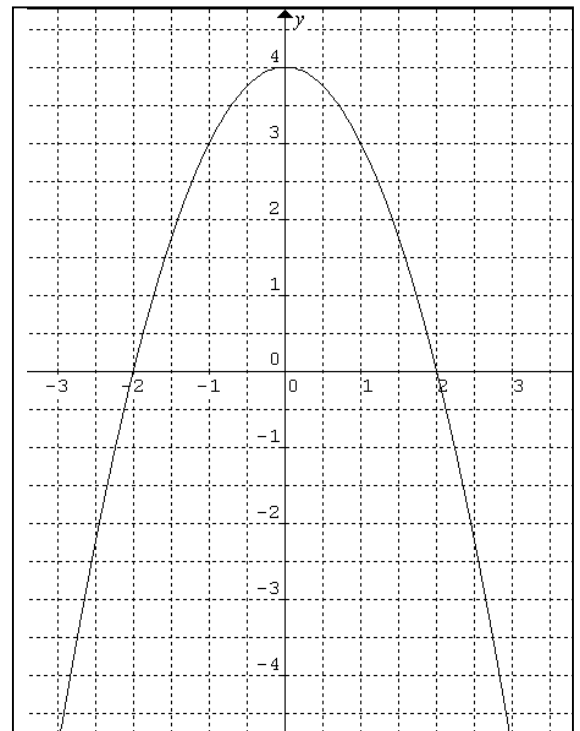
From the graph of $y = f(x)$ shown, find:

- a) $f(2)$ b) $f(0)$ c) $f(-1)$

Example 3

If $f(x) = -3x + 2$ write and simplify:

- a) $f(p)$ b) $f(3t)$
- c) $f(-a)$ d) $f(4 + 3w)$



Example 4

If $f(x) = 4x + 3$ find the value of x when $f(x) = 15$.

Example 5

If $f(x) = x^2 + 5x$ find x when $f(x) = 14$.

Example 6

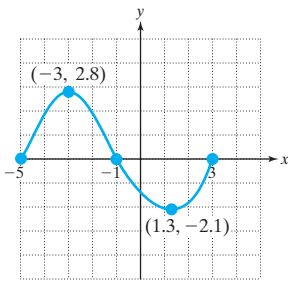
If $f(x) = 5 - 3x$ and $g(x) = 4x + 1$, find a value of x such that:

a) $f(x) = g(x)$

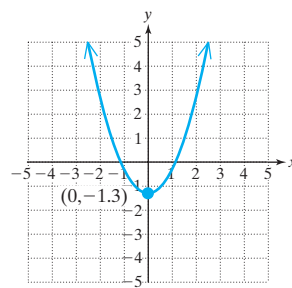
b) $f(x + 2) = g(x - 1)$

For Exercises 11–24, find the domain and range of the relations. Use interval notation where appropriate.

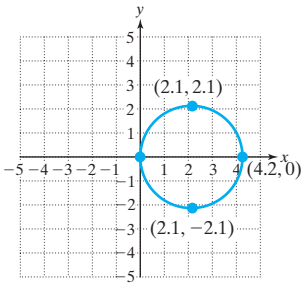
11.



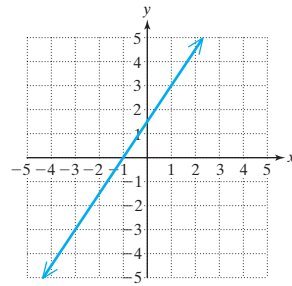
12.



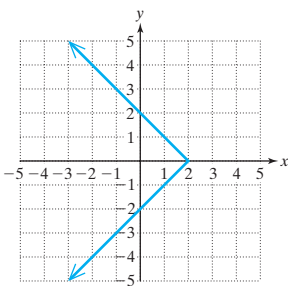
13.



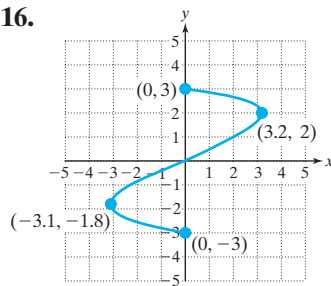
14.



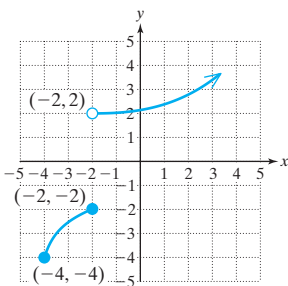
15.



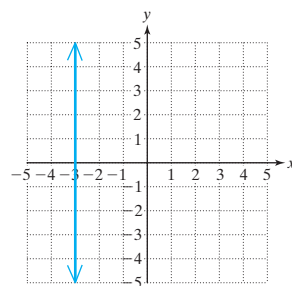
16.



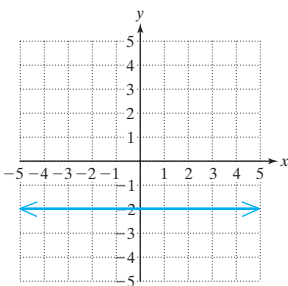
17. *Hint:* The open circle indicates that the point is not included in the relation.



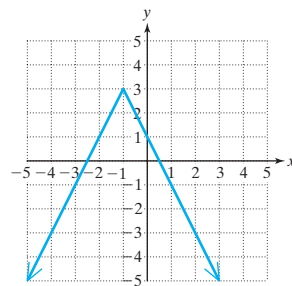
18.



19.

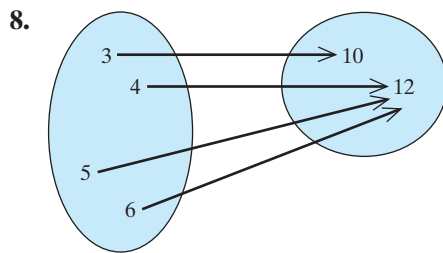
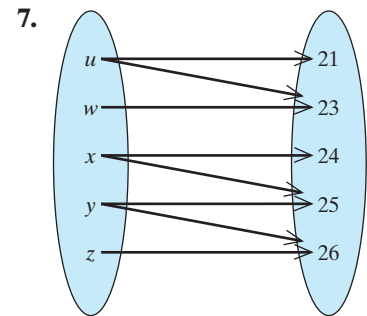
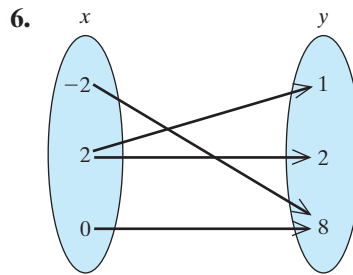
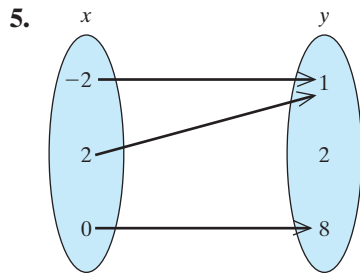


20.



Concept 1: Definition of a Function

For Exercises 5–10, determine if the relation defines y as a function of x .

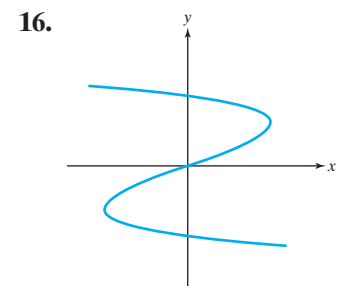
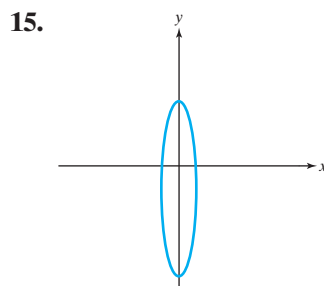
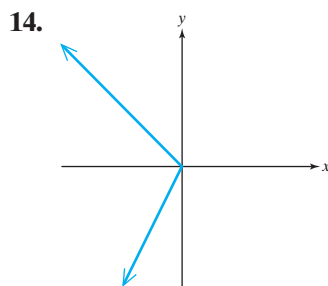
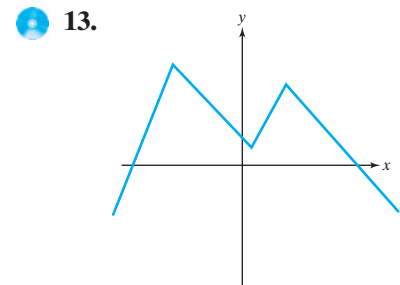
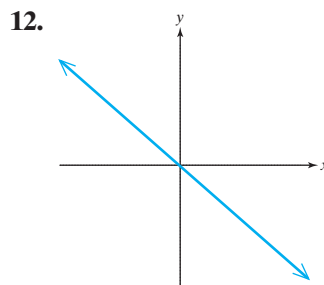
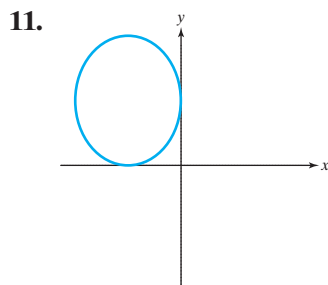


9. $\{(1, 2), (3, 4), (5, 4), (-9, 3)\}$

10. $\left\{(0, -1.1), \left(\frac{1}{2}, 8\right), (1.1, 8), \left(4, \frac{1}{2}\right)\right\}$

Concept 2: Vertical Line Test

For Exercises 11–16, use the vertical line test to determine whether the relation defines y as a function of x .

**Concept 3: Function Notation**

Consider the functions defined by $f(x) = 6x - 2$, $g(x) = -x^2 - 4x + 1$, $h(x) = 7$, and $k(x) = |x - 2|$. For Exercises 17–48, find the following.

17. $g(2)$

18. $k(2)$

19. $g(0)$

20. $h(0)$

21. $k(0)$

22. $f(0)$

23. $f(t)$

24. $g(a)$

WORKSHEET – DOMAINS AND RANGES OF RELATIONS AND FUNCTIONS

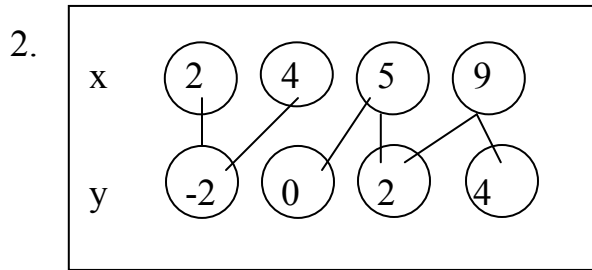
Part 1 – Identify Domains, Ranges, and Functions. Identify the domain and range of each relation given below. Then determine if the relation represents a function. Record your answers in the appropriate spaces provided for each problem.

1. $\{(2, 3), (-1, 5), (0, -1), (3, 5), (5, 0)\}$

Domain: _____

Range: _____

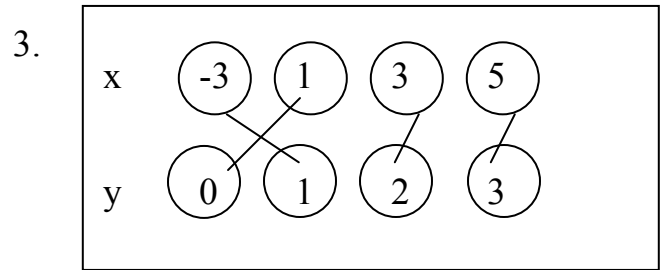
Function: yes no



Domain: _____

Range: _____

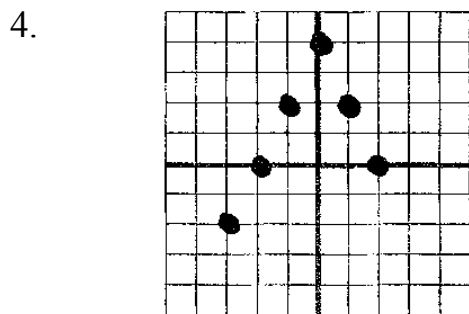
Function: yes no



Domain: _____

Range: _____

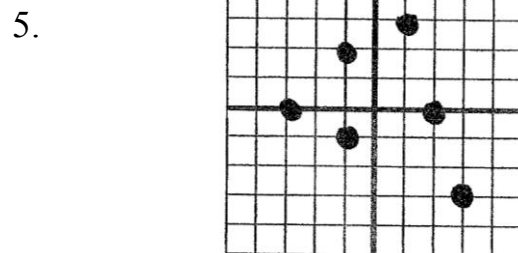
Function: yes no



Domain: _____

Range: _____

Function: yes no



Domain: _____

Range: _____

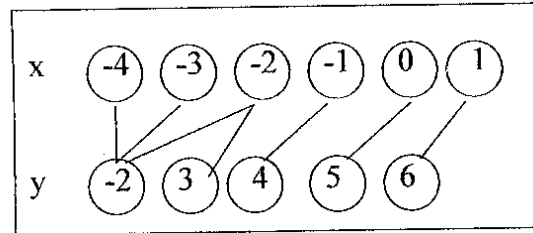
Function: yes no

Name: _____ Per: _____ Date: _____

Part 2 – Different Representations. Read each problem carefully and perform the indicated task. Also, for each problem, determine if the relation given represents a function and record your answers in the appropriate spaces provided for each problem.

6. Rewrite the relation given to the right as a set of ordered pairs.

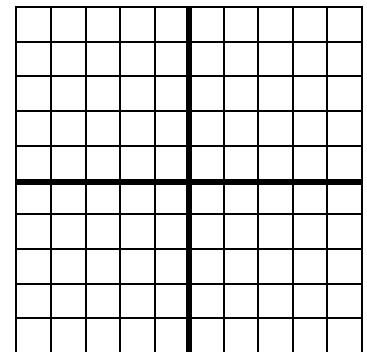
Answer:



Function: yes no

7. Graph the relation given below on the coordinate plane to the right.

x	-5	-4	-3	0	3	4	5
y	-4	-2	-1	0	-1	-2	-4



Function: yes no

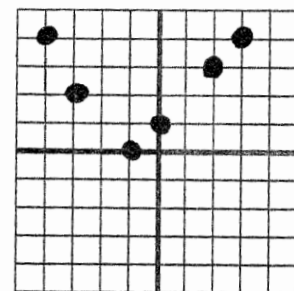
8. Construct a mapping diagram in the space below to represent the following set of ordered pairs.
(2, -1), (3, 2), (5, 4), (3, -1), (6, 5)

Mapping diagram:

Function: yes no

9. Create a table that is equivalent to the relation graphed on the coordinate plane to the right.

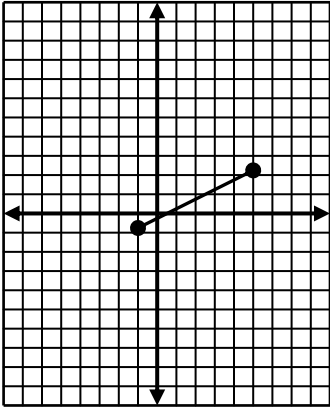
Table:



Function: yes no

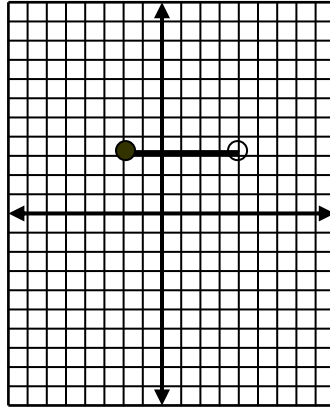
For each problem: a) State the domain
b) State the range
c) Determine if the graph is a function

1.



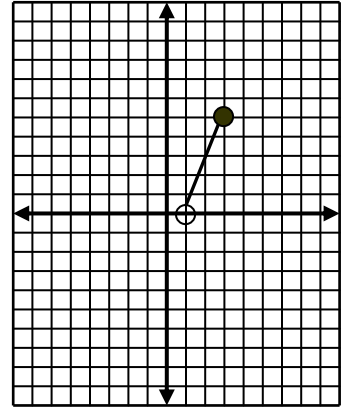
a) _____
b) _____
c) _____

2.



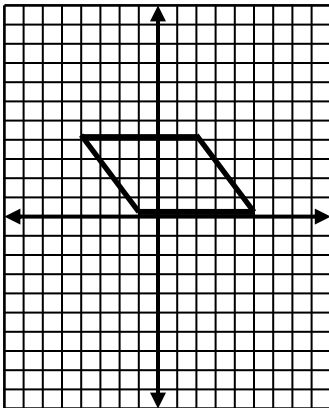
a) _____
b) _____
c) _____

3.



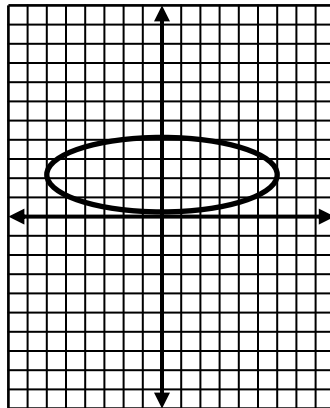
a) _____
b) _____
c) _____

4.



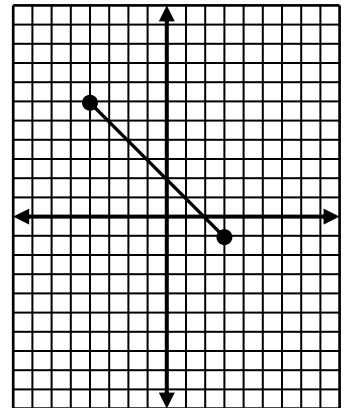
a) _____
b) _____
c) _____

5.



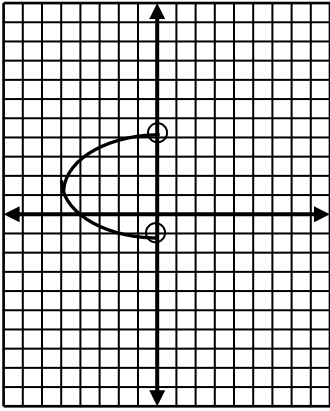
a) _____
b) _____
c) _____

6.



a) _____
b) _____
c) _____

7.

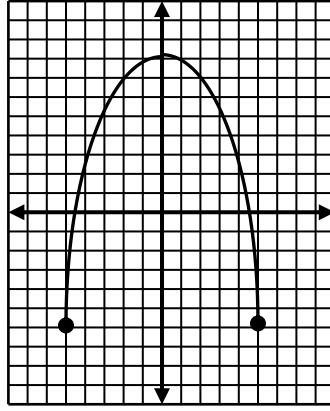


a) _____

b) _____

c) _____

8.

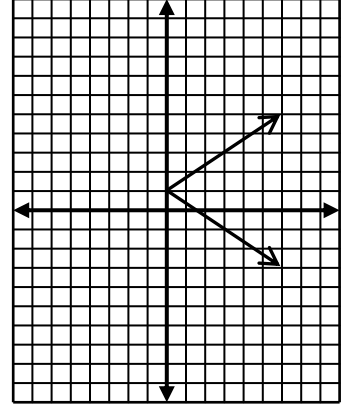


a) _____

b) _____

c) _____

9.

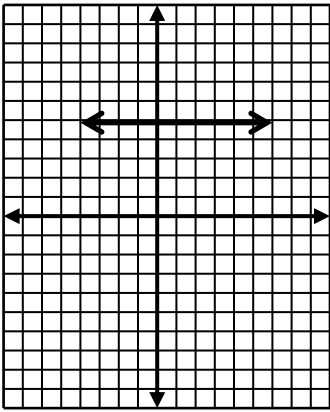


a) _____

b) _____

c) _____

10.

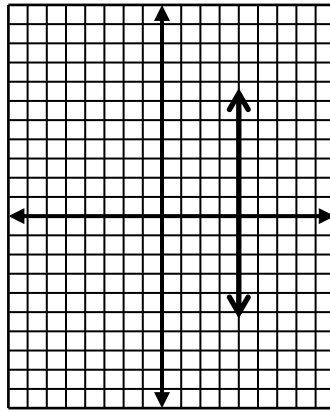


a) _____

b) _____

c) _____

11.

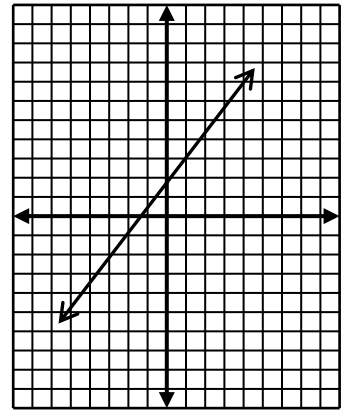


a) _____

b) _____

c) _____

12.



a) _____

b) _____

c) _____

13. Tara's car travels about 25 miles on one gallon of gas. She has between 10 and 12 gallons of gas in the tank.

a) List the independent and dependent quantities.

b) Find the reasonable domain and range values.

c) Write the reasonable domain and range as inequalities.

14. Sal and three friends plan to bowl one or two games each. Each game costs \$2.50.

a) List the independent and dependent quantities.

b) Find the reasonable domain and range values.

c) Write the reasonable domain and range as inequalities.