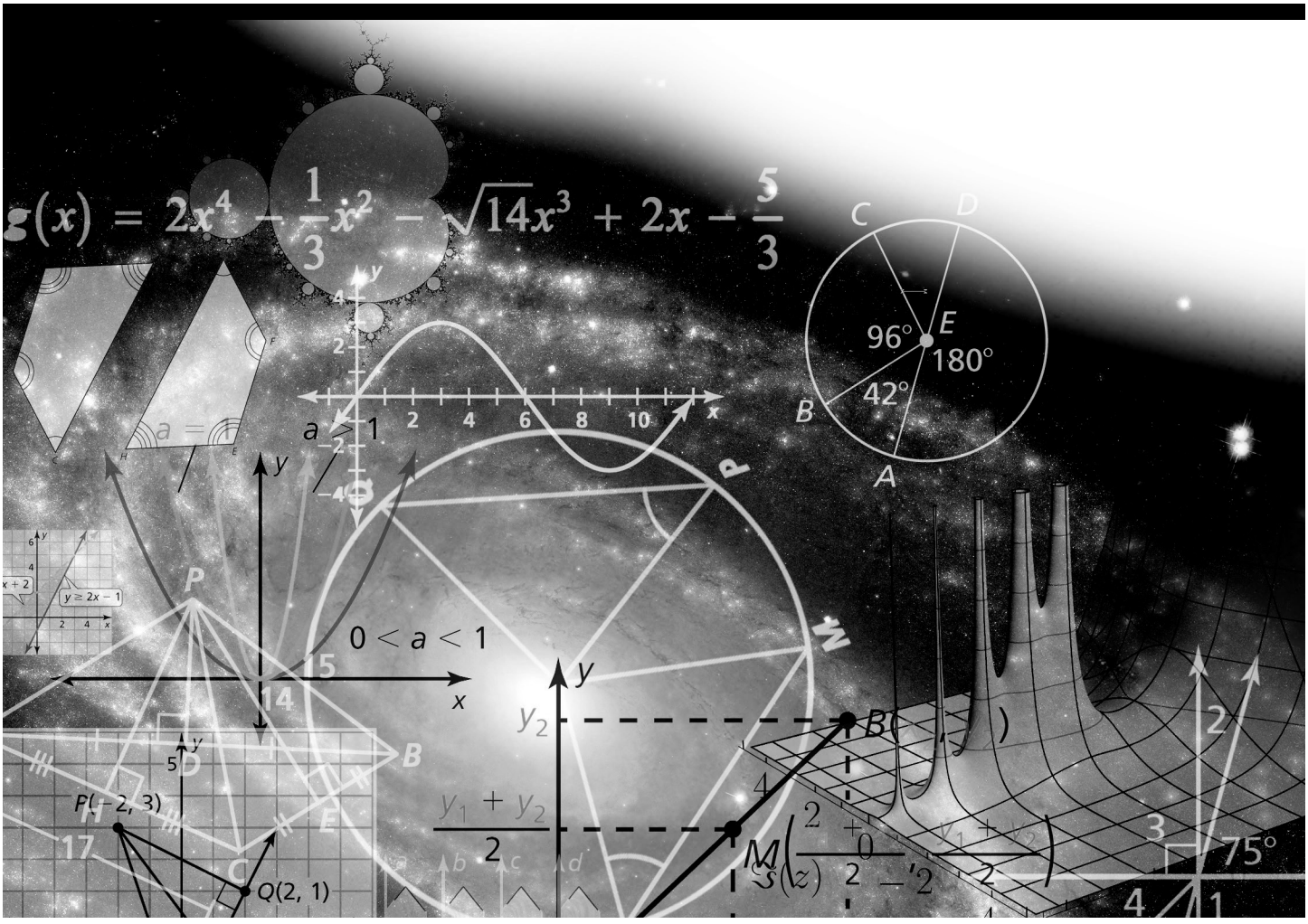
CHAPTER 3

Graphing Linear Functions

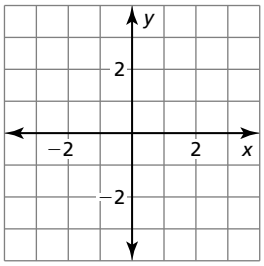


Name _____ Date _____

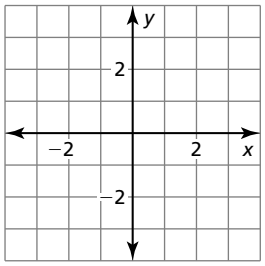
Chapter 3 Maintaining Mathematical Proficiency

Plot the point in a coordinate plane. Describe the location of the point.

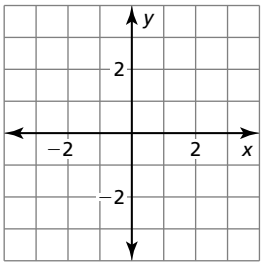
1. $A(-3, 1)$



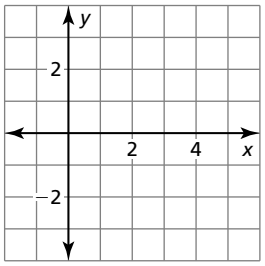
2. $B(2, 2)$



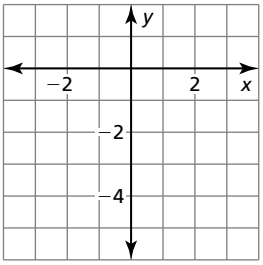
3. $C(1, 0)$



4. $D(5, 2)$



5. Plot the point that is on the y-axis and 5 units down from the origin.



Evaluate the expression for the given value of x.

6. $2x + 1;\ x = 3$

7. $16 - 4x;\ x = -4$

8. $12x + 7;\ x = -2$

9. $-9 - 3x;\ x = 5$

10. The length of a side of a square is represented by $(24 - 3x)$ feet. What is the length of the side of the square when $x = 6$?

Name_____ Date _____

3.1 Functions

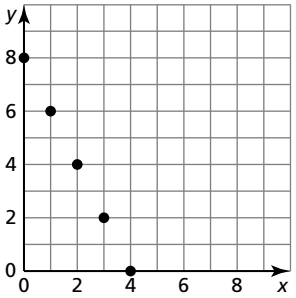
For use with Exploration 3.1

Essential Question What is a function?

1 EXPLORATION: Describing a Function

Work with a partner. Functions can be described in many ways.

- by an equation
- by an input-output table
- using words
- by a graph
- as a set of ordered pairs



a. Explain why the graph shown represents a function.

b. Describe the function in two other ways.

2 EXPLORATION: Identifying Functions

Work with a partner. Determine whether each relation represents a function. Explain your reasoning.

a.

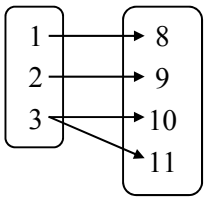
Input, *x*	0	1	2	3	4
Output, *y*	8	8	8	8	8

b.

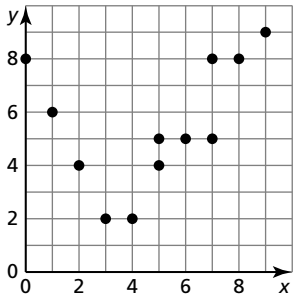
Input, *x*	8	8	8	8	8
Output, *y*	0	1	2	3	4

2 EXPLORATION: Identifying Functions (continued)

c. **Input, *x*** **Output, *y***



d.



e. $(-2, 5), (-1, 8), (0, 6), (1, 6), (2, 7)$

f. $(-2, 0), (-1, 0), (-1, 1), (0, 1), (1, 2), (2, 2)$

g. Each radio frequency x in a listening area has exactly one radio station y.

h. The same television station x can be found on more than one channel y.

i. $x = 2$

j. $y = 2x + 3$

Communicate Your Answer

3. What is a function? Give examples of relations, other than those in Explorations 1 and 2, that (a) are functions and (b) are not functions.

Name_____ Date _____

3.1 Practice

For use after Lesson 3.1

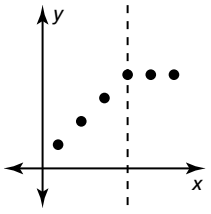
Notes:

Core Concepts

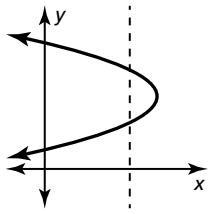
Vertical Line Test

Words A graph represent a function when no vertical line passes through more than one point on the graph.

Examples Function



Not a function



Notes:

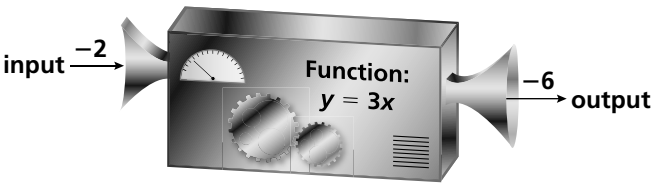
Name _____ Date _____

3.1 Practice (continued)

The Domain and Range of a Function

The **domain** of a function is the set of all possible input values.

The **range** of a function is the set of all possible output values.



Notes:

Worked-Out Examples

Example #1

Determine whether the relation is a function. Explain.

(7, 4), (5, –1), (3, –8), (1, –5), (3, 6)

no; The input 3 has two outputs, −8 and 6.

Example #2

MODELING WITH MATHEMATICS The function y = 25x + 500 represents your monthly rent y(in dollars) when you pay x days late.

a. Identify the independent and dependent variables.

b. The domain is 0, 1, 2, 3, 4, and 5. What is the range.

a. The amount of your monthly rent y depends on how many days late x it is when you pay. So, y is the dependent variable and x is the independent variable.

b. Make an input-output table to find the range.

Input, x	$25x + 500$	Output, y
0	25(0) + 500	500
1	25(1) + 500	525
2	25(2) + 500	550
3	25(3) + 500	575
4	25(4) + 500	600
5	25(5) + 500	625

The range is 500, 525, 550, 575, 600, and 625.

Name_____ Date _____

3.1 Practice (continued)

Practice A

In Exercises 1 and 2, determine whether the relation is a function. Explain.

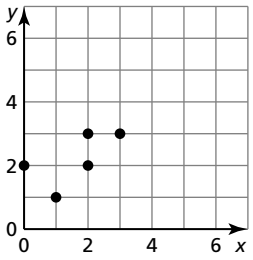
1.

Input, *x*	–2	0	1	–2
Output, *y*	4	5	4	5

2. $(0, 3), (1, 1), (2, 1), (3, 0)$

In Exercises 3 and 4, determine whether the graph represents a function. Explain.

3.



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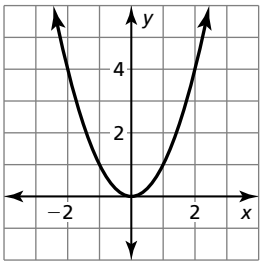
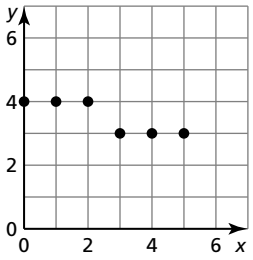


In Exercises 5 and 6, find the domain and range of the function represented by the graph.

5.



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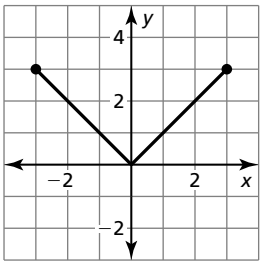


7. The function $y = 12x$ represents the number y of pages of text a computer printer can print in x minutes.

a. Identify the independent and dependent variables.

b. The domain is 1, 2, 3, and 4. What is the range?

Name_____ Date _____

Practice B

In Exercises 1 and 2, determine whether the relation is a function. Explain.

1.

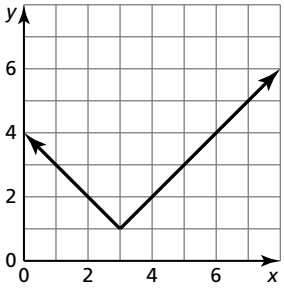
Input, *x*	0	1	3	2	1
Output, *y*	1	5	10	15	20

2.

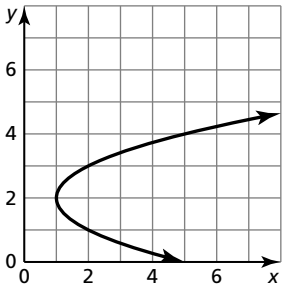
Input, *x*	0	1	2	3	4
Output, *y*	−14	−7	0	7	14

In Exercises 3 and 4, determine whether the graph represents a function. Explain.

3.



4.



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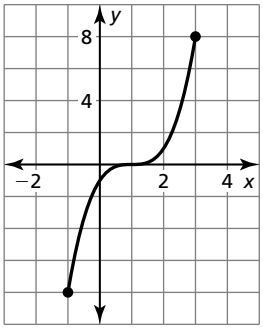
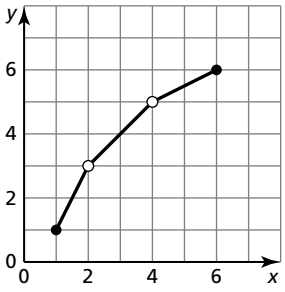


6.



7. The function $2x + 1.5y = 18$ represents the number of book raffle tickets x and food raffle tickets y you buy at a club event.

a. Solve the equation for y.

b. Make an input-output table to find ordered pairs for the function.

c. Plot the ordered pairs in a coordinate plane.

In Exercises 8–10, find the domain and range of the function.

8. $y = |x| + 2$ **9.** $y = -|x| + 1$ **10.** $y = -|x| - 3$