Name _____ Date _____

3.2 Linear Functions

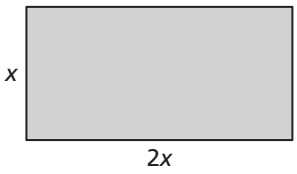
For use with Exploration 3.2

Essential Question How can you determine whether a function is linear or nonlinear?

1 EXPLORATION: Finding Patterns for Similar Figures

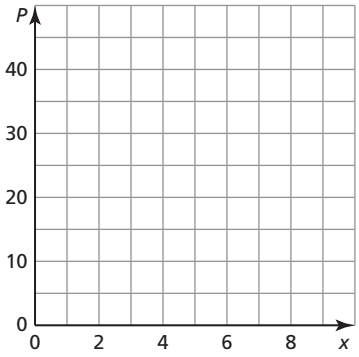
Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

Work with a partner. Complete each table for the sequence of similar figures. (In parts (a) and (b), use the rectangle shown.) Graph the data in each table. Decide whether each pattern is linear or nonlinear. Justify your conclusion.



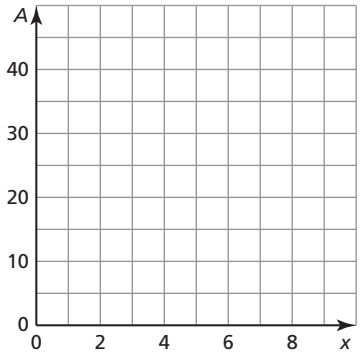
a. perimeters of similar rectangles

x	1	2	3	4	5
P					



b. areas of similar rectangles

x	1	2	3	4	5
A					

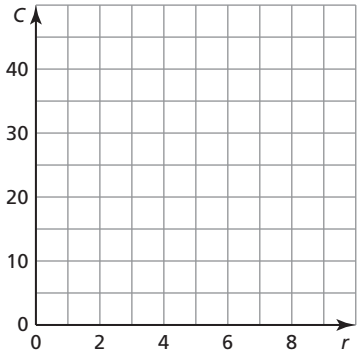


3.2 Linear Functions (continued)

1 EXPLORATION: Finding Patterns for Similar Figures (continued)

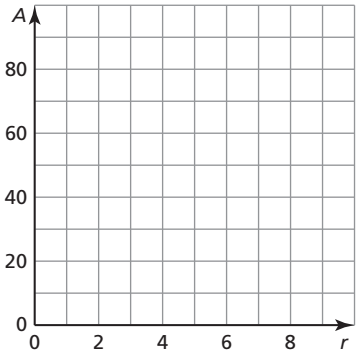
c. circumferences of circles of radius r

r	1	2	3	4	5
C					



d. areas of circles of radius r

r	1	2	3	4	5
A					



Communicate Your Answer

2. How do you know that the patterns you found in Exploration 1 represent functions?

3. How can you determine whether a function is linear or nonlinear?

4. Describe two real-life patterns: one that is linear and one that is nonlinear. Use patterns that are different from those described in Exploration 1.

Name _____ Date _____

3.2 Notetaking with Vocabulary

For use after Lesson 3.2

In your own words, write the meaning of each vocabulary term.

linear equation in two variables

linear function

nonlinear function

solution of a linear equation in two variables

discrete domain

continuous domain

Notes:

Name_____ Date _____

3.2 Notetaking with Vocabulary (continued)

Core Concepts

Representations of Functions

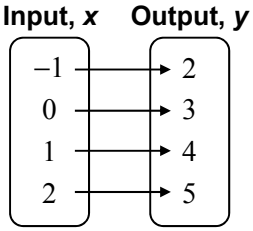
Words An output is 3 more than the input.

Equation $y = x + 3$

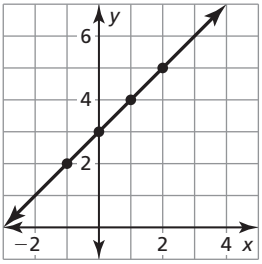
Input-Output Table

Input, x	Output, y
−1	2
0	3
1	4
2	5

Mapping Diagram



Graph

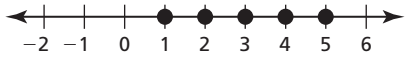


Notes:

Discrete and Continuous Domains

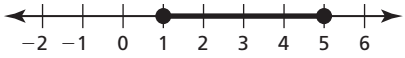
A **discrete domain** is a set of input values that consists of only certain numbers in an interval.

Example: Integers from 1 to 5



A **continuous domain** is a set of input values that consists of all numbers in an interval.

Example: All numbers from 1 to 5



Notes:

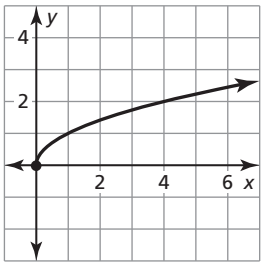
Name _____ Date _____

3.2 Notetaking with Vocabulary (continued)

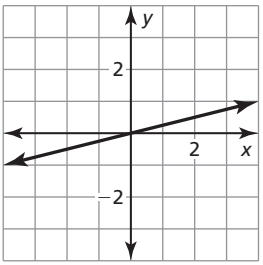
Extra Practice

In Exercises 1 and 2, determine whether the graph represents a *linear* or *nonlinear* function. Explain.

1.



2.



In Exercises 3 and 4, determine whether the table represents a *linear* or *nonlinear* function. Explain.

3.

x	1	2	3	4
y	−1	2	5	8

4.

x	−1	0	1	2
y	0	−1	0	3

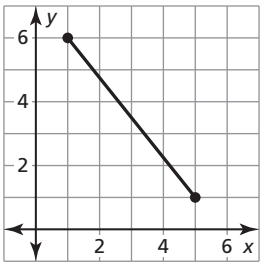
In Exercises 5 and 6, determine whether the equation represents a *linear* or *nonlinear* function. Explain.

5. $y = 3 - 2x$

6. $y = -\frac{3}{4}x^3$

In Exercises 7 and 8, find the domain of the function represented by the graph. Determine whether the domain is *discrete* or *continuous*. Explain.

7.



8.