7.4 Practice

▶ Review & Refresh

Write a linear function that relates y to x.

1.
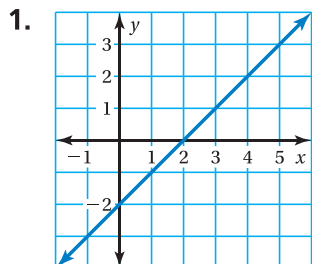
2.

x	0	1.5	3	4.5
y	5	4	3	2

The vertices of a figure are given. Draw the figure and its image after a dilation with the given scale factor. Identify the type of dilation.

3. $A(-3, 1)$, $B(-1, 3)$, $C(-1, 1)$; $k = 3$

4. $J(2, 4)$, $K(6, 10)$, $L(8, 10)$, $M(8, 4)$; $k = \frac{1}{4}$

▶ Concepts, Skills, & Problem Solving

COMPARING FUNCTIONS **Graph each equation. Decide whether each graph represents a *linear* or *nonlinear* function.** (See Exploration 1, p. 295.)

5. $h = 5 + 6t$ Equation 1

   $h = 5 + 6t^2$ Equation 2

6. $y = -\dfrac{x}{3}$ Equation 1

   $y = -\dfrac{3}{x}$ Equation 2

IDENTIFYING FUNCTIONS FROM TABLES **Does the table represent a *linear* or *nonlinear* function? Explain.**

7.

x	0	1	2	3
y	4	8	12	16

8.

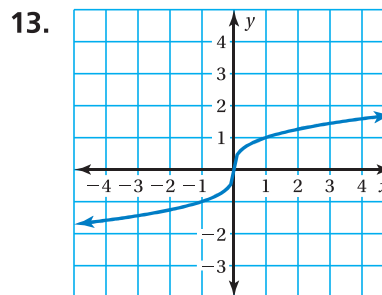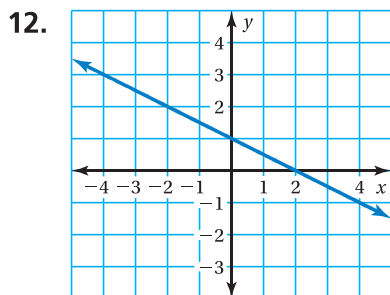| x	6	5	4	3
y	21	15	10	6

IDENTIFYING FUNCTIONS FROM EQUATIONS **Does the equation represent a *linear* or *nonlinear* function? Explain.**
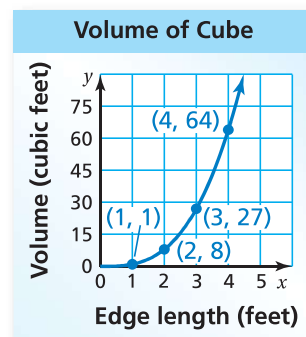
9. $2x + 3y = 7$

10. $y + x = 4x + 5$

11. $y = \dfrac{8}{x^2}$

IDENTIFYING FUNCTIONS FROM GRAPHS **Does the graph represent a *linear* or *nonlinear* function? Explain.**

12.

13.

14. IDENTIFYING A FUNCTION The graph shows the volume V (in cubic feet) of a cube with an edge length of x feet. Does the graph represent a *linear* or *nonlinear* function? Explain.

Volume of Cube

15. 🅜🅟 **MODELING REAL LIFE** The frequency y (in terahertz) of a light wave is a function of its wavelength x (in nanometers). Is the function relating the wavelength of light to its frequency *linear* or *nonlinear*?

Color	Red	Yellow	Green	Blue	Violet
Wavelength, x	660	595	530	465	400
Frequency, y	454	504	566	645	749

16. **DIG DEEPER!** The table shows the cost y (in dollars) of x pounds of sunflower seeds.

Pounds, x	Cost, y
2	2.80
3	?
4	5.60

a. What is the missing y-value that makes the table represent a linear function?

b. Write a linear function that represents the cost y of x pounds of seeds. Interpret the slope.

c. Does the function have a maximum value? Explain your reasoning.

17. 🅜🅟 **MODELING REAL LIFE** A birch tree is 9 feet tall and grows at a rate of 2 feet per year. The table shows the height h (in feet) of a willow tree after x years.

Years, x	Height, h
0	5
1	11
4	17
9	23

a. Does the table represent a *linear* or *nonlinear* function? Explain.

b. Which tree is taller after 10 years? Explain.

18. CRITICAL THINKING In their first year, Show A has 7 million viewers and Show B has 5 million viewers. Each year, Show A has 90% of the viewers it had in the previous year. Show B loses 200,000 viewers each year.

a. Determine whether the function relating the year to the number of viewers is *linear* or *nonlinear* for each show.

b. Which show has more viewers in its sixth year?

19. 🅜🅟 **PATTERNS** The ordered pairs represent a function.

$$(0, -1), (1, 0), (2, 3), (3, 8), \text{ and } (4, 15)$$

a. Graph the ordered pairs and describe the pattern. Is the function *linear* or *nonlinear*?

b. Write an equation that represents the function.