NAME

Module 9 Using Functions
Lesson 3 Writing Functions from Patterns

For each table, write a function to represent the pattern shown.

1.

Input	Output
0	–3
1	–2
2	–1
3	0
4	1

$f(x) = x - 3$

2.

Input	Output
–6	0
–4	2
–3	3
0	6
2	8

$f(x) = x + 6$

3.

Input	Output
–3	9
–1	3
0	0
1	–3
2	–6

$f(x) = -3x$

4.

Input	Output
–9	–4.5
–6	–3
2	1
3	1.5
8	4

$f(x) = 0.5x$ or $f(x) = \frac{1}{2}x$

5.

Input	Output
0	2
1	102
2	202
3	302
4	402

$f(x) = 100x + 2$

6.

Input	Output
–5	0
–3	0
0	0
1	0
3	0

$f(x) = 0$

7.

Input	Output
–4	54
–2	52
1	49
4	46
6	44

$f(x) = 50 - x$

8.

Input	Output
1	5
2	7
3	9
4	11
5	13

$f(x) = 2x + 3$

9.

Input	Output
–3	–10
–2	–7
–1	–4
3	8
4	11

$f(x) = 3x - 1$

For each table, write a function to represent the pattern shown. Then use the function to complete the table.

10.

Input	Output
–4	$-\frac{3}{4}$
–2	$-\frac{1}{4}$
0	$\frac{1}{4}$
1	$\frac{1}{2}$
3	**1**

$f(x) = \frac{1}{4}x + \frac{1}{4}$

11.

Input	Output
–3	–8
–2	–8
0	–8
1	–8
2	–8
4	**–8**

$f(x) = -8$

12.

Input	Output
–4	7
–3	6
–2	5
–1	4
0	3
2	**1**

$f(x) = -x + 3$

13.

Input	Output
–2	–4
–1	–1
0	0
1	–1
2	–4
4	**–16**

$f(x) = -x^2$

14.

Input	Output
–2	1
–1	2
0	3
1	4
2	5
3	**6**

$f(x) = x + 3$

15.

Input	Output
–5	14
–2	8
0	4
2	0
5	–6
10	**–16**

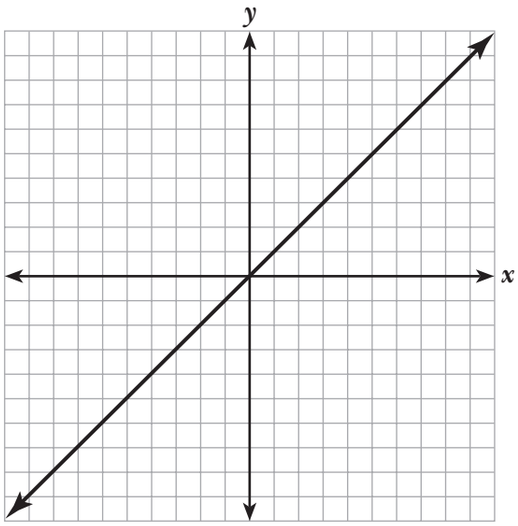
$f(x) = -2x + 4$

Journal

1. A student looked at a table of values and noticed that the ordered pair (1, 1) was an ordered pair in the function. She believes that the function being described in the table is $f(x) = x$. Is she correct? Explain.
2. Explain how to use slope to determine whether a function is a linear function.
3. In a linear function, why is it especially helpful to have 0 as one of the x-values in the table? How does it make writing the linear function easier?
4. Explain how a scatterplot can help determine the function represented in a table of values.
5. The directions for the exercises in this lesson read, "Write **a** function for the input/output table." Could the directions be written as, "Write **the** function for the input/output table?" Why or why not?

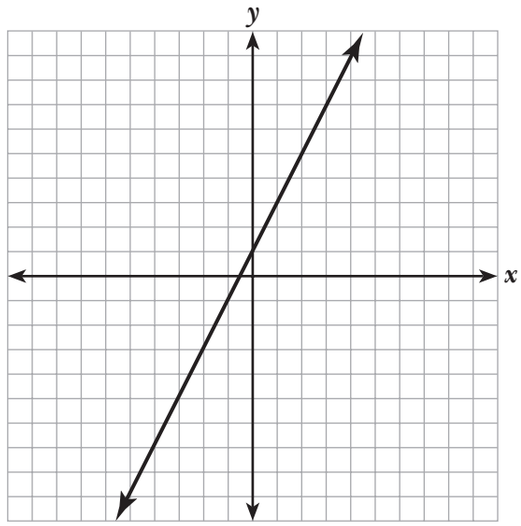
Cumulative Review

Identify the slope and *y*-intercept of each line.

1. 

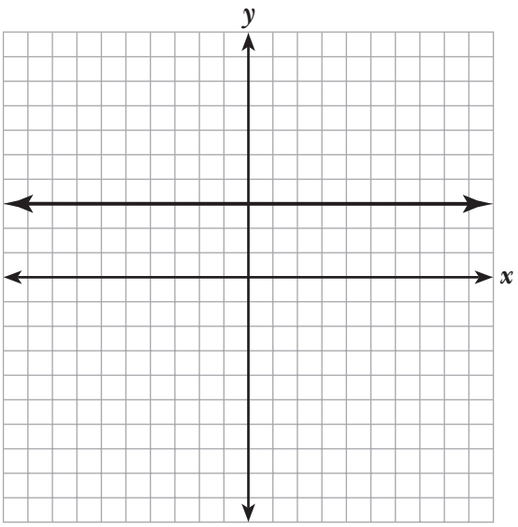
slope: 1

y-intercept: (0, 0)

2. 

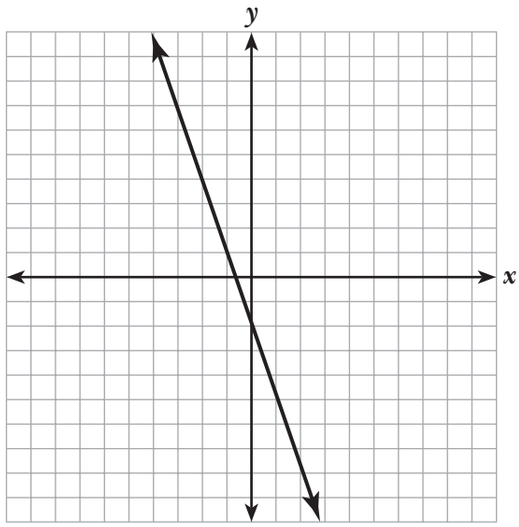
slope: 2

y-intercept: (0, 1)

3. 

slope: 0

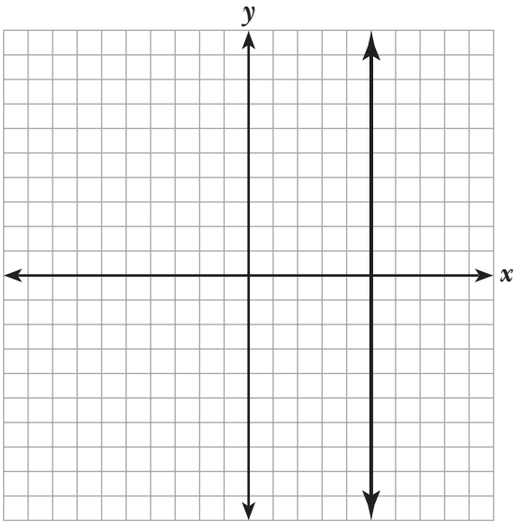
y-intercept: (0, 3)

4. 

slope: –3

y-intercept: (0, –2)

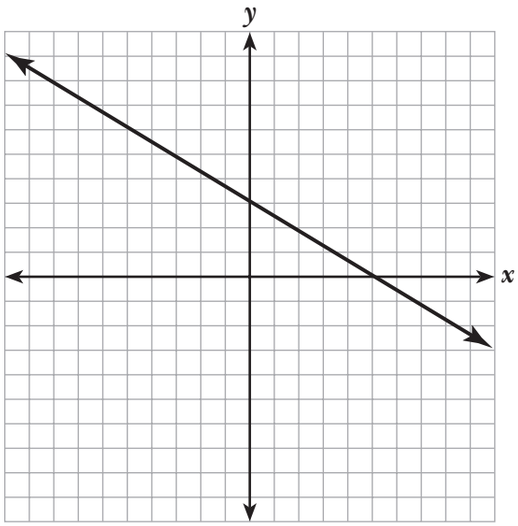
5.



slope: undefined

y-intercept: none

6.



slope: $-\frac{2}{3}$

y-intercept: (0, 3)

For each exercise, write the equation of the line in slope-intercept form.

7. slope: 2
y-intercept: (0, –3)

$y = 2x - 3$

8. slope: $\frac{2}{3}$
y-intercept: (0, 4)

$y = \frac{2}{3}x + 4$

9. passing through (–2, 3) and (2, 1)

$y = -\frac{1}{2}x + 2$

10. passing through (3, 5) and parallel to the line $y = -x + 4$

$y = -x + 8$

Possible Journal Responses

1. The student may be correct. However, there are many functions containing the ordered pair (1, 1). She should check the remaining ordered pairs to determine whether the function $f(x) = x$ is true for them as well.
2. If a function is linear, the slope between any two ordered pairs will be constant. To verify that a function is linear, find the slope using several different pairs of points.
3. The ordered pair whose first element, or *x*-value, is 0 shows the *y*-intercept of the line. Once you have the *y*-intercept, to write the equation of the line, find the slope.
4. A scatterplot helps to determine what type of equation represents the function. If the points lie in a line, the equation is linear. If they form a curve, the equation may be quadratic. If they form a V-shaped pattern, the function uses an absolute value operation.
5. No, the input/output values may satisfy more than one function.