EXAMPLE 2
SOLUTIONS
(CONTINUED)

b. Calculate the rate of change first when the start value is not given in the table.

x	y
−1	−2
1	8
4	23
6	33
9	48
12	63

Change in x-values = +2

Change in y-values = +10

$$\text{Rate of Change} = \frac{\text{Change in } y\text{-values}}{\text{Change in } x\text{-values}} = \frac{+10}{+2} = +5$$

To find the start value, use the rate of change to find the y-value that is paired with the x-value of 0.

x	y
−1	−2
0	3

+5

A rate of change of +5 means the y-value increases by 5 each time the x-value increases by 1. The x- and y-values for the step before zero are given. Add 5 once to the y-value to get the start value: −2 + 5 = 3.

Linear Equation: $y = 3 + 5x$

EXERCISES

Write the equation for each recursive routine.

1. Rate of Change = +8
Start Value = −6

2. Rate of Change = $-\frac{1}{2}$
y-intercept = $3\frac{1}{4}$

3. Rate of Change = +7.1
Start Value = 0

4. Rate of Change = −3
y-intercept = 7

5. Start Value = −10
Rate of Change = 0

6. y-intercept = 120
Rate of Change = −54

Determine the rate of change and y-intercept for each table. Write a linear equation that represents each table.

7.

x	y
0	4
1	12
2	20
3	28
4	36

8.

x	y
0	12
1	11
2	10
3	9
4	8

9.

x	y
−2	2
−1	4
0	6
1	8
3	12

Determine the rate of change and y-intercept for each table. Write a linear equation that represents each table.

10.

x	y
−1	29.5
0	31
3	35.5
4	37
7	41.5

11.

x	y
−2	−1
2	15
5	27
7	35
10	47

12.

x	y
4	1
6	2
10	4
13	5.5
18	8

13. Danna was able to finish 12 of her math homework problems at school. At home, she can do 4 problems every 2 minutes.
  a. How many problems does Danna complete each minute?
  b. What is Danna's start value for her homework on this particular day?
  c. Write a linear equation that represents this situation.
  d. What do the x-values represent in this equation?
  e. What do the y-values represent in this equation?
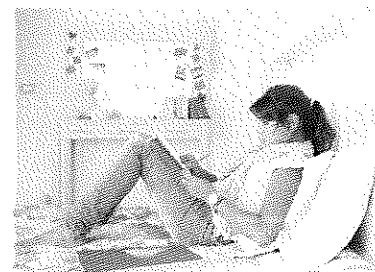
14. Jermaine wants to write a linear equation to help him calculate how much money he has saved based on the number of days he has been saving. He begins with nothing in his savings. He saves $6 per day.
  a. What is the linear equation that represents this situation?
  b. How much will he have saved after 12 days? Use words and/or numbers to show how you determined your answer.

15. Jack left a bottle of water sitting on the counter. When he first measured the temperature, it was 65° F. Each hour, he measured the temperature. It remained at 65° F.
  a. What is the y-intercept in this situation?
  b. What is the rate of change?
  c. Write a linear equation to represent the water's temperature based on the number of hours that have passed.

16. Shannon climbed to the top of a very tall slide and sent a ball down the slide. The top of the slide is 32 feet off the ground. The ball took only 4 seconds to make it to the bottom of the slide.
  a. What linear equation represents the ball's height off the ground based on the number of seconds it has traveled?
  b. How high off the ground was the ball after 2.2 seconds? Explain how you know your answer is correct.
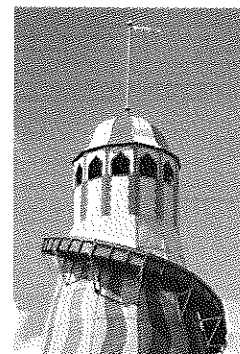
Copy each table. Determine the rate of change and y-intercept. Fill in the missing values and write the linear equation that represents the table.

17.

x	y
0	−1
1	2
2	5
3	
4	

18.

x	y
−1	24
0	23.5
1	23
2	
3	

19.

x	y
0	14
1	25
2	36
5	
7	