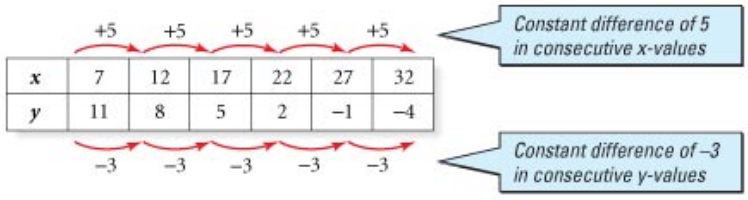
EXAMPLE 3 **Does the table of values at right represent a linear relationship between x and y? Explain. If the relationship is linear, write the next ordered pair that would appear in the table.**

x	7	12	17	22	27	32
y	11	8	5	2	−1	−4

SOLUTION

Find differences in consecutive x-values and consecutive y-values.



PROBLEM SOLVING

Look for a pattern. Because there is a constant difference in the x-values and a constant difference in the y-values, the relationship between x and y is linear.

The next table entry for x is $32 + 5$, or 7.
The next table entry for y is $-4 + (-3)$, or -7.

TRY THIS

Does the table of values at right represent a linear relationship between x and y? Explain. If the relationship is linear, write the next ordered pair that would appear in the table.

x	−2	2	6	10	14	18
y	1	2	4	8	16	32

CRITICAL THINKING

Does the table at right represent a linear relationship between x and y? Explain.

x	9	6	3	0	−3	−6
y	5	5	5	5	5	5

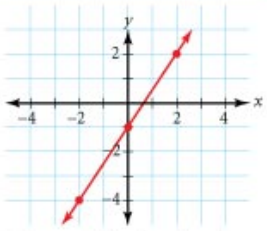
Exercises

Communicate

1. Discuss the relationships among the table, equation, and graph shown here.

x	−4	−2	0	2	4
y	−7	−4	−1	2	5

$y = \frac{3}{2}x - 1$



APPLICATION

2. **SALES TAX** Suppose that a state sales tax is 7%. Make a table showing the amount of tax on items with prices of \$6, \$8, \$10, and \$12. How can you find whether the price and amount of sales tax are linearly related?

3. Explain how to verify that the points $(-1, 7)$, $(0, 4)$, and $(2, -2)$ are all on the same line.

Guided Skills Practice

APPLICATION

4. INCOME Suppose that you work part-time at a department store, earning a base salary of \$50 per week plus a 15% commission on all sales that you make. ***(EXAMPLE 1)***

Weekly sales, x	Weekly income, y
100	$50 + (0.15)(100) = 65$
200	?
300	?
400	?
x	?

a. Copy and complete the table.
b. Graph the points represented in the table and connect them.
c. Write a linear equation to represent the relationship between the weekly sales, x, and the weekly income y.
d. Find the weekly income, y, for weekly sales of \$1200.

5. Graph $y = 3x - 2$. ***(EXAMPLE 2)***

6. Does the table below represent a linear relationship between x and y? If the relationship is linear, write the next ordered pair that would appear in the table. ***(EXAMPLE 3)***

x	−4	1	6	11	16	21
y	13	19	25	31	37	43

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Practice and Apply

State whether each equation is a linear equation.

7. $y = -3x$ **8.** $y = -x$ **9.** $y = 12 + 2x$
10. $y = 5 - 4x$ **11.** $y = \frac{1}{2}x - 3$ **12.** $y = -\frac{2}{3}x$
13. $y = \frac{1}{x}$ **14.** $y = \frac{-4}{x}$ **15.** $y = -x^2 + 1$
16. $y = 2 + 5x^2$ **17.** $y = 5.5x - 2$ **18.** $y = 11 - 1.2x$

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for Exercises 19–30

Graph each linear equation.

19. $y = 2x + 1$ **20.** $y = 4x + 3$ **21.** $y = 3x - 6$
22. $y = 6x - 3$ **23.** $y = 5 - 2x$ **24.** $y = 3 - 5x$
25. $y = -x + 5$ **26.** $y = -x - 2$ **27.** $y = \frac{2}{3}x + 4$
28. $y = \frac{1}{3}x - 5$ **29.** $y + 3 = x + 6$ **30.** $y + 4 = x - 3$

For Exercises 31–38, determine whether each table represents a linear relationship between x and y. If the relationship is linear, write the next ordered pair that would appear in the table.

31.

x	y
0	10
1	22
2	34
3	46

32.

x	y
0	−5
3	−1
6	3
9	7

33.

x	y
3	−5
4	1
5	6
6	11

34.

x	y
−2	1
−3	2
−4	4
−5	8

35.

x	y
8	28
6	22
4	16
2	10

36.

x	y
12	−3
9	−8
6	−13
3	−18

37.

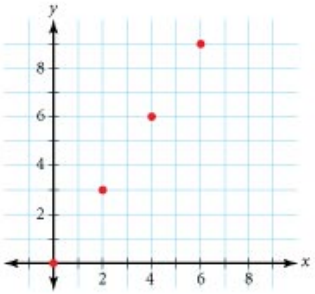
x	y
6	115
9	100
12	85
15	75

38.

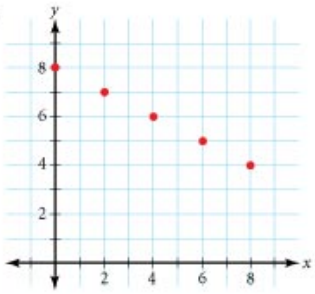
x	y
−6	58
−9	44
−12	32
−15	20

For each graph, make a table of values to represent the points. Does the table represent a linear relationship? Explain.

39.



40.



41. Make a table of values for the equation $y = 4x - 1$, and graph the line. Is the point (2, 6) on this line? Explain how to answer this question by using the table, the graph, and the equation.

Calculator button indicates that a graphics calculator is recommended.

Use a graphics calculator to graph each equation. Then sketch the graph on graph paper.

42 $y = -3x + 1.5$ **43** $y = -x - 2.5$ **44** $y = 12 - 2.5x$

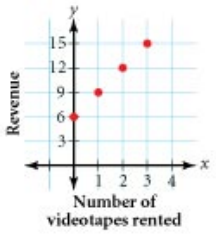
45 $y = 4 - 0.5x$ **46** $y = \frac{1}{2}x - \frac{3}{5}$ **47** $y = -\frac{2}{3}x + \frac{1}{2}$

CHALLENGE

48. What can you determine about the graph of $y = mx + b$ when $x = 0$? What can you determine about the graph of $y = mx + b$ when $y = 0$?

APPLICATION

49. INCOME A video rental store charges a \$6 membership fee and \$3 for each video rented. In the graph at right, the x-axis represents the number of videos rented by a customer and the y-axis represents the store's revenue from that customer.



a. Make a table for the data points on the graph.

b. If 15 videos are rented, what is the revenue?

c. If a new member paid the store a total of \$27, how many videos were rented?

d. Explain how to find answers to parts **b** and **c** by using an extended table and an extended graph.