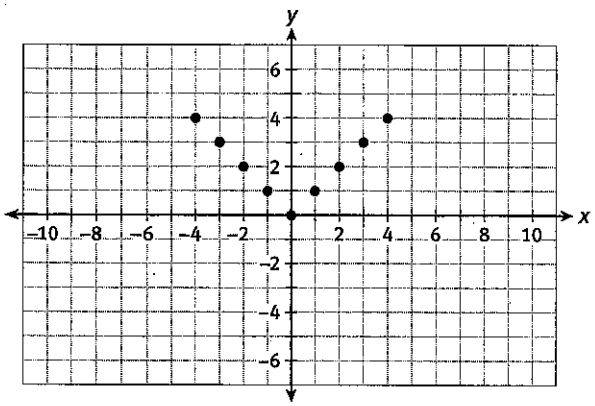
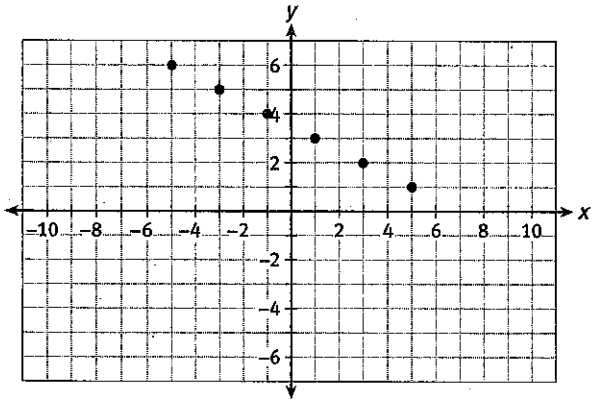
ACTIVITY 3.1

1. Looking at the graph, what do you notice about the relationship between x and y?



2. Looking at the graph, what do you notice about the relationship between x and y?



Graph the following data sets and identify each as linear or non-linear.

3. {(2,−3), (4,−2), (−2,−5), (0,4)}
4. {(3,0), (2,4), (−1,−4), (−2,1)}
5. {(0,5), (4,−3), (3,−1), (2,1)}
6. Determine which of the following expressions displays a linear relationship. Use multiple representations to explain your reasoning.
   a. $\sqrt{x}$
   b. $\frac{1}{2}x$
   c. $3 + 0.5x$
   d. $x + 7$
7. Explain how you can determine if an expression represents a linear pattern.

ACTIVITY 3.2

Find the domain and range for the data in Questions 8 and 9

8. {(11,2), (2,−14), (−5,13), (58,33)}
9.

x	y
1	−8
3	−6
5	−4
7	−3

Use mapping to determine if the information in Questions 10–12 represents a function.

10. {(−3,4), (−6,1), (6,0), (−1,5), (−6,4)}
11. $x - 9$ for $x = -1, -3, -5, -7, -9$
12.

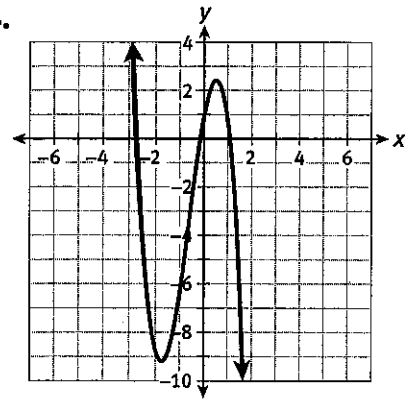
x	y
−1	9
−5	0
9	0
−1	4

For Questions 13–15 determine if the relations represent functions. Explain your reasoning.

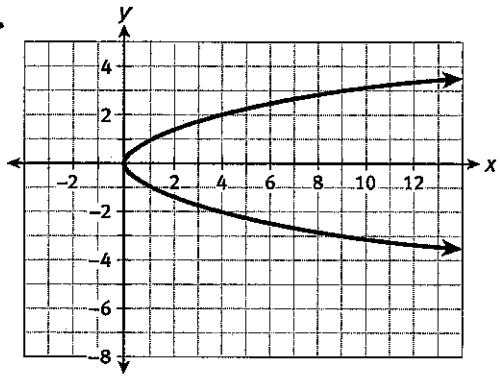
13.

x	y
0	7
2	5
−7	0
6	−5
0	12
5	2
−1	4
1	8

14.



15.



ACTIVITY 3.3

Veronika rides her bike 24 miles in 2 hours.

16. Create a ratio of Veronika's miles per hour.

17. Using the ratio you found in Question 16, determine how far Veronika can ride in 5 hours.

18. If Veronika rode her bike for 42 miles at the rate you found, how long was she riding?

19. Find the slope and y-intercept of the following:

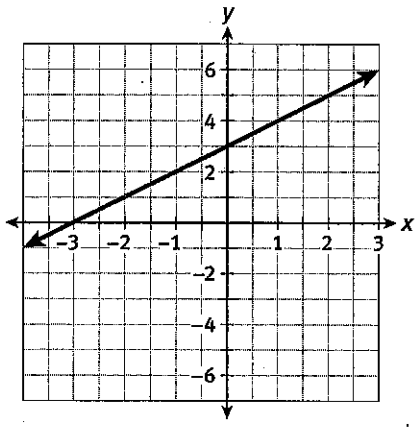
a.

x	y
0	−3
2	−1
4	1

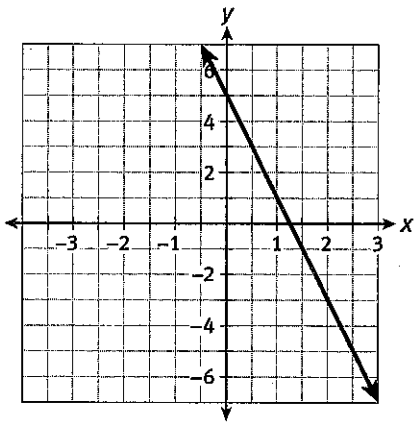
b.

x	y
−1	5
0	9
4	25

c.



d.



20. If a line with a slope of $-\frac{1}{2}$ contains the point (2, 3), then it must also contain which of the following points?

a. (−2, 6)
b. (0, 5)
c. (1, 2)
d. (4, 2)
e. (8, 0)

ACTIVITY 3.4

21. Find the slope.

x	y
0	11
2	7.5
4	4

Graph the following linear equations.

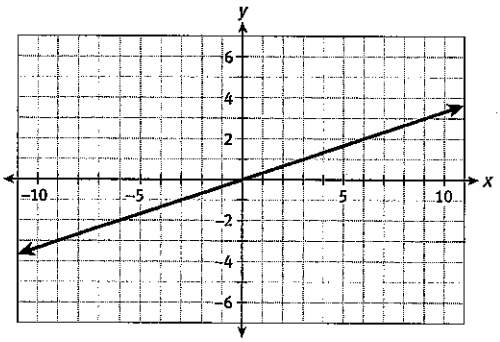
22. $y = 5x$

23. $y = -4x$

24. $y = \frac{1}{5}x$

25. A line with a slope of -2 goes through the point $(3, 5)$. It also goes through the point $(-2, p)$. What is the value of p?

26. Write the equation of the line graphed below.



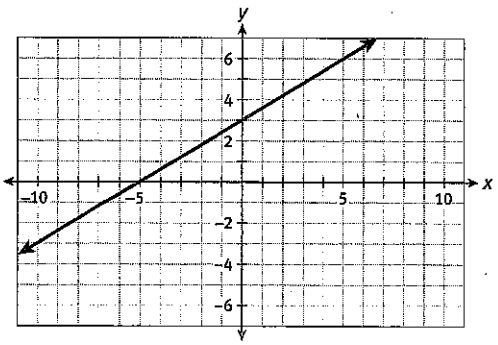
Graph the following linear equations.

27. $y = 5x - 2$

28. $y = 2x + 10$

29. $y = -25x + 100$

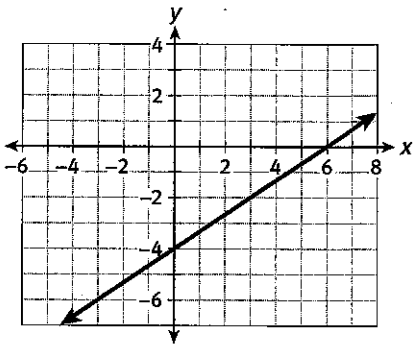
30. Write an equation for the line graphed below.



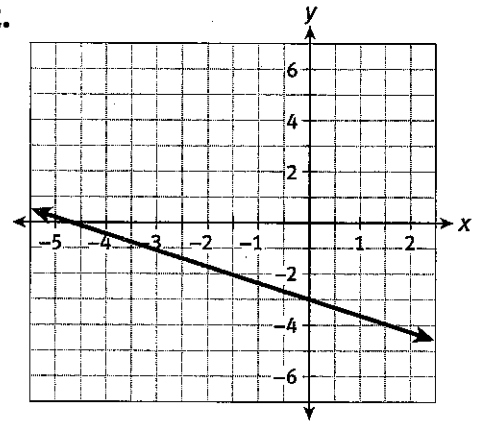
ACTIVITY 3.5

Find the x- and y-intercepts of the following graphs.

31.



32.



Find x- and y-intercepts of the following equations.

33. $y = 6x + 30$

34. $y = 3x + 12$

35. $y = -7x - 21$

36. $9x + y = 72$

For Questions 37 and 38, graph the line with the given intercepts.

37. x-intercept: 7
y-intercept: 4

38. x-intercept: -5
y-intercept: 3

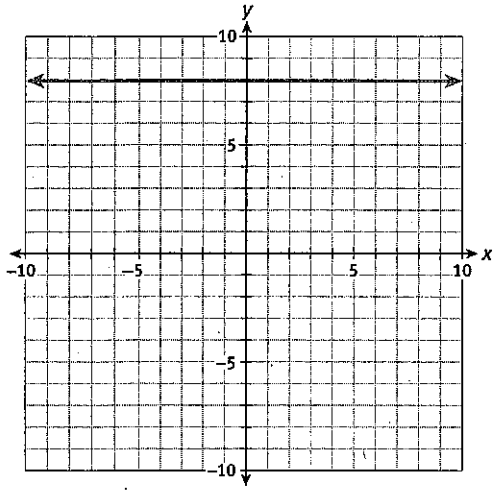
Graph the following equations of lines.

39. $x = -7$

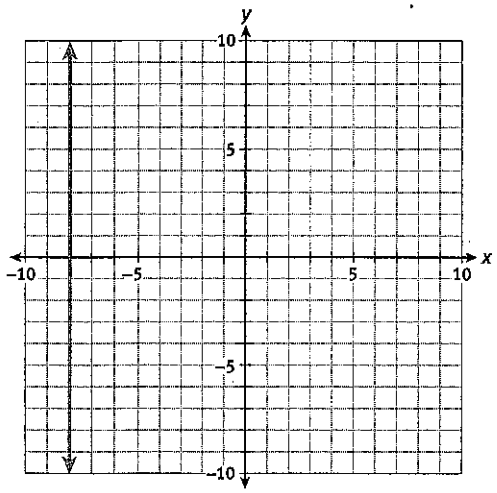
40. $y = 2$

For 41–42, write the equation of the line in the graph.

41.



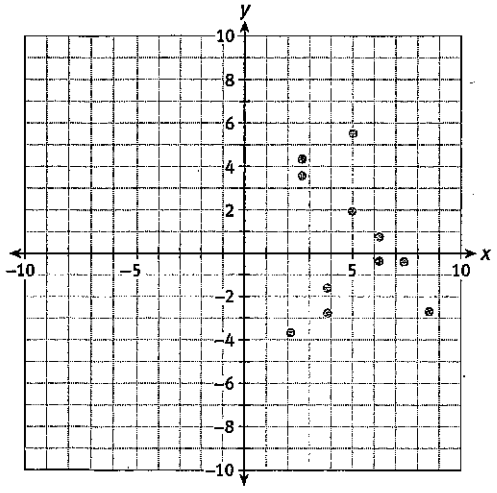
42.



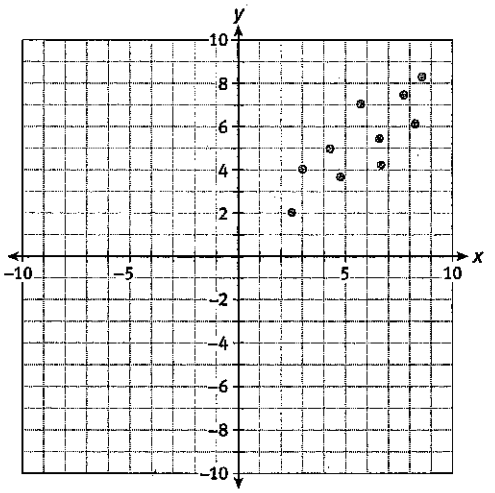
ACTIVITY 3.6

Determine if the graphs for Questions 43 through 46 have a positive, a negative, or no association.

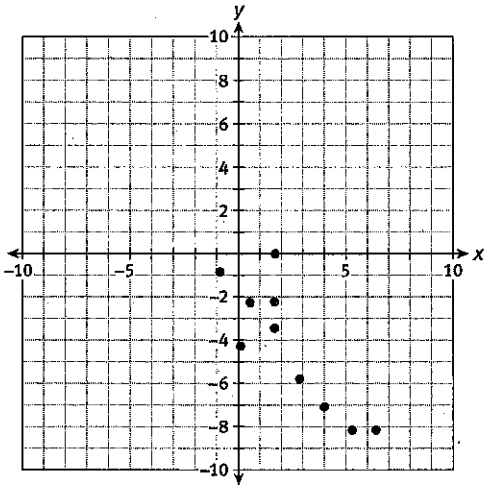
43.



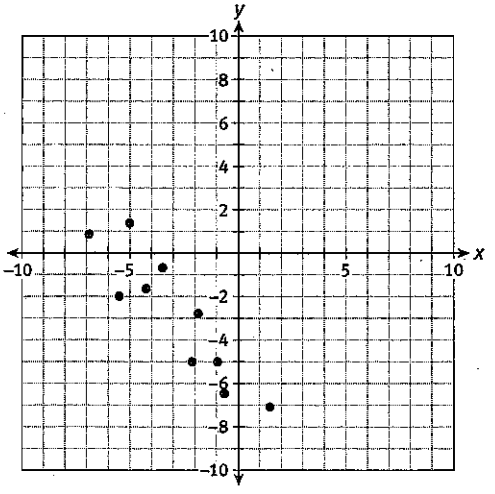
44.



45.



46.



47. Find the equations of the trend lines for any of the graphs in 43–46 that had a positive or negative association.

ACTIVITY 3.7

Determine what information is relevant to solve the following problem. Do not solve the problem.

48. A monkey weighs 10 pounds. He eats 2 pounds of bananas in a day. How many pounds of bananas will he eat in 1 week?

49. Determine which of the following points $\{(0,3), (-1,4), (3,0), (4,-1)\}$ are solutions to the system of equations.

$$\begin{cases} 3x + 2y = 5 \\ x + 2y = 7 \end{cases}$$

50. Determine which of the following points $\{(-3,5), (3,-5), (3,5), (-3,-5)\}$ are solutions to the system of equations.

$$\begin{cases} 3x - y = -4 \\ 2x - 5y = 19 \end{cases}$$

Solve the following systems of equations by graphing.

51. $\begin{cases} y = 3x + 2 \\ y = -2x - 8 \end{cases}$

52. $\begin{cases} x + y = -1 \\ 2x + 2y = 4 \end{cases}$

Solve the following systems of equations algebraically.

53. $\begin{cases} y = 4 - x \\ y = x - 2 \end{cases}$

54. $\begin{cases} y = -3x + 6 \\ 3x + y = 5 \end{cases}$

55. $\begin{cases} 4x - y = 1 \\ 6x + y = -6 \end{cases}$

UNIT 3

Reflection

An important aspect of growing as a learner is to take the time to reflect on your learning. It is important to think about where you started, what you have accomplished, what helped you learn, and how you will apply your new knowledge in the future. Use notebook paper to record your thinking on the following topics and to identify evidence of your learning.

Essential Questions

1. Review the mathematical concepts and your work in this unit before you write thoughtful responses to the questions below. Support your responses with specific examples from concepts and activities in the unit.
   - Why is it important to consider slope, domain, and range in problem situations?
   - How can graphs be used to interpret solutions of real-world problems?

Academic Vocabulary

2. Look at the following academic vocabulary words:
   - bivariate data
   - continuous data
   - discrete data
   - domain
   - function
   - linear data
   - range
   - rate of change
   - relation
   - slope
   - solution of a system of linear equations
   - system of linear equations
   - trend line
   - x-intercept
   - y-intercept

   Choose three words and explain your understanding of each word and why each is important in your study of math.

Self-Evaluation

3. Look through the activities and Embedded Assessments in this unit. Use a table similar to the one below to list three major concepts in this unit and to rate your understanding of each.

Unit Concepts	Is Your Understanding Strong (S) or Weak (W)?
Concept 1	
Concept 2	
Concept 3	

   a. What will you do to address each weakness?

   b. What strategies or class activities were particularly helpful in learning the concepts you identified as strengths? Give examples to explain.

4. How do the concepts you learned in this unit relate to other math concepts and to the use of mathematics in the real world?

1. Which situation, when graphed, would be non-linear?

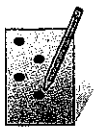
A. the amount of water in a tub as it drains

B. the height of a wedding cake as 5-inch layers are added

C. the speed of each car passing through an intersection

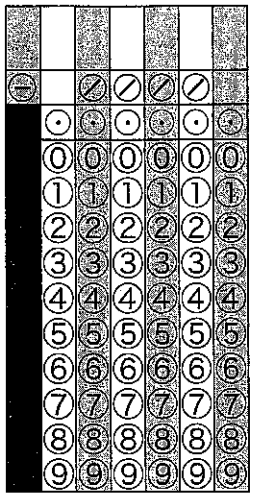
D. the weight of a sandbag as shovelfuls of dirt are added

1. Ⓐ Ⓑ Ⓒ Ⓓ



2. What is the slope of the graph of $y = -2x + 6$?

2.



Read Solve Explain

3. Jimmy joined Rhapsody internet music service at a cost of $12.99 per month. He received an MP3 player for a gift and wanted to start downloading songs. Rhapsody charges $0.99 per downloaded song.

Part A: Complete the table for the cost of downloading 1, 2, 3, 4, or 5 songs in a month

# of songs	Cost
1	
2	
3	
4	
5	

Part B: List the domain and range of the function from the table. Write an equation that Jimmy can use to determine the cost C of any number of downloads d.

Answer and Explain

Domain: _____

_____

Range: _____

_____

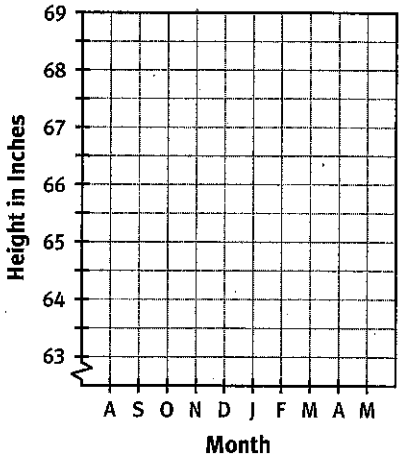
Read
Solve
Explain

4. Itmar was 63 inches tall in August at the start of 8th grade. His best friend Megan was 65 inches tall at that time. Itmar grew an average of one-half of an inch each month through May. Megan grew one-fourth of an inch each month through May.

Part A: Write two equations, one to show Itmar's height at any time during the school year and one to show Megan's. Use h for height and m for number of months since August.

Answer and Explain

Part B: Graph each student's height from August to May on this graph.



Part C: Will Itmar be taller than Megan by the end of 8th grade in May? If so, describe the point where their heights are the same.

Solve and Explain