MATH LAB

6.3 Investigating Graphs of Linear Functions

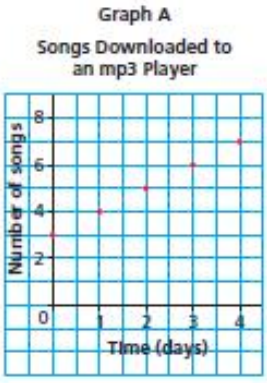
LESSON FOCUS

Investigate the relationship between the graph and the equation of a linear function.

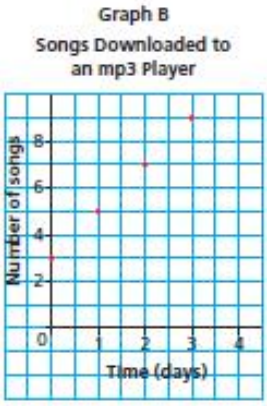
Make Connections

Alimina purchased an mp3 player and downloaded 3 songs.
Each subsequent day, she downloads 2 songs.
Which graph represents this situation? Explain your choice.

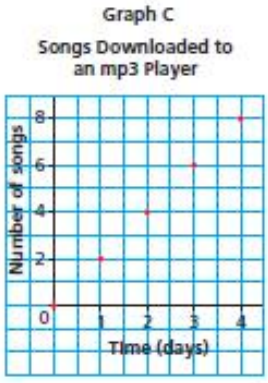
Graph A



Graph B



Graph C



Construct Understanding

TRY THIS

Work with a partner.

Use a graphing calculator or a computer with graphing software.

A. Graph $y = mx + 6$ for different values of m.
Include values of m that are negative and 0.
Use a table to record your results.

Equation	Value of m	Sketch of the Graph	Slope of the Graph	x-intercept	y-intercept
$y = x + 6$	1				

B. How does changing the value of m change the appearance of the graph?
What does m represent?

C. Graph $y = 2x + b$ for different values of b.
Include values of b that are negative and 0.
Use a table to record your results.

Equation	Value of b	Sketch of the Graph	Slope of the Graph	x-intercept	y-intercept
$y = 2x + 6$	6				

D. How does changing the value of b change the appearance of the graph?
What does b represent?

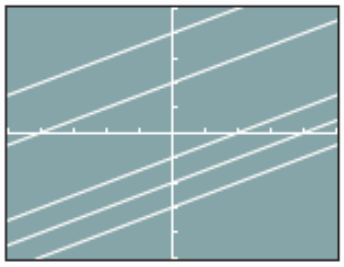
E. Predict the appearance of the graph of $y = -2x + 4$.
Verify your prediction by graphing.

Suppose you are given the graph of a linear function. How could you use what you learned in this lesson to determine an equation for that function?

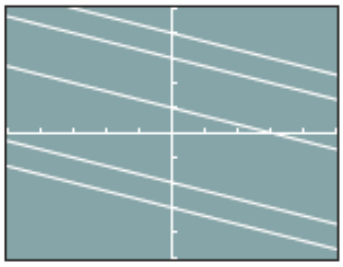
Assess Your Understanding

1. In the screens below, each mark on the x-axis and y-axis represents 1 unit. What is the equation of each line?

a) The slope of each line is $\frac{1}{2}$.



b) The slope of each line is $-\frac{1}{3}$.



2. A linear function is written in the form $y = mx + b$. Use your results from *Try This* to suggest what the numbers m and b represent. Explain how you could use this information to graph the function.

3. Describe the graph of the linear function whose equation is $y = -3x + 6$. Draw this graph without using technology.

4. **a)** Predict what will be common about the graphs of these equations.

i) $y = x - 1$ **ii)** $y = 2x - 1$

iii) $y = -3x - 1$ **iv)** $y = -2x - 1$

b) Graph the equations to check your prediction.

5. **a)** Predict what will be common about the graphs of these equations.

i) $y = x - 3$ **ii)** $y = x - 2$

iii) $y = x$ **iv)** $y = x + 3$

b) Graph the equations to check your prediction.

6. Graph each equation on grid paper without using a table of values. Describe your strategy.

a) $y = 3x + 5$ **b)** $y = -3x + 5$

c) $y = 3x - 5$ **d)** $y = -3x - 5$

7. In Lesson 5.6, question 12, page 309, the cost, C dollars, to rent a hall for a banquet is given by the equation $C = 550 + 15n$, where n represents the number of people attending the banquet.

a) Graph this equation on grid paper.

b) Compare the equation above with the equation $y = mx + b$. What do m and b represent in this context?