Bellringer

Find the slope and y-intercept of the line represented by the table:

X	0	2	4	6	8
y	1	7	13	19	25

Slope ***m*** = _____ y-intercept ***b*** = _____

4.3 Graphing Linear Nonproportional Relationships Using Slope and *y*-intercept

8.F.3
Interpret the equation $y=mx+b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.

8.F.4
Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two *(x,y)* values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or table of values.

Using Slope-intercept Form to Graph a Line

$y = mx + b$

m = Slope

b = y-intercept

→ Represents equation of a line

→ Slope ⇒ $\frac{\text{Rise}}{\text{Run}}$

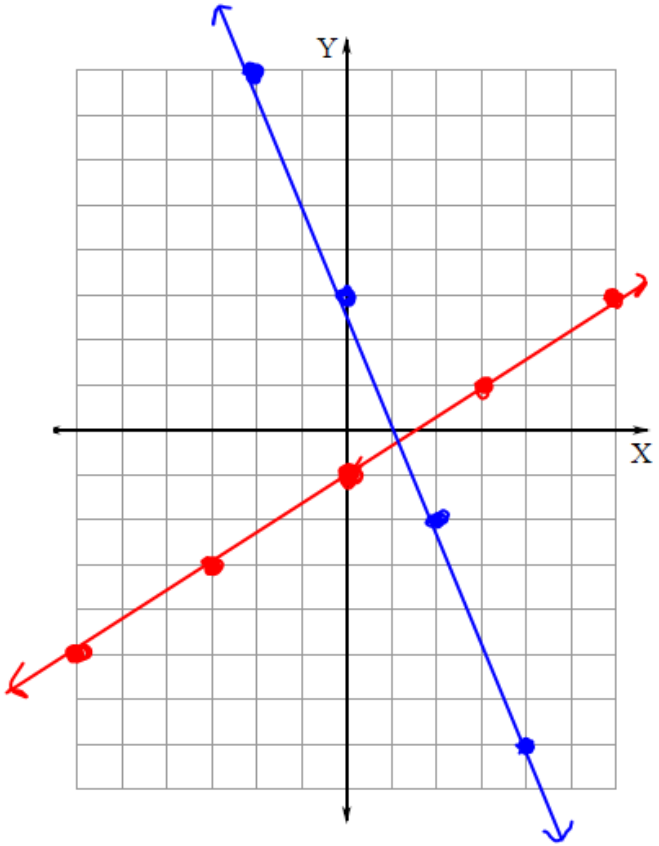
→ y-intercept ⇒ where line crosses y-axis
when x is zero, y is b (y-int)

EXAMPLE 1

$\frac{2}{3} = \frac{-2}{-3}$

A Graph $y = \frac{2}{3}x + -1$.

- Identify then plot y-intercept
- Use slope ($\frac{\text{Rise}}{\text{Run}}$) to plot other points
- Draw line



B Graph $y = -\frac{5}{2}x + 3$.

$\frac{-5}{2}$ $\frac{5}{-2}$

ADDITIONAL EXAMPLE 1

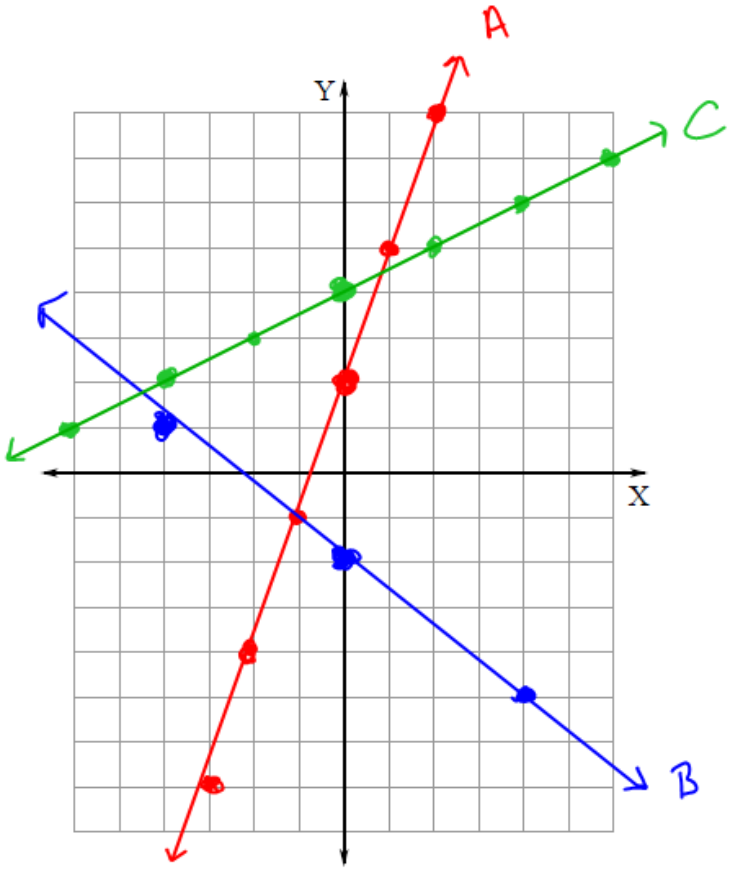
Graph each equation.

A $y = 3x + 2$ $\frac{+3}{1}$

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

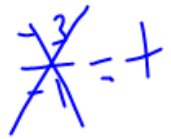
$-\frac{3}{4} = \frac{-3}{4} = \frac{3}{-4} \neq \frac{-3}{-4}$

C. $y = \frac{1}{2}x + 4$



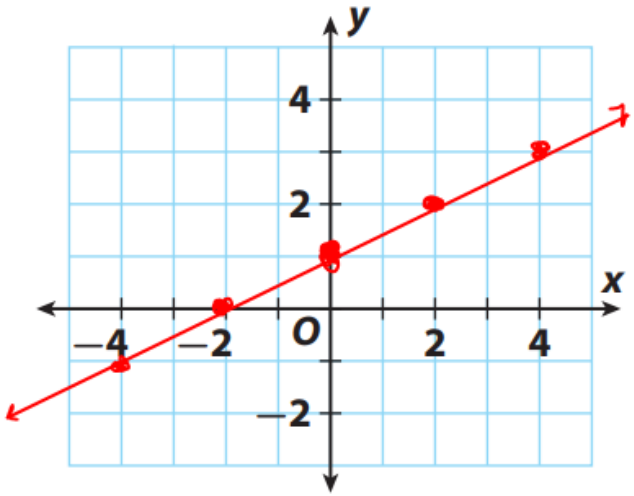
YOUR TURN

$-3 = \frac{-3}{1} = \frac{3}{-1}$

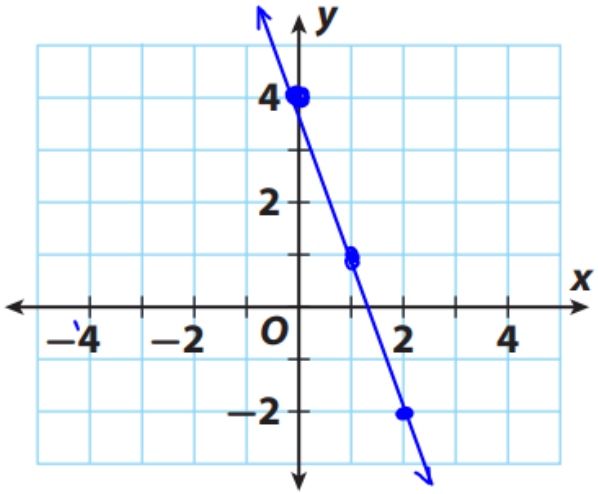


Graph each equation.

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



3. $y = -3x + 4$

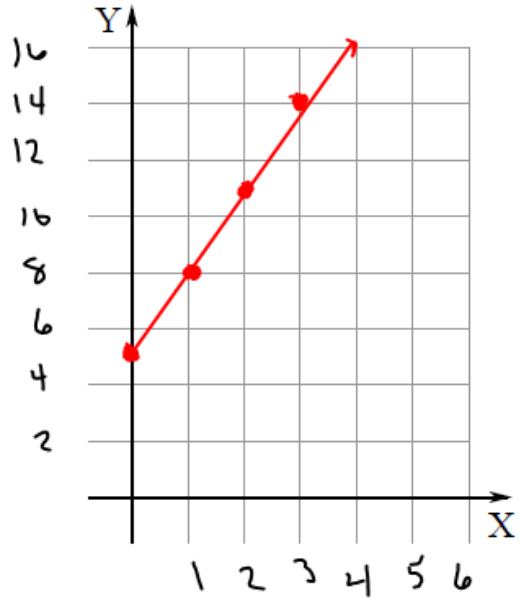


ADDITIONAL EXAMPLE 2

A shipping company charges a fixed amount plus a certain amount per pound to ship a package. The total cost *y*, in dollars, to ship a package is given by the equation $y = 3x + 5$, where *x* is the weight of the package in pounds.

A Graph the equation.

B What is the weight of a package that can be shipped for $17?



y = mx + b

$ lbs

m = 3/1 b = 5

17 = 3x + 5
−5 −5
12 = 3x
12/3 = 3x/3
x = 4 lbs

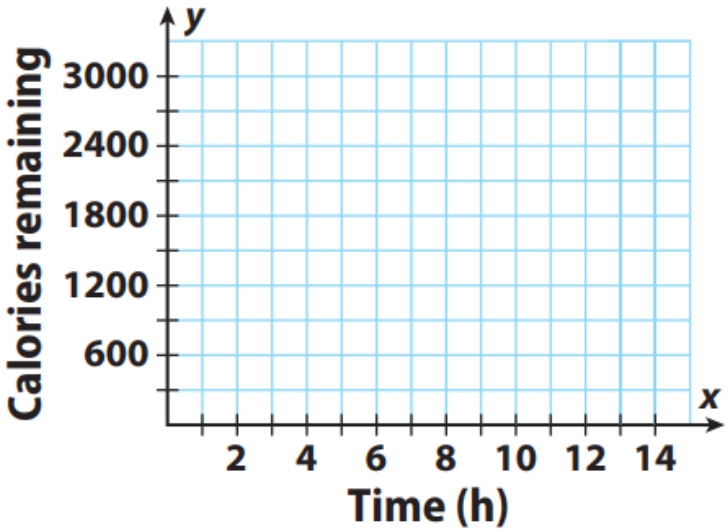
YOUR TURN

What If? **Ken decides to modify his exercise plans from Example 2 by slowing the speed at which he walks. The equation for the modified plan is $y = -200x + 2400$.**

4. Graph the equation.

5. How does the graph of the new equation compare with the graph in Example 2?

_____



6. Will Ken have to exercise more or less to meet his goal? Explain.

_____

_____

_____

7. Suppose that Ken decides that instead of walking, he will jog, and that jogging burns 600 calories per hour. How do you think that this would change the graph?

_____

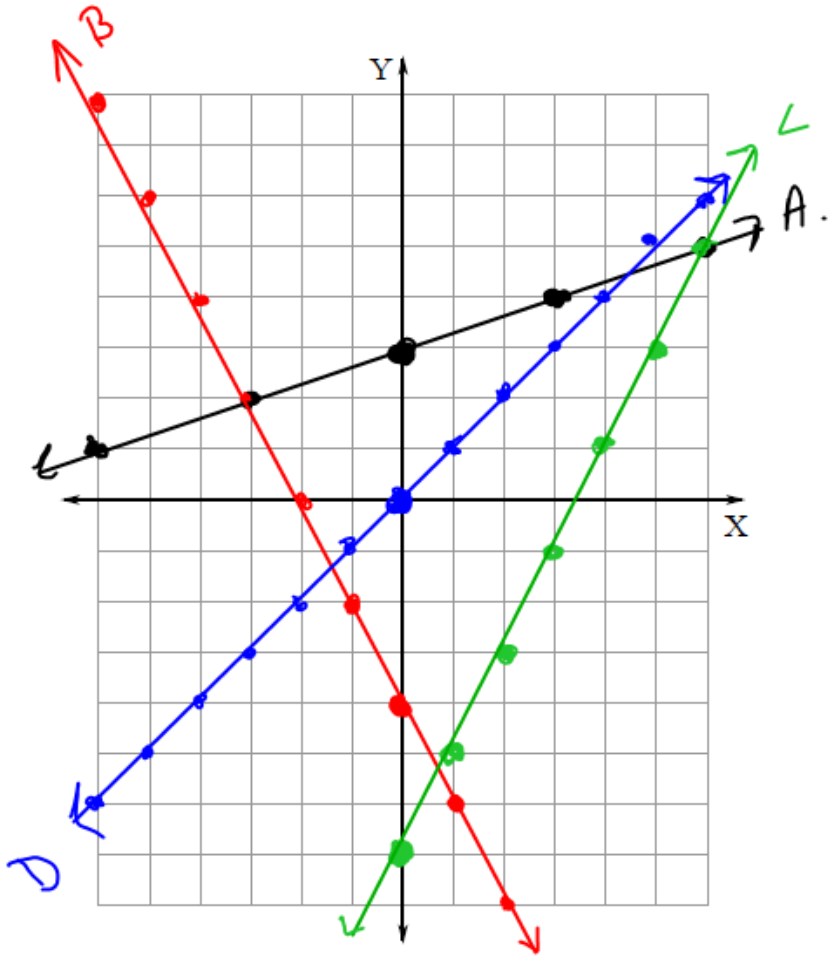
_____

A. $y = \frac{1}{3}x + 3$

B. $y = -2x - 4$ $\quad \frac{-2}{1} = \frac{2}{-1} \neq \frac{2}{-1}$

C. $y = \frac{12}{6}x - 7$

D. $y = x + 0$

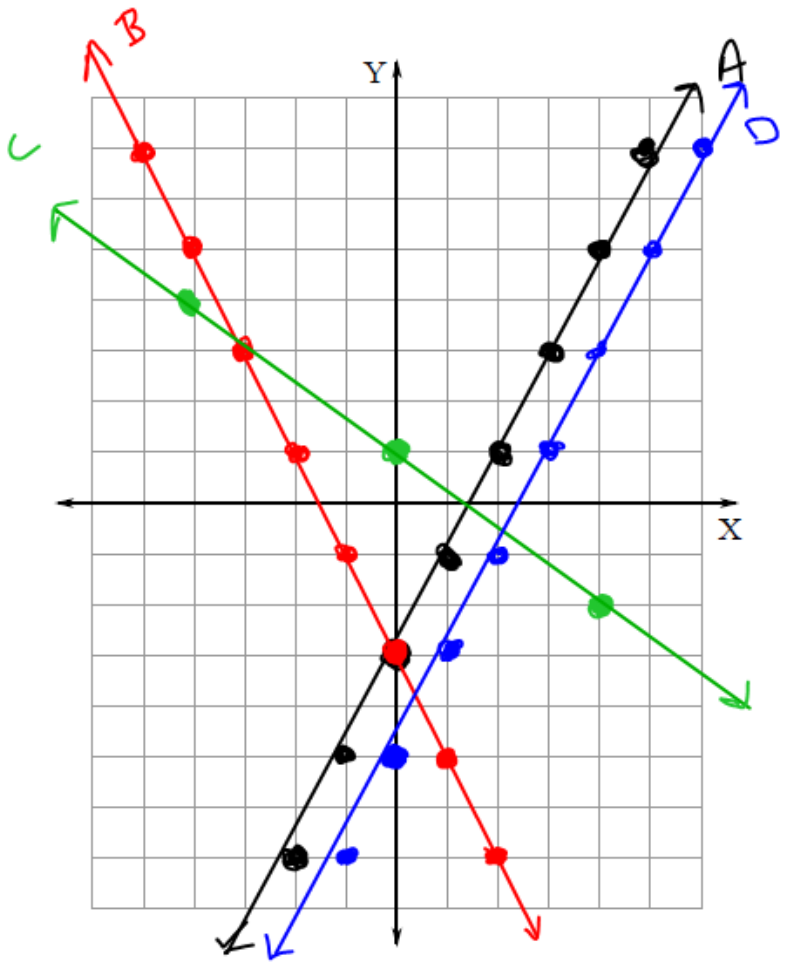


A. $3+y=2x \quad = \quad y=2x+-3$

B. $2y=-4x-6 \quad = y=-2x+-3$

C. $1-\frac{3}{4}x=y \quad = \quad y=\frac{-3}{4}x+1$

D. $-y=\frac{-4}{2}x+5 \quad = y=2x+-5$

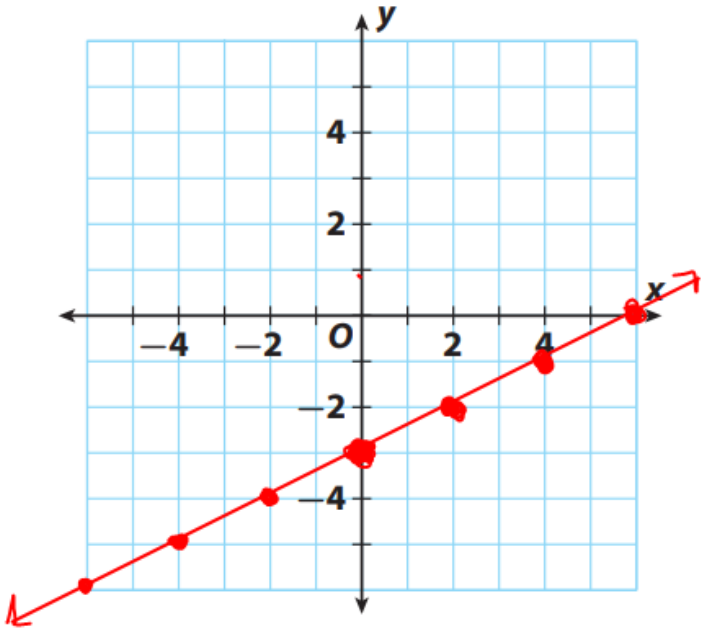


Guided Practice

Graph each equation using the slope and the *y*-intercept. (Example 1)

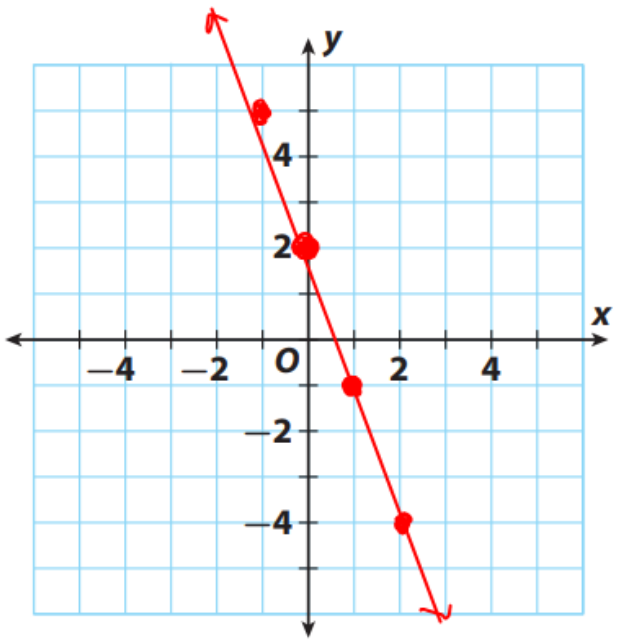
1. $y = \frac{1}{2}x + 3$

slope = $\frac{1}{2}$ *y*-intercept = 3



2. $y = -3x + 2$

slope = $\frac{-3}{1}$ *y*-intercept = 2



p 111 #7 Identify 4 coordinates (x, y) on the line

$m = -1$

$b = 8$

Option 1 → graph

Option 2 → table

$y = -1x + 8$

(-1, 9), (0, 8), (1, 7), (2, 6)

x	-1	0	1	2	3
y	9	8	7	6	5

$y = -1(-1) + 8$
$1 + 8$
9

$y = -1(0) + 8$
$0 + 8$
8

$y = -1(1) + 8$
$-1 + 8$
7

HW

p110-112

(1-16)