

Algebra 1 4.1

Write and graph linear equations in slope-intercept form.

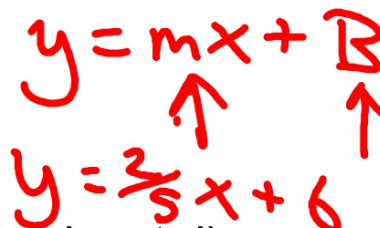
Model data with equations in slope-intercept form

linear

slope

y-intercept

$y = mx + b$

$$y = mx + b$$
$$y = \frac{2}{5}x + 6$$


Youtube:ymca

→ constant function (horizontal)  
bicycles and constant slope

Song

Whiteboards

## KeyConcept Slope-Intercept Form

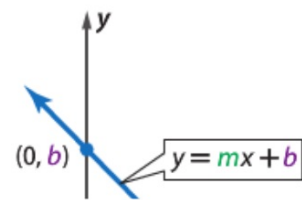


**Words** The slope-intercept form of a linear equation is  $y = mx + b$ , where  $m$  is the slope and  $b$  is the  $y$ -intercept.

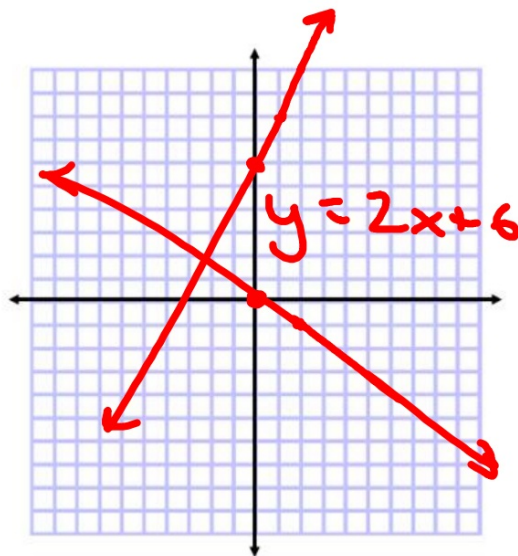
**Example**

$$y = mx + b$$
$$y = 2x + 6$$

slope  $\rightarrow$   $\leftarrow$   $y$ -intercept



$$y = -\frac{1}{2}x + 0$$
$$y = -\frac{1}{2}x$$



Write an equation of a line in slope-intercept form with the given slope and  $y$ -intercept. Then graph the equation.

1 slope: 2,  $y$ -intercept: 4

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

$$y = 2x + 4$$

$$y = 4 + 2x$$

2. slope:  $-5$ ,  $y$ -intercept: 3

$$y = -1.5x + 4$$
$$2y + 3x = 8$$
$$\begin{array}{r} 2y + 3x = 8 \\ -3x \quad -3x \\ \hline 2y = 8 - 3x \\ \frac{2y}{2} = \frac{8}{2} - \frac{3x}{2} \\ y = 4 - \frac{3}{2}x \end{array}$$
$$y = -\frac{3}{2}x + 4$$
$$y = 4 - \frac{3}{2}x$$

## Whiteboards

3. slope:  $\frac{3}{4}$ ,  $y$ -intercept:  $-1$

4. slope:  $-\frac{5}{7}$ ,  $y$ -intercept:  $-\frac{2}{3}$

Does it say y= ? (not yet)

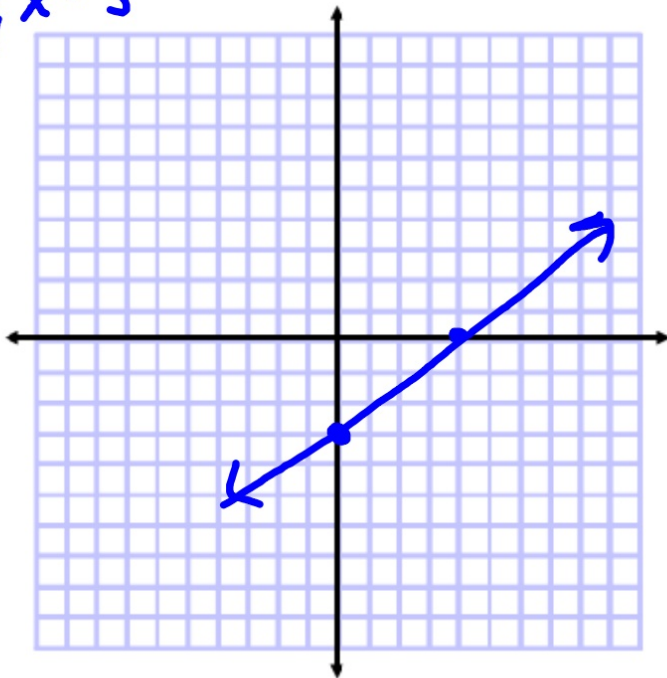
### Guided Practice

Graph each equation.

2A.  $3x - 4y = 12$

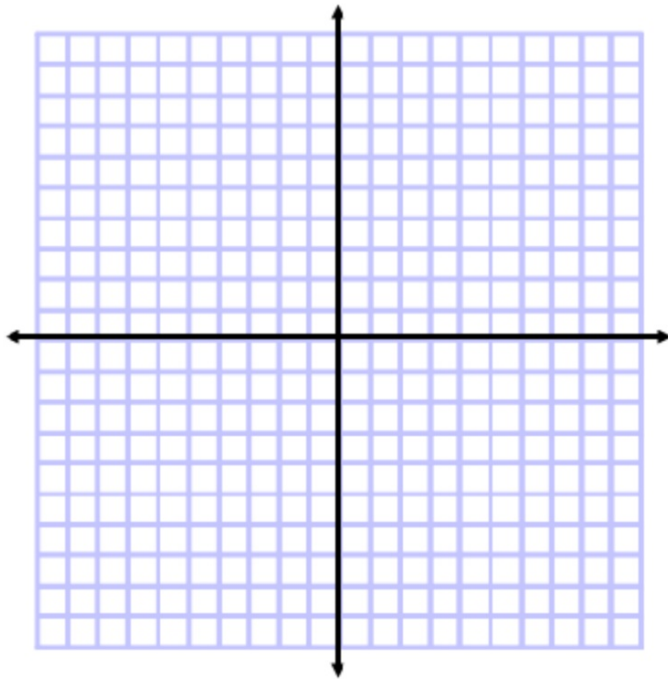
$$\begin{aligned} -3x & & -3x \\ -4y & = & -3x + 12 \\ \frac{-4y}{-4} & = & \frac{-3x + 12}{-4} \\ y & = & \frac{3}{4}x + 3 \end{aligned}$$

2B.  $-2x + 5y = 10$



5.  $-4x + y = 2$

6.  $2x + y = -6$



Special cases:  
horizontal & vertical

**Guided**Practice

Graph each equation.

3A.  $y = 5$   $y = 0x + 5$

$x = 2$   
 $y = -4$   
 $x = -1$

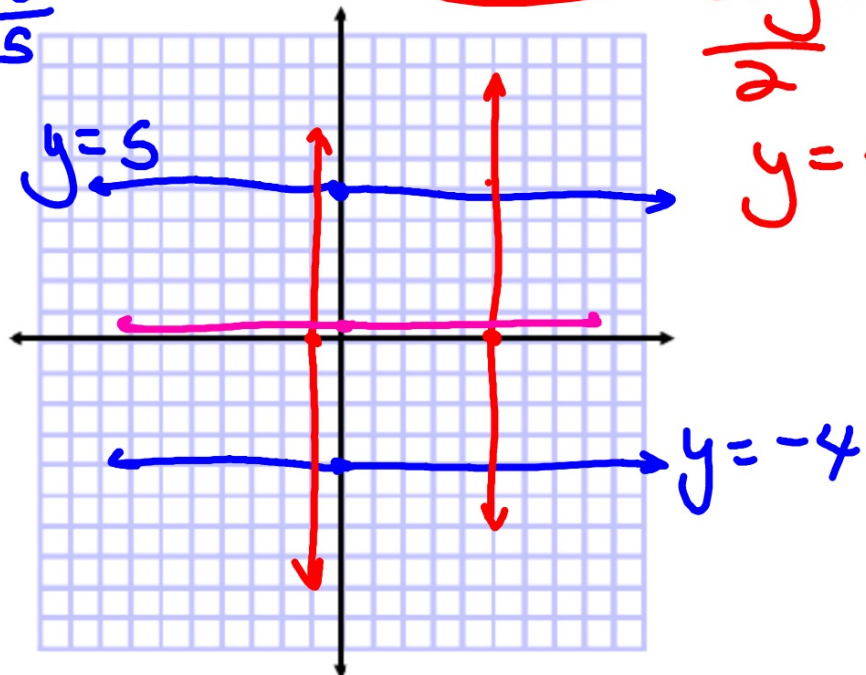


$x = 5$

~~$y = 5$~~   $0/5$

3B.  $2y = 1$

$2y = 1$   
 $y = \frac{1}{2}$



Where do they start (B)? What is the rate of change (m)?

**Real-World Example 5** Write and Graph a Linear Equation



**SPORTS** Use the information at the left about high school sports.

- a. Write a linear equation to find the number of girls in high school sports after 1997.



**Real-WorldLink**  
 In 1997, about 2.6 million girls competed in high school sports. The number of girls competing in high school sports has increased by an average of 0.06 million per year since 1997.  
 Source: National Federation of High School Associations

1997, 2.6 + 0<sup>n</sup>

$$\frac{6}{100} \quad \frac{3}{50} \quad \frac{0.06}{1}$$

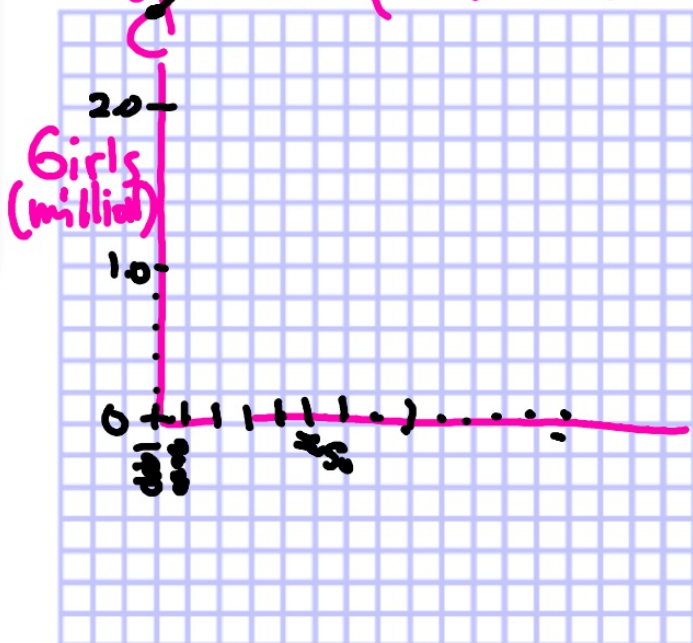
- b. Graph the equation.

$$y = mx + B$$

$$y = 0.06x + 2.6$$

- c. Estimate the number of girls competing in 2017.

$$y = 0.06(20) + 2.6$$





**Guided Practice**  $y = 5x - 1160$

5. **FUNDRAISERS** The band boosters are selling sandwiches for \$5 each. They bought \$1160 in ingredients.

- A. Write an equation for the profit  $P$  made on  $n$  sandwiches.
- B. Graph the equation.
- C. Find the total profit if 1400 sandwiches are sold.

When do they make a profit?

