

Algebra 1 4.1

Write and graph linear equations in slope-intercept form.

Model data with equations in slope-intercept form
linear

slope (R.O.C.) $y = mx + b$
y-intercept (starting) $\uparrow$ $\uparrow$
 $y = mx + b$

constant function (horizontal)
bicycles and constant slope

$$y = 3$$
$$x = 6$$

Youtube:ymca

Song

Whiteboards

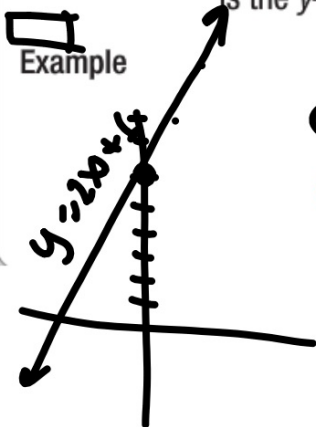
KeyConcept Slope-Intercept Form



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



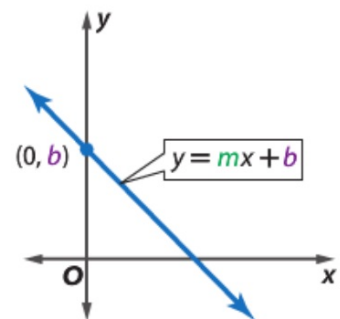
$$y = mx + b$$

$$y = 2x + 6$$

slope $\uparrow$

$\uparrow$ y -intercept

$\frac{2}{1}$



$$y = mx + b$$

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

$$y = 2x + 4$$

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

$$f(x) = 2x + 4$$

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

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.

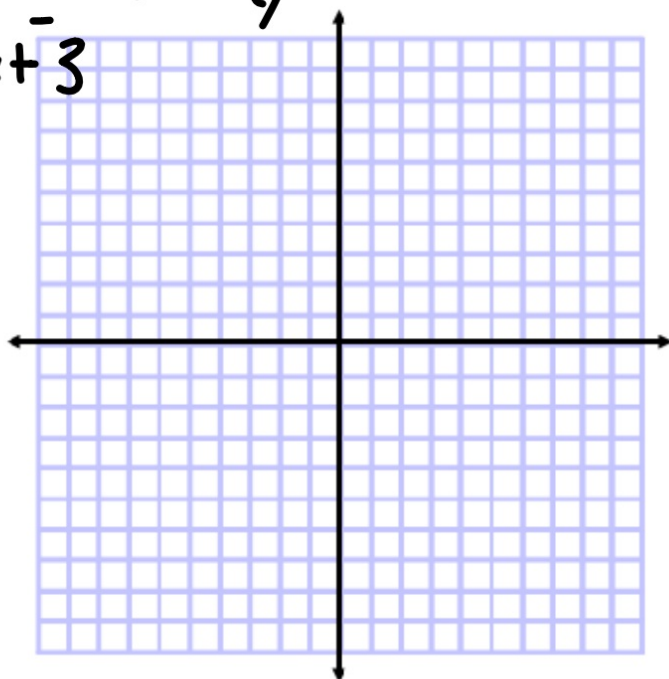
2A. $3x - 4y = 12$

$$\begin{array}{r} -3x \quad -3x \\ \hline \end{array}$$

$$\frac{-4y}{-4} = \frac{-3x + 12}{-4}$$

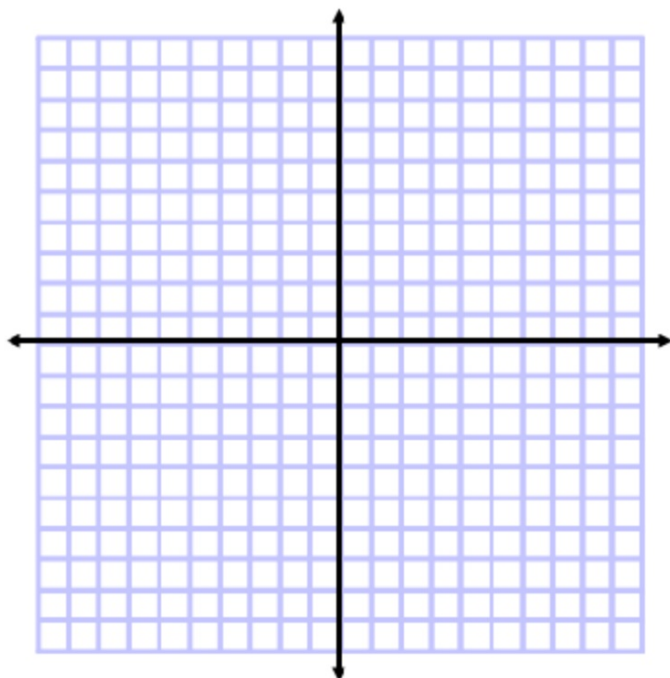
$$y = \frac{3}{4}x + 3$$

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



5 $-4x + y = 2$

6 $2x + y = -6$



GuidedPractice

Graph each equation.

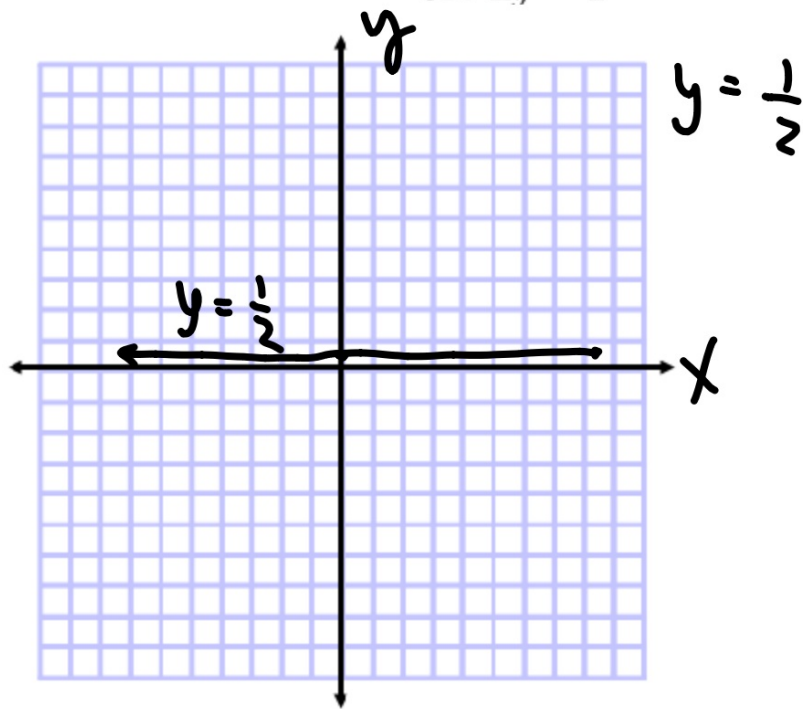
3A. $y = 5$

$x = 2$

$y = -4$

$x = -1$

3B. $2y = 1$



Special cases:

horizontal & vertical (opp to axis)

$y = 3$ $x = -3$

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.

$$y = mx + B$$

↑ ↑
R.O.C. start

start 1997, 2.6 mil.

$$m = +0.06 \frac{\text{mil}}{\text{yr}}$$

↑
B

- b. Graph the equation.

$$y = 0.06x + 2.6$$

$$\text{girls} = 0.06(\text{yr}) + 2.6$$

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



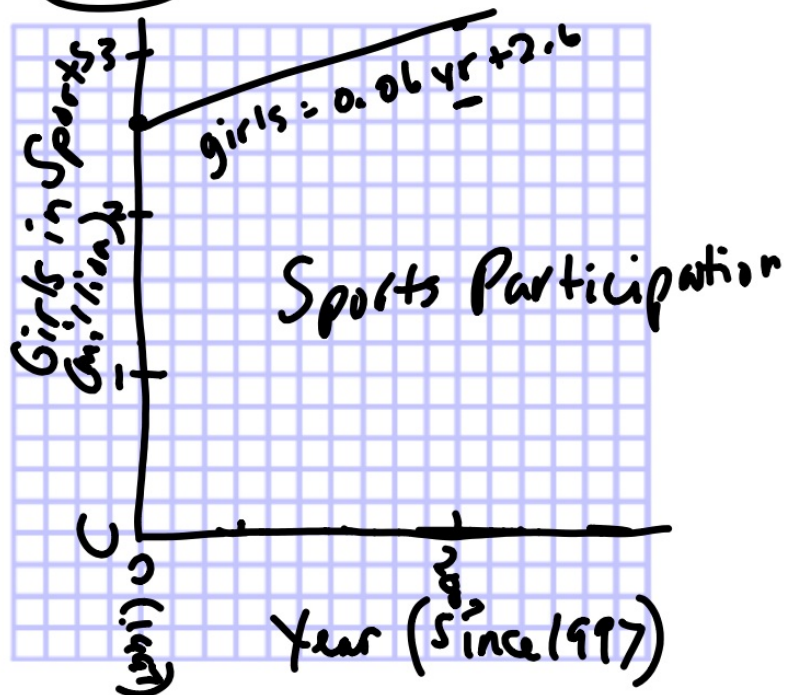
Real-World Link

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

$$\frac{.06}{1} = \frac{.6}{10}$$

$$\begin{aligned} \text{girls} &= 0.06(20) + 2.6 \\ &= 3.8 \text{ million} \end{aligned}$$



Guided Practice

$$P = 5n - 1160$$
$$= 5 \cdot 1400 - 1160$$

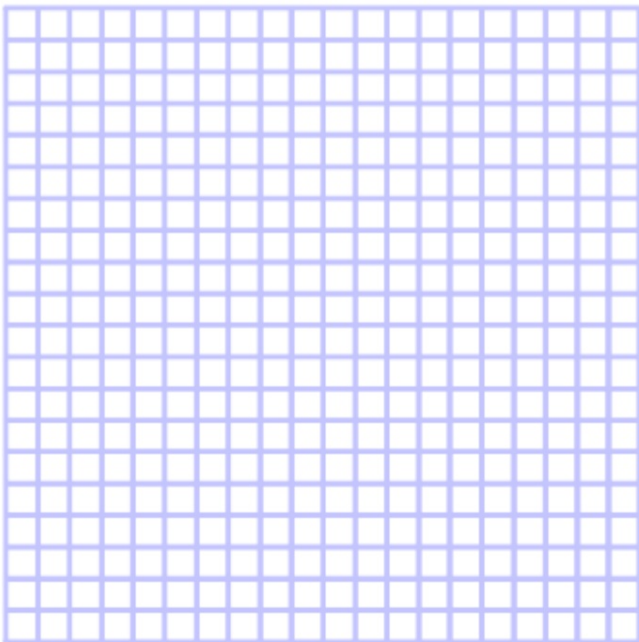
$$\boxed{\$5840}$$

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.

\$5840

When do they make a profit?



WB 4.1 (prac)
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