Algebra 1 4.1 $y = mx + B$

Write and graph linear equations in slope-intercept form.

Model data with equations in slope-intercept form

linear

slope m

y-intercept b

y=mx+b

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.

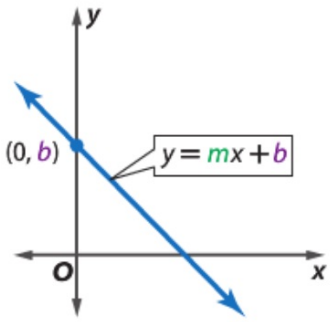
Example

$$y = mx + b$$

$$y = 2x + 6$$

slope — 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

$y = 2x + 4$

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)

GuidedPractice

$y = mx + B$

Graph each equation.

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

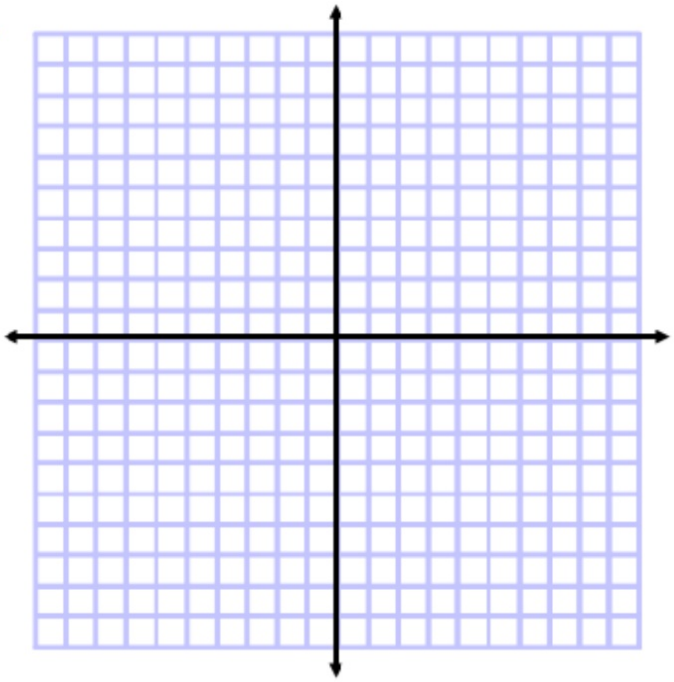
$\frac{-4y}{-4} = \frac{-3x}{-4} + \frac{12}{-4}$

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

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

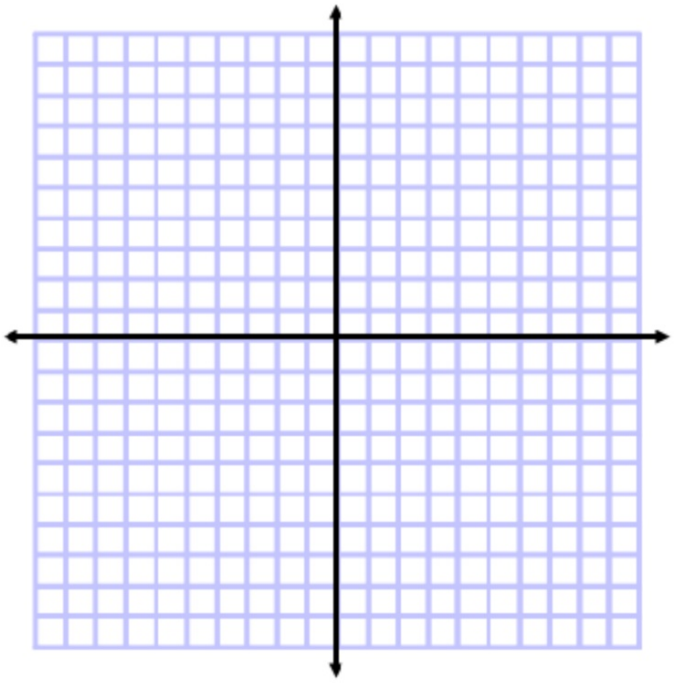
$y = 2 + \frac{2}{5}x$

$y = \frac{2}{5}x + 2$



5. $-4x + y = 2$

6. $2x + y = -6$



Special cases:
horizontal & vertical

$m = 0$ $m = \text{undef}$

$y = \text{constant}$ $x = \text{constant}$

GuidedPractice

Graph each equation.

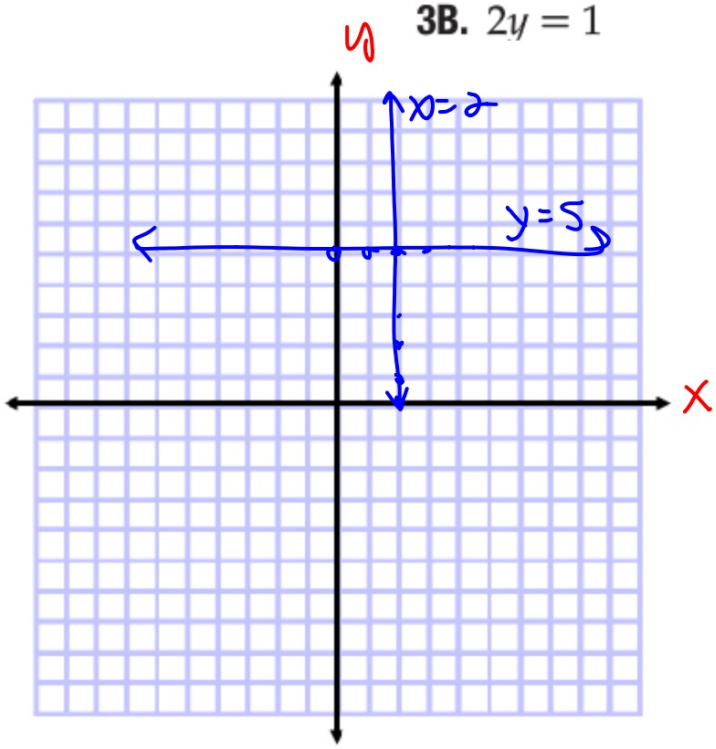
3A. $y = 5$

x = 2

y = -4

x = -1

3B. $2y = 1$



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. $y = mx + B$

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

$y = 0.06x + 2.6$

Real-World Link

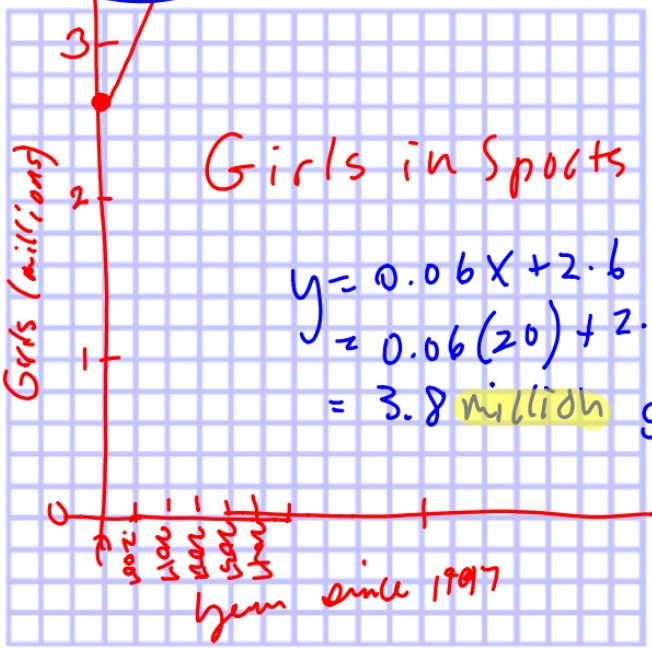
In 1997, about 2.6 million girls competed in high school sports. The number of girls competing in high school sports has increased by an average of 0.06 million per year since 1997.

Source: National Federation of High School Associations

m B

b. Graph the equation. 2,600,000 2.6 million

c. Estimate the number of girls competing in 2017.



$y = 0.06x + 2.6$
$= 0.06(20) + 2.6$
$= 3.8$ million girls

$y = 0.06x + 2.6$

$\frac{6}{100}$ $\frac{3}{50}$

$\frac{60}{1000}$

GuidedPractice

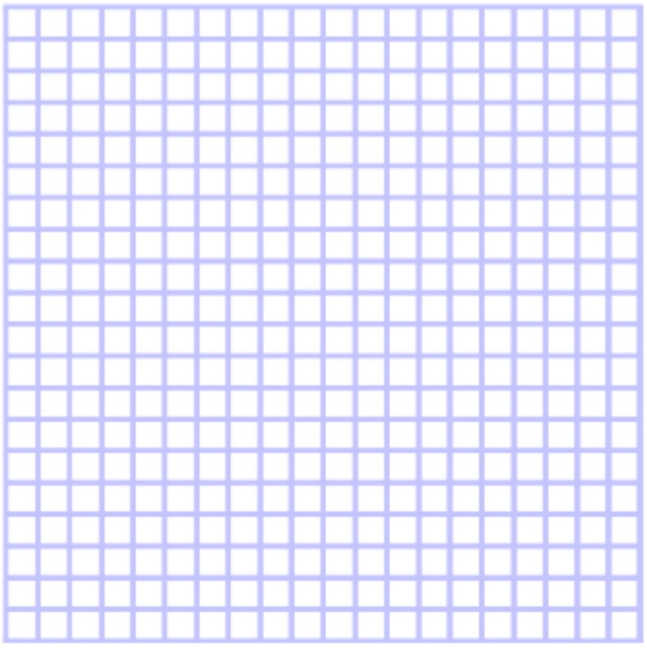
5. FUNDRAISERS The band boosters are selling sandwiches for $5 each. They bought $1160 in ingredients.

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?



$P = 5n + -1160$

$5 \cdot 1400 + -1160$