

Notes 4.3

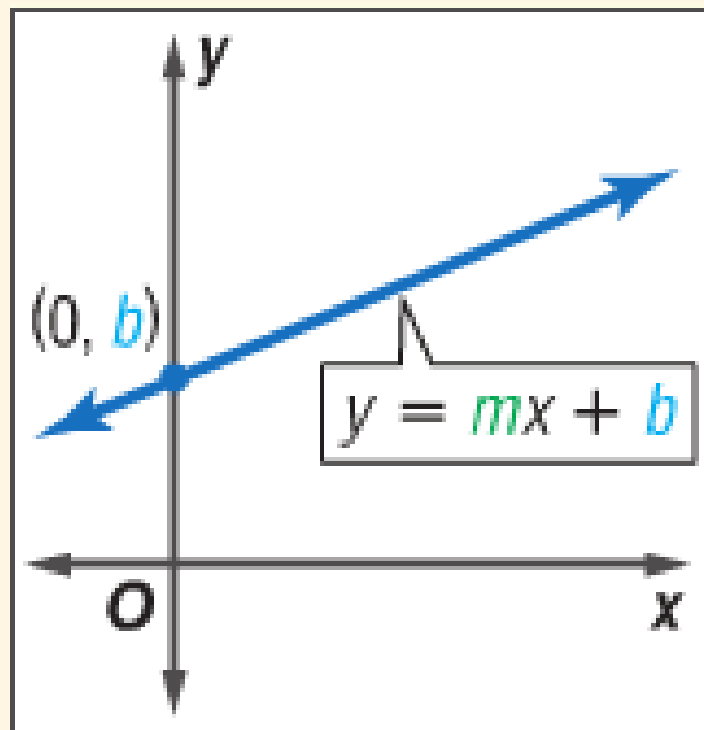
Graphing Equations in Slope-Intercept Form

I. Slope-Intercept Form

Symbols $y = mx + b$

slope \uparrow \uparrow y -intercept

Graph



II. Writing linear Equations in Slope-Intercept Form

Ex. 1 Write the equation of the line in slope-intercept form.

$$\text{slope} = \frac{1}{4}; \text{ y-intercept} = 4$$

$$y = mx + b$$

*Substitute the given values for
m and b.*

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

Simplify if necessary.

Ex. 2: Write the equation that describes the line in slope-intercept form.

slope = -9 ; y-intercept = $-\frac{5}{4}$

$$y = mx + b$$

Substitute the given values for m and b . Simplify if necessary.

$$y = -9x + \left(-\frac{5}{4}\right)$$

$$y = -9x - \frac{5}{4}$$

Ex. 3: Write the equation of a line in slope-intercept form that passes through the origin and has a slope of -2.

slope = -2; y-intercept = 0

$$y = mx + b$$

Substitute the given values for m and b. Simplify if necessary.

$$y = -2x + (0)$$

$$y = -2x$$

IV. Writing an Equation from a Graph

Ex. 1: Write an equation using slope-intercept form of the line shown on the graph.

Step 1: Find the slope using two points on the line.

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} && \text{rise} \\ &= \frac{-1 - 3}{2 - 0} && \text{run} \\ &= \frac{-4}{2} \text{ or } -2 && \text{Simplify.} \end{aligned}$$

The slope is -2 .

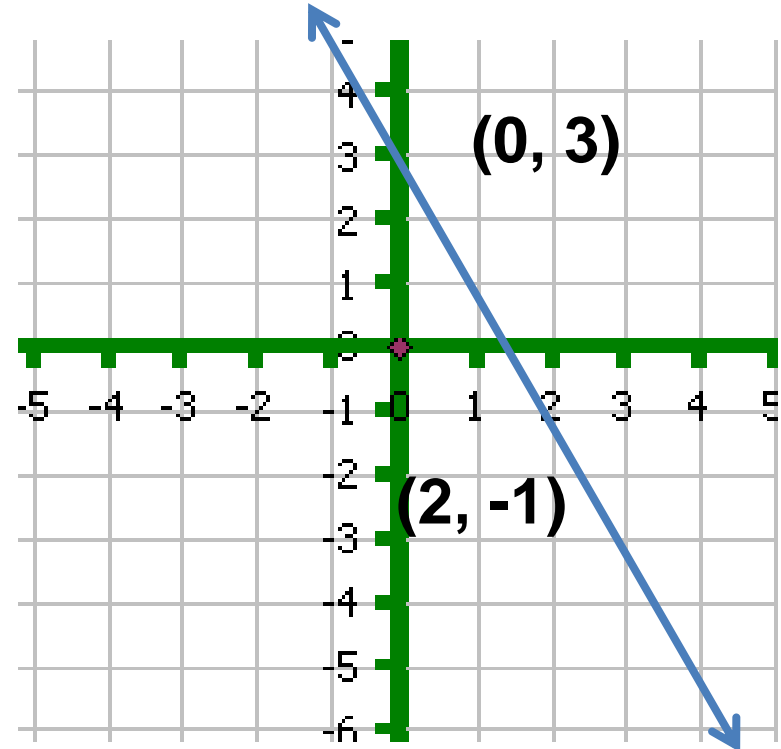
Step 2: Find the y-intercept

. The line crosses the y-axis at $(0, 3)$. So, the y-intercept is 3.

Step 3: Write the equation.

$$y = mx + b$$

$$y = 2x + 3$$



Ex. 2: Write an equation using slope-intercept form of the line shown on the graph.

Step 1: Find the slope using two points on the line.

The slope is $\frac{1}{4}$

Step 2: The line crosses the y-axis at $(0, -1)$. So, the y-intercept is -1 .

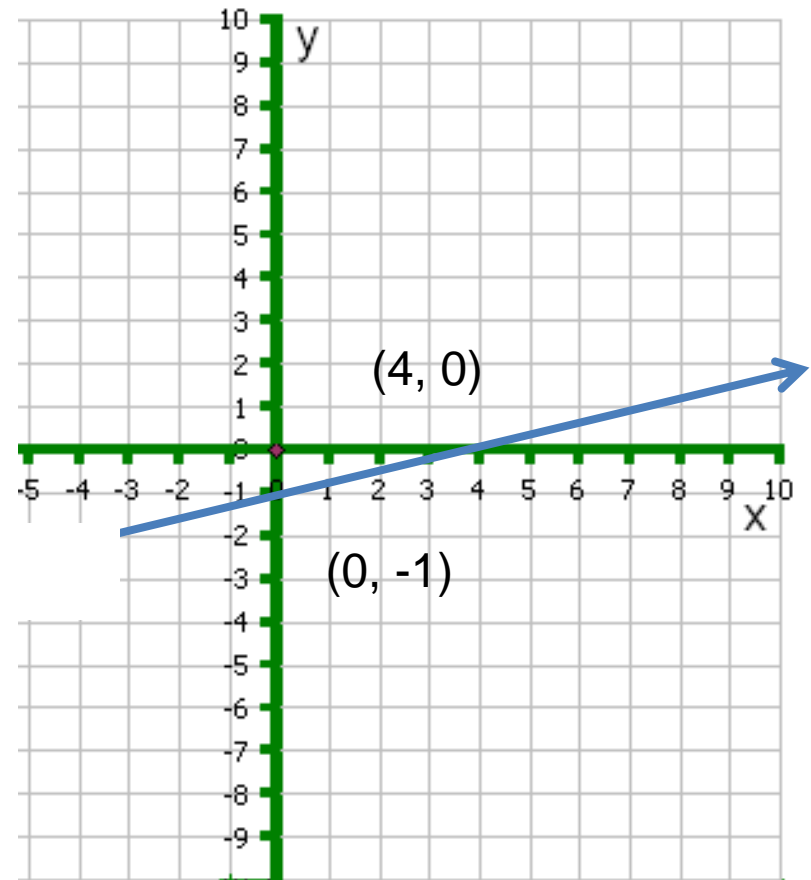
Step 3: Write the equation:

$$y = mx + b$$

$$m = \frac{1}{4}; b = -1$$

The equation of the line is $y =$

$$\frac{1}{4}x - 1$$



V. Graphing by Using Slope and y-intercept

Ex. 1: Graph the line given the slope and y-intercept.

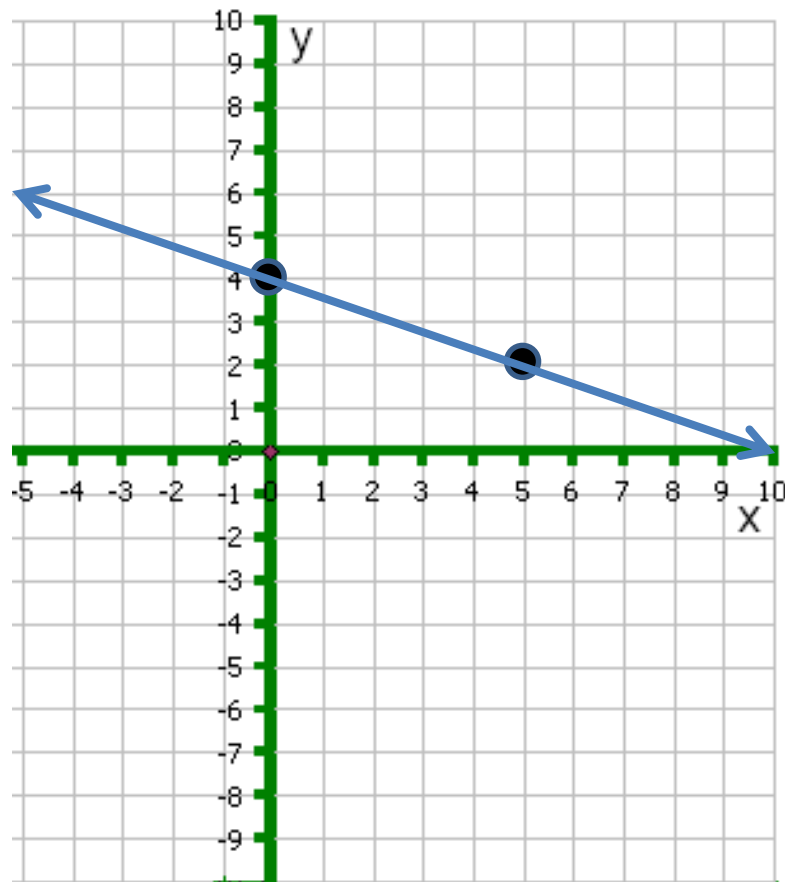
$$y = -\frac{2}{5}x + 4$$

y intercept = 4

Step 1 The y-intercept is 4, so the line contains (0, 4). Plot (0, 4).

Step 2 Slope = $-\frac{2}{5}$ Count 2 units down and 5 units right from (0, 4) and plot another point.

Step 3 Draw the line through the two points.



Ex. 2: Graph the line given the slope and y-intercept.

$$5x - 3y = 6$$

Step 1 Solve for y to write the equation in slope-intercept form.

$$5x - 3y = 6$$

Original equation

$$5x - 3y - 5x = 6 - 5x$$

Subtract $5x$ from each side.

$$-3y = 6 - 5x$$

Simplify.

$$-3y = -5x + 6$$

$6 - 5x = 6 + (-5x)$ or $-5x + 6$

$$\frac{-3y}{-3} = \frac{-5x + 6}{-3}$$

Divide each side by -3 .

$$y = \frac{5}{3}x - 2$$

$$y = \frac{5}{3}x - 2$$

Divide each term in the numerator by -3 .

$$y = \frac{5}{3}x - 2$$

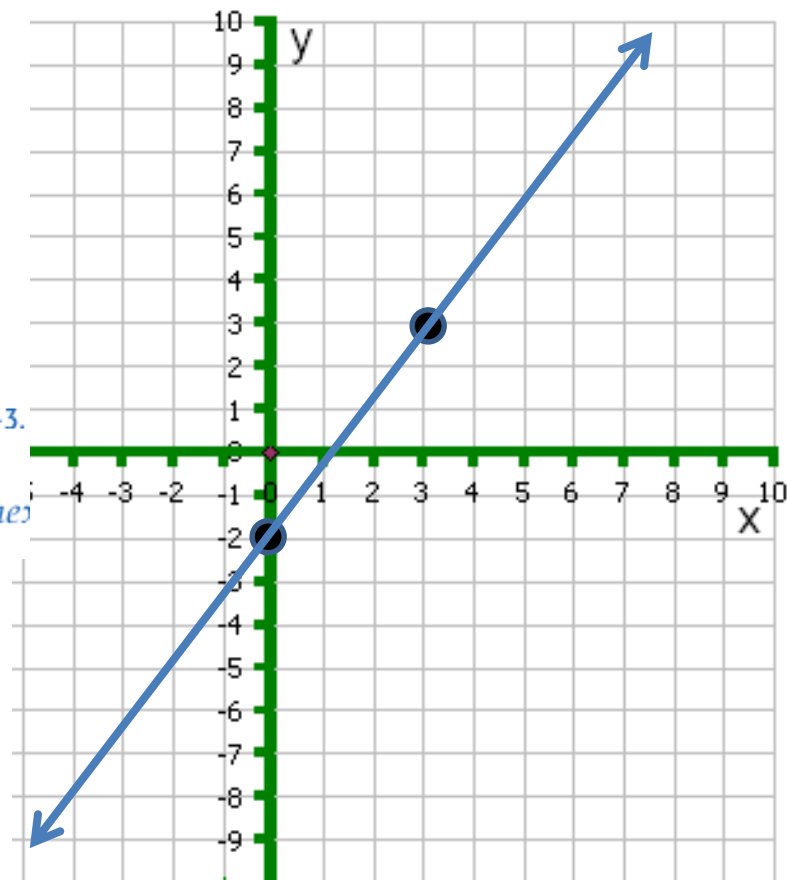
Simplify.

(continued on the next page)

Slope: $\frac{5}{3}$; y-intercept: -2

Start by plotting the y-intercept.

Starting from the y-intercept, go up 5 and to the right 3.



VI. Applications

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

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

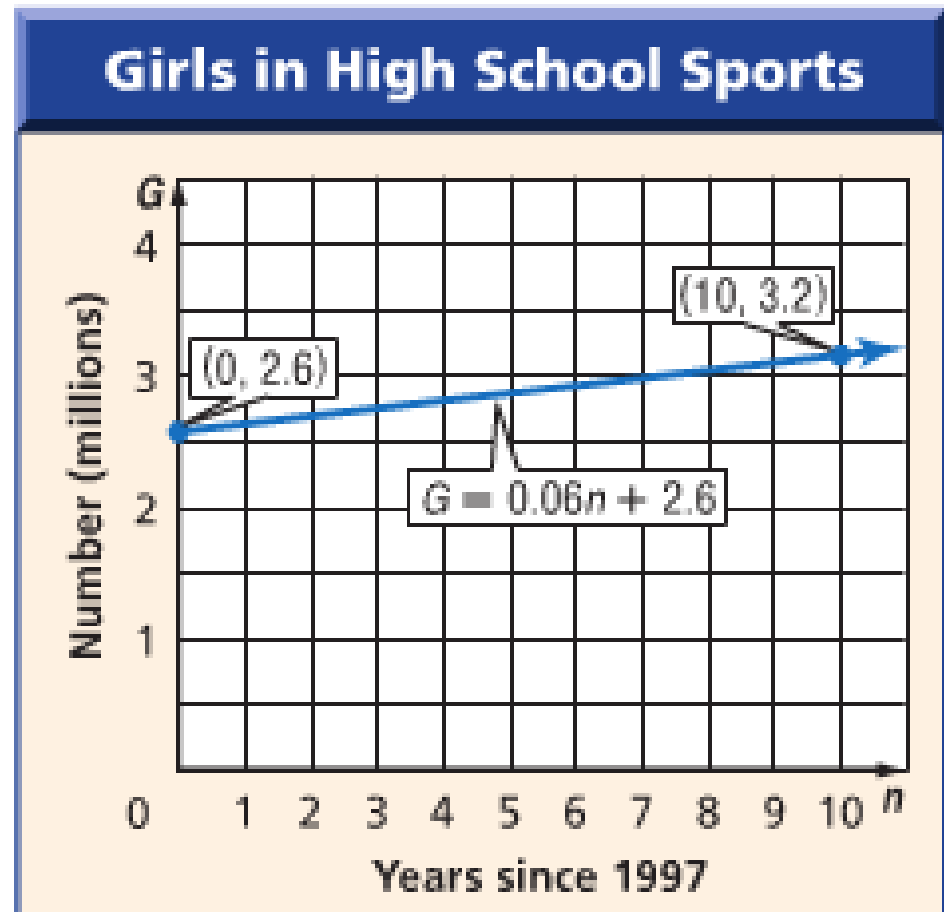
Words	Number of girls competing	equals	rate of change	times	number of years after 1997	plus	amount at start.
Variables	Let G = number of girls competing.				Let n = number of years after 1997.		
Equation	G	=	0.06	·	n	+	2.6

b. Graph the equation.

Identify independent and dependent variables.

Determine what units to use and how to number the x- and y-axis.

The graph passes through $(0, 2.6)$ with slope of 0.06.



Future Business Leaders of America is making sandwiches that they are selling for \$5 each. They spent \$160 on ingredients and supplies.

- a. Write an equation that represents the profit P they will make on s sandwiches.

- b. Graph the equation.

- c. Find the total profit if 90 sandwiches are made.