

Focus:

1. To be able to identify the slope and y-intercept of a straight-line graph.
2. To be able to determine a linear equation using slope and y-intercept.
3. To be able to rewrite a linear relation in slope-intercept form
4. To be able to graph equations in slope-intercept form.



Curricular Competencies

- A2 I can explore, analyze and apply mathematical ideas  
C3 I can use proper math vocabulary and language in discussions

Need to Know:

Slope measures the steepness of an incline or a decline. It can be calculated using:

$$m = \frac{\text{rise}}{\text{run}} \quad (\text{graph})$$

$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad (\text{given points})$$

The **y-intercept** is the point where the graph crosses or touches the vertical axis. Its coordinate is (0, y)

The **x-intercept** is the point where the graph crosses or touches the horizontal axis. Its coordinate is (x, 0)

When graphing, we usually start at a point after the y-intercept then use the slope to determine other points on the graph.

Slope-Intercept Form of a Linear Equation

m: slope (multiplier)

b: y-intercept (constant)

x: independent variable

y: dependent variable

$$y = mx + b$$

$$y = mx + b$$

Example 1:

Write the equation of the linear functions in slope-intercept form given the information.

a. Slope:  $\frac{3}{4}$ ; y-int: 5

$$y = \frac{3}{4}x + 5$$

b. Slope:  $-\frac{5}{2}$ ; y-int: -3

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

c. Slope: 7; y-int: -7

$$y = 7x - 7$$

Example 2:

Graph the following linear equations and state the coordinates of the x- and y- intercepts.

a)  $f(x) = \frac{3x}{1} - 5$

x-intercept: \_\_\_\_\_

y-intercept: \_\_\_\_\_

$$\left(\frac{5}{3}, 0\right)$$

$$(0, -5)$$

b)  $f(x) = 2 - \frac{3}{4}x$

x-intercept: \_\_\_\_\_

y-intercept: \_\_\_\_\_

$$\left(\frac{8}{3}, 0\right)$$

$$(0, 2)$$

$$y = mx + b$$

$$0 = \frac{3x}{1} - 5$$

$$+5 \quad +5$$

$$\frac{5}{3} = \frac{3x}{3}$$

$$\frac{5}{3} = x$$

$$y = mx + b$$

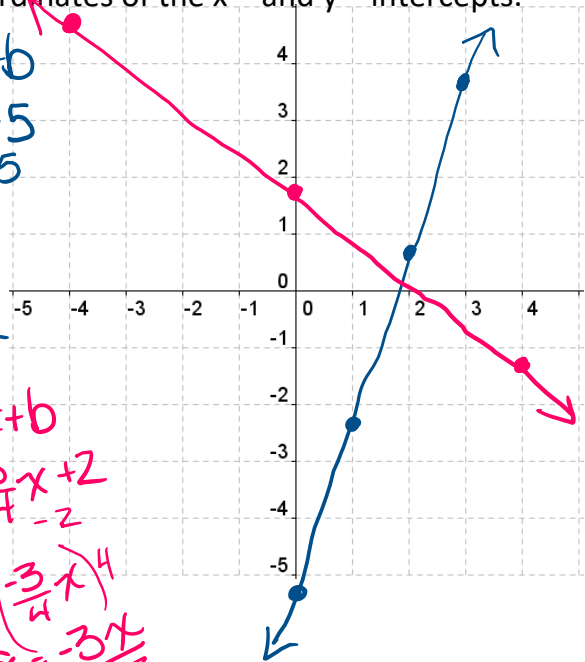
$$0 = -\frac{3}{4}x + 2$$

$$-2 \quad -2$$

$$4(-2) = \left(-\frac{3}{4}x\right)4$$

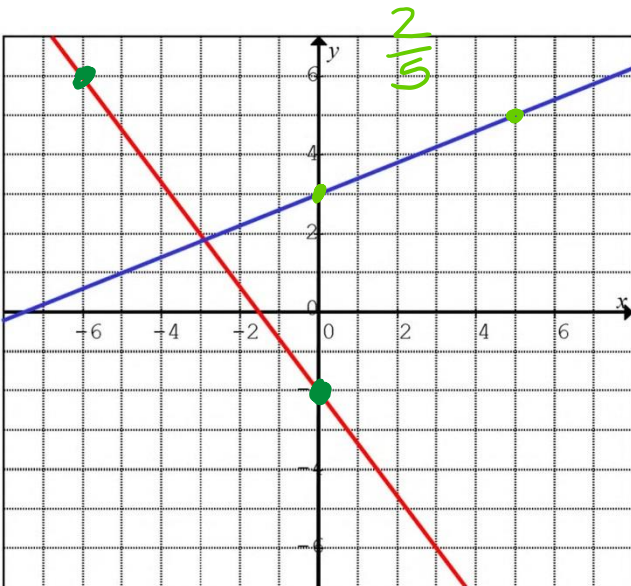
$$-8 = -\frac{3x}{1}$$

$$\frac{8}{3} = x$$



Example 3:

Write the equations of the following graphs in slope-intercept form.



$$y = mx + b$$

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

$$y = mx + b$$

$$y = -\frac{8}{6}x - 2$$

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

Example 4:

Determine the equation of the following in slope-intercept form.

a) E (2,3) and F (1,7)

b) J (-6,-2) and K (5,8)

$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad y = mx + b$$

$$= \frac{7 - 3}{1 - 2} \quad y = -4x + b$$

$$= \frac{-4}{-1} \quad 3 = -4(2) + b$$

$$= 4 \quad 3 = -8 + b$$

$$+8 \quad +8$$

$$11 = b$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{8 - (-2)}{5 - (-6)}$$

$$= \frac{10}{11}$$

$$y = mx + b$$

$$8 = \frac{10}{11}(5) + b$$

$$8 = \frac{50}{11} + b$$

$$-\frac{50}{11}$$

$$\frac{8}{1} - \frac{50}{11} = b$$

$$y = \frac{10}{11}x + \frac{38}{11}$$

$$\frac{88}{11} - \frac{50}{11} = b \quad b = \frac{38}{11}$$

Example 5:  $y = -4x + 11$

Write each equation in the form of  $y = mx + b$

a.  $3x + 3y - 4 = 0$

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

$$3x + 3y = 4$$

$$-3x \quad -3x$$

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

b.  $x - 4y - 8 = 0$

$$\frac{x - 8}{4} = \frac{4y}{4}$$

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

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

Example 6:

Jim likes to rock climb in his spare time. Recently he climbed down from the top of a cliff to the bottom. At the top, where Jim started, he was 2500 ft above the ground. He moved down the cliff at a speed of 20 ft/min.

a. Write an equation to represent the height,  $h$ , in feet that Jim was above the ground after  $t$  minutes.

$$h = -20t + 2500$$

b. What does the slope represent?

how fast he goes down

c. What was Jim's height above the ground after 40 minutes?

$$h = -20t + 2500$$

$$= -20(40) + 2500$$

$$= -800 + 2500$$

$$h = 1700 \text{ ft}$$

d. How many minutes did it take Jim to reach the ground?

$$h = -20t + 2500$$

$$0 = -20t + 2500$$

$$+20t \quad +20t$$

$$\frac{20t}{20} = \frac{2500}{20}$$

$$t = 125 \text{ min}$$



Assign: P 349 1 ace, 3 ace, 4, 5 ace, 6 ace, 7, 8 ace, 9 bd, 10 bd, 13