

Algebra 2A  
2-4 More about Linear Equations

Name: \_\_\_\_\_  
Date: \_\_\_\_\_ Hr: \_\_\_\_\_

**Objective:** To write an equation of a line given its slope and a point on the line.

**Common Core Content Standard**

- F.IF.8 Write a function defined by an expression in different but equivalent forms...
- F.IF.9 Compare properties of two functions each represented in a different way...
- Also F.IF.2, A.CED.2

The equation of a line in \_\_\_\_\_ form through point  $(x_1, y_1)$  with slope  $m$ :  $y - y_1 = m(x - x_1)$ .

**Example 1: Writing an Equation Given a Point and the Slope**

A line passes through  $(-1, 3)$  with slope  $-\frac{2}{3}$ . What is an equation of the line?

**Example 2: Writing an Equation Given Two Points**

A line passes through  $(5, 1)$  and  $(7, 9)$ . What is an equation of the line in point slope form?

A \_\_\_\_\_ form of a linear equation is  $Ax + By = C$ , where  $A, B, C$  are real numbers and  $A$  and  $B$  are not both zero.

**Example 3: Writing an Equation in Standard Form**

What is an equation of the line  $y = \frac{2}{5}x - 3$  in standard form? Use integer coefficients.

Take note

### Concept Summary Writing Equations of Lines

Slope-Intercept Form

$$y = mx + b$$

Use this form when you know the slope and the  $y$ -intercept.

Point-Slope Form

$$y - y_1 = m(x - x_1)$$

Use this form when you know the slope and a point, or when you know two points.

Standard Form

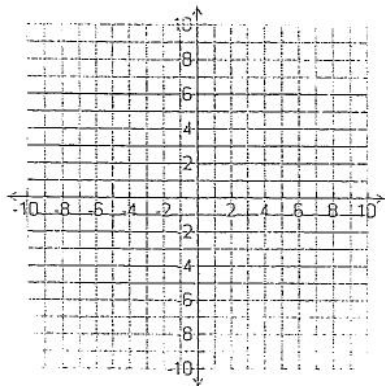
$$Ax + By = C$$

$A$ ,  $B$ , and  $C$  are real numbers.  
 $A$  and  $B$  cannot both be zero.

### Example 4: Graphing an Equation Using Intercepts

a.) What are the intercepts of  $4x + 3y = 12$ ?

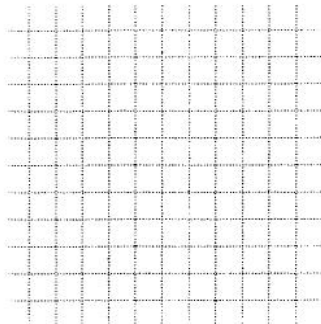
b.) Graph the equation.



### Example 5: Drawing and Interpreting a Linear Graph

The cost of a taxi ride depends on the distance traveled. You paid \$8.50 for a 3-mile ride, while your friend paid \$18.50 for an 8-mile ride.

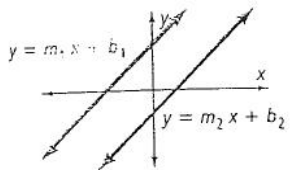
a.) What graph models the situation?



b.) What is an equation of the line in standard form?

**Take note** **Key Concepts** Parallel and Perpendicular Lines

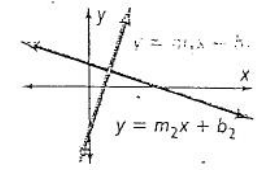
The slopes of parallel lines are equal.



$y = m_1x + b_1$   
 $y = m_2x + b_2$

$m_1 = m_2$   
 $b_1 \neq b_2$

The slopes of perpendicular lines are negative reciprocals of each other.



No line can be vertical.

$y = m_1x + b_1$   
 $y = m_2x + b_2$

$m_1 \cdot m_2 = -1$   
 $m_1 = -\frac{1}{m_2}$   
 $m_2 = -\frac{1}{m_1}$

$m_1$  and  $m_2$  are negative reciprocals of each other.

### Example 6: Writing Equations of Parallel and Perpendicular Lines

What is the equation of each line in slope-intercept form?

a.) the line parallel to  $y = 5x - 4$  through  $(-2, 1)$

b.) the line perpendicular to  $y = -2x + \frac{3}{4}$  with the same y-intercepts as  $x + 3y = 12$

