

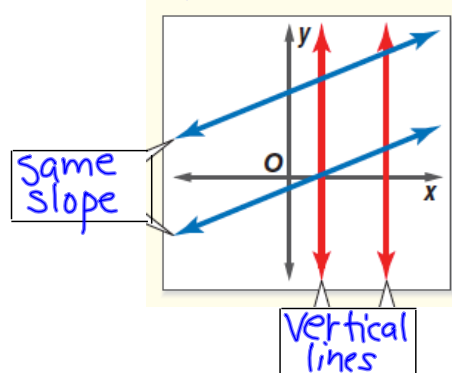
# Algebra I

## Lesson 5-6

- I can write an equation of the line that passes through a given point, parallel to a given line.
- I can write an equation of the line that passes through a given point, perpendicular to a given line.

Lines in the same plane that do not intersect are called parallel lines. These lines have the same slope.

Two nonvertical lines are parallel if they have the same slope. All vertical lines are parallel.



You can write the equation of a line parallel to a given line if you know a point on the line and an equation of the given line.

Write the slope-intercept form of an equation for the line that passes through  $(-1, -2)$  and is parallel to the graph of  $y = -3x - 2$

$$y = -3x - 2$$

$$m = -3$$

$$(-1, -2) \quad m = -3$$

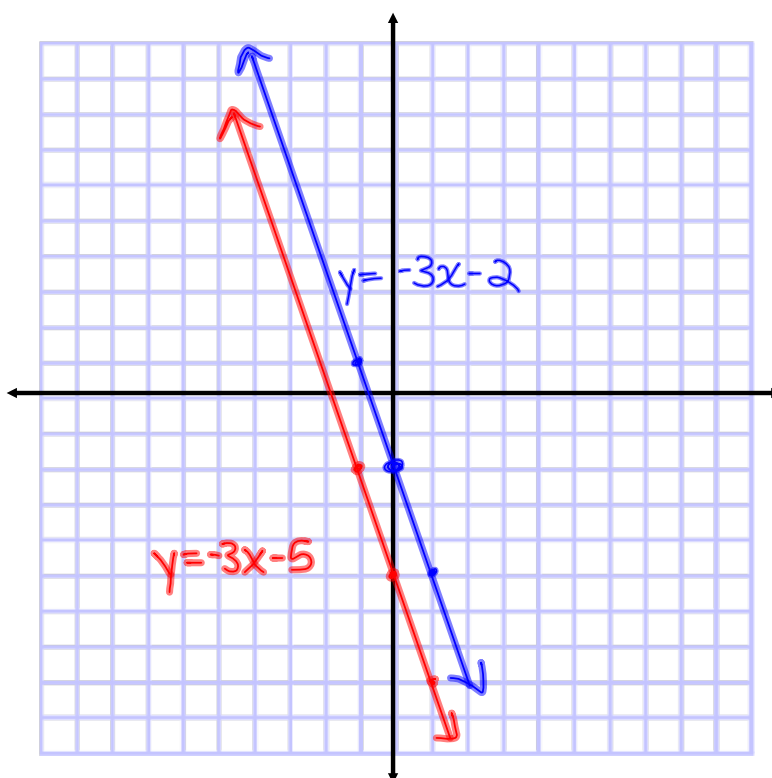
$$y - (-2) = -3(x - (-1))$$

$$y + 2 = -3(x + 1)$$

$$y + 2 = -3x - 3$$

$$\begin{array}{r} y + 2 = -3x - 3 \\ \underline{-2} \qquad \qquad \underline{-2} \\ y = -3x - 5 \end{array}$$

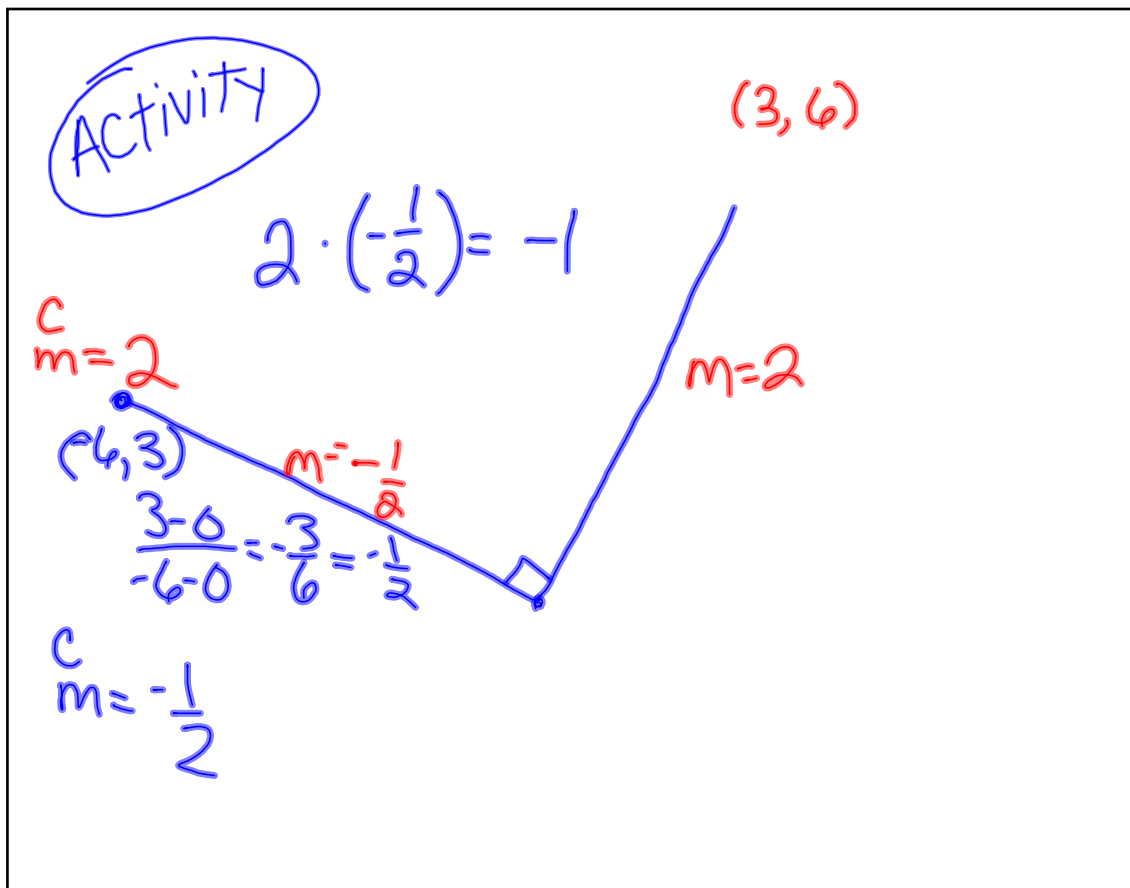
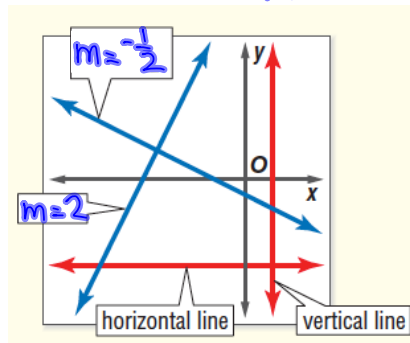
$$y = -3x - 5$$



Lines that intersect at right angles are called perpendicular lines.

Two nonvertical lines are perpendicular if the product of their slopes is -1.

This means the slopes are opposite reciprocals of each other.



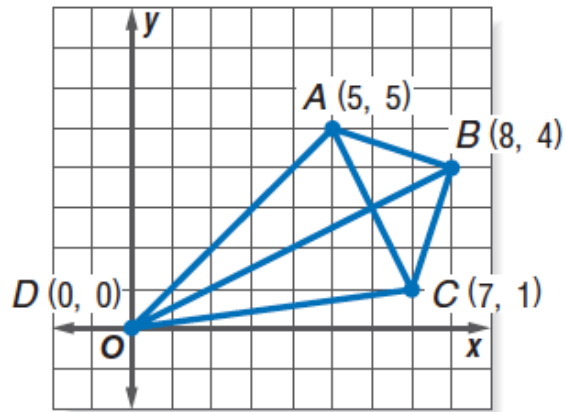
Determine whether  $\overline{AC}$  is perpendicular to  $\overline{BD}$ .

$$\overline{AC}$$

$$m = \frac{5-1}{5-7} = \frac{4}{-2} = -2$$

$\overline{BD}$

$$m = \frac{4-0}{8-0} = \frac{4}{8} = \frac{1}{2}$$



$$-2 \cdot \frac{1}{2} = -1$$

the lines are perpendicular because the product of their slopes is  $-1$

Write the slope-intercept form for an equation of the line that passes through  $(-3, -2)$  and is perpendicular to the graph of  $x + 4y = 12$ .

$$x + 4y = 12$$

$$\underline{-x} \quad \underline{-x}$$

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

$$y = -\frac{1}{4}x + 3$$

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

$$m = 4$$

$$y + (-2) = 4(x + (-3))$$

$$y + 2 = 4x + 12$$

$$\underline{-2} \quad \underline{-2}$$

$$y = 4x + 10$$

Write the slope-intercept form for an equation of a line perpendicular to the graph of  $y = -\frac{1}{3}x + 2$  and passes through the x-intercept of that line.

$$y = -\frac{1}{3}x + 2$$

$$m = -\frac{1}{3}$$

$$0 = -\frac{1}{3}x + 2$$

$$\underline{-2} \qquad \qquad \underline{-2}$$

$$-3(-2) = \left(-\frac{1}{3}x\right) \cdot -3$$

$$6 = x$$

$$m = 3$$

$$(6, 0)$$

$$y - 0 = 3(x - 6)$$

$$y = 3x + -18$$

OR

$$y = 3x - 18$$

## Assignment:

Pgs 296-297 # <sup>20</sup>~~14~~-24 even; 25-27;  
28-~~38~~ <sup>32</sup> even 40-41