

# Lesson 3 - 6

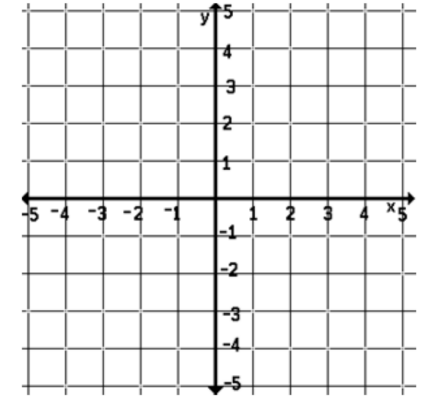
## Lines in the Coordinate Plane

### Forms of the Equation of a Line

FORM	EXAMPLE
The <input type="text"/> of a line is <input type="text"/> where $m$ is the slope and $(x_1, y_1)$ is a given point on the line.	$y - 3 = 2(x - 4)$ $m = 2, (x_1, y_1) = (3, 4)$
The <input type="text"/> of a line is <input type="text"/> where $m$ is the slope and $b$ is the $y$ -intercept.	$y = 3x + 6$ $m = 3, b = 6$
The equation of a <input type="text"/> line is <input type="text"/> where $a$ is the $x$ -intercept.	$x = 5$
The equation of a <input type="text"/> line is <input type="text"/> where $b$ is the $y$ -intercept.	$y = 2$

### Remember!

A line with  $y$ -intercept  $b$  contains the point   
 A line with  $x$ -intercept  $a$  contains the point



Write the equation of a line, in slope-intercept form, with slope of 4, that contains the point  $(-1, 3)$

Using Point-Slope Form

Using Slope-Intercept Form

Write the equation of each line in slope-intercept form.

- The line with slope 3 that passes through  $(0, 6)$

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- The line with slope  $-4$  that passes through  $(0, -5)$

Write the equation of each line in slope-intercept form.

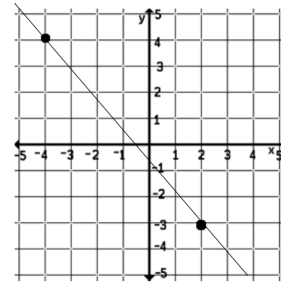
Write an equation for the line containing  
(8,5) and (11,14)

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(-5,9) and (-4,7)

Write the equation of each line in slope-intercept form.

A line with x-intercept of -3 and y-intercept of 6



Write the equation of each line in slope-intercept form.

5. The line parallel to  $y = 5x + 1$  that passes  
through (3, 8)

6. The line parallel to  $y = -3x - 2$  that passes  
through (-2, 7)

Write the equation of each line in slope-intercept form.

7. The line that passes through (-1, 0) and is  
parallel to the line through (0, 1) and (2, -3)

8. The line that passes through (3, 5) and is  
parallel to the line through (3, 3) and (-3, -1)

Write the equation of each line in slope-intercept form.

9. The line parallel to  $x - 3y = -12$  that passes through  $(-3, 4)$

12. The line perpendicular to  $y = \frac{1}{2}x + 1$  that passes through  $(1, 4)$

Write the equation of each line in slope-intercept form.

13. The line perpendicular to  $y = -x + 2$  that passes through  $(-1, -7)$

16. The line perpendicular to  $2y = x + 5$  that passes through  $(2, 1)$

18. **Error Analysis** A student was asked to find the equation of the line perpendicular to  $y - 2x = 1$  that passes through the point  $(4, 3)$ . The student's work is shown at right. Explain the error and give the correct equation.

The given line has slope  $-2$ , so the required line has slope  $\frac{1}{2}$ .

$$y - y_1 = m(x - x_1) \quad \text{Use point-slope form.}$$

$$y - 3 = \frac{1}{2}(x - 4) \quad \text{Substitute for } m, x_1, y_1.$$

$$y - 3 = \frac{1}{2}x - 2 \quad \text{Distributive Property}$$

$$y = \frac{1}{2}x + 1 \quad \text{Add 3 to both sides.}$$

### Lesson Quiz

Write the equation of each line in slope intercept form

A horizontal line through  $(3, 7)$

The line that contains  $(-3, 0)$  and  $(4, -7)$

the line with  $x$ -intercept  $-2$  and  $y$ -intercept

$-1$  in slope-intercept form

19. Are the lines given by the equations  $-4x + y = 5$  and  $-x + 4y = 12$  parallel, perpendicular, or neither? Why?