

Algebra 2 Notes  
Unit 0 0.6 Write Equations of Lines

Name Key

Option 1: Using Slope-Intercept Form (Best if given intercept)

1. Use *Slope-Intercept* form equation:  $y = mx + b$ .
2. Find slope... How?  $m = \frac{y_2 - y_1}{x_2 - x_1}$  if given points,  $\frac{\text{rise}}{\text{run}}$  if graph
3. Find y-intercept. *given*
4. Rewrite  $y = mx + b$  with the slope and y-intercept that you found.

Option 2: Using Point-Slope Form

1. Use *Point-Slope* form equation:  $y - y_1 = m(x - x_1)$   
 ➤ This formula is derived from the slope formula!
2. Find slope.  $m = \frac{y_2 - y_1}{x_2 - x_1}$  or  $\frac{\text{rise}}{\text{run}}$
3. Use a point  $(x_1, y_1)$  and slope to substitute into  $y - y_1 = m(x - x_1)$ .
4. Solve for y. State your equation in  $y = mx + b$  form.

Example: Write the equation of a line that passes through  $(6, 2)$  and  $(3, -2)$ .

Find Slope	Using Point-Slope
$\frac{-2 - 2}{3 - 6}$ $\frac{-4}{-3} = \frac{4}{3}$	<p>choose easiest point <math>(6, 2)</math></p> $y - 2 = \frac{4}{3}(x - 6)$ <p>Distribute</p> $y - 2 = \frac{4}{3}x - 8$ <p>+2            +2</p> $y = \frac{4}{3}x - 6$ <p>You may set Fraction</p>

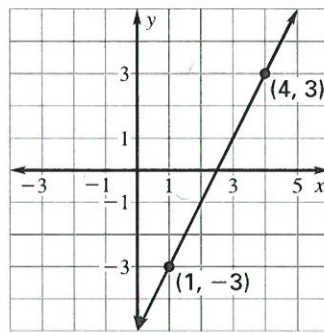
**EXAMPLES - Write an equation that satisfies the following conditions:**

1.  $m = \frac{1}{5}$  passes through  $(0, 5)$   $(0, b)$   
intercept

$$y = mx + b$$

$$y = \frac{1}{5}x + 5$$

2.



$$\frac{\text{rise}}{\text{run}} = \frac{2}{1}$$

↑ int. exact

$$y = 2x - 5$$

3. x-intercept is  $(5, 0)$   
y-intercept is  $(0, -5)$  ← int.

$$m = \frac{-5 - 0}{0 - 5} = \frac{-5}{-5} = 1$$

$$y = 1x - 5$$

or

$$y = x - 5$$

4. passes through  $(2, -3)$  and  $(2, 5)$

$$m = \frac{5 - (-3)}{2 - 2} = \text{undefined}$$

$$\boxed{x = 2}$$

vertical line

5. passes through  $(-6, 0)$  → not b  
perpendicular to  $3x - 2y = 30$

Find m

$$3x - 2y = 30$$

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

$$\frac{-2y}{-2} = \frac{-3x + 30}{-2}$$

$$y = \frac{3}{2}x - 15$$

$$m = \frac{3}{2}$$

$$\perp m = -\frac{2}{3}$$

point

$$y - 0 = -\frac{2}{3}(x - (-6))$$

$$y = -\frac{2}{3}x - \frac{12}{3}$$

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

watch signs!

Double-  
↓

6. passes through  $(-6, 0)$   
parallel to  $3x - 2y = 30$

$$m = \frac{3}{2}$$

$$y - 0 = \frac{3}{2}(x - (-6))$$

$$y = \frac{3}{2}(x + 6)$$

$$y = \frac{3}{2}x + \frac{18}{2}$$

$$\boxed{y = \frac{3}{2}x + 9}$$