

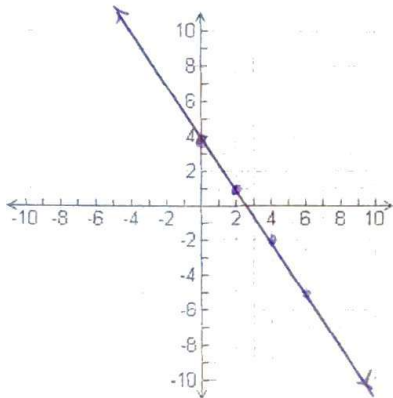
Notes: Point - Slope Form

Graph the following lines:

Slope - Intercept Form:

Standard Form:

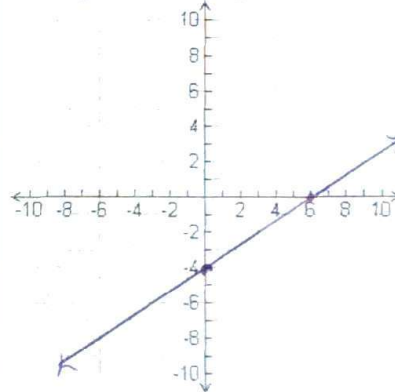
a)  $y = -\frac{3}{2}x + 4$



When do we use it??  
 given slope + y-intercept  
 (rate of change and initial amount starting point)

b)  $4x - 6y = 24$

$(6, 0)$   $(0, -4)$



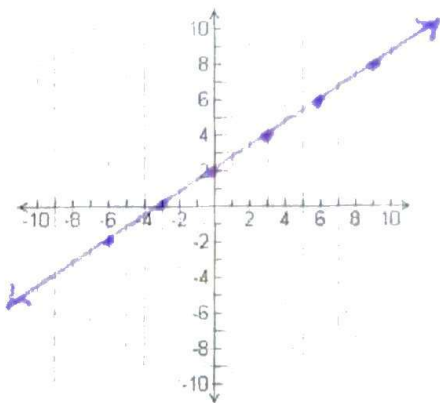
When or how can we use it??  
 helpful for finding x- + y- intercepts

Point - Slope Form

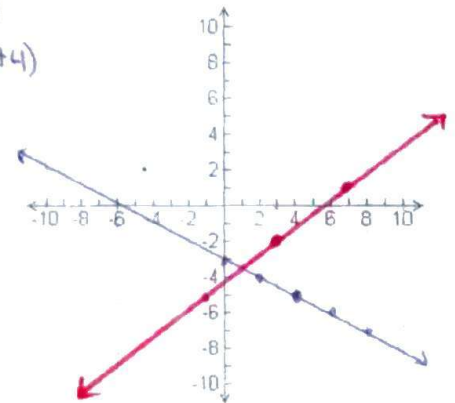
$y - y_1 = m(x - x_1)$   
 $(x_1, y_1)$   $m = \text{slope}$

When or how can we use it??  
 slope + a point (not y-int)  
 or given 2 points

$(x - (+3))$   
 $y - 4 = \frac{2}{3}(x - 3)$   
 $(y - (+4))$   
 $(3, 4)$   
 $m = \frac{2}{3}$



$y + 5 = -\frac{1}{2}(x - 4)$   
 $y - (-5)$   $(x - (+4))$   
 $(4, -5)$   
 $m = -\frac{1}{2}$



$y + 2 = \frac{3}{4}(x - 3)$   
 $(3, -2)$   
 $m = \frac{3}{4}$

Write the equation of the line in point - slope form given the following information.

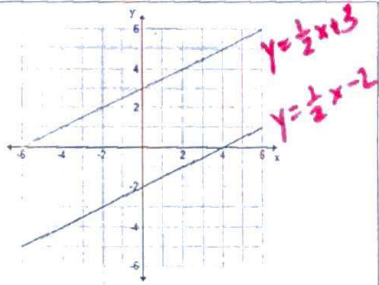
a) Slope = 3,  $(5, -3)$   
 $y - y_1 = m(x - x_1)$   
 $y - (-3) = 3(x - 5)$   
 $y + 3 = 3(x - 5)$   
 $y + 3 = 3x - 15$   
 $y = 3x - 18$

b) slope =  $-\frac{5}{4}$ ,  $(-10, 8)$   
 $y - 8 = -\frac{5}{4}(x + 10)$   
 $4y - 32 = -5(x + 10)$   
 $4y - 32 = -5x - 50$   
 $5x + 4y = -18$

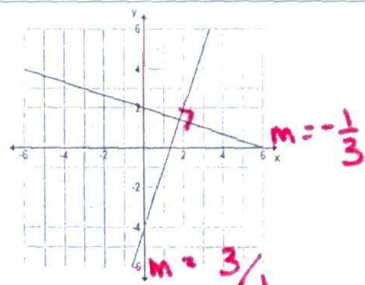
c)  $m = 1$ ,  $(-1, -9)$

d)  $(-3, 10)$  and  $(5, 14)$   
 $\frac{\Delta y}{\Delta x} = \frac{14 - 10}{5 - (-3)} = \frac{4}{8} = \frac{1}{2} = m$   
 $y - 10 = \frac{1}{2}(x + 3)$   
 $y - 14 = \frac{1}{2}(x - 5)$

# PARALLEL AND PERPENDICULAR LINES



Parallel Lines



Perpendicular Lines

same slope  
different y-intercepts

opposite reciprocals  
(opp sign / flip fraction)

Slope	$\frac{2}{3}$	$\xrightarrow{y=3} 0$	Undefined	1
Slope	$\parallel$	$\frac{2}{3}$	0	Undefined
Slope	$\perp$	$-\frac{3}{2}$	Undefined	$\downarrow -\frac{1}{1}$

Slope	(2, 5), (4, 3)	$y = 3x - 7$	$y = 4$
Parallel	$\frac{\Delta y}{\Delta x} = \frac{3-5}{4-2} = -1$	3	0
Perpendicular	$\frac{1}{1}$	$-\frac{1}{3}$	Undefined

Determine if each pair of lines is parallel, perpendicular or neither.

<p>a) <math>2x + y = 5</math> <math>x - y = -6</math></p> <p><math>y = -2x + 5</math> <math>y = x - 6</math></p> <p>neither</p>	<p>b) <math>3x - 2y = 6</math> <math>y = -\frac{2}{3}x - 5</math></p> <p><math>y = \frac{3}{2}x - 3</math> <math>y = -\frac{2}{3}x - 5</math></p> <p><math>\perp</math></p>	<p>c) <math>3x - y = 5</math> <math>y = 3x - 2</math></p> <p><math>y = 3x - 5</math> <math>y = 3x - 2</math></p> <p><math>\parallel</math></p>
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Write the linear equation for the line (in slope - intercept form) PARALLEL to the line  $y = -\frac{2}{3}x + 6$  and passing through the point  $(-3, -3)$ .

$$m = -\frac{2}{3} \quad m_{\parallel} = \left[ -\frac{2}{3} \right] \quad (-3, -3)$$

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

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

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

Write the linear equation for the line (in slope - intercept form) that is PERPENDICULAR to the line  $y - 4x = 8$ , containing the point  $(-4, -2)$ .

$$y = 4x + 8$$

$$m = 4 \quad m_{\perp} = \left[ -\frac{1}{4} \right]$$

$$\boxed{(-4, -2)}$$

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

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

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

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

Write the equation of the line, in slope - intercept form that ...

<p>a) ... is parallel to the line <math>2x + 3y = 6</math> and passes through the point <math>(0, -3)</math>.</p>	<p>b) ... is perpendicular to the line <math>y = 2x - 3</math> and contains the point <math>(-4, 8)</math>.</p>	<p>c) ... is perpendicular to the line with a slope of <math>-\frac{3}{2}</math> and contains the point <math>(-3, -5)</math>.</p>
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