

9/6/2012 - Sec 3.3

Math 1010

#50

#80

$$\begin{array}{r} 4x - 3y = 8 \\ -4x \end{array} \quad \text{and} \quad \begin{array}{r} 4y + 3x = 12 \\ -3x \end{array}$$

$$\frac{-3y}{-3} = \frac{-4x + 8}{-3}$$

$$y = \frac{4}{3}x + \frac{-8}{3}$$

$$m_1 = \frac{4}{3}$$

$$\frac{4y}{4} = \frac{-3x + 12}{4}$$

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

$$m_2 = -\frac{3}{4}$$

perpendicular

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ave Rate of change = slope

$$(x_1, y_1) ; (x_2, y_2)$$

(2000, 281) ; (2008, 79)

$$m = \frac{79 - 281}{2008 - 2000} = \frac{-202}{8} = -25.25$$

b) decreasing 25.25 mobile homes placed per year



# Graphing Equations

1<sup>st</sup>: put it into slope-int form

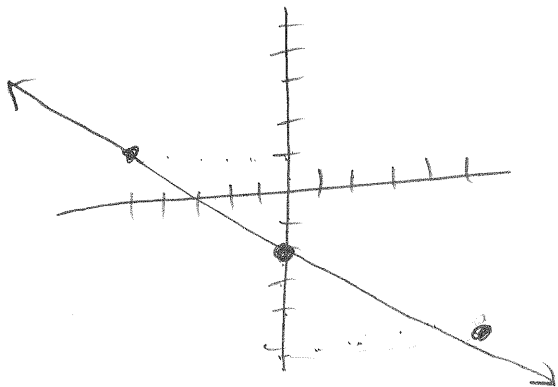
2<sup>nd</sup>: plot the y-int

3<sup>rd</sup>: find another point using the slope and y-int

4<sup>th</sup>: complete graph by connecting the dots

$$\text{Ex: } \underset{-3x}{3x} + 5y = \underset{-3x}{-10}$$

$$\frac{5y}{5} = \frac{-3x}{5} - \frac{10}{5}; \quad y = \frac{-3}{5}x - 2$$



$$\frac{-3}{5} \quad \text{or} \quad \frac{3}{-5}$$

Given slope, a point not y-int

## Method 1

### Point slope form of a Line

Given slope  $m$  and a point  $(x_1, y_1)$   
the equation of the line is

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

Ex:  $m = \frac{1}{2}$ , point =  $(3, 4)$

$$y - 4 = \frac{1}{2}(x - 3)$$

$$y - 4 = \frac{1}{2}x - \frac{3}{2}$$

$$y = \frac{1}{2}x + \frac{5}{2}$$

## Method 2

Use two slope-int form

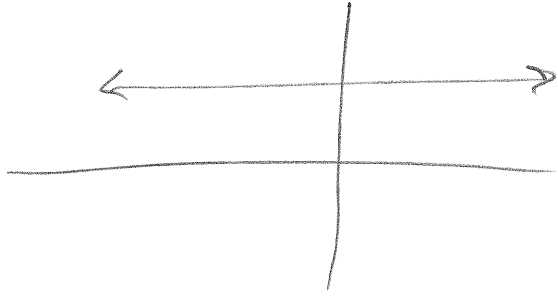
$m = \frac{1}{2}$ , point =  $(3, 4)$

$$y = mx + b$$

$$4 = \frac{1}{2}(3) + b \Rightarrow 4 = \frac{3}{2} + b \Rightarrow b = \frac{5}{2}$$

$$y = \frac{1}{2}x + \frac{5}{2}$$

Horizontal Line



$$y = b$$

$$\text{slope} = 0$$

$$\frac{0}{1}$$

$$\frac{1}{0}$$

find eq of line through  $(2, 5)$   
with slope = 0

$$y = 5$$

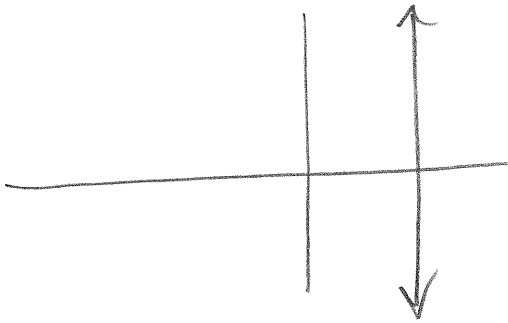
$$y - 5 = 0 \cdot (x - 2)$$

$$y - 5 = 0$$

$$+5 \quad +5$$

$$y = 5$$

Vertical Line



$$x = a$$

slope are undefined

find eq through  $(2, 5)$   
with slope undefined

$$x = 2$$

# Standard form

$$\underline{Ax + By = C} \quad \text{with } A, B, C \text{ all integers}$$

A is positive  
and any common  
factor is divided  
away

write  $y = \frac{1}{2}x + \frac{5}{2}$  in Standard Form

$$-\frac{1}{2}x \quad -\frac{1}{2}x$$

$$2 \cdot \frac{1}{2}x + 2 \cdot y = \frac{2 \cdot 5}{2}$$

LCD = 2

$$\frac{-x}{-1} + \frac{2y}{-1} = \frac{5}{-1}$$

$$\boxed{x - 2y = -5}$$

# Summary of Lines

1. Slope-int form

$$y = mx + b$$

2. point-slope form

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

3. Standard Form

$$Ax + By = C$$

4. Horizontal Line

$$y = b$$

5. Vertical Line

$$x = a$$

Find the line parallel to  $2x - 3y = 10$   
and through  $(-8, 3)$

find slope

$$\begin{array}{r} 2x - 3y = 10 \\ -2x \quad -2x \end{array}$$

$$\begin{array}{r} -3y = -2x + 10 \\ \underline{-3} \quad \underline{-3} \quad \underline{-3} \end{array}$$

$$y = \boxed{\frac{2}{3}}x - \frac{10}{3}$$

my slope =  $\frac{2}{3}$

(since lines are parallel, parallel line slopes are equal)

through  $(-8, 3)$

Equation is (in slope-int form)

$$y = \frac{2}{3}x + \frac{25}{3}$$

$$m = \frac{2}{3} \quad (-8, \boxed{3}) \leftarrow \begin{array}{l} \text{Not} \\ \text{the } y\text{-int} \\ (0, b) \end{array}$$

$$y - 3 = \frac{2}{3}(x + 8)$$

$$y - 3 = \frac{2}{3}x + \frac{16}{3}$$

$\quad \quad \quad + 3$

$$\boxed{y = \frac{2}{3}x + \frac{25}{3}}$$