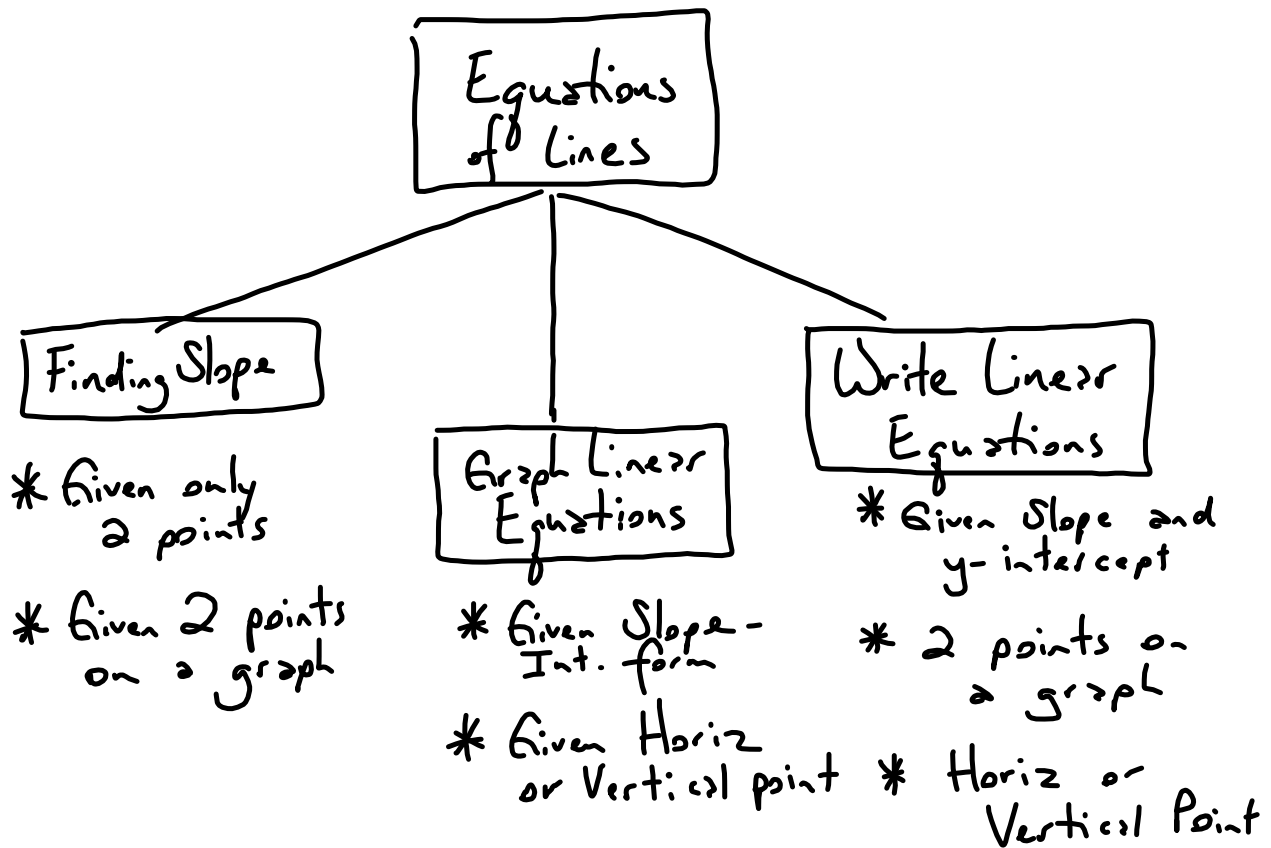


## Ch 3.7



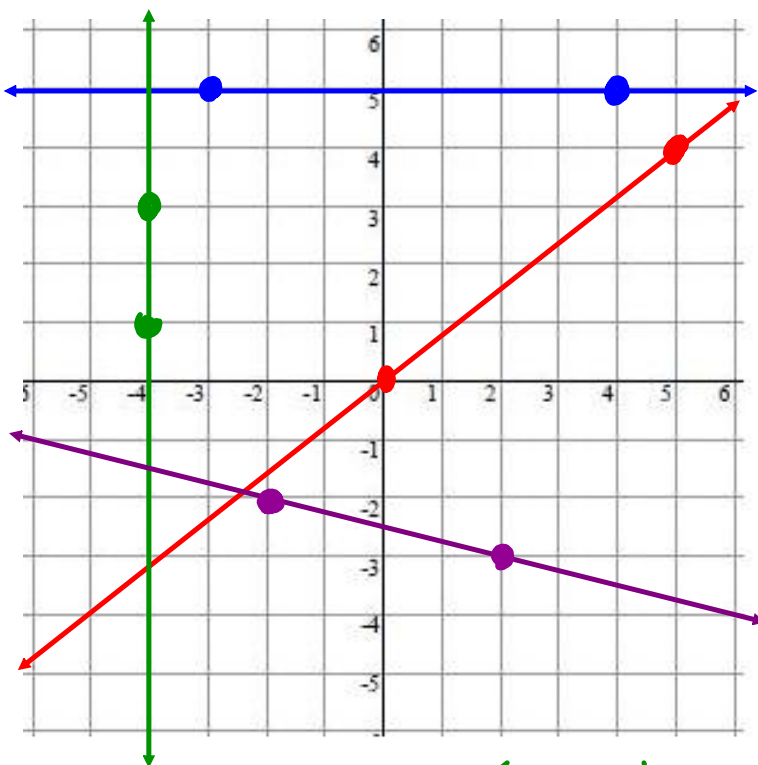
# 3.7 Equations of Lines

Slope:

$$\text{Slope} = \frac{\text{rise}}{\text{run}}$$

$$\text{or } \frac{y_2 - y_1}{x_2 - x_1}$$

Ex 1 | Find the slope of all four lines.



Red line

Purple line

Blue line  
 $(-3, 5)$   $(4, 5)$   
 $x_1, y_1$   $x_2, y_2$

Green line  
 $(-4, 1)$   $(-4, 3)$   
 $x_1, y_1$   $x_2, y_2$

# Slope-Intercept form

$$y = mx + b$$

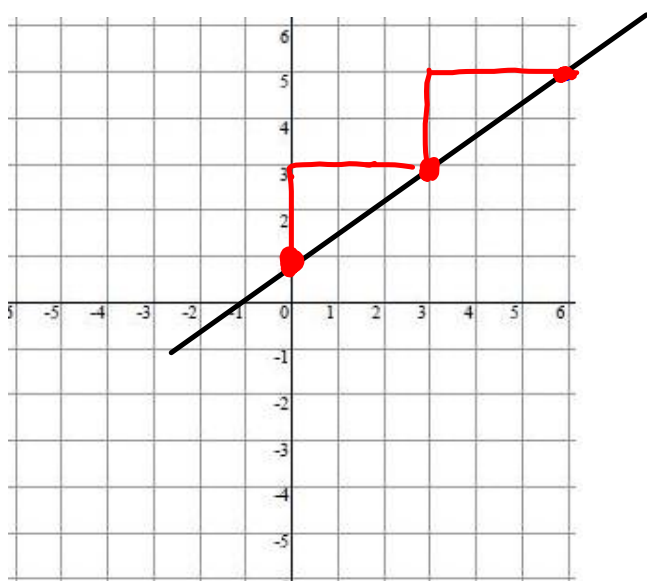
# Point-Slope form

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

Ex 2 | Graph each equation

a)

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

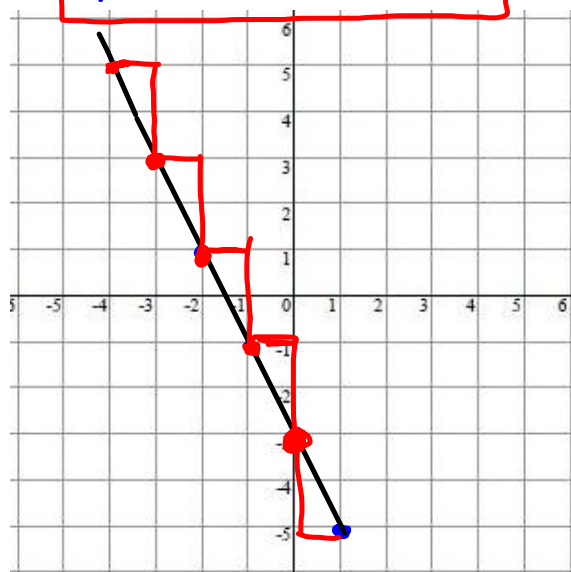


b)

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

$$y - 3 = -2x - 6$$

$$y = -2x - 3$$



ex 3 | Write an equation for the line passing through points  $(-2, -1)$  &  $(3, 5)$

① Find Slope

$$m = \frac{5 - (-1)}{3 - (-2)}$$

$$= \frac{6}{5}$$

② Use Point-Slope Form

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

$$y - 5 = \frac{6}{5}(x - 3)$$

or

$$y + 1 = \frac{6}{5}(x + 2)$$

ex 4 | Write an equation, in slope-intercept form, of a line passing through points  $(0, -2)$  and  $(6, 7)$ .

① Find Slope

$$m = \frac{7 - (-2)}{6 - 0}$$

$$= \frac{9}{6} \text{ or } \frac{3}{2}$$

② Use Point-Slope Form

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

$$y - 7 = \frac{3}{2}(x - 6)$$

$$y - 7 = \frac{3}{2}x - 9$$

Now Convert  $\rightarrow$  +7 +7  
to Slope-Int.

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

Ex 5 | Write the equations of the horizontal and vertical lines through the point  $(8, -4)$ .

Horizontal - No Slope

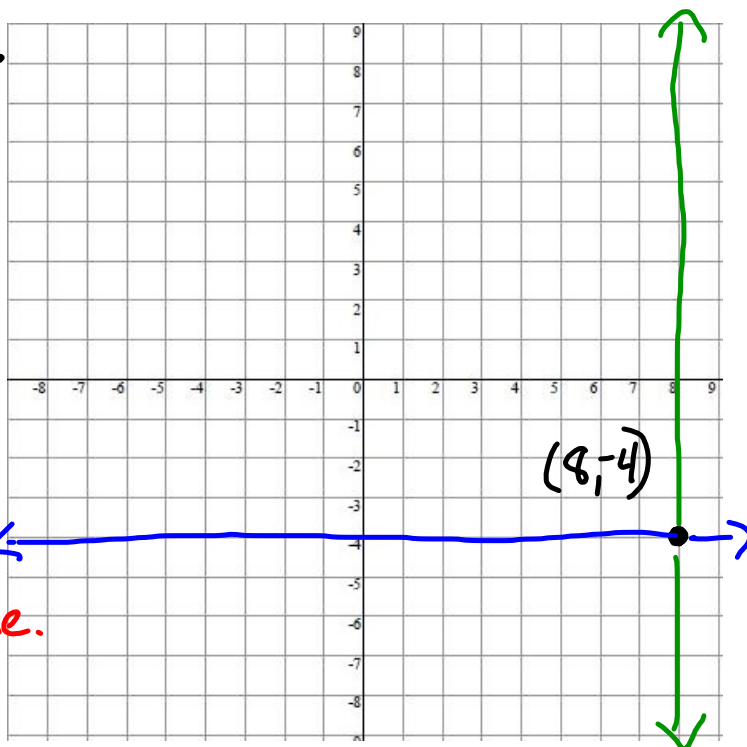
$x$  can be all numbers,  
but  $y$  is always the same.

$$\therefore y = y_1 \text{ or } y = -4$$

Vertical - Undefined

$y$  can be all numbers,  
but  $x$  is always the same.

$$\therefore x = x_1 \text{ or } x = 8$$



Ex 6 | Write the equation in slope-intercept form.

$$\begin{aligned}
 4x - 10y &= 30 \\
 -4x & \quad -4x \\
 \hline
 -10y &= -4x + 30 \\
 \hline
 -10 & \quad -10 \\
 \hline
 y &= \frac{2}{5}x - 3
 \end{aligned}$$

## Power of Zero

$$\begin{array}{rcl}
 2^5 & = & 32 \\
 2^4 & = & 16 \\
 2^3 & = & 8 \\
 2^2 & = & 4 \\
 2^1 & = & 2 \\
 2^0 & = & 1 \\
 2^{-1} & = & \frac{1}{2} \\
 2^{-2} & = & \frac{1}{2^2} \\
 2^{-3} & = & \frac{1}{2^3} \\
 2^{-4} & = & \frac{1}{2^4} \\
 2^{-5} & = & \frac{1}{2^5}
 \end{array}$$



$$\begin{array}{rcl}
 \frac{1}{2^1} & = & \frac{1}{2^1} \\
 \frac{1}{2^2} & = & \frac{1}{2^2} \\
 \frac{1}{2^3} & = & \frac{1}{2^3}
 \end{array}$$