

# 3.7 Equations of Lines

Slope:

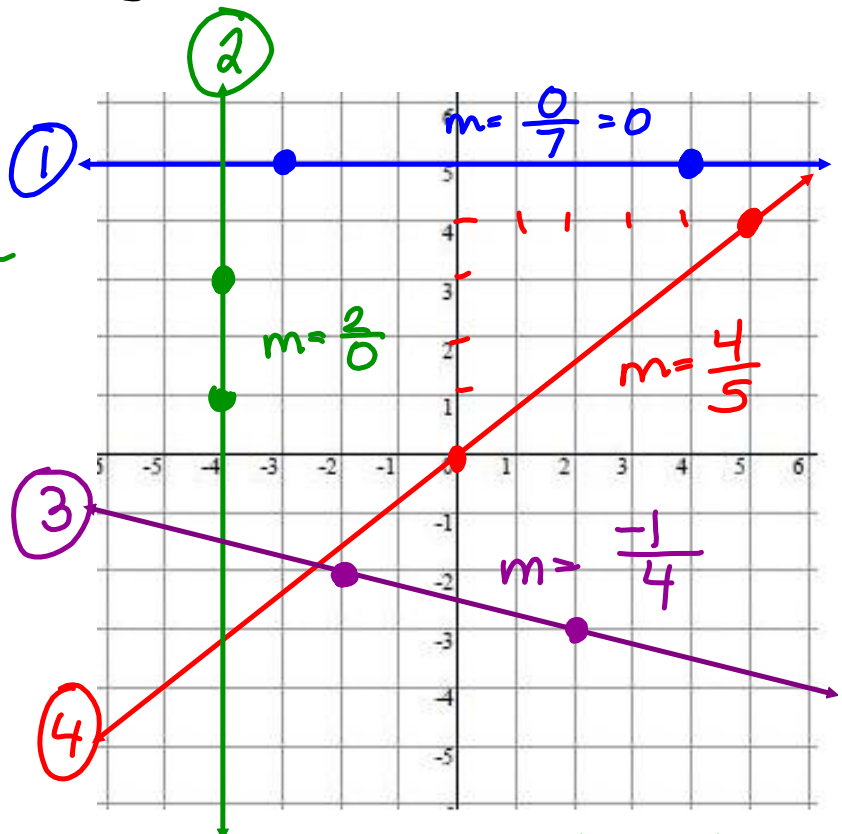
①  $m = 0$

② undefined slope

③  $m = -\frac{1}{4}$

④  $m = \frac{4}{5}$

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

$$m = 0$$

$$\frac{5-5}{4-(-3)} = \frac{0}{7} = 0$$

$m$  -  
undefined

$$\frac{3-1}{-4-(-4)} = \frac{2}{0}$$

undefined

# Slope-Intercept form

$$y = mx + b$$

Point-Slope form  $(x-x_1)m = \frac{y-y_1}{x-x_1}$

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

pt:  $(x_1, y_1)$

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

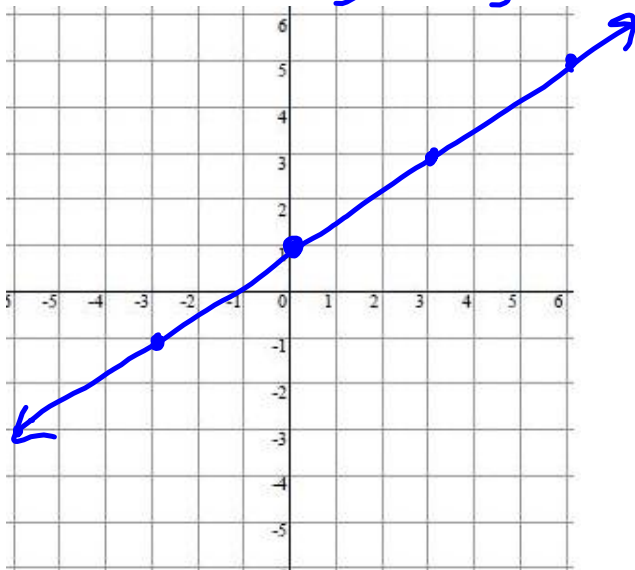
Ex 2 | Graph each equation

①

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

$$b = 1 \quad (0, 1)$$

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



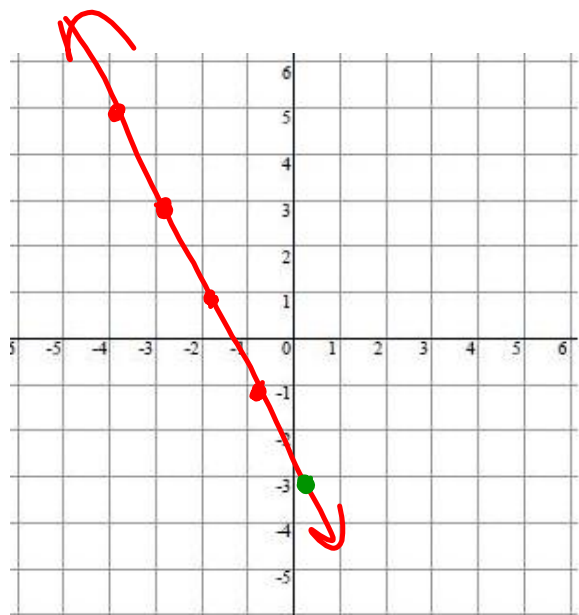
②

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

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

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

$$\text{pt: } (-3, 3) \quad m = -\frac{2}{1}$$



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

$$y = mx + b$$

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

$$5 = \frac{6}{5}(3) + b$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

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

$$\frac{25}{5} = \frac{18}{5} + b$$

$$m = \frac{5 - (-1)}{3 - (-2)} = \frac{6}{5}$$

OR

$$\frac{-18}{5} = b$$

$$5 \left\langle \begin{matrix} (-2, -1) \\ (3, 5) \end{matrix} \right\rangle \frac{6}{5}$$

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

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

$$y = \frac{6}{5}x + \frac{7}{5}$$

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

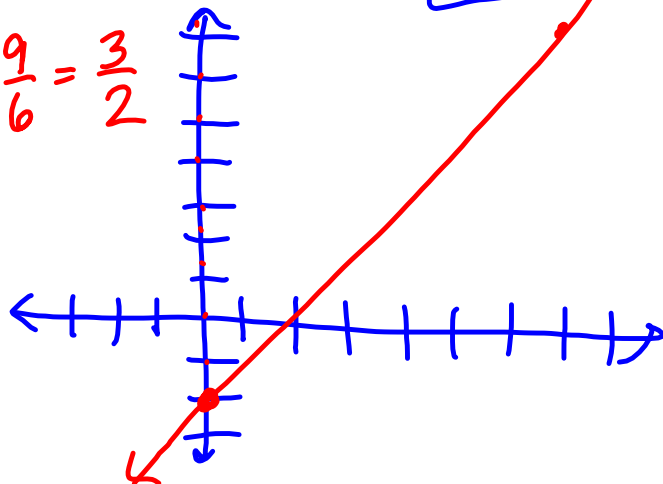
$$m = \frac{7 - (-2)}{6 - 0} = \frac{9}{6} = \frac{3}{2}$$

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

$$6 \left\langle \begin{matrix} (0, -2) \\ (6, 7) \end{matrix} \right\rangle 9$$

$$m = \frac{9}{6} = \frac{3}{2} \quad (6, 7)$$

$$m = \frac{9}{6} = \frac{3}{2}$$



$$7 = \left(\frac{3}{2}\right)\left(\frac{6}{6}\right) + b$$

$$7 = 9 + b$$

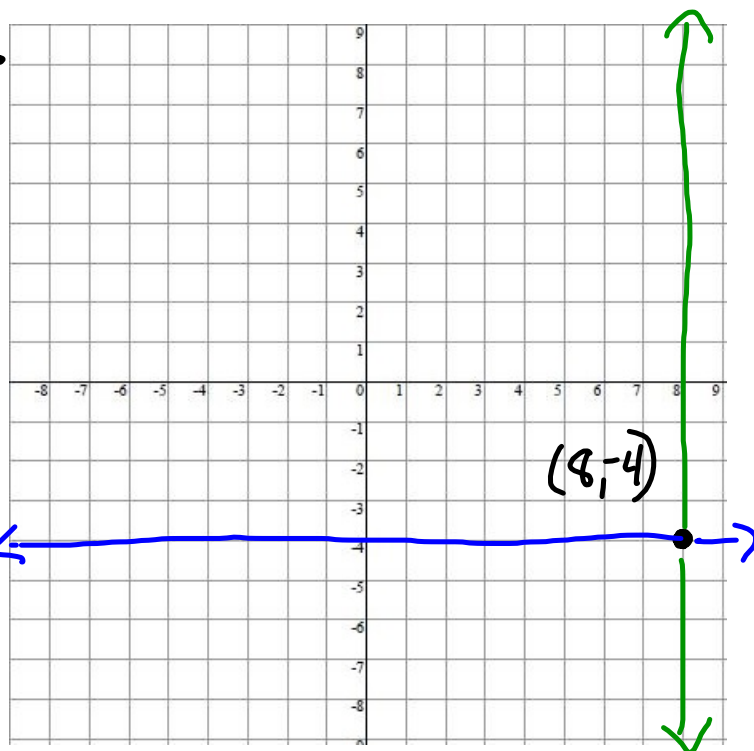
$$-2 = b$$

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

$$\text{VUX } x = 8$$

HOY

$$y = -4$$



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

$$y = mx + b$$

$$4x - 10y = 30$$

$$-4x$$

$$-4x$$

$$\frac{-10y}{-10} = \frac{-4x}{-10} + \frac{30}{-10}$$

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