What am I learning today?

Learning Objective 5.1

How to create linear equations.

Lines are normally written in ___Slope-intercept___ form

$Y =$ ___m___ $X +$ ___b___

- Slope is represented by the ___m___ variable
- Y-Intercept (0, y) is represented by the ___b___ variable
- A point ON the line is represented by the ___X & y___ variables.

1. Write a linear equation with a slope of 2 and a y-intercept of (0, -4).

   m b

   $$y = 2x - 4$$

2. Write a linear equation with a slope of 2 and goes through the point (-1, 2).

   x, y

   $$2 = 2(-1) + b \qquad m = 2$$
   $$2 = -2 + b \qquad x = -1$$
   $$4 = b \qquad y = 2$$
   $$y = 2x + 4$$

3. Write a linear equation with a y-intercept of 2 and goes through the point (2, 4).

   $$4 = m(2) + 2 \qquad b = 2$$
   $$4 = 2m + 2 \qquad x = 2$$
   $$2 = 2m \qquad y = 4$$
   $$1 = m$$
   $$y = 1x + 2$$

4. Write a linear equation with an undefined slope and goes through the point (-1, 3).

   $$HOY$$
   $$VUX \qquad x = -1$$

5. Write a linear equation that goes through (-3, -4) and (-1, 8).

   $$slope = \frac{y_2 - y_1}{x_2 - x_1} = \frac{(8) + (+4)}{(-1) + (+3)} = \frac{12}{2} = 6 = m$$
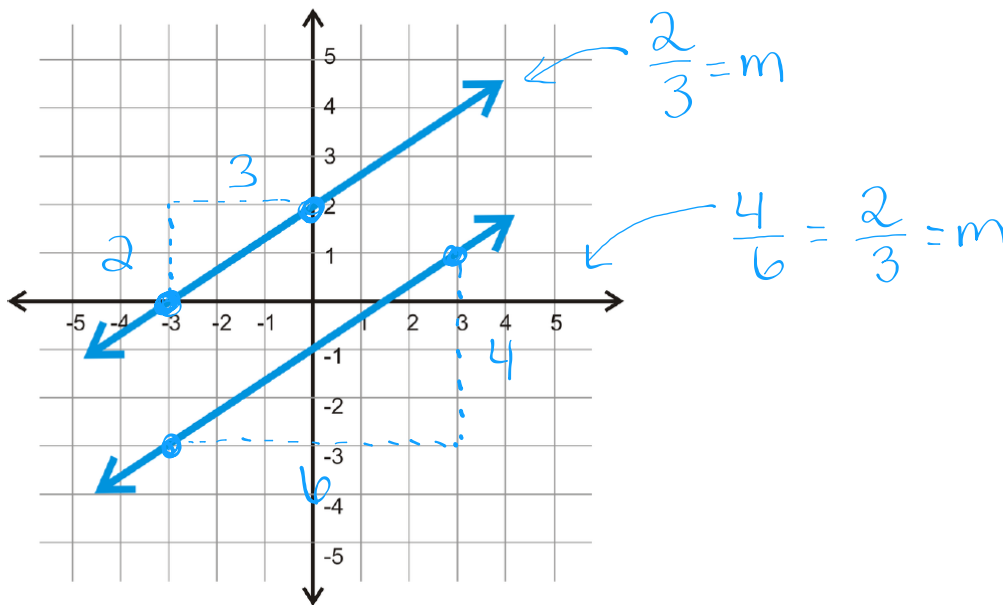
   $$x = -3$$
   $$y = -4$$

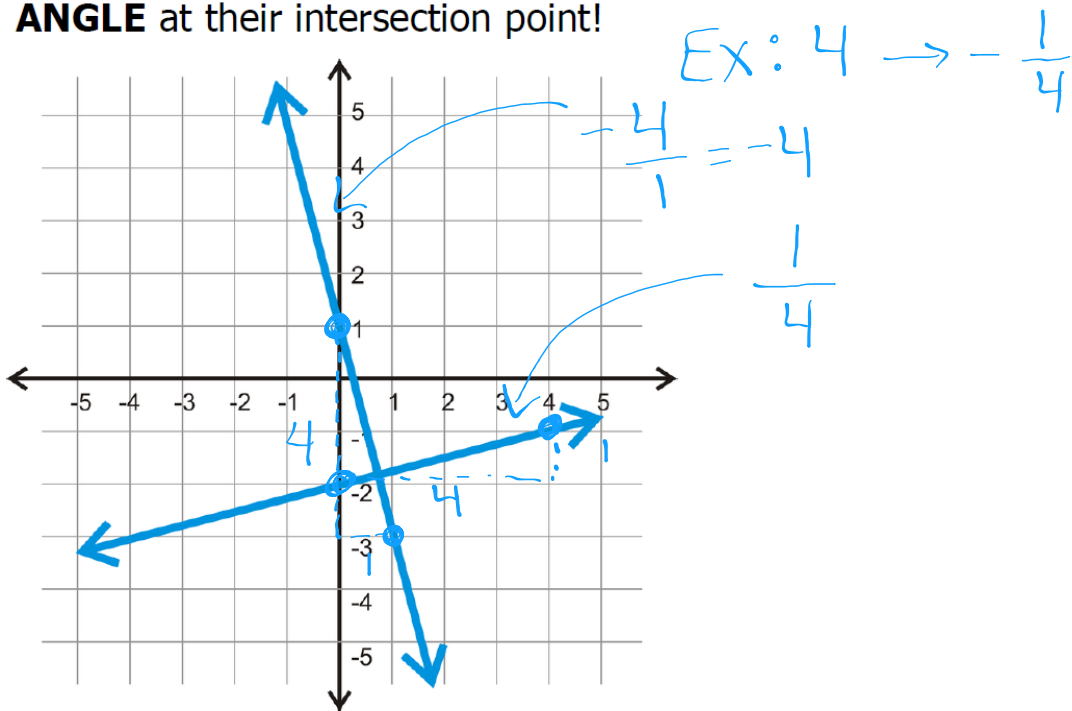 $$-4 = 6(-3) + b$$
   $$-4 = -18 + b$$
   $$14 = b$$

   $$y = 6x + 14$$

6. Write a linear equation that goes through (-3, -4) and (-7, 9).

Parallel Lines – They have the ____$same$____ slope! This is why parallel lines **DO NOT TOUCH!**

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

$$\frac{4}{6} = \frac{2}{3} = m$$

Perpendicular Lines – They have _opposite_ _reciprocal_
slopes of each other! This is why perpendicular lines always create a **90°**
ANGLE at their intersection point!

$$Ex: 4 \rightarrow -\frac{1}{4}$$

$$\frac{-4}{1} = -4$$

$$\frac{1}{4}$$

1. Find the slope of a parallel line to y = 3x + 2 $m = 3$

2. Find the slope of a perpendicular line to y = 3x + 2 $m = -\frac{1}{3}$

3. Find the equation of a parallel line to y = ~~3x~~ + 2 and goes through
    the point (1, 2).

    $$2 = 3(1) + b$$
    $$2 = 3 + b$$
    $$-1 = b$$
    $$y = 3x - 1$$

    $$m = 3$$
    $$x = 1$$
    $$y = 2$$

4. Find the equation of a perpendicular line to $y = 3x + 2$ and goes through the point (1, 2).   O.R.

$m = -\frac{1}{3}$

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

$x = 1$ $2 = \frac{-1}{3} + b$

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

$\frac{7}{3} = b$

$y = -\frac{1}{3}x + \frac{7}{3}$

5. Find the equation of a line parallel to $y = -3$ and passes through the point (8, -3).   same   HOY

$y = -3$

6. Find the equation of a line perpendicular to $x = 4$ and passes through the point (3, 6).   O.R.   VUX

$y = 6$

7. Determine which pairs are parallel or perpendicular to each other

Line A: $y = \frac{1}{3}x - 5$

Line B: $y = -3x - 8$

Line C: $5y = \frac{5}{3}x + \frac{10}{5}$ $y = \frac{1}{3}x + 2$

Line D: 6x + 2y = 14
$-6x \qquad \uparrow \quad -6x$

$\frac{2y}{2} = \frac{-6x}{2} + \frac{14}{2}$

$y = -3x + 7$

Parallel   Perp.

A ‖ C   A ⊥ B
$m = \frac{1}{3}$ A ⊥ D

B ‖ D   B ⊥ C
$m = -3$ C ⊥ D

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Classwork:

Complete the classwork about parallel and perpendicular lines. SHOW ALL WORK!

HW: On top of the bin.