Name: _____ Date: Dec 2 Hour: 6th

Unit 4A: Day 1: Relationships between Lines

Focus Question: How are lines related by their equations?

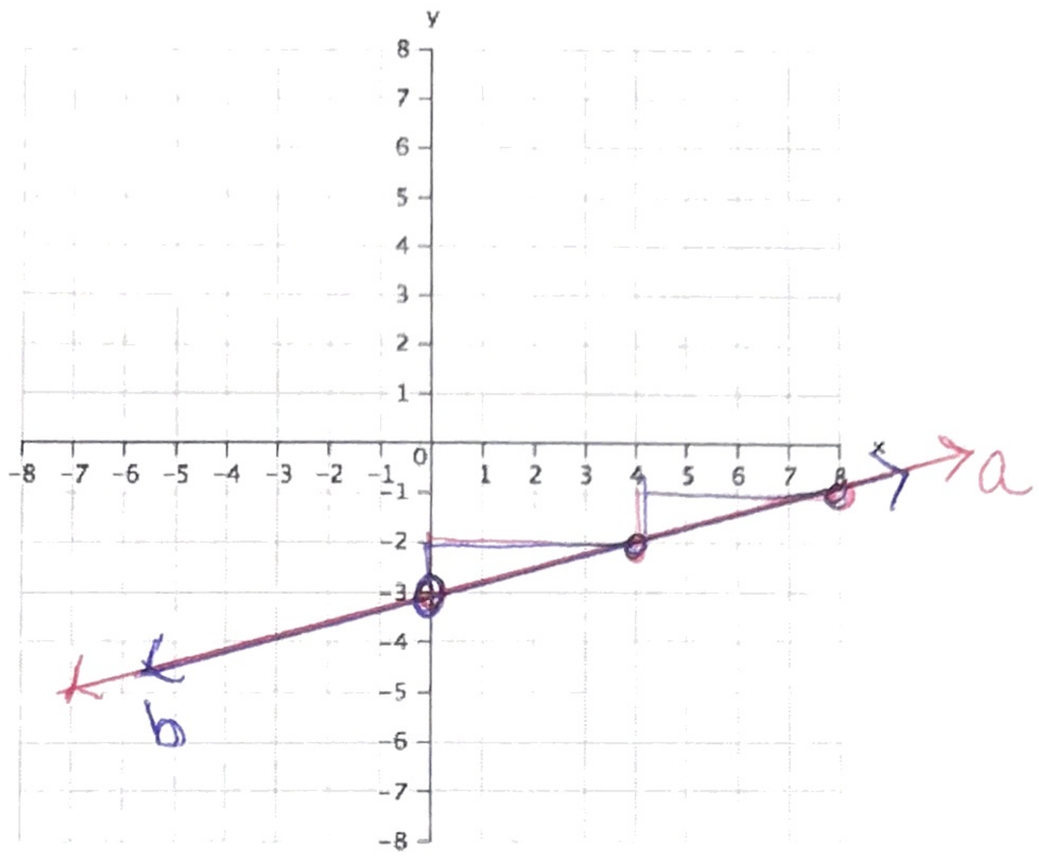
A. Using two different colors, graph the two lines below.

1. Line a is $y = \frac{1}{4}x - 3$ ← b

   $m = \frac{1 \text{ up}}{4 \text{ over}}$

   Line b is $y = \frac{1}{4}x - 3$ ← b

   $m = \frac{1 \text{ up}}{4 \text{ over}}$



2. What is the relationship of the two lines when graphed?

   lined up ontop of eachother / coinciding

3. How are the two equations related?

   they are identical

* Lines coincide when the slopes are equal AND the y-int. are equal

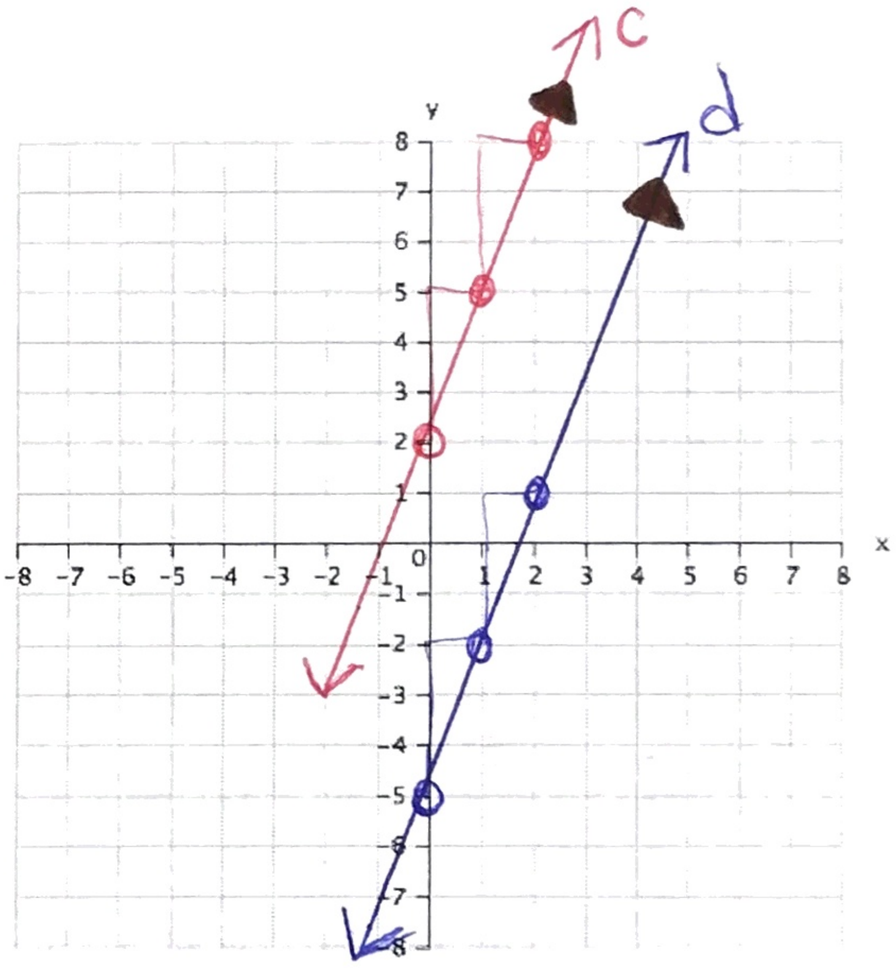
B. Using two different colors, graph the two lines below.

1. Line c is $y = 3x + 2$ ← b

   $m = \frac{3 \text{ up}}{1 \text{ over}}$

   Line d is $y = 3x - 5$ ← b

   $m = \frac{3 \text{ up}}{1 \text{ over}}$



2. What is the relationship of the two lines when graphed?

   parallel (same direction & donot cross)

   symbol: //

3. How are the two equations related?

   same slope

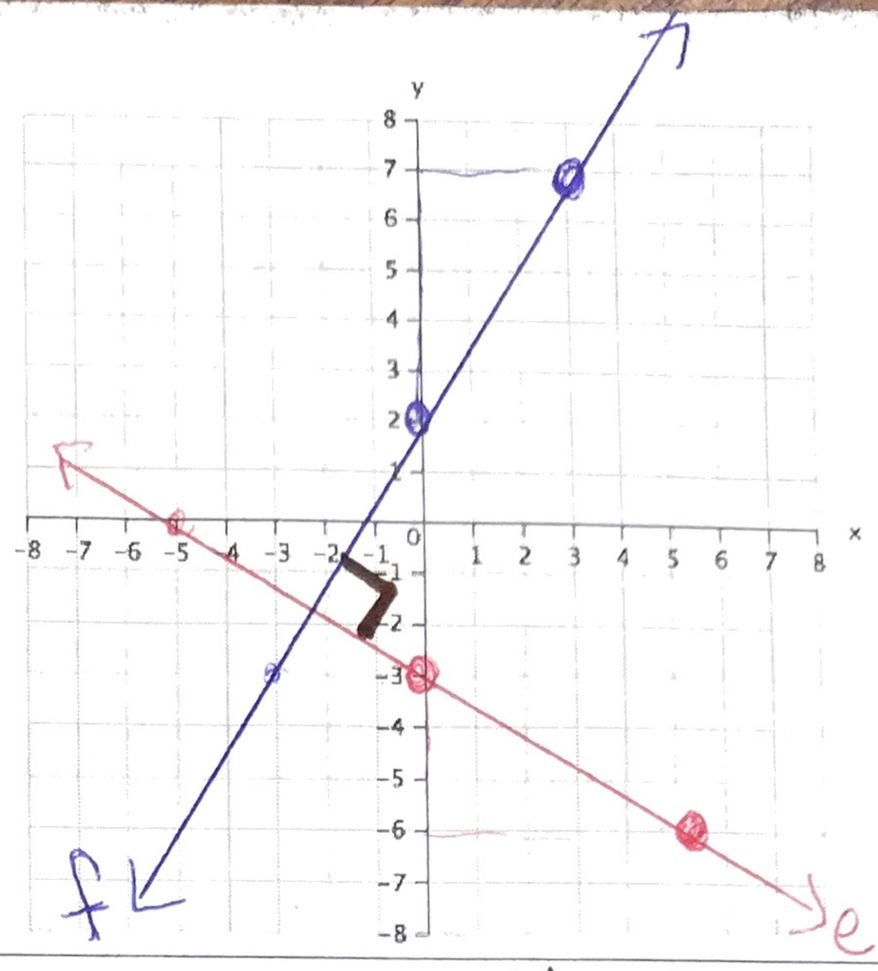
   diff. y int.

* Lines are parallel when the slopes are equal BUT the y-int. are different

C. Using two different colors, graph the two lines below.

1. Line e is $y = -\frac{3}{5}x - 3$ $-3 = b$ $m = \frac{-3 \text{ down}}{5 \text{ over}}$

   Line f is $y = \frac{5}{3}x + 2$ $+2 = b$ $m = \frac{5 \text{ up}}{3 \text{ over}}$



2. What is the relationship of the two lines when graphed?

(cross at 90°) symbol: ⊥

Perpendicular

3. How are the two equations related?

opposite (+ and −)

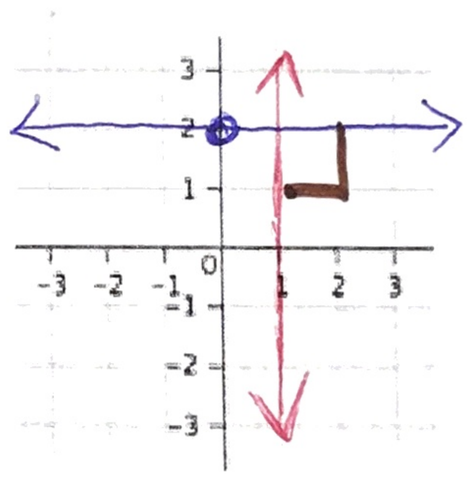
reciprocals (#'s switched places)

$-\frac{3}{5}$

$+\frac{5}{3}$

4. What type of line is perpendicular to a horizontal line (for example y = 2)?

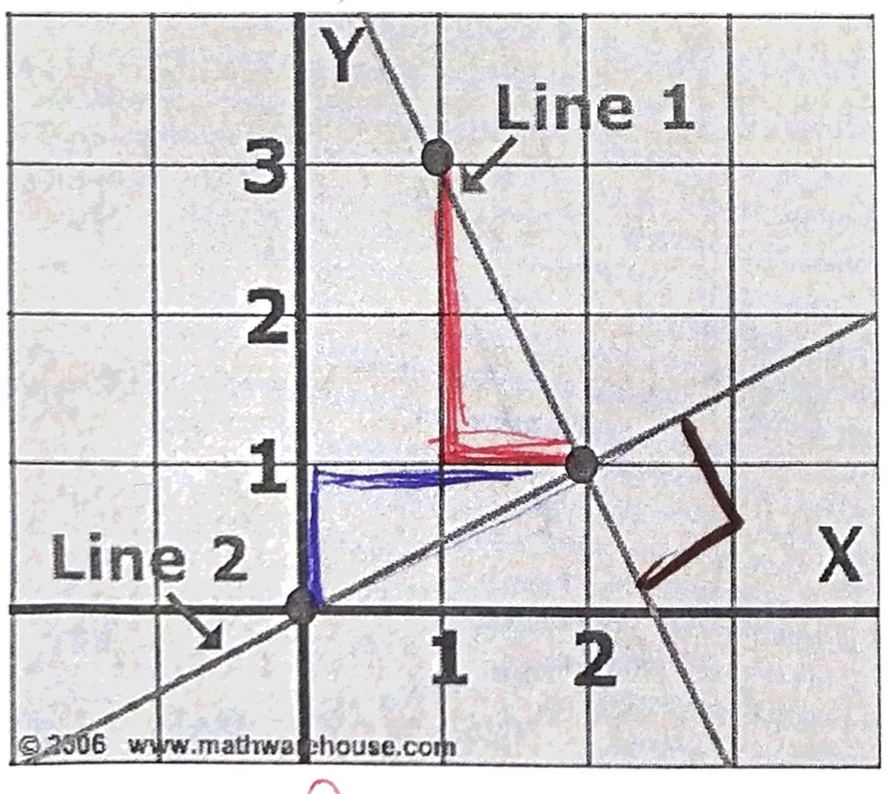
Vertical (x = 1)



★ Lines are perpendicular when the slopes are opposite reciprocals (the y-int do NOT matter) ★

D. Decide if the two lines below are perpendicular. Explain.

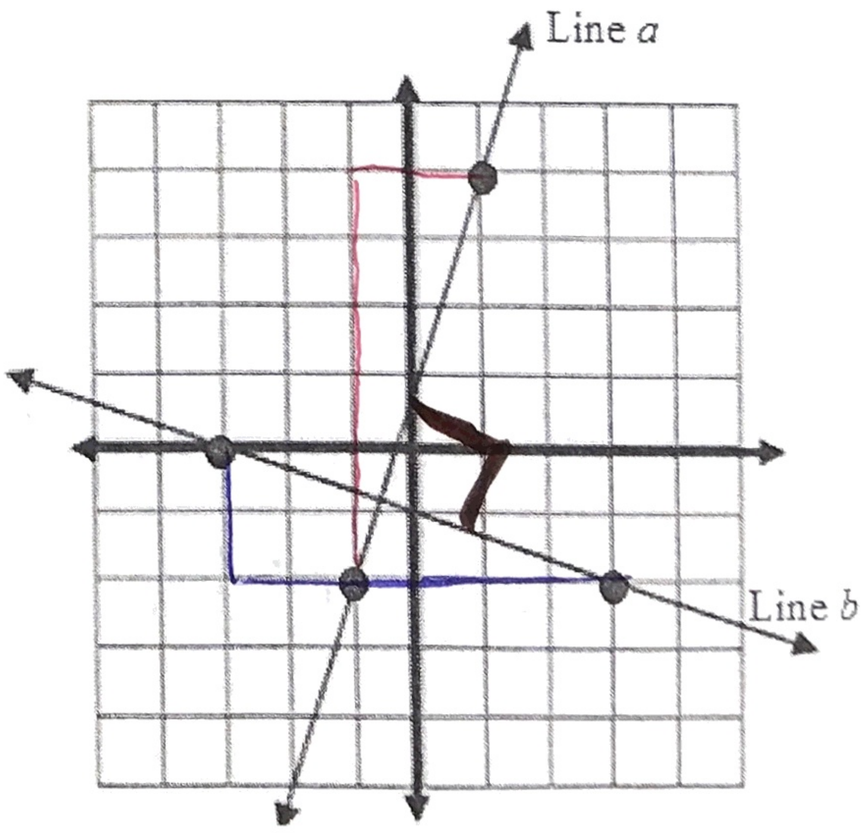
slopes are opp. recip.



$m_1 = -\frac{2}{1}$

$m_2 = +\frac{1}{2}$

line 1 is ⊥ to line 2 b/c the slopes are opp. recip.



$m_a = +\frac{6}{2}$

$m_b = -\frac{2}{6}$

line a is ⊥ to line b b/c the slopes are opp. recip