

HW8.3 Unique Slopes and Lines

Due Date: _____

1. Identify whether each pair of lines is parallel, perpendicular, or neither by finding and comparing the slopes.

① $x - y + 1 = 0 \Rightarrow x + 1 = y$
 a) $8x + 4y + 1 = 0 \Rightarrow \therefore m_1 = 1 \text{ or } \frac{1}{1}$
 $\frac{4}{4}y = \frac{-8x-1}{4}$
 $y = -2x - \frac{1}{4}$
 $\therefore m_2 = -2$

These slopes are not related
and therefore "neither".

b) $3x - 2y + 12 = 0 \Rightarrow 3x + 12 = 2y$
 $-2x - 3y - 12 = 0$
 $\frac{3}{2}x + 6 = y$
 $m_1 = \frac{3}{2}$
 $-\frac{2}{3}x - 4 = y$
 $m_2 = -\frac{2}{3}$

$-\frac{2}{3}$ is perpendicular to $\frac{3}{2}$!

c) $2x + 5y - 13 = 0$
 $2x - 5y + 23 = 0$
 $2x + 23 = 5y$
 $\frac{2}{5}x + \frac{23}{5} = y$
 $m_2 = \frac{2}{5}$
 $5y = -2x + 13$
 $y = -\frac{2}{5}x + \frac{13}{5}$
 $m_1 = -\frac{2}{5}$

Neither

d) $2x + y + 3 = 0 \rightarrow y = -2x - 3$
 $6x + 3y - 15 = 0$
 $3y = -6x + 15$
 $y = -2x + 5$
 $m_2 = -2$
 $m_1 = -2$

$m_1 = m_2 \therefore$ parallel !

2. Given the points $A(-8, -2)$, $B(-2, 2)$, $C(6, 4)$, and $D(8, 1)$, determine whether m_{AB} and m_{CD} are parallel, perpendicular, or neither.

$$m_{AB} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m_{AB} = \frac{2 - (-2)}{-2 - (-8)}$$

$$m_{AB} = \frac{4}{6} = \frac{2}{3}$$

$$m_{CD} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m_{CD} = \frac{1 - 4}{8 - 6}$$

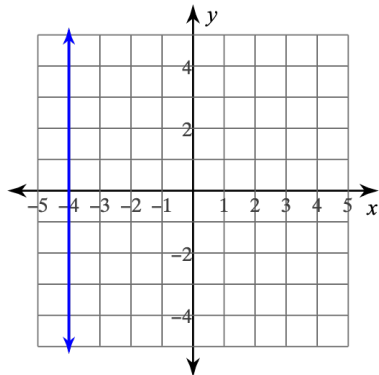
$$m_{CD} = \frac{-3}{2}$$

negative reciprocals!!

$\therefore m_{AB}$ is perpendicular to m_{CD} .

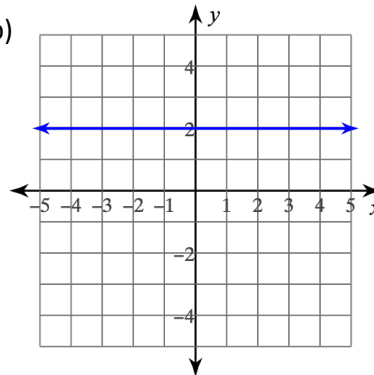
3. Write the equations of the following lines:

a)



Vertical
 $\therefore x = \text{constant}$
 $x = -4$

b)



Horizontal
 $\therefore y = \text{constant}$
 $y = 2$