MTH1W Analytic Geometry Name: _____

HW7.3 Unique Slopes and Lines Due Date: _____

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

a)
① $x - y + 1 = 0$
② $8x + 4y + 1 = 0$

$x - y + 1 = 0$
$1x + 1 = 0$
$m_1 = \frac{1}{1}$

$8x + 4y + 1 = 0$
$\frac{4y}{4} = \frac{-8x}{4} - \frac{1}{4}$
$y = -2x - 0.25$
$m_2 = -2$

Slopes are not parallel (equal) or perpendicular (negative reciprocals)
∴ neither

b)
① $3x - 2y + 12 = 0$
② $-2x - 3y - 12 = 0$

$3x - 2y + 12 = 0$
$\frac{3x}{2} + \frac{12}{2} = \frac{2y}{2}$
$\frac{3}{2}x + 6 = y$
$m_1 = \frac{3}{2}$

$-2x - 3y - 12 = 0$
$\frac{-2x}{3} - \frac{12}{3} = \frac{3y}{3}$
$\frac{-2}{3}x - 4 = y$
$m_2 = \frac{-2}{3}$

m_1 and m_2 are negative reciprocals
∴ perpendicular
OR: $\frac{3}{2} \times \frac{-2}{3} = \frac{-6}{6} = -1$

c)
① $2x + 5y - 13 = 0$
② $2x - 5y + 23 = 0$

$2x + 5y - 13 = 0$
$5y = -2x + 13$
$y = \frac{-2}{5}x + \frac{13}{5}$
$m_1 = \frac{-2}{5}$

$2x - 5y + 23 = 0$
$2x + 23 = 5y$
$\frac{2}{5}x + \frac{23}{5} = y$
$m_2 = \frac{2}{5}$

$m_1 \neq m_2$ and
$m_1 \times m_2 \neq -1$
∴ neither.

d)
① $2x + y + 3 = 0$
② $6x + 3y - 15 = 0$

$2x + y + 3 = 0$
$y = -2x - 3$
$m_1 = -2$

$6x + 3y - 15 = 0$
$\frac{3y}{3} = \frac{-6x}{3} + \frac{15}{3}$
$y = -2x + 5$
$m_2 = -2$

$m_1 = m_2$
∴ 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.

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

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

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

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

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

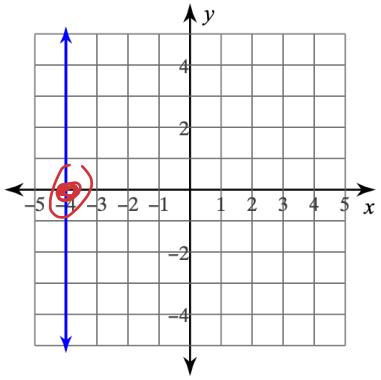
$m_{CD} = \frac{-3}{2}$

m_{AB} is m_{CD} are perpendicular.

$\frac{2}{3} \times \frac{-3}{2} = \frac{-6}{6} = -1$!

3. Write the equations of the following lines:

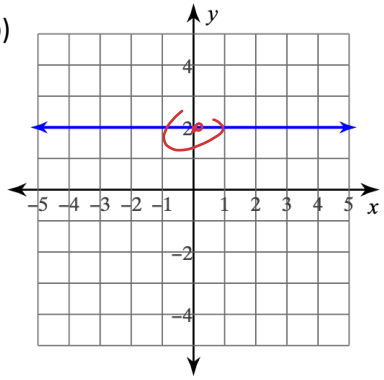
a)



Vertical, $\therefore$ $x =$ x-intercept

$x = -4$

b)



Horizontal, $\therefore$ $y =$ y-intercept

$y = 2$