Warm-Up   *make sure equations are in Slope Intercept form!

Provide an example of a line that would be parallel to:	Provide an example of a line that would be perpendicular to:	Provide an example of a line that would be neither parallel or perpendicular:	Provide an example of a line is coincidental: (same slope & same y-intercept)
1. $3x = y - 9$ $m = 3$ $\quad +9 \quad +9$ $y = 3x + 9$ Ex: $\boxed{y = 3x \pm \#}$	2. $4 = 2x + 2y$ $y = -x + 2$ $-2x \quad -2x$ $\frac{2y}{2} = \frac{-2x + 4}{2}$ $m = -1$ Ex: $\boxed{y = x \pm \#}$ Oppree: 1	3. $y = 6x + 1$ $m \neq 6$ $m \neq -\frac{1}{6}$ Ex: $\boxed{y = -6x \pm \#}$	4. $x = y + 1$ $-1 \quad -1$ Ex: $\boxed{y = x - 1}$

(if not through a specific point, you can use anything for b).

Midpoint Formula (not on formula sheet)

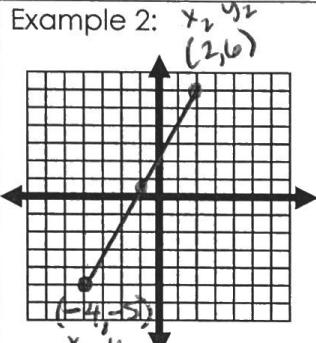$$\left(m_x , m_y\right) = \left(\frac{x_1 + x_2}{2} , \frac{y_1 + y_2}{2}\right)$$

| Example 1:
$x_1 \, y_1 \quad x_2 \, y_2$
$(3, 7) \& (-2, 4)$

$\left(\frac{3 + -2}{2} , \frac{7 + 4}{2}\right)$

$\left(\frac{1}{2} , \frac{11}{2}\right)$ or

$\quad (.5, 5.5)$ | Example 2: $x_2 \, y_2$ $(2,6)$

$x_1 \, y_1$

$\left(\frac{-4 + 2}{2} , \frac{-5 + 6}{2}\right) = \left(-1, \frac{1}{2}\right)$
or
$(-1, .5)$ | Example 3:
Given the endpoint of a segment is $(7, -3)$ and the midpoint of the segment is $(3, -6)$, what is the other endpoint of the segment? $\boxed{(-1, -9)}$
$m_x \, m_y = \left(\frac{x_1 + x_2}{2} , \frac{y_1 + y_2}{2}\right)$
Ⓧ 2. $3 = \frac{7 + x}{2}$ Ⓨ 2. $6 = \frac{-3 + y}{2}$ .2
$6 = 7 + x$ $-12 = -3 + y$
$\frac{-7 \quad -7}{-1 = x}$ $\frac{+3 \quad +3}{-9 = y}$ |

Partitioning a Segment (on formula sheet)

$$(x, y) = \left(x_1 + \frac{a}{a+b}(x_2 - x_1) , \; y_1 + \frac{a}{a+b}(y_2 - y_1)\right)$$
$$\qquad\qquad\qquad\quad x \qquad\qquad\qquad\qquad\quad y$$

| Partition the segment by the given ratio:
1. $(-14, 3) \& (10, -4)$; $1{:}2$
$\quad x_1 \, y_1 \quad x_2 \, y_2 \; a{:}b$
$X: -14 + \left(\frac{1}{3}\right)(10 + 14) = -6$
$y: 3 + \left(\frac{1}{3}\right)(-4 - 3) = \frac{2}{3}$ or .67
$\boxed{\left(-6, \frac{2}{3}\right)}$ | Partition the segment by the given ratio:
2. $(-6, -5) \& (7, 8)$; $2{:}3$

$X: -6 + \left(\frac{2}{5}\right)(7 + 6) = -\frac{4}{5}$ or $-.8$
$y: -5 + \left(\frac{2}{5}\right)(8 + 5) = \frac{1}{5}$ or $.2$
$\boxed{\left(-\frac{4}{5}, \frac{1}{5}\right)}$ or $(-.8, .2)$ |