1.5 Equations of Lines and Equations of Parallel and Perpendicular Lines
Pre-AP Geometry

Name Key
Period _____ Date _____

Parallel: same slope (different y-intercepts)

Perpendicular: opposite reciprocal slopes (negative)

Point-Slope: $y - y_1 = m(x - x_1)$

Part 1:
Write an equation of the line that passes through the given point P and has the given slope m.

A) P(5,4), m = 4 (x_1, y_1)

$y - 4 = 4(x - 5)$
$y - 4 = 4x - 20$
$+4 \quad +4$
$y = 4x - 16$

B) P(0,-3), m = $-\frac{1}{6}$

$y + 3 = -\frac{1}{6}(x - 0)$
$y + 3 = -\frac{1}{6}x - 3$
$-3 \quad -3$
$y = -\frac{1}{6}x - 3$

Part 2:
Write an equation of the line that passes through the point P and is parallel to the line with the given equation.

A) P(1, -10), y = 2x - 1 (slope = 2)

$y + 10 = 2(x - 1)$
$y + 10 = 2x - 2$
$-10 \quad -10$
$y = 2x - 12$

B) P(-2, 5), y = -2x + 3 (slope = -2)

$y - 5 = -2(x + 2)$
$y - 5 = -2x - 4$
$+5 \quad +5$
$y = -2x + 1$

Part 3:
Write an equation of the line that passes through the point P and is perpendicular to the line with the given equation.

A) P(3,2), y = 3x + 1 (slope = $-\frac{1}{3}$)

$y - 2 = -\frac{1}{3}(x - 3)$
$y - 2 = -\frac{1}{3}x + 1$
$+2 \quad +2$
$y = -\frac{1}{3}x + 3$

B) P(-8, -2), y = 4x - 3 (slope = $-\frac{1}{4}$)

$y + 2 = -\frac{1}{4}(x + 8)$
$y + 2 = -\frac{1}{4}x - 2$
$-2 \quad -2$
$y = -\frac{1}{4}x - 4$

Part 4:

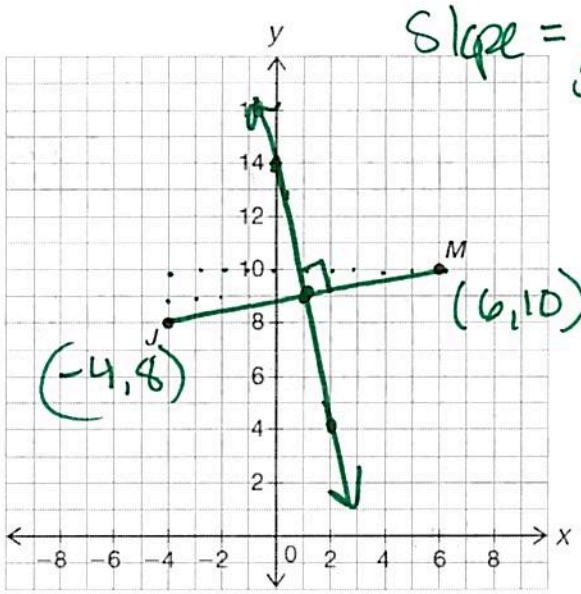
Find the equation of the perpendicular bisector of $\overline{JM}$.

midpoint = $\left(\frac{-4+6}{2}, \frac{8+10}{2}\right)$

$(1, 9)$

⊥ slope $= -5$

midpoint



slope $= \frac{1}{5}$

$y - 9 = -5(x - 1)$

$y - 9 = -5x + 5$

$+9 \qquad +9$

$y = -5x + 14$

Part 5:

Calculate the distance between the line given by the equation $y = \frac{4}{3}x + 2$ and the point (-4, 5).

Point $(-4, 5)$

1) ⊥ slope $= -\frac{3}{4}$

$y - 5 = -\frac{3}{4}(x + 4)$

$y - 5 = -\frac{3}{4}x - 3$

$+5 \qquad +5$

$y = -\frac{3}{4}x + 2$ (2) Equation of line

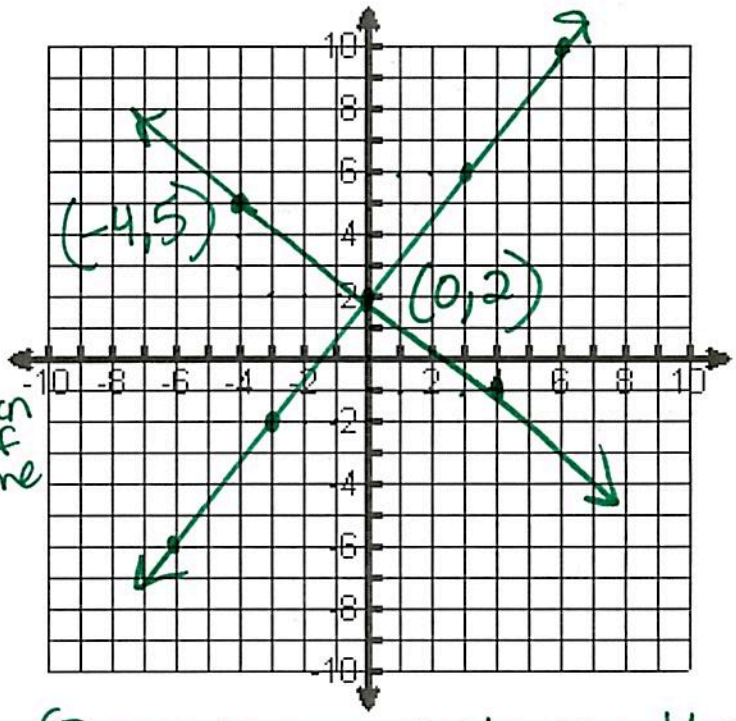
where do they intersect?

$y = \frac{4}{3}x + 2$

$-\frac{3}{4}x + 2 = \frac{4}{3}x + 2$

(3) $x = 0 \quad (0, 2)$

$y = 2$



(4) Distance between them:

$\sqrt{(-4-0)^2 + (5-2)^2}$

$\sqrt{(-4)^2 + (3)^2}$

$\sqrt{25} = \boxed{5}$