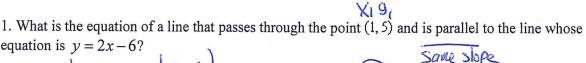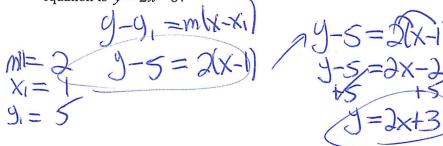Name **Schlansky**

Mr. Schlansky

Date _____

Geometry

Linear Equations Through a Point

1. What is the equation of a line that passes through the point $(1, 5)$ and is parallel to the line whose equation is $y = 2x - 6$?

$x_1 \ y_1$

Same slope

$y - y_1 = m(x - x_1)$

$m = 2$
$x_1 = 1$
$y_1 = 5$

$y - 5 = 2(x - 1)$

$y - 5 = 2(x - 1)$
$y - 5 = 2x - 2$
$+5 \qquad +5$
$y = 2x + 3$

2. What is the equation of a line that passes through the point $(-3, -11)$ and is perpendicular to the line whose equation is $y = -\frac{1}{2}x - 4$?

$x_1 \ y_1$

negative reciprocal slope

$m_\perp = 2$
$x_1 = -3$
$y_1 = -11$

m

$y - y_1 = m(x - x_1)$

$y + 11 = 2(x + 3)$

$y + 11 = 2(x + 3)$
$y + 11 = 2x + 6$
$-11 \qquad -11$
$y = 2x - 5$

3. What is the equation of a line that passes through the point $(-2, 5)$ and is parallel to the line whose equation is $y = -2x + 4$?

$x_1 \ y_1$

Same slope

m

$m\parallel = -2$
$x_1 = -2$
$y_1 = 5$

$y - y_1 = m(x - x_1)$

$y - 5 = -2(x + 2)$

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

4. What is the equation of a line that passes through the point $(5, 4)$ and is perpendicular to the line whose equation is $y = -\frac{1}{3}x$?

$x_1 \ y_1$

negative reciprocal slopes

m

$m_\perp = 3$
$x_1 = 5$
$y_1 = 4$

$y - y_1 = m(x - x_1)$

$y - 4 = 3(x - 5)$

$y - 4 = 3(x - 5)$
$y - 4 = 3x - 15$
$+4 \qquad +4$
$y = 3x - 11$

$$X_1 \ Y_1$$

5. What is the equation of a line that passes through the point $(6,-5)$ and is perpendicular to the line whose equation is $y + x = 5$?

negative reciprocal slopes

$$-x -x$$
$$y = -x + 5$$

$$m\perp = 1$$
$$X_1 = 6$$
$$y_1 = -5$$

$$y - y_1 = m(x - x_1)$$
$$y + 5 = 1(x - 6)$$

$$y + 5 = 1(x - 6)$$
$$y + 5 = x - 6$$
$$-5 \qquad -5$$
$$y = x - 11$$

6. Find an equation of the line passing through the point $(5,4)$ and parallel to the line whose equation is $2x + y = 3$.

Same slope

$$-2x \quad -2x$$
$$y = -2x + 3$$
$$\quad m$$

$$m\parallel = -2$$
$$X_1 = 5$$
$$y_1 = 4$$

$$y - y_1 = m(x - x_1)$$
$$y - 4 = -2(x - 5)$$

$$y - 4 = -2(x - 5)$$
$$y - 4 = -2x + 10$$
$$+4 \qquad +4$$
$$y = -2x + 14$$

7. Find an equation of the line passing through the point $(6,5)$ and perpendicular to the line whose equation is $2y + 3x = 6$.

negative reciprocal slopes

$$-3x \quad -3x$$
$$\frac{2y}{2} = \frac{-3x + 6}{2}$$
$$y = -\frac{3}{2}x + 3$$
$$\qquad m$$

$$m\perp = \frac{2}{3}$$
$$X_1 = 6$$
$$y_1 = 5$$

$$y - y_1 = m(x - x_1)$$
$$y - 5 = \frac{2}{3}(x - 6)$$

$$y - 5 = \frac{2}{3}(x - 6)$$
$$y - 5 = \frac{2}{3}x - 4$$
$$+5 \qquad +5$$
$$y = \frac{2}{3}x + 1$$

8. Write an equation of the line that passes through the point $(6,-5)$ and is parallel to the line whose equation is $2x - 3y = 11$.

Same slope

$$-2x \qquad -2x$$
$$\frac{-3y}{-3} = \frac{-2x + 11}{-3}$$
$$y = \frac{2}{3}x - \frac{11}{3}$$
$$\qquad m$$

$$m\parallel = \frac{2}{3}$$
$$X_1 = 6$$
$$y_1 = -5$$

$$y - y_1 = m(x - x_1)$$
$$y + 5 = \frac{2}{3}(x - 6)$$

$$y + 5 = \frac{2}{3}x - 4$$
$$-5 \qquad -5$$
$$y = \frac{2}{3}x - 9$$