

When asked to find the equation of a line you will be given some data, either a point and slope, two points, or an equation where you must first find the slope and a point.

Memorize the following formulas to be successful.

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

$$y - y_1 = \frac{y_2 - y_1}{x_2 - x_1}(x - x_1)$$

Ex 2) Find the equation of the line in slope intercept form that passes through the points (1, 2) and (3, 6).

1 2

$$y - 2 = \frac{6 - 2}{3 - 1} (x - 1)$$

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

$$y - 2 = 2x - 2$$

$$y = 2x + 0$$

Ex 3) Find the equation of the line in slope intercept form that has a slope of -3 and y-intercept of 2.

Reminder: Slope Intercept Form is $y = mx + b$

$$y = -3x + 2$$

Geometry Reminder:

- 1) Parallel lines have the same slope.
- 2) Perpendicular lines have slopes that are opposite **and** reciprocals of each other (their products = -1).

Ex 4) Find the equation of the line containing the point $(-1, 3)$ that is parallel to the line $2x + y = 10$.

$$m = -2 \quad (y = -2x + 10) \text{ Same slope}$$

$$y - 3 = -2(x + 1)$$

$$y - 3 = -2x - 2$$

$$y = -2x + 1$$

Ex 5) Find the equation of the line containing the point (2, -3) that is perpendicular to $4y - x = 20$.

$$4y - x = 20$$

$$4y = x + 20$$

$$y = \frac{1}{4}x + 5$$

→ slope = $\frac{1}{4}$

The opposite and reciprocal is:

$$m = -4$$

$$y + 3 = -4(x - 2)$$

$$y + 3 = -4x + 8$$

$$y = -4x + 5$$