Writing Equations Study Guide

	Important Equations to Memorize		
	Slope Between 2 Points	*Point-Slope Form*	*Slope-Intercept Form*
Equation	$m = \dfrac{y_2 - y_1}{x_2 - x_1}$	$y - y_1 = m(x - x_1)$	$y = mx + b$
When to use	When you need to find the slope, or m	When you're given a *point* and the *slope*	When you're given the *slope* and *y-intercept*
Example	Find the slope between (2,-3) & (-4, 7)	Write the eqn of a line with a slope of 2/5 that contains (5,-7)	Write the eqn of a line with a slope of 3 and a y-intercept of 1/2
Answer	$\dfrac{7-(-3)}{-4-2} = \dfrac{7+3}{-4-2} = \dfrac{10}{-6} = -\dfrac{5}{3}$	$y - (-7) = \dfrac{2}{5}(x-5)$	$y = 3x + \dfrac{1}{2}$

Writing Equations Examples

Point-Slope Form

Write the equation of a line in *point-slope form* that contains the point (8,-3) & a slope of 1/2

$$y - (-3) = \frac{1}{2}(x-8)$$
$$y + 3 = \frac{1}{2}(x-8)$$

Write the equation of a line in *point-slope form* that contains the points (4,-8) & (-2,-7)

$$m = \frac{-7-(-8)}{-2-4} = \frac{-7+8}{-6} = -\frac{1}{6}$$
$$y - (-8) = -\frac{1}{6}(x-4)$$
$$y + 8 = -\frac{1}{6}(x-4)$$

Slope-Intercept Form

Write the equation of a line in *slope-intercept form* with a slope of -1/2 and a y-intercept of 5.

$$y = -\frac{1}{2}x + 5$$

Write the equation of a line in *slope-intercept form* that contains the point (-2,4) and a slope of -1.

$$y - 4 = -1(x - (-2))$$
$$y - 4 = -1(x + 2)$$
$$y - 4 = -1x - 2$$
$$y - 4 + 4 = -1x - 2 + 4$$
$$y = -x + 2$$

Write the equation of a line in *slope-intercept form* that contains the points (-5,8) & (1, 2).

$$m = \frac{2-8}{1-(-5)} = \frac{-6}{6} = -1$$
$$y - 8 = -1(x - (-5))$$
$$y - 8 = -1(x + 5)$$
$$y - 8 = -1x - 5$$
$$y - 8 + 8 = -x - 5 + 8$$
$$y = -x + 3$$

	Parallel	Perpendicular	Neither
Definition	•Have the SAME slope	•Opposite (+/-) •Reciprocal (flipped fraction)	•All else
Examples (look only at slopes to tell if parallel, perp., or neither)	m = 2 & m = 2 m = -1 & m = -1	$m = \dfrac{2}{5} \,\&\, m = -\dfrac{5}{2}$ $m = -3 \,\&\, m = \dfrac{1}{3}$	m = 2 & m = -2 (not reciprocals) $m = \dfrac{2}{5} \,\&\, m = \dfrac{5}{2}$ (not opposite)
Given Two Equations (solve for y=mx+b and look at m)	$2)\, y - 2x = 5$ $1)\, y = 2x - 3 \quad y - 2x + 2x = 5 + 2x$ $\boxed{m = 2} \qquad y = 2x + 5$ $\boxed{m = 2}$	$1)8x + 5y = 20 \quad 2)5x - 8y = 16$ $5y = -8x + 20 \quad -8y = -5x + 16$ $y = -\dfrac{8}{5}x + 4 \qquad y = \dfrac{5}{8}x - 2$ $\boxed{m = -\dfrac{8}{5}} \qquad \boxed{m = \dfrac{5}{8}}$	$1)\, y - 2x = 8 \qquad 2)2y - x = 4$ $y = 2x + 8 \qquad 2y = x + 4$ $\boxed{m = 2} \qquad y = \dfrac{1}{2}x + 2$ Not opposites $\quad \boxed{m = \dfrac{1}{2}}$

Practice Problems

1. Write the equation of a line in point–slope form that contains the points (8,4) & (6,-2).

2. Write the equation of a line in slope-intercept form that contains the points (8,4) & (6,-2).

3. Write the equation of a line in slope-intercept form that is parallel to the equation y=3x-2 and contains the point (4,-7). [Hint: what does parallel tell you about your slope?]