4-2 Notes: Writing Equations in Slope-Intercept Form

$y = mx + b$

m = slope

b = y intercept

Example 1: Write an equation of the line that passes through (–4, 2) with a slope of 3.

Step 1: point slope form $y - 2 = 3(x + 4)$

Step 2: simplify (solve for y) $y - 2 = 3x + 12$, $+2 \quad +2$

$y = 3x + 14$

Write an Equation Given Two Points

Example: Write an equation of the line that passes through (1, 2) and (3, –2).

Step 1: $m = \frac{-2-2}{3-1} = \frac{-4}{2} = -2$ (x_1, y_1 x_2, y_2)

Step 2: $y - y_1 = m(x - x_1)$

Choose ONLY 1 point $y - 2 = -2(x - 1)$

$y - 2 = -2x + 2$, $+2 \quad +2$

$y = -2x + 4$

Example: Write an equation of the line that passes through (1, -2) and (7, -2).

Step 1: $m = \frac{-2-(-2)}{7-1} = \frac{0}{6} = 0$ (x_1, y_1 x_2, y_2)

Step 2: $y - (-2) = 0(x - 1)$

$y + 2 = 0$, $-2 \quad -2$

$y = -2$

* note y value in both points

line = horizontal b/c slope = 0

all horizontal lines are $y = \#$.

Example: Write an equation of the line that passes through (-3, -2) and (-3, 7).

Step 1: $m = \frac{7-(-2)}{-3-(-3)} = \frac{9}{0}$ = undefined!! slope

All undefined = vertical lines

All vertical lines are $x = \#$

$x = -3$

note x value in both points

4-3 Notes: Writing Equations in Point-Slope Form

Key

Point-Slope Form

Point-Slope Form	$y - y_1 = m(x - x_1)$ m = slope of the line (x_1, y_1) = any point on the line.

To write an equation in point-slope form, all you need is the slope m and any point on the line (x_1, y_1). Substitute these values into the point slope formula and reduce any signs.

Example 1: Write an equation in point-slope form for the line that passes through (6, 1) with a slope of $-\frac{5}{2}$.

$m = -5/2$

$(x_1, y_1) = (6, 1)$

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

$y - 1 = -5/2(x - 6)$

Example 2: Write an equation in point-slope form for the line containing (2, 5) and (4, –1).

Step 1: $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-1-5}{4-2} = \frac{-6}{2} = -3$

Step 2: $y - y_1 = m(x - x_1)$

use only 1 point!

$y - 5 = -3(x - 2)$

Forms of Linear Equations

Slope-Intercept Form	$y = mx + b$	m = slope; b = y-intercept
Point-Slope Form	$y - y_1 = m(x - x_1)$	m = slope; (x_1, y_1) is a given point
Standard Form	$Ax + By = C$	A and B are not both zero. Usually A is nonnegative and A, B, and C are integers whose greatest common factor is 1.

Example 1: Write $y + 5 = \frac{2}{3}(x - 6)$ in standard form.

$Ax + By = C$ = standard form

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

$y + 5 = 2/3x - 4$

$-3\left[y - 2/3x = -9\right]$

$-3y + 2x = 27$

$2x - 3y = 27$

Example 2: Write $y - 2 = -\frac{1}{4}(x - 8)$ in slope-intercept form.

slope intercept: $y = mx + b$

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

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

$+2 \quad +2$

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