Name:_____   Date:_____

Notes
Algebra Section 5.1
Pages 283-289

Goal: "You will write equations of lines"

Slope – intercept form:

$$y = mx + b$$

Situation 1: Write the equation of a line in slope – intercept form if given slope and the y – intercept

Ex:
Slope: –2
y – intercept: 5

$y = -2x + 5$

Ex:
Slope: 8
y – intercept: –7

$y = 8x - 7$

Ex:
Slope: 4
y – intercept: –3

$y = 4x - 3$

Ex:
Slope: $\frac{3}{4}$
y – intercept: –3

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

Ex:
Slope: 0
y – intercept: 5

$y = 5$

Ex:
Slope: –1
y – intercept: 0

$y = -x$

Situation 2: Write the equation of a line in slope – intercept form if given two points on the line

1. Find the <u>slope</u> using the formula $\frac{y_2 - y_1}{x_2 - x_1}$.   **Ex:** $(0, -5)$ $(3, -1)$

2. Find the <u>y-intercept</u> (y-intercept $x = 0$)
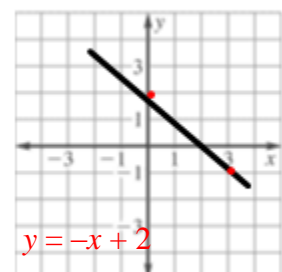
3. Plug in <u>m</u> and <u>b</u>.

Ex: $(0, 2)$ $(4, -1)$ **Ex:** $(0, 1)$ $(4, -1)$ **Ex:**

$y = -\frac{3}{4}x + 2$ $y = -\frac{1}{2}x + 1$

$y = -x + 2$

Situation 3: Write an equation of a line given two function values

1. Create two <u>ordered</u> <u>pairs</u>.

Ex: $f(0) = 5$ $f(4) = 17$
(0, 5) and (4, 17)

2. Find the <u>slope</u>.

$m = 3$

3. Find the <u>y-intercept</u>. ($x=0$)

$b = 5$

4. Plug in <u>m</u> and <u>b</u>.

$y = 3x + 5$

Ex: $f(0) = -2$ $f(8) = 4$

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

Ex: $f(-3) = 6$ $f(0) = 5$

$$y = -\frac{1}{3}x + 5$$

Ex: $f(0) = 7$ $f(3) = 1$

$$y = -2x + 7$$

Real $-$ world connection: $y = mx + b$

*In the real world, $m = $ <u>constant</u> rate of <u>change</u> and $b = $ <u>initial</u> value.

Ex: A recording studio charges musicians an initial fee of $50 to record an album. Studio time costs an additional $35 per hour.
   a) Write an equation that gives the total cost to record an album as a function of studio time needed.
   $y = 35x + 50$

   b) Find the total cost to make an album that takes 10 hours to record.

   $y = 35(10) + 50$
   $y = 400$

Ex: A dance studio charges $20 to use the facility and $25 per hour of instruction.
   a) Write an equation that gives the total cost as a function of hours of dance instruction.

   $y = 25x + 20$

   b) Find the total cost for 2 hours of dance instruction.

   $y = 25(2) + 20$
   $y = 70$