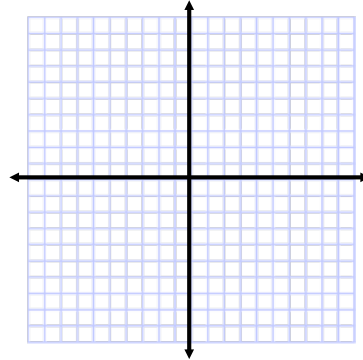## Algebra Equations of Lines Day 2

Warm up

1. You have $5 and you earn $2 everyday.

   a. How much money will you have in 10 days?
   b. How much money will you have in 25 days?
   c. How much money will you have in d days?
   d. Write an equation to represent the situation?

$25
$55
$2d + 5$
$y = 2d + 5$

x	y
0	5
1	7
2	9
3	11
4	13
5	15
6	17
7	19
8	21
9	23
10	25

$$y = 2x + 5$$
$$= 2(25) + 5$$
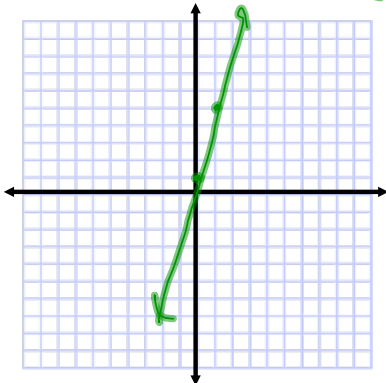$$= 55$$

When Equations are in __slope__ __intercept__ form, they look like $y = mx + b$.
__m__ represents the slope and __b__ represents the __y__-intercept.
For example in the equation, $y = 5x + 3$, the slope is __5__ and the __y__-intercept is __3__.
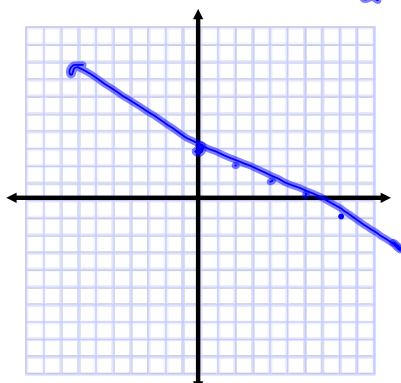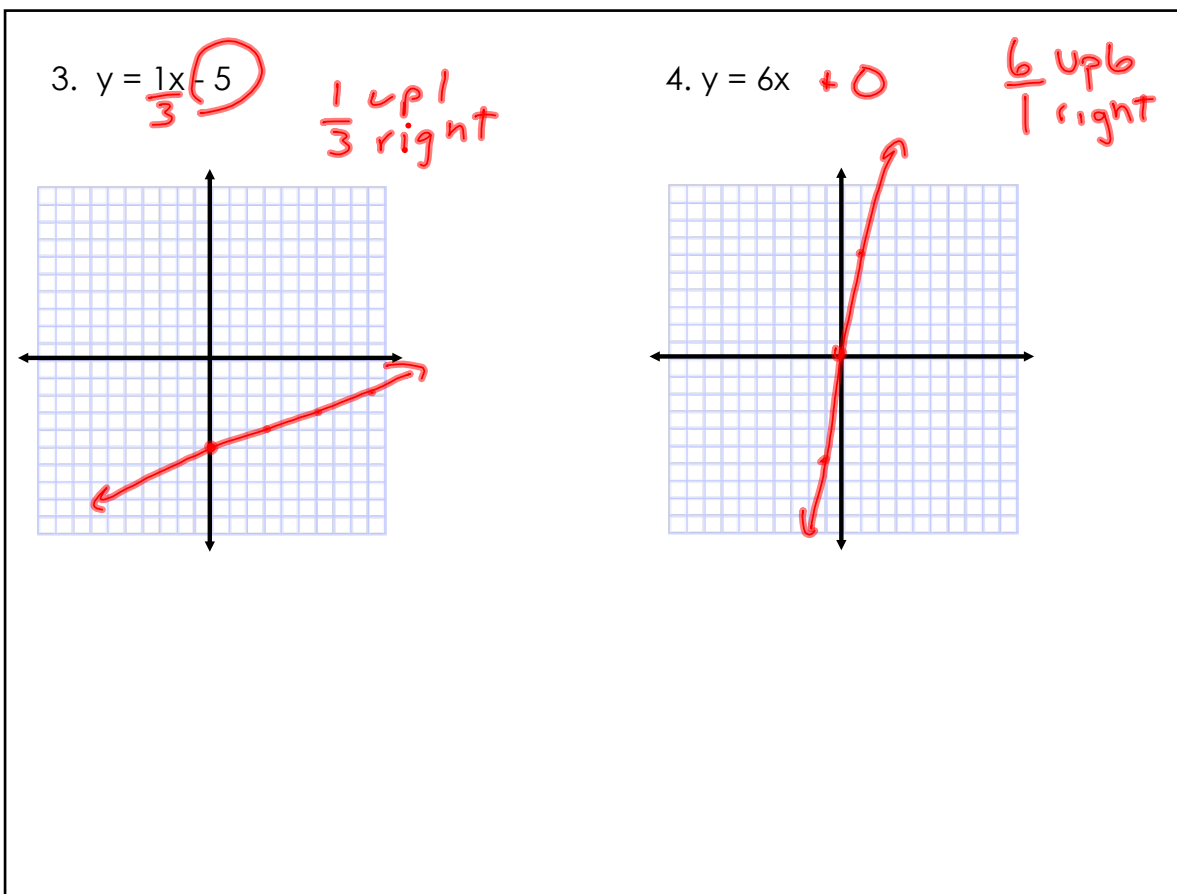
Examples
For numbers 1-4, graph each line with the given equation.

1. $y = 4x + 1$

$\dfrac{4}{1}$ up 4 right

2. $y = -\dfrac{1}{2}x + 3$

$\dfrac{-1}{2}$ down 1 right 2

3. $y = \frac{1}{3}x - 5$ (circled: -5)

$\frac{1}{3}$ up 1
3 right

4. $y = 6x$ + 0

$\frac{6}{1}$ up 6
1 right

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5. Graph the line with a slope of 2, that goes through the point (1, -4).

$\frac{2}{1}$ up 2
1 right

Steps: Plot the _point_ first. Then use the _slope_ to find the next point.

a. What is the equation for this line? $y = 2x - 6$

$(1, -4)$
x, y

$y = mx + b$
$-4 = (2)(1) + b$
$-4 = 2 + b \rightarrow b = -6$
$-2 \quad -2$

b. What is a shortcut to find the equation (without graphing)?

See above

Steps: 1. Start with Slope-intercept form which is $y = mx + b$.
2. Substitute the slope in for _m_ and the coordinate in for _x_ and _y_.
3. Solve for _b_.
4. Substitute the 2 essential values _m_ & _b_ in for _slope_ & _y-intercept_

6. Find the equation for the line with a slope of 3, through the point (-2, 5).

x y

$$y = \underline{3}x + \underline{11}$$

$$5 = 3(-2) + b$$
$$5 = -6 + b$$
$$+6 \qquad +6$$
$$\boxed{b} = 11$$

7. Find the equation for the line with a slope of 2/5, through the point (10, -1).

X y

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

$$-1 = \left(\frac{2}{5}\right)(10) + b \qquad \Big| \quad -5 = b$$
$$-1 = 4 + b$$

8. Find the equation for the line that goes through the origin, and has a slope of -4/3.

(0,0)

$$y = mx + b$$

$$y = \underline{\frac{-4}{3}}x + \underline{0} \qquad OR \quad y = \frac{-4}{3}x$$

Assign Equations
Day 3 Wkst

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1. (5,10) and (-2,13)
   $x_1\ y_1 \qquad\ x_2\ y_2$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{13-10}{-2-5} = \frac{3}{-7} \qquad \underline{m = \frac{-3}{7}}$$

5. _____ (0,3)
                      x y
$$y = mx + b$$
$$3 = 2(0) + b$$
$$3 = b$$

$$y = \underline{2}x + \underline{3}$$

6. _____ (1, 4)
                      x y
$$y = mx + b$$
$$4 = 3(1) + b$$
$$4 = 3 + \boxed{b}$$
$$-3 \quad -3$$
$$1 = b$$

$$y = \underline{3}x + \underline{1}$$