Name _key_ _____ Date_____ Hour_____

2.3-2.4 Notes – Equations of Lines
Alg 2 Trig G

You can write an equation of a line if you are given:

- the ___slope (m)___ and the ___y-intercept (b)___
- the ___slope (m)___ and the ___coordinates of a point (x,y)___ on the line
- the ___coordinates of 2 points___ on the line

Slope-intercept form:

$$y = mx + b$$

m = ___slope___

b = ___y-intercept___

Name the slope and y-intercept of the graph of each equation.

1) $y = 6x + 3$ | $m = 6$ |
                    | $b = 3$ |

2) $y = \dfrac{4}{3}x - 7$ | $m = \dfrac{4}{3}$ |
                              | $b = -7$ |

⭐ 3) $y = -8$ | $m = 0$ |
horizontal line | $b = -8$ | —●— -8 —→

⭐ 4) $x = 1$ | $m = \emptyset$ |
vertical line | $b = none$ |

5) $y - 5x = 20$ | $m = 5$ |
   $+5x \quad +5x$ | $b = 20$ |
   $y = 20 + 5x$

6) $-4y - x = -12$
   $\quad + x \qquad + x$
   $-4y = -12 + 1x$
   $\overline{-4} \quad \overline{-4} \quad \overline{-4}$
   $y = 3 - \dfrac{1}{4}x$

   | $m = \dfrac{-1}{4}$ |
   | $b = 3$ |
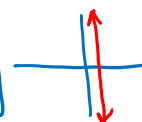
Graph each equation using the slope and y-intercept

1) $y = -\dfrac{1}{2}x + 6$

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

$b = 6$
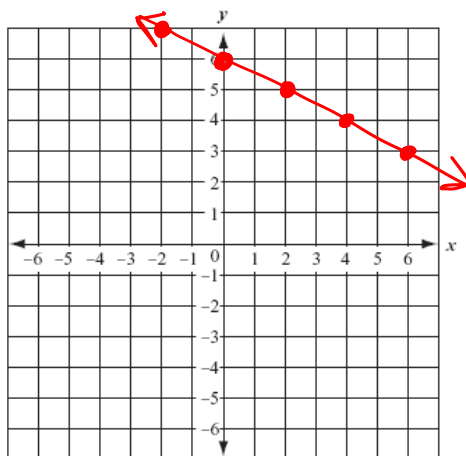
2) $3y + 9 = 3x$
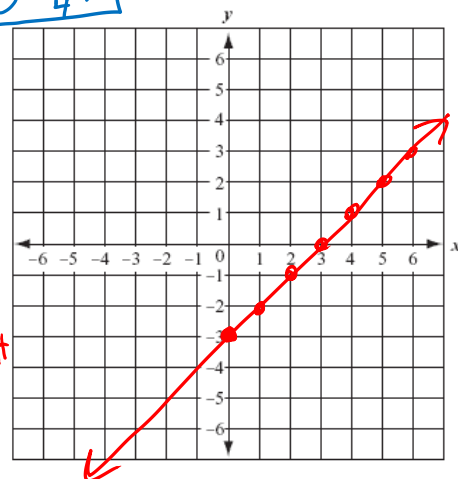 $\qquad -9 \quad -9$
   $\dfrac{3y}{3} = \dfrac{3x}{3} - \dfrac{9}{3}$
   $y = x - 3$
   $m = 1 = \dfrac{1}{1} \dfrac{up}{right}$
   $b = -3$

Write the equation in slope-intercept form of the line that satisfies the given conditions.

1) m = 3, b = -4
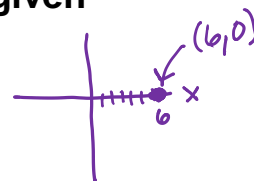
$$y = 3x - 4$$

2) m = $\frac{-2}{5}$, x-intercept = 6

x y
(6, 0)

(6,0)

$$y = mx + b$$
$$0 = \frac{-2}{5}(6) + b$$
$$0 = -2.4 + b$$
$$2.4 = b$$

$$y = \frac{-2}{5}x + 2.4$$

3) m = 3 and passes through (-4, 6)

x y

$$y = mx + b$$
$$6 = 3(-4) + b$$
$$6 = -12 + b$$
$$18 = b$$

$$y = 3x + 18$$

SLOPE (m) = $\frac{y_2 - y_1}{x_2 - x_1}$

* can use either point to find b

4) passes through (-3, 3) and (5, -13)

X Y   x y

$$m = \frac{-13 - 3}{5 - -3} = \frac{-16}{8} = -2 \; m$$

$$y = mx + b$$
$$3 = -2(-3) + b$$
$$3 = 6 + b$$
$$-3 = b$$

$$y = -2x - 3$$

* parallel lines have the same slope   m = -2

5) parallel to the graph of y = -2x + 8
and passes through (5, 10)
x   y

$$y = mx + b$$
$$10 = -2(5) + b$$
$$10 = -10 + b$$
$$20 = b$$

$$y = -2x + 20$$

* perpendicular lines slopes are opposite reciprocals $\left(\frac{3}{5} \to \frac{-5}{3}\right)$ ex.

6) perpendicular to the graph of
y = 4x - 1 and passes through (6, -3)
m = 4   x   Y

opp. recip m = $\frac{-1}{4}$

$$y = mx + b$$
$$-3 = \frac{-1}{4}(6) + b$$
$$-3 = -1.5 + b$$
$$-1.5 = b$$

$$y = \frac{-1}{4}x - 1.5$$