Math 10
Slope Intercept Form
Warmup 7.2

Name:_____

Slope intercept form:

$$y = mx + b$$

y-intercept : (0, b)

slope : $\frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x}$

(x,y) represent an ordered pair that makes the equation a true statement

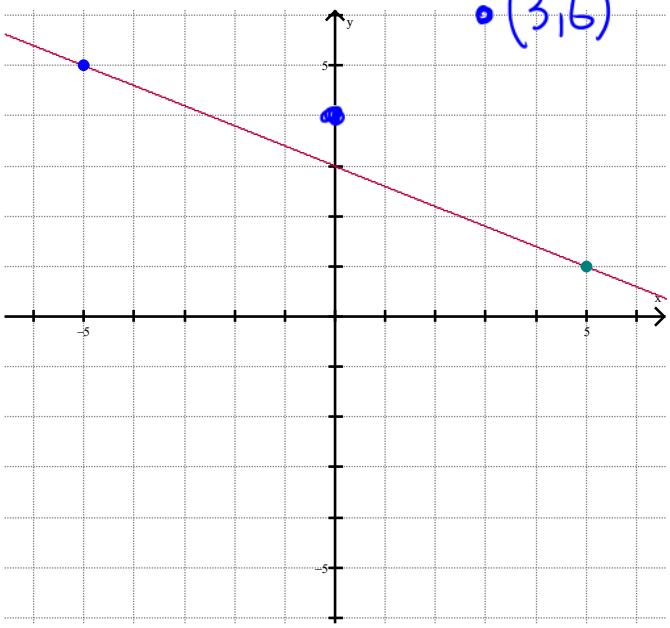
Find the slope and *y*-intercept for each line:

$y = \frac{2}{3}x + 4$ (0,4) is on the graph.	$y = -x - 5$
$m = \frac{2}{3}$ $b = 4$	$m =$ $b =$

What is the equation of the line drawn on the graph.

$6 = \frac{2}{3}(3) + 4$ ✓

(3,6) is on the graph.



Graph the line with the equation: $y = \frac{2}{3}x + 1$ on the grid above.

7.2 General Form

Objectives:
- Convert the equation of a line into general form.
- Use the General Form to find x- and y-intercepts
- Find the equation of horizontal and vertical lines

Slope Intercept form is just one way to write the equation of a line.

How could you convert an equation from slope intercept form to General Form?

The general form is when one side of the equation equals 0.

$Ax + By + C = 0$

A, B, C are integers

multiply to get rid of fraction

$4 \cdot y = \left(\frac{3}{4}x - 2\right) \cdot 4$

$4y = 3x - 8$

$0 = 3x - 4y - 8$

note

$-3x + 4y + 8 = 0$ is also correct but not preferred

$3\left(y = -\frac{2}{3}x + 4\right)$

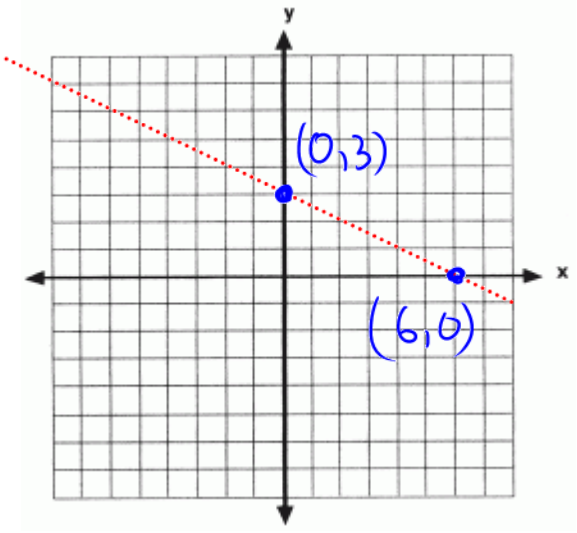
$3y = -2x + 12$

$2x + 3y - 12 = 0$

$12\left(y = \frac{1}{3}x - \frac{3}{4}\right)$

$12y = 4x - 9$

$0 = 4x - 12y - 9$



Complete the table for the listed values of *x* and *y* and graph the line made by the equation

Equation:

$x + 2y - 6 = 0$

x	*y*	
0	3	✓
6	0	
2	2	
3	1.5	✓

$x + 2(0) - 6 = 0$

$2 + 2y - 6 = 0$

$(3) + 2(1.5) - 6 = 0$

$0 = 0$ ✓

The point where this crosses the *x*-axis is called the "*x*-intercept". The point where this graph crosses the *y*-axis is called the "*y*-intercept"

What is the *x*-intercept. (6,0)

What is the *y*-intercept? (0,3)

* x-intercept is always (_, 0) y-int is always (0, _)

$2x + 3y - 12 = 0$

$-2x \quad +12 \quad -2x \quad +12$

$3y = -2x + 12$

$\frac{3y}{3} = \frac{-2x+12}{3}$

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

$y = mx + b.$

$Ax + By + C = 0$

$-Ax \quad -C \quad -Ax - C$

$By = -Ax - C$

$\frac{By}{B} = \frac{-Ax - C}{B}$

$y = -\frac{A}{B}x + \frac{-C}{B}$

Sometimes it's easier to sketch a graph using its intercepts:

Find the x- and y-intercepts for $2x - 3y + 6 = 0$

x	y
-3	0
0	2

← x-int

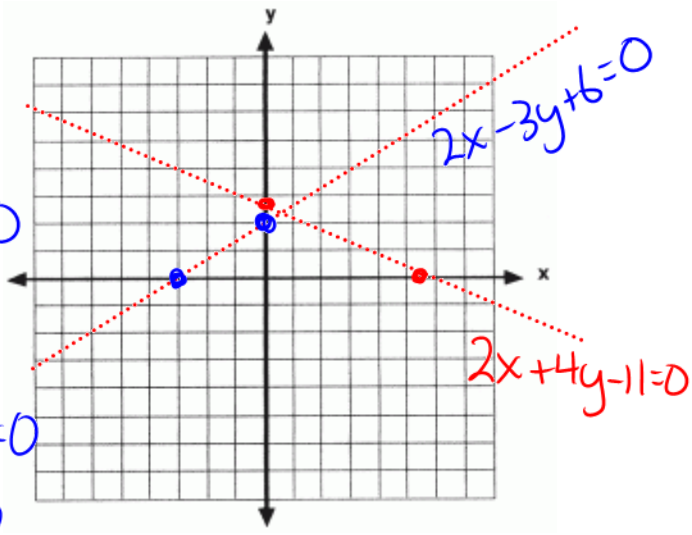
← y-int

$2x+6=0$

$x=-3$

$-3y+6=0$

$y=2$



$2x+4y-11=0$

x	y
0	2.75 or $\frac{11}{4}$
+5.5	0

Remember: The general form is when one side of the equation equals 0.

$Ax + By + C = 0$

Special Cases

Horizontal and Vertical Lines occur when one of the coefficients, (A or B) is 0.

Complete the table and graph:

$0x + 2y - 6 = 0$

x	y
0	3
1	3
2	3

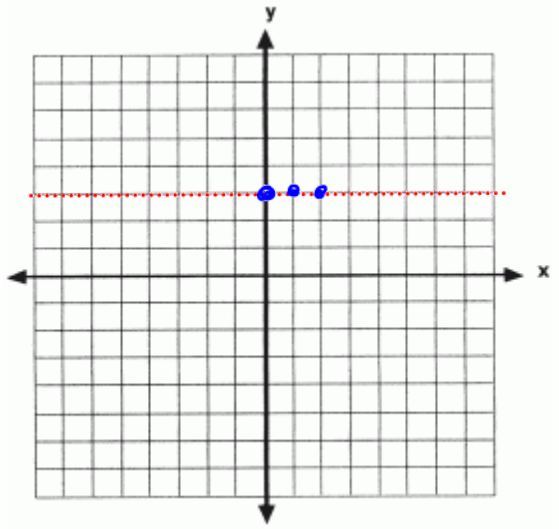
$2y-6=0$

no x's, graph is a horizontal line.

Rewrite the equation with the variable isolated on one side of the equation.

$2y-6=0$

$y=3$



Find:

a) x-intercept: no x-intercept.

b) y-intercept: $(0,3)$

c) Domain: $(-\infty,\infty)$ or $\{x; x \in \mathbb{R}\}$

d) Range: $y=3$

e) Slope: $m=0$

Facts about the equation $y =$

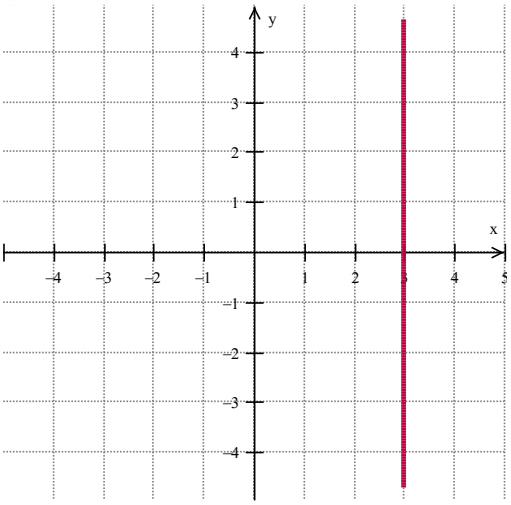
- horizontal line with $m=0$
- has a y-intercept, but no x-int

What do you think the equation of a vertical line might look like? $x=3$

- an infinite number of equations possible.

$2x-6=0$

$3x-9=0$



What are:

a) x-intercept $(3,0)$

b) y-intercept none

c) Domain: $x=3$

d) Range: $(-\infty,\infty)$

e) Slope: undefined

Facts about the equation $x =$

a vertical line with m= undefined.

- has x-int but no y-int

The equation to represent the storage capacity of standard PVR is given as $8x + y = 250$, where x is the number of hours of HD programming, and y represents the number of hours of regular programming.

What is the x-intercept for this equation?
What does it represent?

$8x = 250$

$x = 31.25$

$(31.25, 0)$

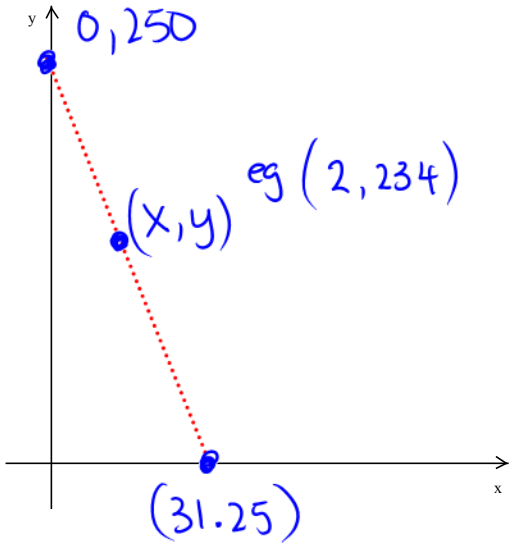
# of hours of HD programming

hours of reg programming.

What is the y-intercept for this equation?

$(0,250)$

$y = 250$



this means we can have 250 hours of reg programming if there is no HD

HW p365 # 1, 2-3ace, 4, 5, 6ace, #7, 10-16, 18, 19

Math 10 Chapter 7

Equations Using Slope Intercept Form

Worksheet 1

1. Convert each equation into standard form:

a) $y = \frac{2}{3}x + 3$ b) $y = -\frac{3}{2}x + 2$ c) $y = \frac{1}{2}x - \frac{1}{3}$

d) $y = -3x - 1$ e) $y = 2x - 4$ f) $y = 2x + 5$

2. Convert each equation into slope intercept form:

a) $3x + y - 4 = 0$ b) $2x - y + 3 = 0$ c) $x + y + 1 = 0$

d) $2x + 3y - 5 = 0$ e) $3x - 2y + 1 = 0$ f) $x + 2y - 4 = 0$

3. Determine the equation of each line with the given slope and coordinate. Give your answer in both slope intercept format and standard form.

a) $m = 2$; A(3,2) b) $m = 1$; P(-2,-3) c) $m = 3$; x-intercept 5

d) $m = \frac{2}{3}$; B(2,3) e) $m = -\frac{2}{5}$; Q(1,5) f) $m = 1$; y-intercept –2

g) $m = \frac{4}{3}$; C(7,5) h) $m = -2$; R(0,5) i) $m = -1$; x-intercept $\frac{1}{2}$

4. From each pair of coordinates, determine the equation of the line in slope intercept form.

a) A(2,4) ; B(5, 2) b) M(-1,3) ; N(2,1) c) O(0,0) ; P(3, 7)

7.3 Warm-Up

1. Rewrite each equation in general form.

a) $y = \frac{2}{3}x + 1$ **b)** $y = -\frac{1}{5}x - 3$

2. Rewrite each equation in general form.

a) $y - 3 = 2(x + 5)$ **b)** $y + 2 = 4(x - 1)$

3. Simplify.

a) $2\left[\frac{3}{2}(x-4)\right]$ **b)** $5\left[\frac{4}{5}(x-1)\right]$

4. Visualize each of the following lines. Then, write the equation in slope-intercept form.

a) x-intercept of 4 and y-intercept of –5 **b)** passing through (0, 2) and (4, 0)

5. On grid paper, draw each line. Then, write the equation of the line in slope-intercept form.

a) passing through (2, 5) and (–1, –4) **b)** passing through (–3, 6) and (0, 0)