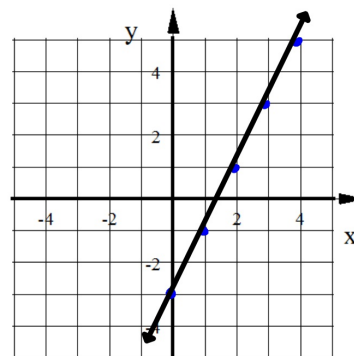


Equations for a Line

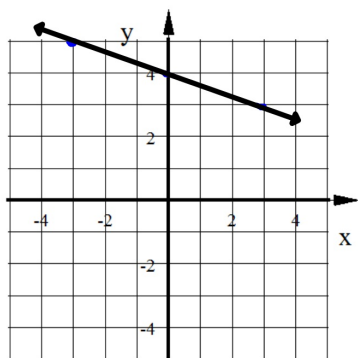
- Slope-Intercept Form $y = mx + b$
- Standard Form $Ax + By = C$
- Point-Slope Form $y - y_1 = m(x - x_1)$
- Horizontal Lines $y = \#$
- Vertical Lines $x = \#$

1. $y = 2x - 3$

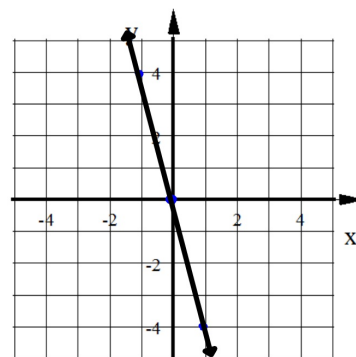


2. $y - 5 = -\frac{1}{3}(x + 3)$

$P(-3, 5)$
 $m = -\frac{1}{3}$



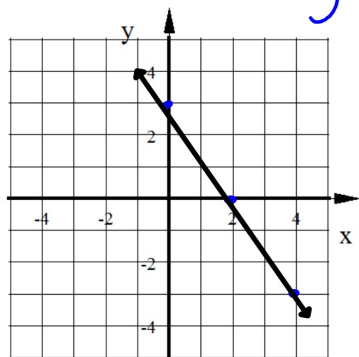
3. $y = -4x$



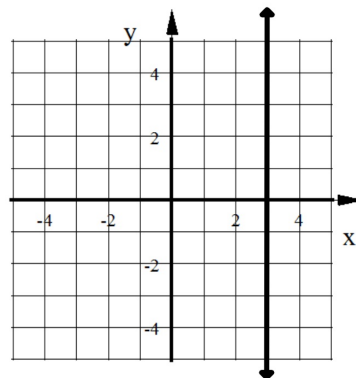
4. $6x + 4y = 12$

$$4y = -6x + 12$$

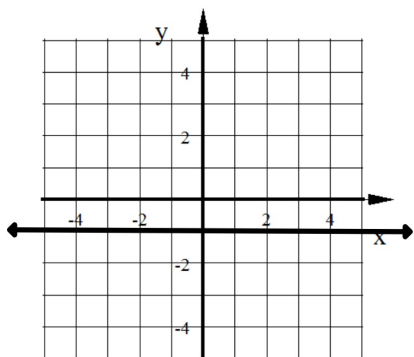
$$y = -\frac{3}{2}x + 3$$



5. $x = 3$



6. $y = -1$



Graphing lines in Standard Form:

$$12x - 6y = 24$$

Method 1: Rewrite into $y = mx + b$

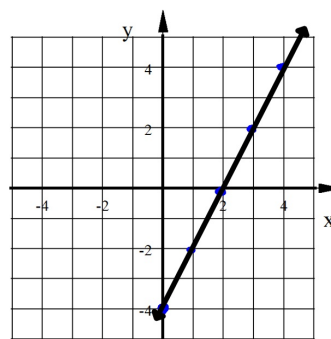
$$-6y = -12x + 24$$

$$y = 2x - 4$$

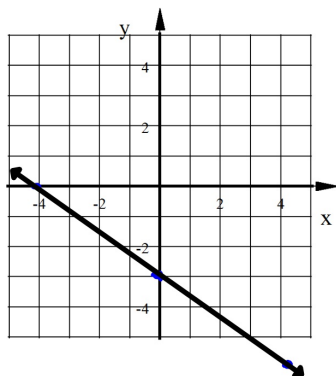
Method 2: Find the x & y intercepts

$$x = 2$$

$$y = -4$$



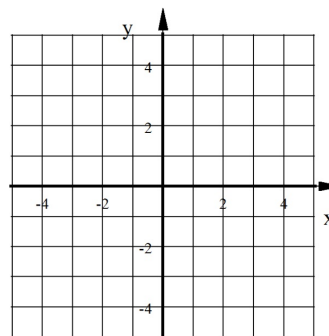
Graph this line:



$$18x + 24y = -72$$

$$\begin{array}{r} -18x \\ \hline -24y = -72 \\ y = -\frac{3}{4}x - 3 \end{array}$$

Graph this line:



$$6x + 15y = 45$$

Equations for a Line

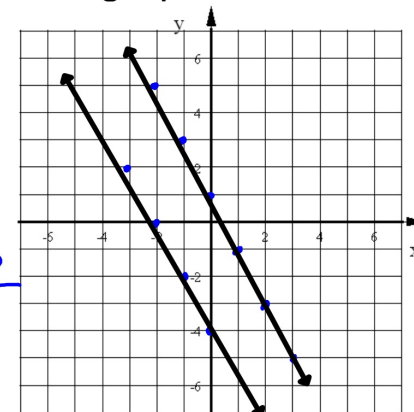
- Slope-Intercept Form $y = mx + b$
- Standard Form $Ax + By = C$
- Point-Slope Form $y - y_1 = m(x - x_1)$
- Horizontal Lines $y = \#$
- Vertical Lines $x = \#$

On the same set of axes graph these two lines:

$$y = -2x + 1$$

$$6x + 3y = -12$$

$$\begin{array}{r} -6x \\ \hline 3y = -6x - 12 \\ y = -2x - 4 \end{array}$$



What is the relationship between the two lines you just graphed?

Parallel → Symbol: \parallel

$$y = -2x + 1$$

Write this equation in Slope-Intercept Form

$$6x + 3y = -12$$

What do you notice about the two equations?

How do you know by just looking at the equations of two lines if they are Parallel?

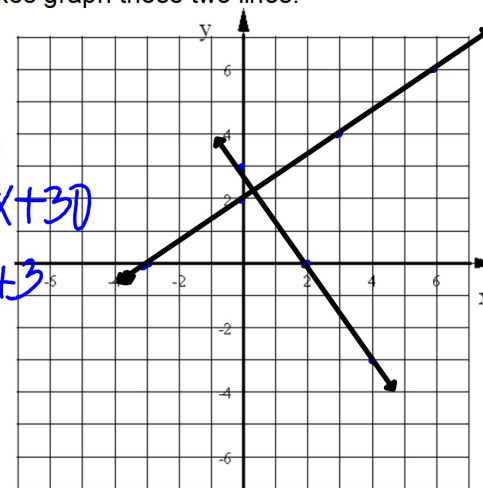
- Same Slope
- Different y-intercept

On the same set of axes graph these two lines:

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

$$15x + 10y = 30$$

$$\begin{aligned} -15x &= -15x \\ 10y &= -15x + 30 \\ y &= \frac{-3x + 30}{2} \end{aligned}$$



What is the relationship between the two lines you just graphed?

Perpendicular → Symbol: \perp

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

Write this equation in Slope-Intercept Form

$$15x + 10y = 30$$

What do you notice about the two equations?

How do you know by just looking at the equations of two lines if they are Perpendicular?

- Slopes are opposite reciprocals
- y-intercept doesn't matter!

Sec 6-5: Parallel and Perpendicular Lines

Two lines are Parallel if they:

- Have the same slope
- Different y-intercepts

Two lines are Perpendicular if they:

- Have opposite reciprocal slopes
- y-intercepts don't matter

Find the opposite reciprocal of each number:

	Opposite Reciprocal		Opposite Reciprocal
7	$-\frac{1}{7}$	$\frac{2.5}{1}$	$-\frac{1}{2.5} = -\frac{2}{5}$
$-\frac{1}{3}$	3	$-\frac{0.63}{1}$	$\frac{1}{0.63} = \frac{100}{63}$

Is each pair of lines parallel?

1. $y = -2x + 4$
 $y = -2 + 4x \rightarrow y = 4x - 2$
 //

2. $y = 3x - 7$
 $y = 3$
 //

3. $y = -\frac{1}{2}x + 7$
 $4x + 8y = 24 \rightarrow 8y = -4x + 24$
 $y = -\frac{1}{2}x + 3$
 //

4. $y = 6x - 1$

$$6x - 2y = 8$$

$$-2y = -6x + 8$$

$$y = 3x - 4$$

Not \perp

Is each pair of lines perpendicular?

1. $y = 3x - 8$

$$y = -3x + 5$$

Not \perp

2. $y = 4x + 20$

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

Not \perp

3. $y = 2x - 5$

$$6x - 3y = 15$$

Not \perp

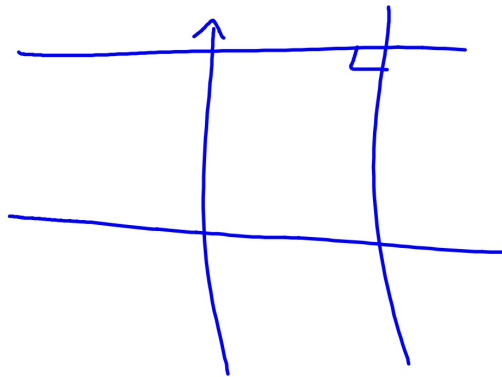
$$-3y = -6x + 15$$

$$y = 2x - 5$$

Neither

4. $y = 9$

$x = 9$



Tell if each pair of lines are parallel, perpendicular, or neither.

1.

$y = \frac{3}{2}x + 8$

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



2.

$y = 6x - 7$

$24x - 4y = 28$

$-4y = -24x + 28$

$y = 6x - 7$

Neither

3.

$y = \frac{1}{7}x + 3$

$y = \frac{1}{7}x - 5$



4. $y = -8x + 3$

$16x + 2y = 11$

$$2y = -16x + 11$$

$$y = -8x + \frac{11}{2}$$

Use this equation:

$y = 4x - 9$

Write the equation of a line that is parallel to this line and passes through the point (5, 1)

$$1 = 4(5) + b$$

$$1 = 20 + b$$

$$m = 4$$

$$y - 1 = 4(x - 5)$$

$$y - 1 = 4x - 20$$

$$y = 4x - 19$$

Write the equation of a line that is perpendicular to this line and passes through the point (-8, 7)

$$m = -\frac{1}{4}$$

$$y - 7 = -\frac{1}{4}(x + 8)$$

$$y - 7 = -\frac{1}{4}x - 2$$

$$y = -\frac{1}{4}x + 5$$

Use this equation:

$6x + 3y = 12$

Write the equation of a line that is parallel to this line and passes through the point (-7, 4)

$$y - 4 = -2(x + 7)$$

$$y - 4 = -2x - 14$$

$$y = -2x - 10$$

$$-6x = -6x$$

$$3y = -6x + 12$$

$$y = -2x + 4$$

$$m = -2$$

Write the equation of a line that is perpendicular to this line and passes through the point (4, 10)

$$m = \frac{1}{2}$$

$$y - 10 = \frac{1}{2}(x - 4)$$

$$y - 10 = \frac{1}{2}x - 2$$

$$y = \frac{1}{2}x + 8$$

Use this equation:

$y = -6$

Write the equation of a line that is parallel to this line and passes through the point (13, -8)

$$y + 8 = 0(x - 13)$$

$$y = -8$$

Write the equation of a line that is perpendicular to this line and passes through the point (-2, -7)

$$x = -2$$

You can now finish Hwk #41 Sec 6-5

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Problems 3-5, 16, 20, 21, 24, 27, 35-37, 39

IXL #16 - S.11 & S.15 due tomorrow at 6pm!

(LAST PAIR OF IXLs FOR THE SEMESTER!)