

**Warm-Up**                      **10/16/18**

**Write out the questions you missed on the last quiz in your INB and correct them.**

**INB**

**10/16/18**

**Module 4**



# **Day 7 - Solving Inequalities**

## Essential Questions 10/16/18

1. How can inequalities be used to demonstrate all possible values that are solutions to a given real life situation?
2. How can a number line be used to display inequalities of a given situation?

# Module 4 Standards 10/16/18

Standard	Sub-Standard	Lesson
<b>MFAEI1.</b> Students will create and solve equations and inequalities in one variable.	a. Use variables to represent an unknown number in a specified set (conceptual understanding of a variable). <b>(MGSE6.EE.2, 5, 6)</b>	<b>Day 1, 2, 3, 4</b>
	b. Explain each step in solving simple equations and inequalities using the equality properties of numbers. <b>(MGSE9-12.A.REI.1)</b>	<b>Day 4, 7</b>
	c. Construct viable arguments to justify the solutions and methods of solving equations and inequalities. <b>(MGSE9-12.A.REI.1)</b>	<b>Day 4</b>
	d. Represent and find solutions graphically.	
	e. Use variables to solve real-world and mathematical problems. <b>(MGSE6.EE.7, MGSE7.EE.4)</b>	<b>Day 5, 6</b>

Standard:

10/16/18



**MFAEI1.** Create and solve inequalities in one variable.

## What is an Inequality? p. 19

An **inequality** is a statement that compares two quantities. The quantities being compared use one of the following signs:



$$A < B$$

A is less than B.



$$A > B$$

A is greater than B.



$$A \leq B$$

A is less than or equal to B.



$$A \geq B$$

A is greater than or equal to B.



$$A \neq B$$

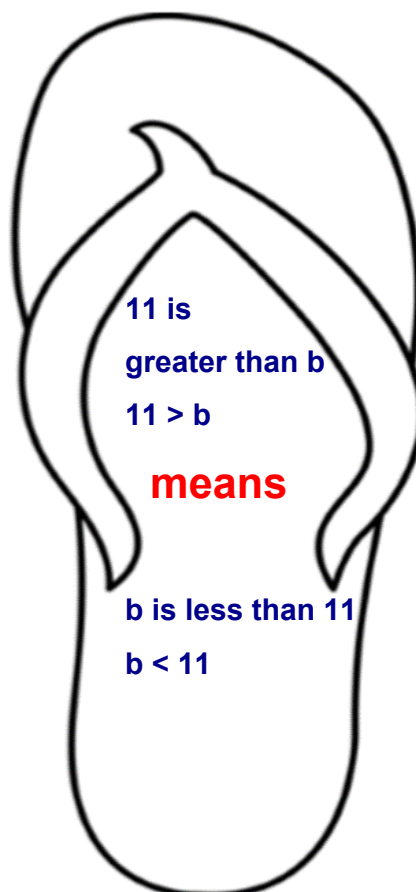
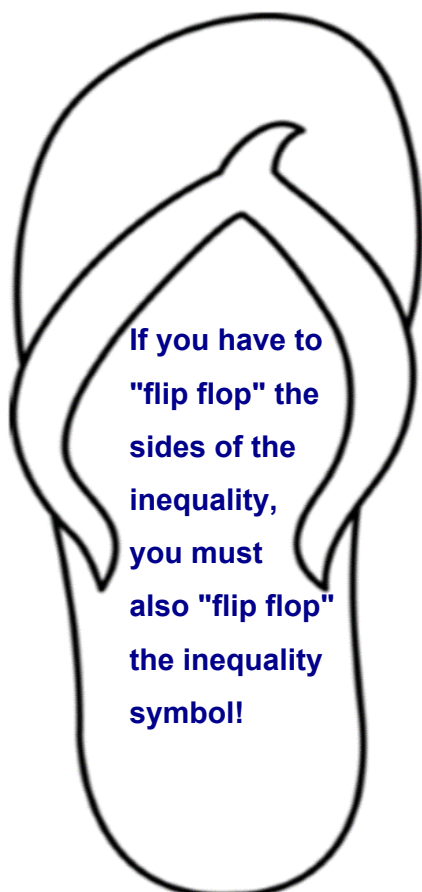
A is not equal to B.

## Translating Inequalities

- A.  $x > 2$  X is greater than 2
- B.  $-3 > p$  p is less than -3
- C.  $y \leq 0$  y is less than or equal to 0
- D.  $-2 \leq z$  Z is greater than or equal to -2
- E.  $x \neq 1$  X is not equal to 1

## Inequalities: Order Matters!

<b>variable</b>	<b>inequality symbol</b>	<b>constant</b>
$x$	$\geq$	$7$





# Graphing Inequalities

When graphing an inequality on a number line, you must pay attention to the sign of the inequality.

Words	Example	Circle	Number Line
Greater Than	$x > 2$	Open	
Less Than	$p < -3$	Open	
Greater Than or Equal To	$z \geq -2$	Closed	
Less Than or Equal To	$y \leq 0$	Closed	
Not Equal To	$x \neq 1$	Open	

## Solutions to Inequalities

A **solution** to an inequality is any number that makes the inequality true.

Value of x	$2x - 4 \geq -12$	Is the inequality true?
-2	$2(-2) - 4 \geq -12$ $-4 - 4 \geq -12$ $-8 \geq -12$	True
-4	$2(-4) - 4 \geq -12$ $-8 - 4 \geq -12$ $-12 \geq -12$	True
-6	$2(-6) - 4 \geq -12$ $-12 - 4 \geq -12$ $-16 \geq -12$	False

## Special Rule with Inequalities

### Experiment

Take the inequality  $6 > 2$ . Is this true?

1. Add 3 to both sides. What is your new inequality?

$$6+3 > 2+3$$

$$9 > 5 \quad \text{True}$$

2. Subtract 3 from both sides. What is your new inequality?

$$6-3 > 2-3$$

$$3 > -1 \quad \text{True}$$

3. Multiply both sides by 3. What is your new inequality?

$$6(3) > 2(3)$$

$$18 > 6 \quad \text{True}$$

4. Divide both sides by 3. What is your new inequality?

$$\frac{6}{3} > \frac{2}{3} \quad 2 > \frac{2}{3}$$

$$\text{True}$$

3. Multiply both sides by -3. What is your new inequality?

$$-18 > -6 \quad \text{False}$$

$$-18 < -6 \quad \text{True}$$

4. Divide both sides by -3. What is your new inequality?

$$-2 > -\frac{2}{3} \quad \text{false}$$

$$-2 < -\frac{2}{3} \quad \text{true}$$

Conclusion:








Multiply or divide by a negative number, you must flip the inequality symbol.

# INB Insert

# 10/16/18

The Golden Rule of Inequalities  
 Whenever you **MULTIPLY** or **DIVIDE** both sides of an inequality by a **NEGATIVE NUMBER**, you must flip the inequality symbol.

1. Get the variable by itself on one side of the inequality symbol.
2. Check the order! Variable-Symbol-Constant.
3. Circle the number on the number line.
4. Open circle or closed circle?
5. Shade appropriately

Open Circle		
		
Closed Circle		
		

Example: Solve and Graph

$$5 - 3x \leq 13 + x$$

$$\begin{array}{r} -5 \quad -5 \\ \hline -3x \leq 8 + x \\ -x \quad -x \\ \hline -4x \leq 8 \\ \hline -4 \quad -4 \\ \hline x \geq -2 \end{array}$$



Practice

I do

$$1. x - 4 < -2$$

$$+4 +4$$

$$x < 2$$

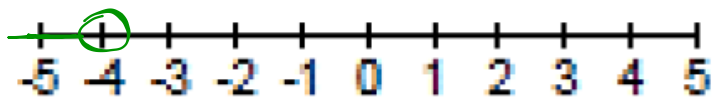


Practice

We do

$$2. \quad \begin{array}{r} -3x > 12 \\ \hline -3 & -3 \end{array}$$

$$x < -4$$



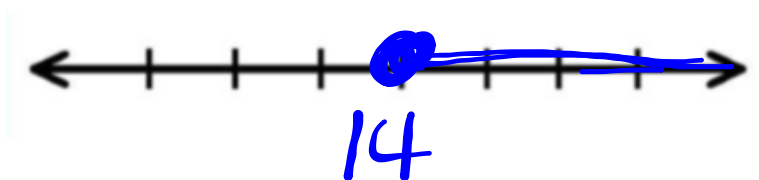
Practice

You do!

$$3. 7 \leq \frac{1}{2}x \quad (2) 7 \leq \frac{1}{2}x \quad (2)$$

$$14 \leq x$$

$$x \geq 14$$



Practice

You do!

4.  $\frac{x}{4} - 1 > 9$

$$\frac{x}{4} - 1 > 9$$

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$$\frac{x}{4} + 1 > 9 + 1$$

$$\cancel{(4)} \frac{x}{4} > 10 \quad (4)$$

$$x > 40$$





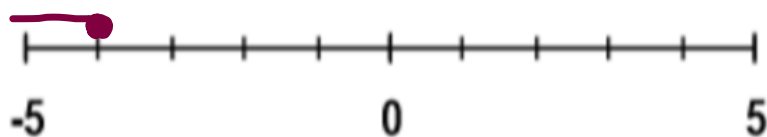
Practice

You do!

5.  $-2(x + 1) \geq 6$

$$-2x - 2 \geq 6$$
$$+2 \quad +2$$

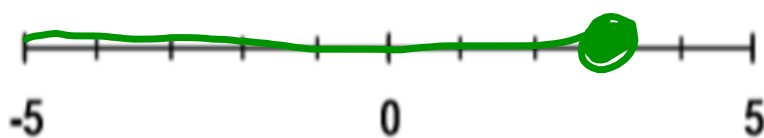
$$\frac{-2x}{-2} \geq \frac{8}{-2} \quad x \leq -4$$



Practice

You do!

$$\begin{array}{r} 6. \quad 6x - 5 \leq 7 + 2x \\ \hline -2x \quad -2x \\ \hline 4x - 5 \leq 7 \\ \quad +5 \quad +5 \\ \hline 4x \leq \frac{12}{4} \quad x \leq 3 \end{array}$$



## Equations Boot Camp 10/16/18

- Get into your boot camp seat and work on the problems assigned to you.
- When you are done, turn them in.

