

Name: _____

Unit 06: Algebraic Expressions, Equations, and Inequalities
Lesson 10: Solving Inequalities

Entrance Ticket

Solve the following equations. Show work

$x + 7 = 12$	$-3x = 12$
$2x = -4$	$3x + 7 = -2$

Engage

Directions: Answer the following questions for yourself, then come to an agreement with your table

How old should people have to be in order to drive a car?

How old should kids have to be to have a smart phone?

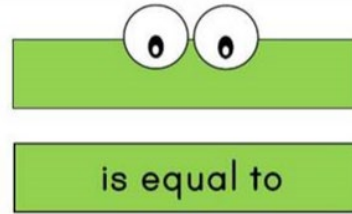
How far would you walk to get Whataburger?



Explore

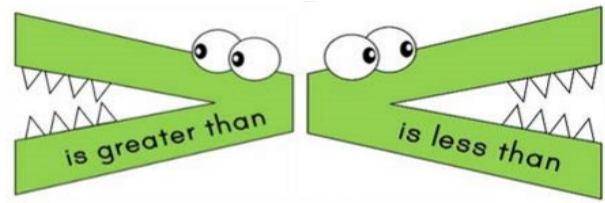
Key Point 0 : An **equation** is a mathematical sentence that includes an **equal sign**.

Equals
=



Key Point 1: An **inequality** is a mathematical sentence that has an **inequality symbol** such as:

Less Than	Less Than or Equal To
<	≤
Greater Than	Greater Than or Equal To
>	≥
Not Equal To	
≠	



CFU

Directions: Circle all the **algebraic inequalities** below.

Remember: *Algebraic* means that it contains a variable!

$5x + 2 \leq 12$	$-2 < 8$	$4y + 3 = 11$	$18x + 5 \neq 41$
$6 + 5 \div 2$	$4x > 20$	$6 + 3 > 5$	$2x + 2y + 14$

Symbol	Meaning	Examples
<	<p>Less than</p> <p>“Is less than”</p> <p>“Is fewer than”</p>	<p>$X < 5$</p> <p>X is <i>less than</i> 5</p> <p>$2x < 15$</p> <p>2x is <i>fewer than</i> 15</p>
≤	<p>Less than or equal to</p> <p>“At most”</p> <p>“Is no more than”</p>	<p>$X \leq 5$</p> <p>X is <i>less than or equal to</i> 5</p> <p>$2x \leq 15$</p> <p>2x is <i>no more than</i> 15</p>
>	<p>Greater than</p> <p>“Is greater than”</p> <p>“Is more than”</p>	<p>$X > 5$</p> <p>x is <i>greater than</i> 5</p> <p>$2x > 15$</p> <p>2x is <i>more than</i> 15</p>
≥	<p>Greater than or equal to</p> <p>“At least”</p> <p>“Is no less than”</p>	<p>$X \geq 5$</p> <p>X is <i>greater than or equal to</i> 5</p> <p>$2x \geq 15$</p> <p>2x <i>is at least</i> 15</p>



Explain

Key Point 2: Inequalities read **left to right** just like a book.

Inequality Symbols				
Symbol	<	>	≤	≥
Key Phrases	<ul style="list-style-type: none">• is less than• is fewer than	<ul style="list-style-type: none">• is greater than• is more than	<ul style="list-style-type: none">• is less than or equal to• is at most• is no more than	<ul style="list-style-type: none">• is greater than or equal to• is at least• is no less than

CFUs

Write < or > to make each inequality true	Use words to describe the inequality.
12 <input type="text"/> 2	12 _____ 2
$3\frac{1}{3}$ <input type="text"/> 3.3	
1.2 <input type="text"/> 1.201	

Key Point 3: An **algebraic equation** usually has **one solution** (or answer) that makes it true.

Key Point 4: An **algebraic inequality** has **many solutions** that make it true.

- We call the answer to an inequality a **solution set**.

Key Point 5: Solving inequalities involves **most** of the same steps as solving equations, except one very important difference:

- **If you multiply or divide both sides of the inequality by a negative value, you MUST also reverse the inequality sign.**

Steps for Success - Solving One-Step Inequalities
Identify the operation you see
Perform the inverse of that operation to both sides <ul style="list-style-type: none">• IMPORTANT: If you multiply or divide both sides by a negative value, you MUST reverse the inequality sign
Check to see if your answer makes sense by evaluating (plugging in your answer to the original inequality and seeing if it is true)

Examples

Ex 1. $3x < -18$	Ex 2. $-5x \geq -25$
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Directions: Determine if the symbol reverses when solving these inequalities.

Caution!

Do not change the direction of the inequality symbol just because you see a negative sign. For example, you do not change the symbol when solving $4x < -24$.

1 $-4x \leq 32$
reverse or stay the same?

2 $6x \leq -18$
reverse or stay the same?

3 $\frac{x}{4} < -1.5$
reverse or stay the same?

4 $\frac{x}{2} \geq 10$
reverse or stay the same?

5 $-2.5x > 35$
reverse or stay the same?

6 $-x < -11$
reverse or stay the same?

Directions: Find the solution set for each inequality below.

Example

$$-3x < 30$$

CFU

$$4x < -24$$

Solution set (Answer)	
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Practice

$$11x < -66$$

$$x + 7 = 11$$

$$-6x \geq 18$$

$$-4x = -16$$

Key Point 6: To check if a value is part of your solution set, **evaluate** by substituting / plugging in the value into the inequality, then asking yourself,

“Is the inequality true?”

Example	Is the value 6 part of the solution set to the inequality $x - 2 < 30$?
CFU 1	List three values that are part of the solution set to the inequality $x - 2 < 30$
CFU 2	List three values that are NOT part of the solution set to the inequality $x - 2 < 30$
CFU 3	You are given the inequality $7c < -14$. Which value represents a number that is a part of the inequality’s solution set? A. -5 B. -2 C. 2

CFU 4	Which inequality is true when $p = 3$? A $p + 15 > 18 - 16$ B $p + 15 \geq 18$ C $p - 10 < -16$ D $p - 10 \leq -16$

Elaborate

Directions: Complete the practice assignment in DeltaMath.

Evaluate / Exit Ticket

Directions: Complete the question below independently.

1.	Solve the inequalities. Write the solution set in the space provided. $k - 12 < 5$ $-6x \geq -30$
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2. You are given the inequality $7c < -14$. Which value represents a number that is part of the inequality's solution set?

A. -5

B. -2

C. 2

D.

3. What mistake did this student make, and what is the correct answer?

$28 \geq t - 9$
 $\frac{-9}{-9} \quad \frac{-9}{-9}$
 $19 \geq t$

The mistake the student made was...

The correct answer is...

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