

## Algebra I

### Lesson 3.3 – Solving Inequalities by Multiplying or Dividing

Mrs. Snow, Instructor

When multiplying and dividing, solving inequalities follows much the same process as when we solve an equation with multiplication or division.

*(notice the “much the same” phrase this is foreshadowing of an exception to the rules)*



<p>Solve and graph:  <math>3x &gt; -36</math>  <del><math>(\frac{1}{3})(3x) &gt; (\frac{1}{3})(-36) - 6</math></del>  <math>x &gt; -6</math></p>	<ol style="list-style-type: none"> <li>1. Clear out the coefficient with multiplication by its reciprocal</li> </ol>
<p><math>-2x &lt; 8</math>  <math>2x - 2x &lt; 8 + 2x</math>  <math>-8 + 0 &lt; 8 + 2x - 8</math>  <math>-8 &lt; 2x</math>  <math>(\frac{1}{2})(-8) &lt; 2x(\frac{1}{2})</math>  <math>-4 &lt; x</math> (x is bigger than -4)  <i>Really?!?! Do we want to do this??????</i></p>	<ol style="list-style-type: none"> <li>1. Get rid of the negative by adding 2x to each side</li> <li>2. OK, subtract constant</li> <li>3. Multiply both sides by the coefficient’s reciprocal</li> </ol>

**If you multiply or divide both sides of an inequality by a negative number, you must flip the inequality sign so to make the statement true**

<p><math>-2x &lt; 8</math>  <math>(-\frac{1}{2})(-2x) &lt; (-\frac{1}{2})8</math>  <math>x &gt; -4</math>          ↪ <b>INEQUALITY SIGN IS FLIPPED!!!</b>          We see that x is bigger than -4</p>	<ol style="list-style-type: none"> <li>1. Multiply both sides by the coefficient’s reciprocal.</li> <li>2. <b>FLIP THE INEQUALITY SYMBOL!!!</b></li> </ol> <p>Note: we get the same answer either the long way or this short way.</p>
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**Solve for the variable and graph:**

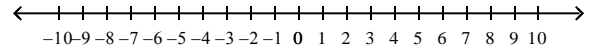
$$4x \leq 28$$

$$-3y > 18$$

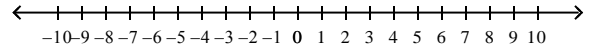
$$5 - 4x \leq 21$$

Write an inequality for each situation. Solve and graph.

The product of a number and 8 is no less than 32.



12 is less than the quotient of  $t$  and 6.



Mr. Davidson has saved \$500 for a trip. If the motel is \$75 per night, what is the maximum number of nights he can stay in the motel?

Write the power represented by each geometric model.



Find the unit rate.  
12 gallons of gas cost \$41.76.

Solve:  $5y - 8 \geq 15$

Find the unit rate:  
A bean plant can grow 4 inches in 12 hours.