

## Algebra I

### Lesson 3.5 – Solving Inequalities with Variables on Both Sides

Mrs. Snow, Instructor



What do you do when you have an inequality with variables on both sides? Do just what you've been doing right along! Keep in mind the steps you need to follow:

- combine like terms
- simplify each side of the inequality if necessary
- use inverses to move terms from one side of the equation to the other
- isolate the variable
- use reciprocals to clear out any coefficients stuck onto the variable
- when multiplying by a negative, make sure to flip the inequality sign

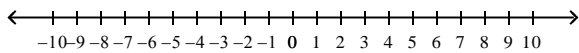
Solve and graph:

$  \begin{aligned}  -8x - 1 &> 4x + 5 \\  -4x + 1 - 8x - 1 &> 4x + 5 - 4x + 1 \\  -12x &> 6 \\  \left(-\frac{1}{12}\right)(-12x) &> 6\left(-\frac{1}{12}\right) \\  x &< -\frac{6}{12} \\  x &< -\frac{1}{2}  \end{aligned}  $	<ol style="list-style-type: none"> <li>1. group x's on the left and constants on the right by subtracting 4x and adding 1 to each side</li> <li>2. multiply by the reciprocal of the coefficient</li> <li>3. Since coefficient is negative, <b>FLIP THE INEQUALITY!</b></li> <li>4. reduce fractions</li> <li>5. graph, is the end point a circle or a dot? Why?</li> </ol>
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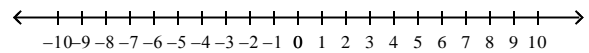
Solve and graph:

$$4x \geq 7x + 6$$

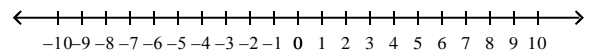
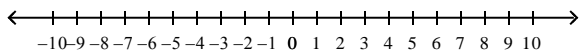
$$5t + 1 < -2t - 6$$



$$5(2 - r) \geq 3(r - 2)$$



$$0.5 - 0.3 + 1.9x < 0.3x + 6$$



$$4(y - 1) \geq 4y + 2$$

$$x - 2 < x + 1$$



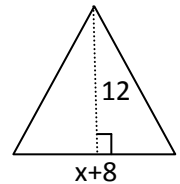
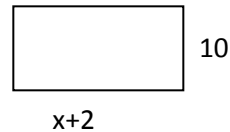
What happened above? Our variable disappeared and we were left with a false statement and a true statement.

**Vocabulary:**

- When we solve an inequality and get an answer that is a false statement, we have what is called a **contradiction**. *The answer to a contradiction is no solutions.*
- When we solve our inequality and end up with an answer that has no variable, but is a true statement, we have an **identity**. *The answer to an identity is all real numbers.*

A-Plus Adverting charges a fee of \$24 plus \$0.10 per flyer to print and deliver flyers. Print and More only charges \$0.25 cents per flyer. For how many flyers is the cost at A-Plus less than the cost at Print and More?

What value of  $x$  will make the area of the triangle less than the area of the rectangle?



The ratio of the width of a rectangle to the length is 3:7. The length is 126 inches, what is the width?

Define the variable, write an inequality and graph the situation. The maximum speed on a highway is 65 miles per hour.