The following steps DON'T affect the direction of the inequality:

- Adding the same number (pos or neg) to both sides
- Subtracting the same number from both sides
- Multiplying both sides by the same positive number
- Dividing both sides by the same positive number

Sec 3-3: Solving Inequalities Using Multiplication and Division

The following steps **DO** affect the direction of the inequality:

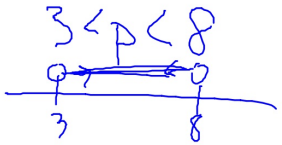
- Multiplying both sides by the same negative number
- Dividing both sides by the same negative number

Compound Inequalities:

Two Inequalities connected with one of the following words:

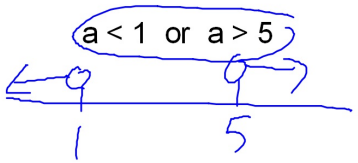
AND

p > 3 and p < 8



OR

a < 1 or a > 5



Graphing and Writing compound inequalities

p > 3 and p < 8

Because this graph is only one part of the number line you can write the inequality as a single statement:

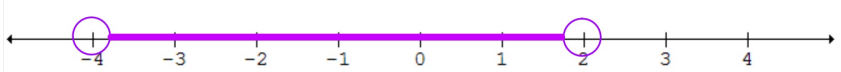
3< x < 8

a < 1 or a > 5

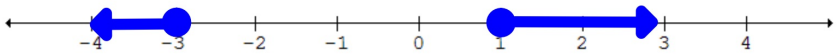
Because this graph is two separate parts of the number line the inequality must remain in two parts.

a < 1 or a > 5

Write the inequalities that model each graph.



$-4 < x < 2$



$x \leq -3$ or $x \geq 1$

When solving an inequality:

- Take the same steps as if it were an equation
- The only difference is that you must

  flip the inequality when you multiply or divide both sides by a negative.

To check your answer to an inequality you must check both

- the starting point
  and
- the direction of the "arrow"

1. $9x + 3(x-4) - x \geq -36$

$9x + 3x - 12 - x \geq -36$

$11x - 12 \geq -36$

$11x \geq -24$

$x \geq \frac{-24}{11}$

Check your answer

Check the starting point

Test -24/11 to see if both sides are =

$9(-24/11) + 3(-\frac{24}{11} - 4) - \frac{24}{11}$

$-36 = -36$ ✓

Check the direction of the inequality

Test a number greater than -24/11 to see if the left side is greater than the right side.

TEST 0

$9(0) + 3(0-4) - 0$

$-12 \geq -36$ ✓