

## Inequalities

An inequality sign works very similarly to an equal sign. The only difference is that when we multiply or divide a inequality by a negative number, we have to change the direction of the inequality to keep the statement true. We do not have to change the direction of the inequality if we are adding or subtracting something to or from both sides of an inequality.

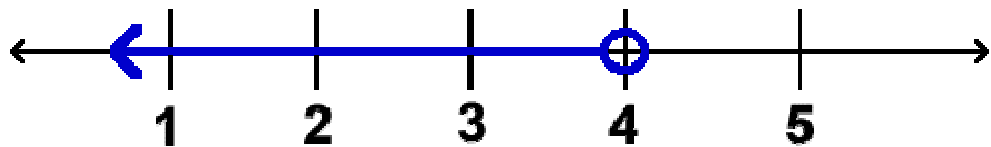
A few definitions we need to know:

1. “<” means “less than”.
2. “>” means “greater than”.
3. “≤” means “less than or equal to”
4. “≥” means “greater than or equal to”
5. An open circle “○” at an endpoint on a graph means the endpoint is not included.
6. A filled-in dot “●” at an endpoint on a graph means the endpoint is is included.

Let’s take a look at a basic inequality.

Example:  $x < 4$

This inequality means “x is less than 4” and graphed on a number line like so:



Example:  $x > 5$

Let’s graph this inequality. Remember, because “x” is strictly greater than 5, we use an open circle for the endpoint.



Example:  $3 \leq x < 6$

This means “x” is bigger than 3, but smaller than 6. One side is an open circle and the other is a filled in dot.



Try graphing the following:

1)  $-2 \leq x \leq 1$

2)  $4 < x$

3)  $-7 < x < -2$

Now let's see what happens when we need to solve for an inequality. Remember that we have to be careful when we multiply or divide by a negative!

Example:  $x + 5 > -2$



Example:  $2x \leq -10$



Example:  $-3x - 5 \geq 14$



Example:  $5 - 2x < 2 + 5x$



Try these:

1)  $5 - 9x < 2 - 8x$



2)  $7(5x - 2) > 6(6x - 1)$

