1.7: Inequalities

Inequalities use: $<$ (open dot), $>$ (open dot) $\quad \leq$ (closed dot), $\geq$ (closed dot)

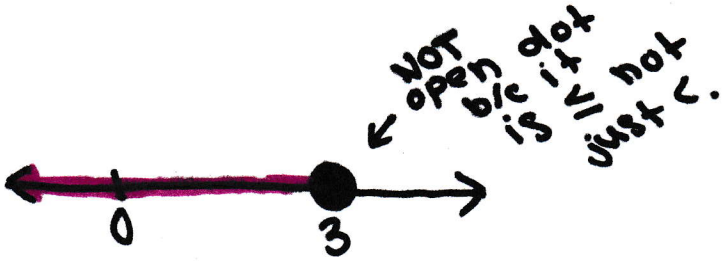
To solve an inequality, that contains a variable, you are looking for all values of x that make that inequality true.

Example: $4x+7 \leq 19$

$-7 \quad -7$

$\frac{4x}{4} \leq \frac{12}{4}$

$x \leq 3$



$(-\infty, 3]$ ← Interval Notation

* You may use any property for solving equation for solving inequalities EXCEPT, if you multiply or divide both sides by a negative #, you must switch (flip) the inequality sign.

Ex: $-1 > -2$

$(-1)(-1) > (-2)(-1)$

$1 \not> 2$ ← NOT True, so we must flip the sign.

Guidelines for Solving Polynomial Inequalities

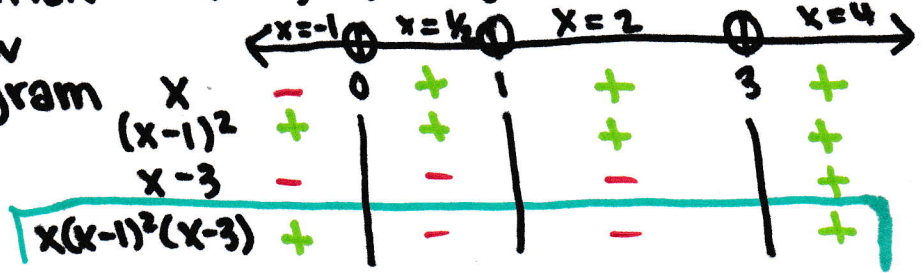
1. Move all terms to one side.
2. Factor
3. Find the intervals. (by solving for the roots)
4. Make a diagram. (Test Values)
5. Solve → (use the last row of your diagram).

Example: $x(x-1)^2(x-3) < 0$

1. Find Intervals: $x=0, x=1, x=3$

   $(-\infty, 0) \quad (0,1) \quad (1,3) \quad (3,\infty)$

2. Draw Diagram



3. Solve.

$(0,1) \cup (1,3)$

This means all solutions for x that make the inequality true are in these intervals