PAP Algebra 2 Name:______________________

Notes Polynomial Inequalities

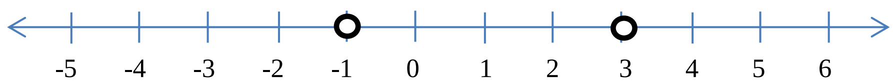
To solve a polynomial inequality such as $x^2 - 2x - 3 < 0$, you can use the fact that a polynomial can only change signs at its zeroes (roots). Between two consecutive zeroes, a polynomial must be entirely positive or entirely negative. We will call these intervals ***test intervals***.

Step 1: Find the zeroes for the polynomial (by factoring) in the inequality $x^2 - 2x - 3 < 0$ and mark them on the number line. These are called critical numbers.

$x^2 - 2x - 3 = 0$

$(x-3)(x+1)= 0$

Roots: $x = 3$, $x= -1$



Solution:

Step 2: Sketch the graph

Step 3: Choose convenient values between your critical numbers to test the value of the expression $x^2 - 2x - 3$. Note whether your result is positive or negative for each test interval.

Step 4: For which test interval(s) was the result negative? This is the interval where $x^2 - 2x - 3 < 0$.

1) Solve $x^2 - x - 6 \leq 0$

Solution:

2) Solve $2x^3 - 3x^2 - 32x > -48$

(Hint: factor by grouping)

Solution:

3) Solve $x^3 + 10x^2 - 24x \leq 0$

4) Solve $x^2 > -2x - 4$

Solution:

Solution:

5) Solve $x^3 - 2x^2 - 9x + 18 \leq 0$

6) Solve $x^3 - 13x^2 + 30x < 0$

Solution:

Solution: