

Solving Quadratic and Higher Degree Inequalities

- Strategy –**
1. Find the critical points
 2. Plot those points on a number line to identify intervals
 3. Check convenient points in those intervals to determine which make the inequality true

Strategy

1. Place everything on one side, zero on the other side
2. Factor completely
3. Find the critical points
4. Plot those on a number line to identify intervals
5. Check convenient points in those intervals to determine which interval(s) make the inequality true

Example Solve the inequality

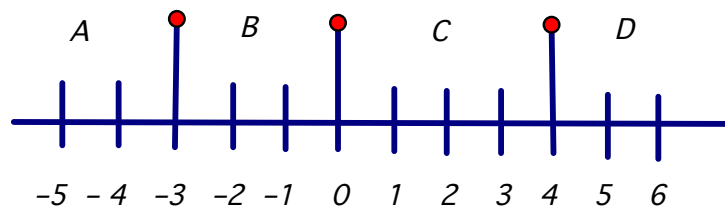
$$x^3 - x^2 \geq 12x$$

1. $x^3 - x^2 - 12x \geq 0$

2. $x(x^2 - x - 12) \geq 0$

$$x(x - 4)(x + 3) \geq 0$$

3. $x = 0, x = 4$ and $x = -3$



5. Intervals A, B, C and D

A Interval A, -5 does not work. Interval B, -1 works

Interval C, 2 does not work. Interval D, 10 works.

Therefore the solution is $-x \leq x \leq 0 \cup x \geq 4$

Find the solution set for the following inequalities.

A

1. $(x - 3)(x - 6) > 0$

2. $(x + 6)(x + 4) > 0$

3. $(x - 2)(x - 5)(x - 10) > 0$

4. $(x + 2)(x - 3)(x - 6) < 0$

5. $(x + 2)(x + 10)(x - 1) < 0$

6. $(2x + 1)(x - 4)(x + 5) > 0$

7. $(x + 1)(x - 5)^2 < 0$

B

$(x + 5)(x - 2) < 0$

$(x + 6)(x + 4) < 0$

$(x - 1)(x - 5)(x + 3) < 0$

$x(x + 1)(x - 5) > 0$

$x(x - 10)(x + 3) < 0$

$(x - 2)^2(x + 3) > 0$

$(x - 3)^3(x + 4) > 0$