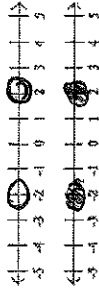


HIVSON

Quadratic Inequalities in 1 Variable

A solution of an inequality in one variable is a value of the variable that makes the inequality true.

The graph of an inequality in one variable consists of all points on a real number line that corresponds to solutions of the inequality.



Steps to Graphing on a Number Line:

- Step 1: Get everything on one side of the inequality
- Step 2: Solve for x (use the quadratic formula)
- Step 3: Plot solution(s) on the number line using either an open or closed circle respectively
- Step 4: Test a point between or outside of the points to see where you should shade. If the point makes the inequality statement true, that is where you should shade.

Quadratic Inequalities in 1 Variable

Example 2

$-x^2 + 2x < 0$

$a = \frac{-1}{-1}$
 $b = \frac{2}{1}$
 $c = \frac{0}{1}$

CK pts

x	y
-1	-3
1	1
3	-3



$x = \frac{-2 \pm \sqrt{(2)^2 - 4(-1)(0)}}{2(-1)}$
 $= \frac{-2 \pm \sqrt{4}}{-2}$
 $= \frac{-2 \pm \sqrt{4}}{-2} = 0$
 $= \frac{-2 - \sqrt{4}}{-2} = 2$

$x < 0$ or $x > 2$

✓ x ✓

Quadratic Inequalities in 1 Variable

Example 1

$-x^2 + 4x \geq 0$

$a = \frac{-1}{4}$
 $b = \frac{4}{2(-1)}$
 $c = \frac{0}{2(-1)}$

CK points

x	y
0	-60
4	4
7	-21



$x = \frac{-4 \pm \sqrt{(4)^2 - 4(-1)(0)}}{2(-1)}$
 $= \frac{-4 \pm \sqrt{16}}{-2}$
 $= \frac{-4 \pm \sqrt{16}}{-2} = 0$
 $= \frac{-4 - \sqrt{16}}{-2} = 4$

$0 \leq x \leq 4$

✓ x

Quadratic Inequalities in 1 Variable

Example 3

$x^2 - 4x + 4 < 0$

$a = \frac{1}{-4}$
 $b = \frac{4}{2(1)}$
 $c = \frac{4}{2(1)}$

CK points

x	y
0	4
4	4



$x = \frac{4 \pm \sqrt{(-4)^2 - 4(1)(4)}}{2(1)}$
 $= \frac{4 \pm \sqrt{0}}{2} = 2$
 $= \frac{4 - \sqrt{0}}{2} = 2$

no solutions

no solutions

Quadratic Inequalities in 1 Variable

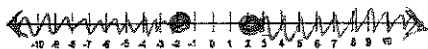
You Practice:

1. $-x^2 + 4 \leq 0$

$a = -1$

$b = 0$

$c = 4$



$$x = \frac{0 \pm \sqrt{(0)^2 - 4(-1)(4)}}{2(-1)}$$

$$x = \frac{0 \pm \sqrt{16}}{-2} \quad \left\{ \begin{array}{l} \frac{0 + \sqrt{16}}{-2} = -2 \\ \frac{0 - \sqrt{16}}{-2} = 2 \end{array} \right.$$

OK pts

x	y
-4	-12 ✓
0	4 ✗
4	-12 ✓

$x \leq -2$ or $x \geq 2$

Quadratic Inequalities in 1 Variable

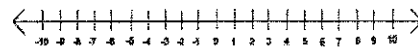
You Practice:

2. $2x^2 < 0$

$a = \underline{\hspace{2cm}}$

$b = \underline{\hspace{2cm}}$

$c = \underline{\hspace{2cm}}$



Quadratic Inequalities in 1 Variable

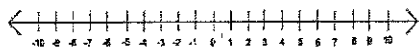
You Practice:

3. $x^2 - 3x - 10 < 0$

$a = \underline{\hspace{2cm}}$

$b = \underline{\hspace{2cm}}$

$c = \underline{\hspace{2cm}}$



Quadratic Inequalities in 1 Variable

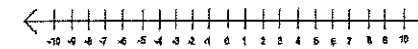
You Practice:

4. $x^2 + 10x + 16 \geq 0$

$a = \underline{\hspace{2cm}}$

$b = \underline{\hspace{2cm}}$

$c = \underline{\hspace{2cm}}$



Quadratic Inequalities in 1 Variable

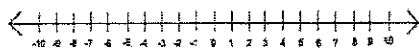
You Practice:

5. $x^2 - 7x - 30 > 0$

$a = \underline{\hspace{2cm}}$

$b = \underline{\hspace{2cm}}$

$c = \underline{\hspace{2cm}}$



Quadratic Inequalities in 1 Variable

You Practice:

6. $x^2 + 5x + 6 \leq 0$

$a = \underline{\hspace{2cm}}$

$b = \underline{\hspace{2cm}}$

$c = \underline{\hspace{2cm}}$

