

P7 Solving Inequalities Algebraically & Graphically

Obj: 1. Solve ineq. using absolute value, quadratics and fractions.

$$|2x-1|=6$$

$$\begin{array}{l} 2x-1=6 \\ +1 \quad +1 \\ 2x=7 \\ x=\frac{7}{2} \end{array} \quad \begin{array}{l} 2x-1=-6 \\ +1 \quad +1 \\ 2x=-5 \\ x=-\frac{5}{2} \end{array}$$

$|x-4| < 8$ less than and
 $>, \geq$ great - or

$$\begin{array}{l} x-4 < 8 \\ +4 \quad +4 \end{array} \text{ and } \begin{array}{l} x-4 > -8 \\ +4 \quad +4 \end{array}$$

(: not included
 [: included

$$x < 12 \text{ and } x > -4$$

$$|2x-1| > 3.6 \quad (-4, 12)$$

$$\begin{array}{l} 2x-1 > 3.6 \\ +1 \quad +1 \end{array} \text{ or } \begin{array}{l} 2x-1 < -3.6 \\ +1 \quad +1 \end{array}$$

$$\begin{array}{l} 2x > 4.6 \\ x > 2.3 \end{array} \quad \begin{array}{l} 2x < -2.6 \\ x < -1.3 \end{array}$$

$$(-\infty, -1.3) \cup (2.3, \infty)$$

$$|3x-2| \geq 5$$

$$\begin{array}{l} 3x-2 \geq 5 \\ +2 \quad +2 \end{array} \text{ or } \begin{array}{l} 3x-2 \leq -5 \\ +2 \quad +2 \end{array}$$

$$\begin{array}{l} 3x \geq 7 \\ x \geq \frac{7}{3} \end{array} \quad \begin{array}{l} 3x \leq -3 \\ x \leq -1 \end{array}$$

$$(-\infty, -1] \cup [\frac{7}{3}, \infty)$$

Quadratic Inequalities:

$$x^2 - x - 12 > 0$$

$$x^2 - x - 12 = 0$$

$$(x-4)(x+3) = 0$$

$$x = 4, -3$$

$$(-\infty, -3) \cup (4, \infty)$$

1. Find zeros (set it = 0)
2. Put #'s on # line.
3. Test each interval
 - $(-4)^2 - (-4) - 12 > 0$
 $8 > 0 \checkmark$
 - $0 - 0 - 12 > 0$
 $-12 > 0 \times$
 - $5^2 - 5 - 12 > 0$
 $8 > 0 \checkmark$

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

$$4x^2 - 1 = 0$$

$$(2x-1)(2x+1) = 0$$

$$\frac{4x^2}{4} = \frac{1}{4}$$

$$\sqrt{x^2} = \sqrt{\frac{1}{4}}$$

$$x = \pm \frac{1}{2}$$

$$[-\frac{1}{2}, \frac{1}{2}]$$

$$0 - 1 \leq 0$$

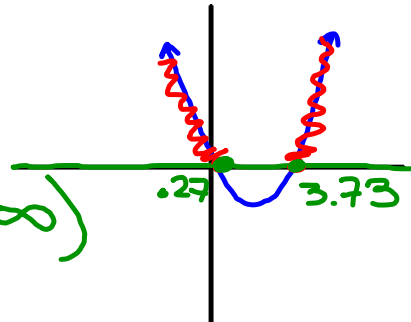
$$-1 \leq 0 \checkmark$$

Graphically:

$$x^2 - 4x + 1 \geq 0$$

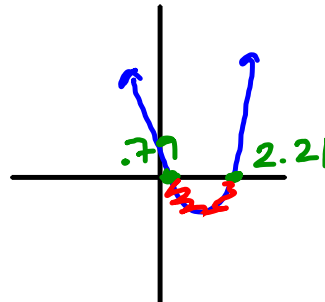
$$y = x^2 - 4x + 1 \quad y = 0$$

$$(-\infty, .27] \cup [3.73, \infty)$$



$$4x^2 - 12x + 7 < 0$$

$$(.79, 2.21)$$



$$x^3 + 2x^2 - 1 \geq 0$$

$$[-1.6, -1] \cup [.6, \infty)$$

