

P7 Solving Inequalities Algebraically & Graphically

Obj: 1. Solve inequalities using absolute values, quadratics, polynomials & fractions.

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

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

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Inequalities

$$|x-4| < 8$$

less than

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

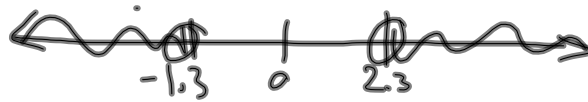
$$x < 12 \quad \text{and} \quad x > -4$$



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Solve & graph: $|2x-1| > 3.6$

$$\begin{aligned} 2x-1 < -3.6 & \quad 2x > 4.6 \\ +1 \quad +1 & \quad \frac{2x}{2} > \frac{4.6}{2} \\ \frac{2x}{2} < \frac{-2.6}{2} & \quad x > \frac{4.6}{2} \end{aligned}$$



$$\begin{aligned} 2x & > 4.6 \\ x & > 2.3 \end{aligned}$$

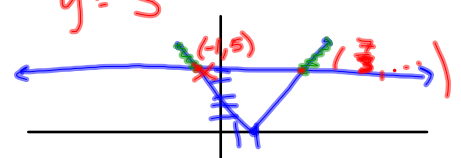
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Solve graphically:

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

$$y = |3x-2|$$

$$y = 5$$



$$x \leq -1 \quad \text{or} \quad x \geq \frac{7}{3}$$

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

Sep 6-9:33 AM

Quadratic Inequalities

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

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

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

$$x - 4 = 0 \quad x + 3 = 0$$

$$x = 4 \quad x = -3$$

$$(-5)^2 - (-5) - 12 > 0$$

$$25 + 5 - 12 > 0$$

$$18 > 0 \checkmark$$

$$0 - 0 - 12 > 0$$

$$-12 > 0 \times$$

$$5^2 - 5 - 12 > 0$$

$$25 - 5 - 12 > 0$$

$$8 > 0 \checkmark$$

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

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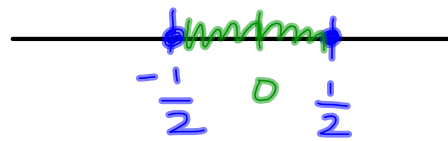
$$4x^2 - 1 \leq 0$$

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

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

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

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



$$0 - 1 \leq 0$$

$$-1 \leq 0 \checkmark$$

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$$2x^2 + 3x \leq 20$$

-20 -20

$$2x^2 + 3x - 20 = 0$$

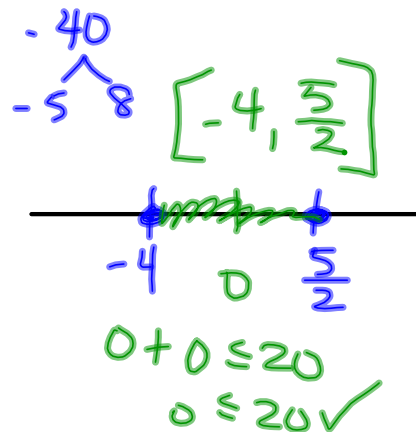
$$(2x^2 - 5x) + (8x - 20) = 0$$

$$(x)(2x-5) + 4(2x-5) = 0$$

$$(2x-5)(x+4) = 0$$

$$2x-5=0 \quad x+4=0$$

$$x = \frac{5}{2} \quad x = -4$$



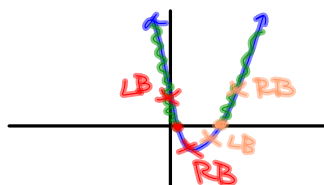
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Graphically

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

$$y = x^2 - 4x + 1$$

$$y = 0 \rightarrow x\text{-axis}$$



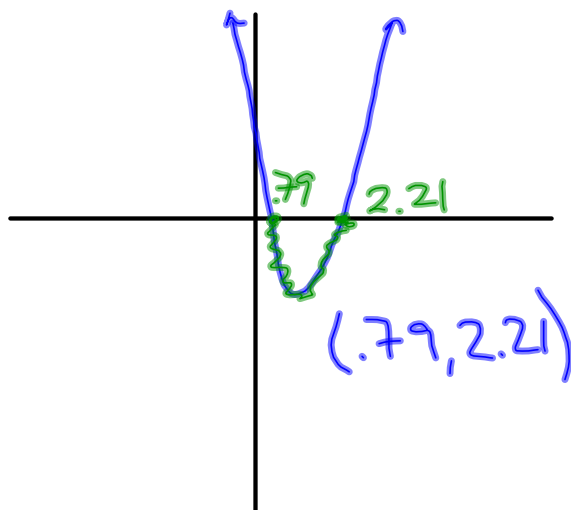
$$x \leq .27 \quad 3.73$$

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

Sep 6-10:02 AM

Graphically:

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



Sep 6-10:06 AM