

Algebra 2 Notes

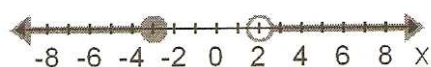
Name: Isy

Section 1.6 - Solving Absolute Value Equations and Inequalities

DAY ONE:

A compound statement is made up of more than one equation or inequality.

A disjunction is a compound statement that uses the word or.



$$x \leq -3 \text{ OR } x > 2$$

A Conjunction is a compound statement that uses the word and.



$$x \geq -3 \text{ AND } x < 2 \iff -3 \leq x < 2$$

Example 1: Solve each compound inequality. Then graph the solution set.

a. $x+3 \leq 2$ OR $3x > 9$

$$x \leq -1 \text{ OR } x > 3$$



b. $-2x < 8$ AND $x-3 \leq 2$

$$x > -4 \text{ AND } x \leq 5$$

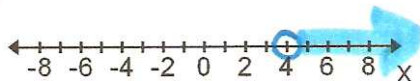
$$-4 < x \leq 5$$



c. $x+3 > 7$ OR $3x > 18$

$$x > 4 \text{ OR } x > 6$$

$$x > 4$$



d. $\frac{2x}{2} \geq \frac{-6}{2}$ AND $\frac{-x}{-1} > \frac{-4}{-1}$

$$x \geq -3 \text{ AND } x < 4$$

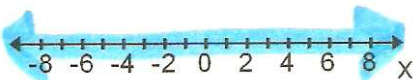
$$-3 \leq x < 4$$



e. $x+4 > -2$ OR $x+3 < 5$

$$x > -6 \text{ OR } x < 2$$

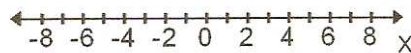
$$\mathbb{R}$$



f. $x+4 \leq -2$ OR $x+3 \geq 5$

$$x \leq -6 \text{ AND } x > 2$$

$$\emptyset$$



Example 2: Write a compound inequality for each graph.

a.



$$-5 < x \leq 4$$

b.



$$x < 0 \text{ OR } x \geq 3$$

DAY TWO:

Recall that the absolute value of a number x , written $|x|$, is the distance from x to 0 on the number line. Because absolute value represents distance without regard to direction, the absolute value of any number is non negative.

Absolute value equations and inequalities can be represented by compound statements.

<p>The solutions of $x =3$ are the two points that are 3 units from <u>0</u>. The solution is a <u>disjunction</u>:</p> <p>$x=3$ or $x=-3$</p>	
<p>The solutions of $x < 3$ are the points that are less than 3 units from <u>0</u>. The solution is a <u>conjunction</u>:</p> <p>$x < 3$ and $x > -3$</p>	
<p>The solutions of $x > 3$ are the points that are more than 3 units from <u>0</u>. The solution is a <u>disjunction</u>:</p> <p>$x > 3$ or $x < -3$</p>	

Example 1: Solve each equation.

<p>a. $x-7 =5$</p> <p>$x-7=5$ or $x-7=-5$</p> <p>$x=12$ or $x=2$</p>	<p>b. $3x+5 =14$</p> <p>$3x =9$</p> <p>$3x=9$ or $3x=-9$</p> <p>$x=3$ or $x=-3$</p>	<p>c. $-2 6x +8=2$</p> <p>$-2 6x =-6$</p> <p>$6x =3$</p> <p>$6x=3$ or $6x=-3$</p> <p>$x=\frac{1}{2}$ or $x=-\frac{1}{2}$</p>
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Example 2: Solve each inequality. Then graph the solution set.

<p>a. $2x+1 > 5$</p> <p>$2x+1 > 5$ or $2x+1 < -5$</p> <p>$2x > 4$ or $2x < -6$</p> <p>$x > 2$ or $x < -3$</p>	<p>b. $3x-9 < 12$</p> <p>$3x-9 \leq 24$</p> <p>$3x-9 \leq 24$ AND $3x-9 \geq -24$</p> <p>$3x \leq 33$ or $3x \geq -15$</p> <p>$x \leq 11$ or $x \geq -5$</p> <p>$-5 \leq x \leq 11$</p>
<p>c. $4x+16 > 8$</p> <p>$4x > -12$</p> <p>$4x > -12$ or $4x < 12$</p> <p>$x > -3$ or $x < 3$</p> <p>\mathbb{R}</p>	<p>d. $-4 x+3 \geq 8$</p> <p>$x+3 \leq -2$</p> <p>$x+3 \leq -2$ and $x+3 \geq 2$</p> <p>$x \leq -5$ or $x \geq -1$</p> <p>\emptyset</p>