

Algebra 1

5.4

Solve compound inequalities (and/or)  
Graph solution sets of compound  
inequalities

inequality

greater than

less than

Venn diagram

intersection *and*

union *or*

compound inequality

*T for both*

*at least*  
*1 T*



- To ride certain roller coasters, you must be at least 52 inches tall, and your height cannot exceed 72 inches. If  $h$  represents the height of a rider, we can write two inequalities to represent this.

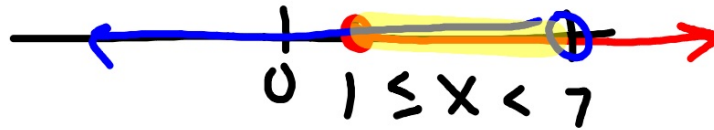
You need to know the code...

### Example 1 Solve and Graph an Intersection

Solve  $-2 \leq x - 3 < 4$ . Then graph the solution set.

Write 2 separate inequalities...

$$\begin{array}{r} -2 \leq x - 3 \quad \text{and} \quad x - 3 < 4 \\ +3 \quad \quad +3 \quad \quad \quad +3 \quad +3 \\ \hline 1 \leq x \quad \quad \quad x < 7 \end{array}$$



**2 Inequalities Containing *or*** Another type of compound inequality contains the word *or*. A compound inequality containing *or* is true if at least one of the inequalities is true. Its graph is the **union** of the graphs of two inequalities.

Whiteboards

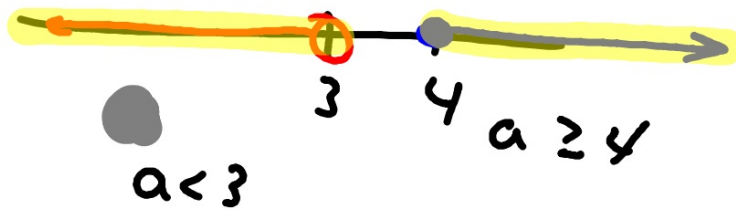
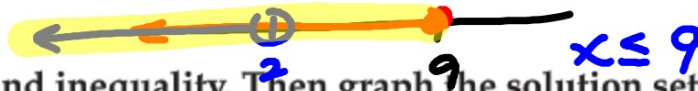
Solve each compound inequality. Then graph the solution set.

3A.  $a + 1 < 4$  or  $a - 1 \geq 3$

$$\begin{array}{r} -1 \quad -1 \quad +1 \quad +1 \\ \hline a < 3 \end{array} \quad a \geq 4$$

3B.  $x \leq 9$  or  $2 + 4x < 10$

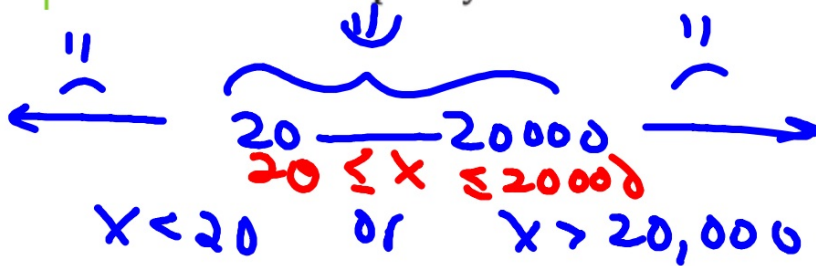
$$\begin{array}{r} -2 \quad -2 \\ \hline 4x < 8 \\ \hline x < 2 \end{array} \quad x < 2$$



**Real-World Example 2** Write and Graph a Compound Inequality



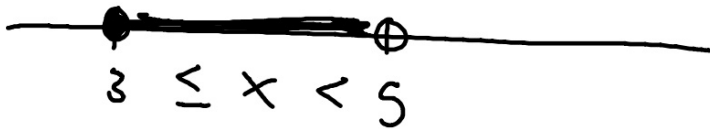
**SOUND** The human ear can only detect sounds between the frequencies 20 Hertz and 20,000 Hertz. Write and graph a compound inequality that describes the frequency of sounds humans cannot hear.



Whiteboard practice

$$5 < x-3 < 12 \quad 5 < x-3 \text{ and } x-3 < 12$$

$$x+5 > 7 \text{ or } x-3 < -6$$



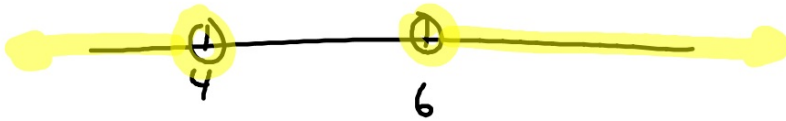
$$x \geq 3 \text{ and } x < 5$$



Trick !!

$$x > 6 \text{ and } x < 4$$

$$2x + 6 < -3x + 5$$



NS