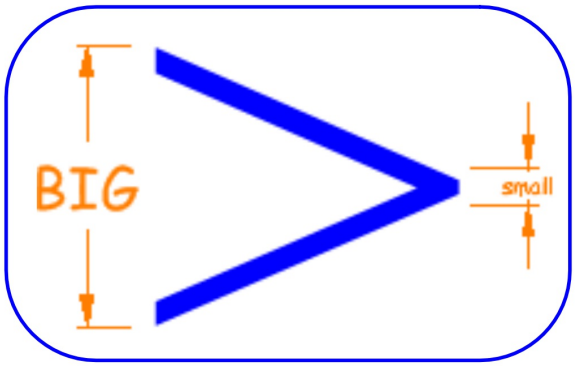
9.3 Solving Linear Inequalities

Objective:

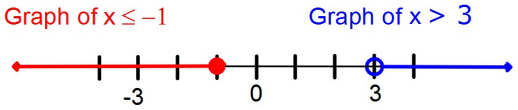
- To solve simple inequalities
- To solve compound inequalities

Inequalities Symbols:

<	>	≤	≥
less than	greater than	less than or equal to	greater than or equal to



The **graph** of an inequality consists of all points on a real number line that correspond to solutions of the inequality



When graphing inequalities on a number line, we use an open dot for > or < and a closed dot for ≤ or ≥

Solve an inequality the same as an equation except:
If you multiply or divide by a negative number, switch the direction of the inequality sign.

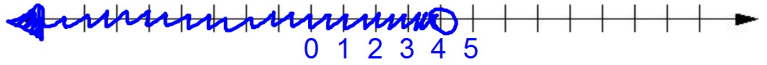
Example 1: Graphing Inequalities on a number line.

a. $5y - 8 < 12$

$+8 \quad +8$

$5y < 20 \quad y < 4$

$\div 5 \quad \div 5$



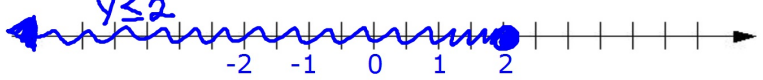
b. $9 - 11y \geq -13$

$-9 \quad -9$

$-11y \geq -22$

$\div -11 \quad \div -11$

$y \leq 2$



c. $2x + 1 \leq 6x - 1$

$-2x \quad -2x$

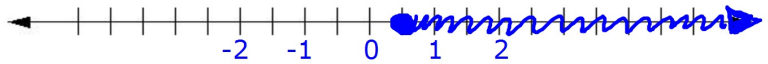
$1 \leq 4x - 1$

$+1 \quad +1$

$2 \leq 4x$

$\frac{2}{4} \leq x$

$\frac{1}{2} \leq x$



Example 2: **Checking Solutions.**

Decide whether the given number is a solution of the inequality.

$2x + 1 \leq 6x - 1$; $x = 3$

$2(3)+1 \leq 6(3)-1$

$7 \leq 17$

yes!

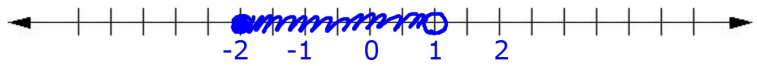
Homework: 1.6 Practice A (1,4,5,6,7-11,13-21,28-33)
The rest will be assigned tomorrow!

A **compound inequality** is two simple inequalities joined by "and" or "or".

Example 3: **Graphing AND Compound Inequalities.**

a) $-2 \leq x < 1$

(This is read as "x is in between -2 and 1)



b) $-2 \leq 3t - 8 \leq 10$

$+8 \quad +8 \quad +8$

$6 \leq 3t \leq 18$

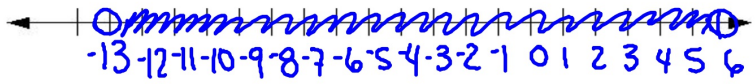
$\div 3 \quad \div 3 \quad \div 3$

$2 \leq t \leq 6$

c) $-9 < t + 4 < 10$

$-4 \quad -4 \quad -4$

$-13 < t < 6$



Example 4: **Graphing OR Compound Inequalities.**

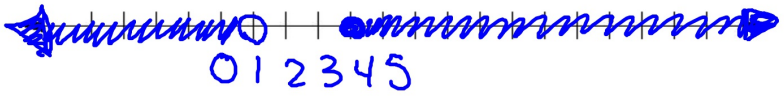
a) $2x + 3 < 5$ or $4x - 7 \geq 9$

$-3 \quad -3 \qquad +7 \quad +7$

$2x < 2 \qquad 4x \geq 16$

$\div 2 \quad \div 2 \qquad \div 4 \quad \div 4$

$x < 1$ OR $x \geq 4$



b) $6x + 9 < 3$ or $3x - 8 > 13$

$-9 \quad -9 \qquad +8 \quad +8$

$6x < -6 \qquad 3x > 21$

$\div 6 \quad \div 6 \qquad \div 3 \quad \div 3$

$x < -1$ OR $x > 7$