Name_____

Algebra 2
Lesson 1-4
Solving Inequalities

An **inequality** is a statement where one side will be bigger or smaller than the other side. The less than (<), greater than (>), less than or equal to (≤), and greater than or equal to (≥) signs are used for these equations. See examples:

$$3n + 2 < 6 \qquad\qquad 2y \geq 0 \qquad\qquad 5x + 3 < 2x + 1$$

Inequalities are solved the same way as linear equations (lesson 1-3), with the following conditions:
1. If you divide both sides of the inequality by a negative, reverse the direction of the arrow (change < to > or > to <).
2. Keep the variable **to the left**
3. Write the final answer with a positive variable

Note: sometimes you will solve the inequality and find that there are no solutions or that all real numbers *a.k.a. identity solution* are solutions. These will be apparent as the variable will disappear and you will be either left with a true statement like 5< 8 (solution is all real numbers) or 0>-6 (no solution).

And and **or**
To solve a pair of inequalities containing **and**, find all values of the variable that make both inequalities true.
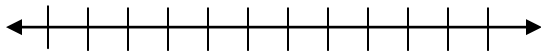To solve a pair of inequalities containing **or**, find all values of the variable that make *at least one* of the inequalities true.

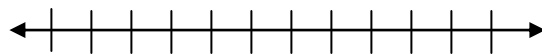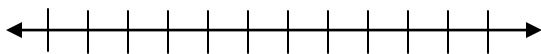**Examples:** Solve and show answer on number line:

1. $5n + 3 < -2$

4. True or false?
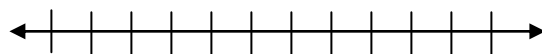$-1 < x \; and \; x \leq -3$ may also be written as
$1 < x \leq -3$

2. $18 + 5x \geq 2x - 3$

5. $3x - 1 > -28 \; and \; 2x + 7 < 19$

3. $4x + 5 < 4(x + 2)$

6. 4y-2≥14 or 3y-4≤-13

Solve.

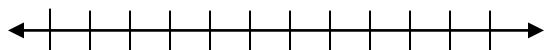1. $3x+2(5x-6)=0.5(8x-10)$

2. $3x+8<-10$

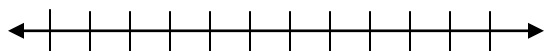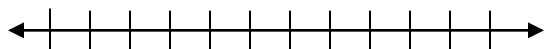3. $18+3x≥4(x-6)$
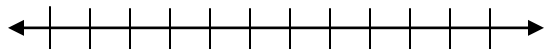
4. $3(x-5)+4<4(2x+3)=1$

5. $6x≥-24$ and $9x<54$

6. $8x>32$ or $-6x-8≤40$

7. One monthly cell phone plan charges $40 plus $0.08 per minute after the first 300 minutes. Another monthly cell phone plan charges $55 plus $0.12 per minute after the first 450 minutes. Both plans would cost the same after _____ minutes.

8. The sum of any triangle's interior angles is 180°. One angle is twice the middle angle x, and the third angle is 20° less than the middle angle. Find the measure of each angel.

9. Rosa earns $8.50 an hour as a cashier. She wants to earn <u>more than</u> $550. How man regular hours must she work to reach her goal?

10. Finish the sentence. The Main difference between an identity solution and no solution of a linear equation is _____.