Section 2.7: SOLVING LINEAR INEQUALITIES

When you are done with your homework you should be able to…

- Graph the solutions of an inequality on a number line
- Use interval notation
- Understand properties used to solve linear inequalities
- Solve linear inequalities
- Identify inequalities with no solution of infinitely many solutions
- Solve problems using linear inequalities

WARM-UP:

Solve:

Find the volume of a sphere with diameter 11 meters.

VOCABULARY

Linear inequality in one variable: An inequality in the form _____, _____, _____, or _____ is a linear inequality in one variable. _____ means _____ _____, _____ means _____ _____ or _____ _____, _____ means _____ _____, and _____ means _____ _____ or _____ _____.

Solving an inequality: The _____ of finding the _____ of _____ that will make the inequality a _____ statement. These numbers are called the **solutions** of the _____, and we say they **satisfy** the _____. The _____ of _____ solutions is called the **solution set** of the inequality.

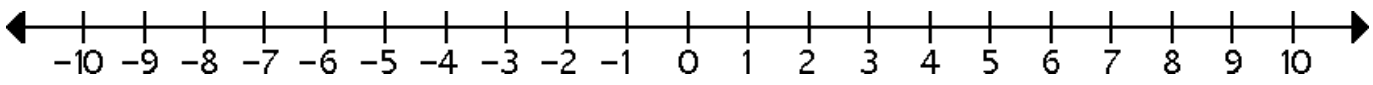
GRAPHS OF INEQUALITIES

There are _____ _____ solutions to the inequality $x > 5$. In other words, the solution set for this inequality is all _____ numbers which are _____ _____ _____. Can we list all these numbers? What does the graph of the solution set look like? Hmmmm…

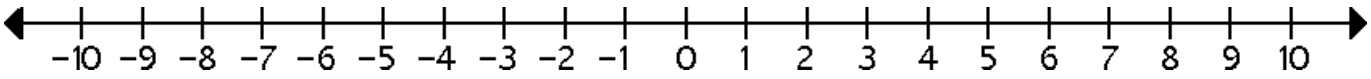
Graphs of _____ to _____ _____ are shown on a _____ _____ by shading _____ _____ representing numbers that are _____. _____ _____, _____, indicate _____ that are _____ and _____, _____, indicate _____ that are _____ _____.

Example 1: Graph the solutions of each inequality.

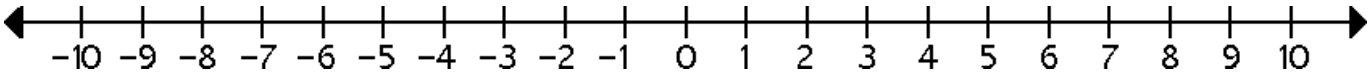
a. $x \leq 6$



b. $x > -\frac{3}{2}$



c. $-\frac{3}{2} < x \leq 6$



SOLUTION SETS OF INEQUALITIES

INEQUALITY	INTERVAL NOTATION	SET-BUILDER NOTATION	GRAPH
$x > a$			
$x \geq a$			
$x < b$			
$x \leq b$			
$a < x < b$			
$a \leq x \leq b$			
$a < x \leq b$			
$a \leq x < b$			

PARENTHESIS ARE ALWAYS USED WITH _____ OR _____!!!

PROPERTIES OF INEQUALITIES

PROPERTY	THE PROPERTY IN WORDS	EXAMPLE
THE ADDITION PROPERTY OF INEQUALITY If _____, then _____. If _____, then _____.		
THE POSITIVE MULTIPLICATION PROPERTY OF INEQUALITY If _____ and ___ is positive, then _____. If _____ and ___ is positive, then _____.		

THE NEGATIVE PROPERTY OF INEQUALITY If _____ and ___ is negative, then _____. If _____ and ___ is negative, then _____.		

STEPS FOR SOLVING A LINEAR INEQUALITY

1. Simplify the _____ _____ on each side.
2. Use the _____ property of _____ to collect all the _____ terms on one side and all the _____ terms on the other side.
3. Use the _____ property of _____ to _____ the _____ and _____. _____ the _____ of the _____ when _____ or _____ both sides by a

_____ number.

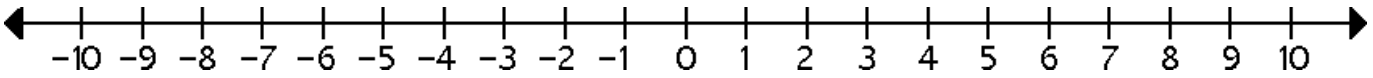
4. Express the _____ set in _____ or _____-

_____ notation, and _____ the solution set on a

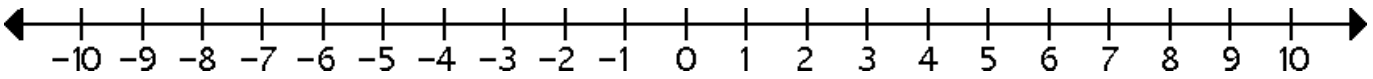
_____ line.

Example 2: Solve each inequality and graph the solution.

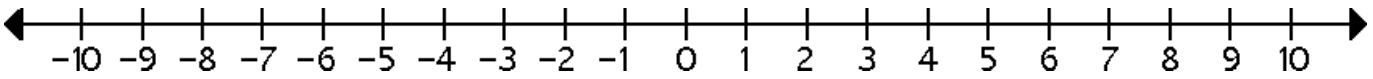
a. $x-3\le 2$



b. $5x+8>2x-7$



c. $4(x+1)\ge 3x+6$



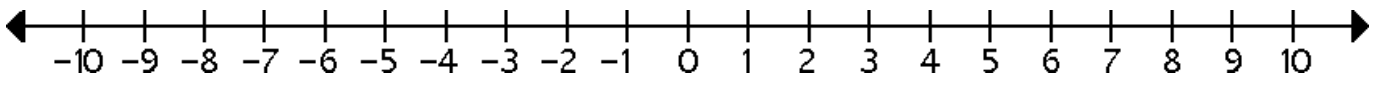
RECOGNIZING INEQUALITIES WITH NO SOLUTION OR INFINITELY MANY SOLUTIONS

If you attempt to solve an inequality with _____ _____ or one that is _____ for _____ _____ number, you will _____ the _____.

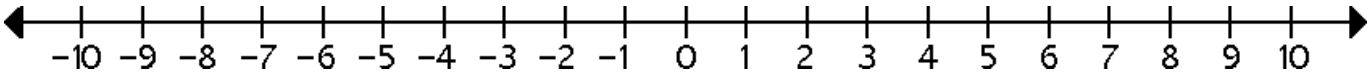
- An inequality with _____ _____ results in a _____ statement, such as _____. The solution set is _____ or _____, the _____ set, and the _____ is an _____ number line.
- An inequality that is _____ for _____ _____ number results in a _____ statement, such as _____. The solution set is _____ or _____, and the graph is a _____ _____ _____line.

Example 3: Solve each inequality and graph the solution.

a. $2(x+1)-1 \le 2x+1$



b. $5x > 2(x-7)+3x$



APPLICATION

1. On three examinations, you have grades of 88, 78, and 86. There is still a final examination, which counts as one grade.
   a. In order to get an A, your average must be at least 90. If you get 100 on the final, compute your average and determine if an A in the course is possible.

   b. To earn a B in the course, you must have a final average of at least 80. What must you get on the final to earn a B in the course?