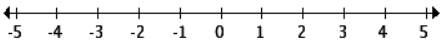
Unit 3 Linear Equations **Name: _____**
Day 9 Absolute Value Inequalities **Date: _____ Hour: _____**
(PH 3-6)

REVIEW:

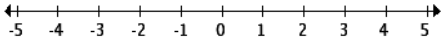
Symbol	Meaning	Closed or Open Circle
<	Less Than	Open ○
>	Greater Than	Open ○
≤	Less Than or Equal to	Closed ●
≥	Greater Than or Equal to	Closed ●

Example 1: Graph each inequality.

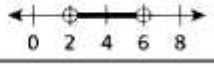
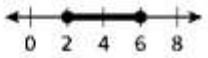
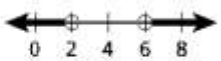
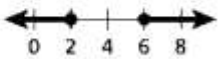
$x < 4$



$x \geq -3$

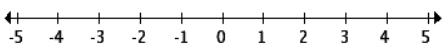


Compound Inequalities

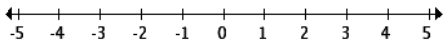
WORDS	ALGEBRA	GRAPH
All real numbers greater than 2 AND less than 6	$x > 2$ AND $x < 6$ $2 < x < 6$	
All real numbers greater than or equal to 2 AND less than or equal to 6	$x \geq 2$ AND $x \leq 6$ $2 \leq x \leq 6$	
All real numbers less than 2 OR greater than 6	$x < 2$ OR $x > 6$	
All real numbers less than or equal to 2 OR greater than or equal to 6	$x \leq 2$ OR $x \geq 6$	

Example 2: ***AND*** - Solutions will make BOTH inequalities true. All numbers shaded are solutions.

$x > -3$ ***and*** $x \leq 0$

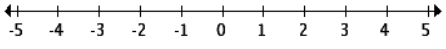


$x > 3$ ***and*** $x > 1$

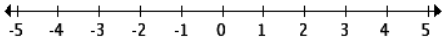


Example 3: ***OR*** - Solutions will make EITHER inequality true. All numbers shaded are solutions.

$x \leq -2$ ***or*** $x > 1$



$x \leq -1$ ***or*** $x > 0$



Steps to Solve Absolute-Value Inequalities

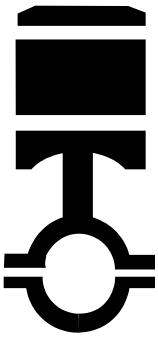
1. Get **ABS** alone
2. Choose symbols $\geq, >$ **OR** $\leq, <$ **AND**
3. Write 2 cases:
   - Case 1: Original without ABS symbols
   - Case 2: **K**eep, **F**lip symbol, **C**hange sign
4. Solve each case

Memory Aid: $\leq$ **< less thAND** $\geq$ **> greatOR**

Example 4: Solve each absolute value inequality. Graph the solutions.

a. $|y - 5| \leq 2$

b. $|4x + 1| > 13$



To maintain quality, a manufacturer sets limits for how much an item can vary from its specifications. You can use an absolute value equation to model a quality-control situation.

Example 5: The ideal diameter of a piston for one type of car engine is 90 mm. The actual diameter can vary from the ideal by at most 2 mm. Find the range of acceptable diameters for the piston.

Actual: Ideal: Tolerance:

Tolerance Equation:

$$|\, Actual - Ideal \,| \leq Tolerance$$

Range of acceptable values:

Homework: page 169-171 #23 – 35 odd, 56, and 58, 59, and 84