

# **Chapter 5: Solving and Graphing Linear Inequalities**

# 5.1 Solving Inequalities Using Addition and Subtraction

- Inequality: replaces = with  $<$ ,  $\leq$ ,  $>$ ,  $\geq$
- Graph: uses number line to show possible solutions for  $x$
- Open Circle:  $<$  or  $>$
- Closed Circle:  $\leq$  or  $\geq$

- To Solve: Do all + or – first

- Example:  $9 > x + 7$

- $$\frac{-7 \quad -7}{\quad \quad \quad}$$

- $$2 > x$$

- Rewrite:  $x < 2$

## 5.2 Solve Inequalities Using Multiplication and Division

- Note: WARNING... WARNING....
- When you **MULTIPLY** or **DIVIDE** by a **negative**
- **Reverse** the inequality sign
  
- Example:  $\frac{-2x}{-2} < \frac{10}{-2}$
- $x > -5$

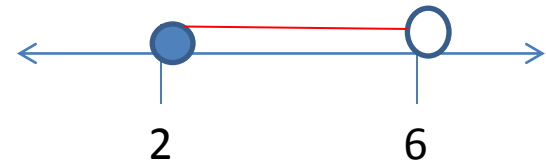
# 5.3 Solve Multi-Step Inequalities

- To **Solve** Regular Inequalities:
  - 1. Parenthesis
  - 2. Combine like terms on same side
  - 3. Use + or – to combine on different sides
  - 4. Use  $\times$  or  $\div$  (watch -)
  
- When you lose your variable: decide if true or false
  - True: All real numbers    Ex:  $3 < 7$
  - False: No Solution        Ex:  $10 < 5$

# 5.4 Solve Compound Inequalities

- **Compound Inequalities:** two separate inequalities joined by *AND* or *OR*.

- 1. And:  $2 \leq x < 6$



- 2. Or:  $x \leq 2$  or  $x > 6$



## 5.5 Absolute Value (=)

- Absolute Value is distance sooo... Always Positive
- To Solve: 2 answers for  $x$
  
- Solve  $|2x + 1| = 5$
- $2x + 1 = 5$  and  $2x + 1 = -5$
  
- But if:  $3|2x - 4| + 5 = 11$  **Simplify first**
- $3|2x - 4| = 6$
- $|2x - 4| = 2$  **Then Solve**

## 5.6 Absolute Value ( $<$ , $\leq$ , $>$ , $\geq$ )

- $>$ ,  $\geq$  **OR**
- Ex.  $|2x - 5| > 7$  To Solve....
- $2x - 5 > 7$  OR  $2x - 5 < -7$
  
- $<$ ,  $\leq$  **AND**
- Ex.  $|2x - 5| < 7$  To Solve....
- $-7 < 2x - 5 < 7$



# 5.7 Graphing

- **Form 1:**  $y < 2x + 5$  **Slope Form**
- Graph:  $m = 2$   $b = 5$   
start with 5 on y axis, use slope 2
- Shade:  $>$  above line  $<$  below line
  
- **Form 2:**  $2x + 3y < 6$  **Standard (Intercept) Form**
- Graph:  $x = 3$   $y = 2$  on axis'
- Shade: test a point (0,0) Yes-shade point
- No-other side

- To test a point to see if it's a solution.....
- Plug in.
- Works (true) yes
- Doesn't (false) no