



**James Madison**  
HIGH SCHOOL

# Solving Inequalities



# Solving Inequalities

- Solving inequalities follows the same procedures as solving equations.
- There are a few **special** things to consider with inequalities:
  - We need to look carefully at the inequality sign.
  - We also need to graph the solution set.

# Review of Inequality Signs





$>$  greater than

$<$  less than

$\geq$  greater than or equal

$\leq$  less than or equal

# How to graph the solutions

- > Graph any number *greater than* . . .  
open circle, line to the right 
- < Graph any number *less than* . . .  
open circle, line to the left 
- ≥ Graph any number *greater than or equal to* . . .  
closed circle, line to the right 
- ≤ Graph any number *less than or equal to* . . .  
closed circle, line to the left 

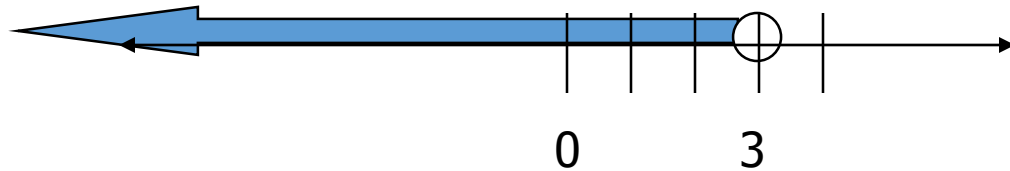
# Solve the inequality:

$$x + 4 < 7$$

$$\underline{-4} \quad \underline{-4}$$

$$x < 3$$

- Subtract 4 from each side.
- Keep the same inequality sign.
- Graph the solution.
  - Open circle, line to the left.





# There is one special case.

- Sometimes you may have to *reverse* the direction of the inequality sign!!
- That only happens when you *multiply or divide* both sides of the inequality by a **negative** number.

## Example:

Solve:  $-3y + 5 > 23$

$$\begin{array}{r} -5 \\ \underline{-5} \end{array} \quad \begin{array}{r} -5 \\ \underline{-5} \end{array} \quad \bullet \text{ Subtract 5 from each side.}$$

$$\underline{-3y} > \underline{18}$$

$$\begin{array}{r} -3 \\ -3 \end{array} \quad \begin{array}{r} -3 \\ -3 \end{array} \quad \bullet \text{ Divide each side by } \text{negative } 3.$$

$$y < -6 \quad \bullet \text{ Reverse the inequality sign.}$$

• Graph the solution.

• Open circle, line to the left.

