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□ Still under “Foundations”  
section of your binder

□ Need your textbook!

Work on Whoops Wednesday

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**Fill in the blank with either < or >.**

1)  $10 < 12$

2)  $-4 > -6$

3)  $\frac{1}{4} < \frac{1}{3}$

4)  $2^3 < 3^2$   
8                      9

5) Write 4 numbers that satisfy the inequality

$x < 3.$

-1, 2, 1, -18

~~3?~~

# Today's Objectives

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- Understand the similarities and differences between solving **equations** and **inequalities**
- Graph the solution set of an inequality

# SUPER, SUPER IMPORTANT

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- It is crucial to know the difference between an equation and an inequality. Saying “one has an equal sign, one has  $<$  or  $>$ ” is not enough.
- Solution to  $x = 8$ ?
- Solution to  $x > -4$ ?

# Differences between equations and inequalities

## □ Discuss with your group:

□ How many solutions do equations have?

One solution, no solution, infinite solutions, two solutions, three solutions,

□ How many solutions do inequalities have?

infinite number of solutions  $x < 3$

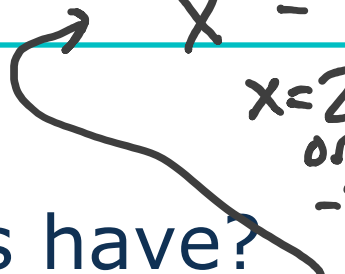
□ **Inequality symbols:**  $<$ ,  $>$ ,  $\leq$ ,  $\geq$ ,  $\neq$

less than      greater than      less than or equal to      greater than or equal to

not equal to

$$x^2 = 4$$

$x = 2$   
or  
 $-2$



Find 3 solutions for each inequality:

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1.  $x + 3 < 12$       2, 7, 7.5

2.  $x - 10 \geq 34$       50, 60, 70

3.  $\frac{x}{5} \leq 4$       20, 15, 10

4.  $-3x > 12$       -5, -6, -7  
~~4~~

# Describe the solutions in words:

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1)  $x + 3 < 12$

**“Numbers that are less than 9”**

2)  $x - 10 \geq 34$

**“Numbers that are greater than or equal to 44”**

3)  $\frac{x}{5} \leq 4$

**“Numbers that are less than or equal to 20”**

4)  $-3x > 12$

**“Numbers that are less than -4”**

# Worksheet





# Solving Inequalities

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## Keep the sign the same when:

- Adding or subtracting anything on both sides
- Multiplying or dividing both sides by a positive number

## Reverse the sign when:

- Multiplying or dividing both sides by a negative number

# Remember: Graphing Inequalities

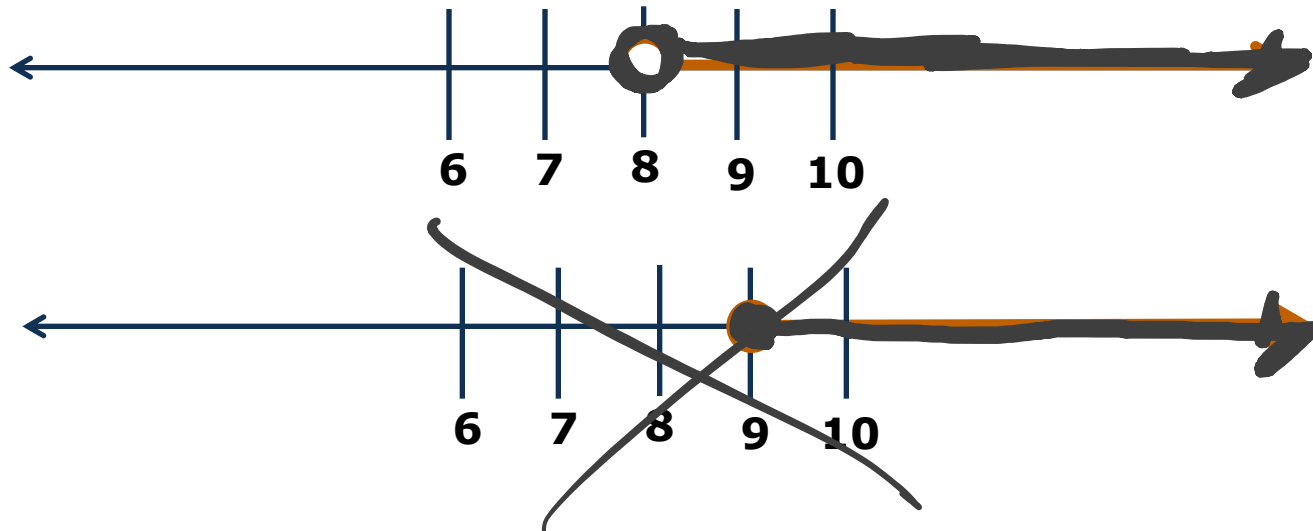
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- Graphing Inequalities
- **Closed dot:**  $\geq$  **or**  $\leq$  (means that value is a solution)
- **Open dot:**  $>$  **or**  $<$  (means that value is not a solution)

# Graphing Inequalities

- If I have " $x > 8$ ", could I just graph that by putting a **closed** circle at 9?

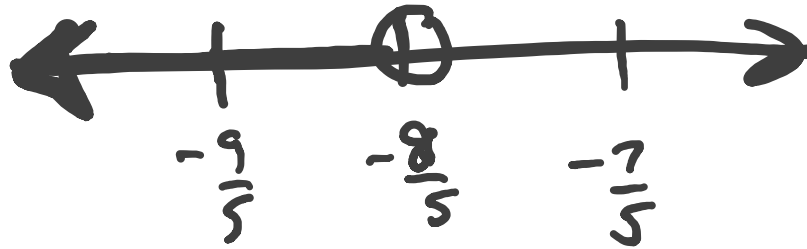
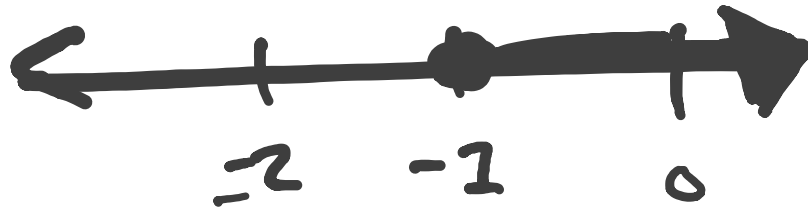
NO → could be 8.1, 8.2, ...



# Graphing

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- Need 3 numbers on a number line



# Solve and graph the solution set.

1.  $5x - 4 \leq 91$        $5x \leq 95$   
 $x \leq 19$

2.  $20 - \frac{3}{2}x > 32$        $-\frac{2}{3} \cdot -\frac{3}{2}x > \frac{4}{2} \cdot -\frac{2}{3}$   
 $x < -8$

3.  $18 - 3(2x - 4) < 6$        $-6x < -24$   
 $18 - 6x + 12 < 6$        $x > 4$   
 $-6x + 30 < 6$

4.  $14 - (-10) \geq 6x - 4 + x$        $x \leq 4$   
 $24 \geq 7x - 4$   
 $28 \geq 7x$   
 $4 \geq x$

Solve the inequality. Graph the solution set.

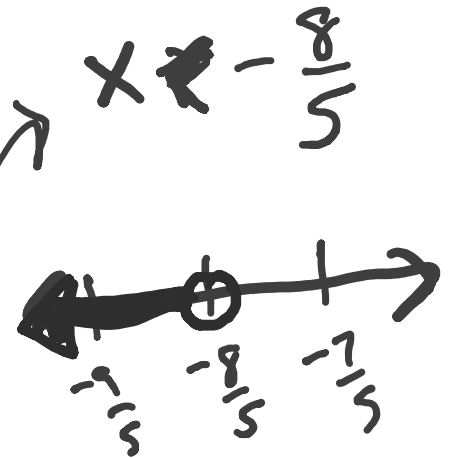
~~$4x + 25 - 8x < 20 - x - 7$~~

$10 - \frac{1}{2}(2x + 8) > 4x + 14$

$10 - x - 4 > 4x + 14$

$6 - x > 4x + 14$

$-5x > 8$



Solve the inequality. Graph the solution set.

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$$2x - 7 \leq 5 + 2x$$

**Solve the inequality. Graph the solution set.**

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$$2(3y - 2) - 4 \geq 3(2y + 7)$$



# Homework

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- pg. 78 (7-10, 13-18)
- You need to graph and solve the inequalities!!!
- You will get fractions as answers some of the time!
- Do your work on a separate sheet of paper if need be.