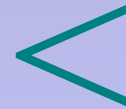




Solving Inequalities



Lesson 4-5



An *inequality* is like an equation, but instead of an equal sign (=) it has one of these signs:

$<$: less than

$\leq$: less than or equal to

$>$: greater than

$\geq$: greater than or equal to

What do Inequalities mean?

- A mathematical sentence that uses one of the inequality symbols to state the relationship between two quantities.

Graphing Inequalities

- When we graph an inequality on a number line we use open and closed circles to represent the number.

$<$ $>$ Plot an open circle ○

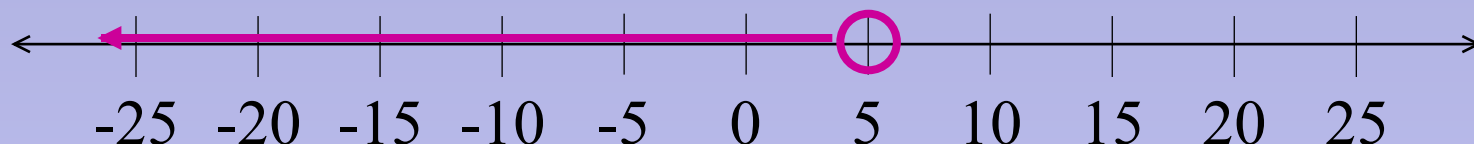
$\leq$ $\geq$ Plot a closed circle ●

$$x < 5$$

means that whatever value x has, it must be less than 5.

Try to name ten numbers that are less than 5!

Numbers less than 5 are to the **left** of 5 on the number line.



- If you said 4, 3, 2, 1, 0, -1, -2, -3, etc., you are right.
- There are also numbers in between the integers, like 2.5, $\frac{1}{2}$, -7.9, etc.
- The number 5 would *not* be a correct answer, though, because 5 is not less than 5.

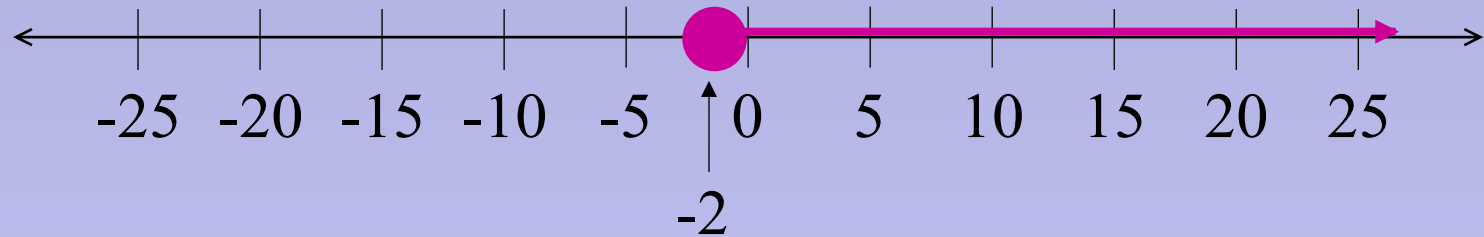
$$x \geq -2$$

means that whatever value x has, it must be greater than or equal to -2 .

Try to name ten numbers that are greater than or equal to

-2

Numbers greater than -2 are to the
right of -2 on the number line.



- If you said -1, 0, 1, 2, 3, 4, 5, etc., you are right.
- There are also numbers in between the integers, like $-1/2$, 0.2, 3.1, 5.5, etc.
- The number -2 *would also* be a correct answer, because of the phrase, “or equal to”.

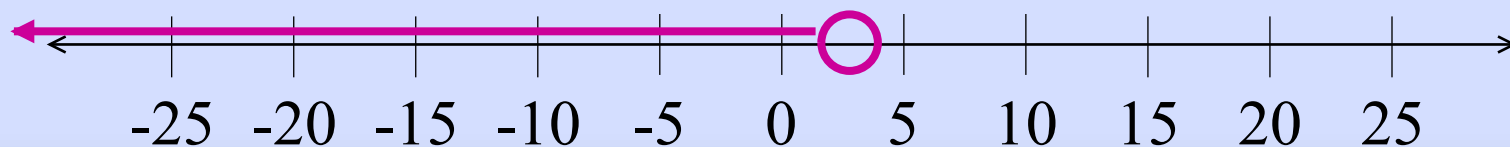
Solving an Inequality

- Follow the same rules and steps that we used to solve an equation.
- Always undo addition or subtraction first, then multiplication.
- Remember whatever is done to one side of the inequality must be done to the other side. The goal is to get the variable by itself.

Solve an Inequality

$$\begin{array}{r} w + 5 < 8 \\ -5 \quad -5 \\ \hline w < 3 \end{array}$$

All numbers less than 3 are solutions to this problem!



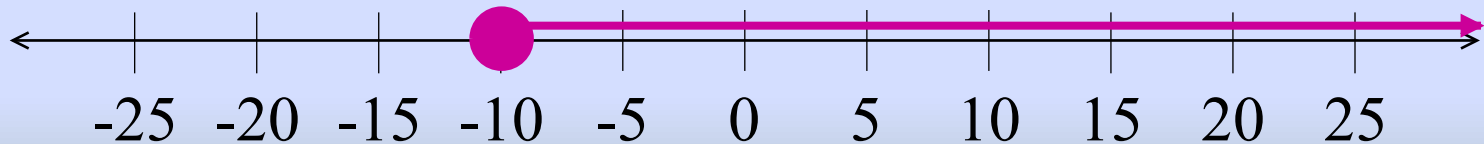
More Examples

$$8 + r \geq -2$$

-8 $\underline{-8}$

All numbers greater than -10
(including -10)

$$r \geq -10$$



More Examples

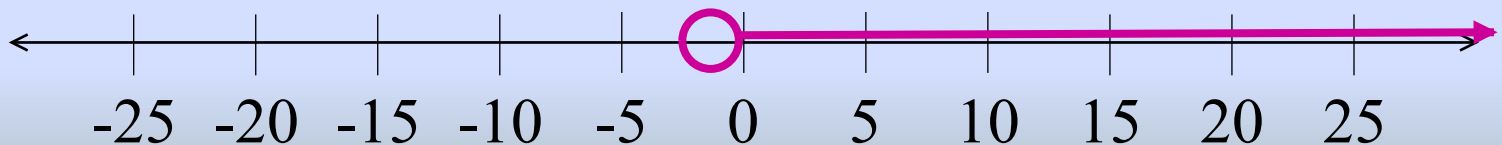
$$2x > -2$$

$$2$$

$$2$$

$$x > -1$$

All numbers
greater than -1
make this problem
true!



More Examples

$$2h + 8 \leq 24$$

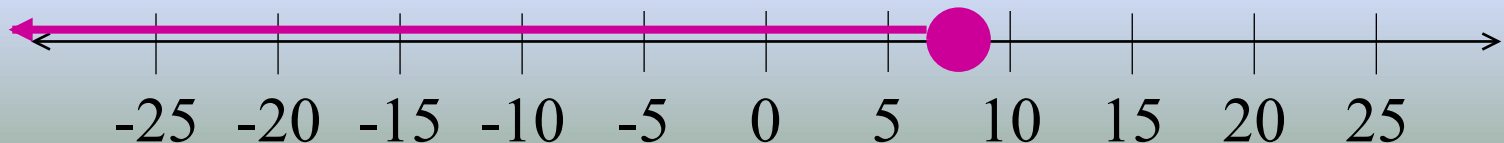
$$\begin{array}{r} -8 \quad -8 \\ \hline \end{array}$$

$$\begin{array}{r} 2h \leq 16 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \quad 2 \\ \hline \end{array}$$

$$h \leq 8$$

All numbers less
than 8 (including 8)



Your Turn....

- Solve the inequality and graph the answer.

1. $x + 3 > -4$

1. $x > -7$

2. $6d \geq 24$

2. $d \geq 4$

3. $2x - 8 < 14$

3. $x < 11$

4. $2c - 4 \leq 2$

4. $c \leq 3$

One Difference

- There is one difference between solving an equation and in inequality.
- If you multiply or divide **BY** a negative number you must reverse the inequality.
- We will look closer at this as a class.