Concept: Solving Inequalities

Name:

COMPUTER COMPONENT

Instructions: In UMATH X follow the **Content Menu** path:

Equations > **Solving Inequalities**

Work through all Sub Lessons of the following Lessons **in order**:

- *Comparing Integers*
- *Inequalities*
- *Inequalities on the Number Line*
- *Solving Inequalities*
- *Solving Compound Inequalities*

Additional Required Materials: Pencil Crayons

NOTE*:* You will not be finishing the entire section before stopping to complete some **OFF COMPUTER EXERCISES**.

As you work through the computer exercises, you will be prompted to make notes in your notebook/math journal.

When you reach the end of the lesson *Solving Compound Inequalities* on the computer, move on to the **OFF COMPUTER EXERCISES** below**.**

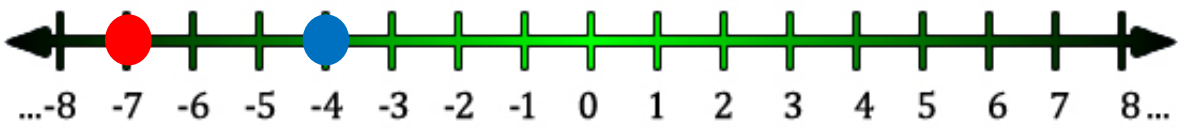
NOTES:

Remember:

- Negative numbers are ***less*** than zero and less than ***positive*** numbers.
- **0** is less than ***positive*** numbers but greater than ***negative*** numbers.
- Positive numbers are greater than ***negative*** numbers and ***greater*** than zero.

Practice:

1. Mark where –7 and -4 are on the number line.



Fill in the inequality.

$$-7 \boxed{<} -4$$

2. A graph of the inequality is given below.

Fill in the inequality: $x \boxed{>} -1$

3. Fill in the blanks.

Inequalities are mathematical ***statements*** involving the symbols

> **(** ***greater than***), < (***less than***),

≥(**greater than or equal to**), and

≤(***less than or equal to***),

4. The solution to an ***inequality*** is a value that makes the inequality ***true.***

5. When solving an inequality you can:

   - Add the ***same*** quantity to ***both*** sides
   - Subtract the ***same*** quantity from ***both*** sides
   - Multiply or divide ***both*** sides by the same ***positive*** quantity
   - If you multiply or divide ***both*** sides by a ***negative*** quantity, the inequality ***sign*** must be ***reversed.***

Remember: When one ***multiplies*** or ***divides*** by a ***negative***

number, the inequality sign is ***reversed.***

Example:

$6 > 3$ (True)

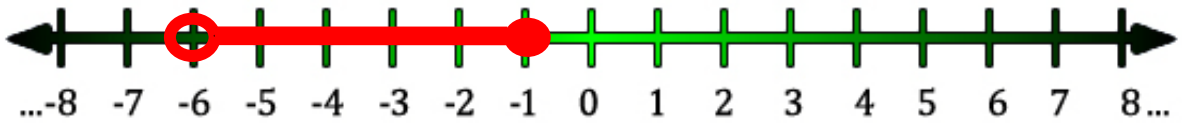
Multiply both sides by -3: $6 \times \mathbf{(-3)} > 3 \times \mathbf{(-3)}$ (**False**)

… but by reversing the sign: $6 \times \mathbf{(-3)} < 3 \times \mathbf{(-3)}$ (**True**)

Compound Inequalities are ***two*** inequalities joined by the terms ***'and' or 'or'.***

- A compound inequality contains the terms "***and***" or "***or***".
- A compound inequality with "***and***" is true only if ***both parts*** of it are true.

  Example: Graph $x > -6$ and $x \leq 1$ (*Hint: remember the open and closed dots*)

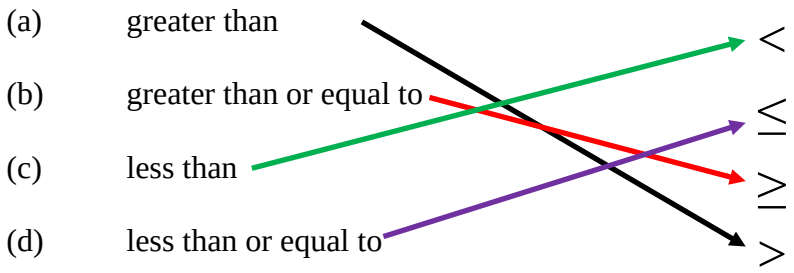


- A compound inequality with "***or***" is true if ***one or both*** of its inequalities are true.

  Example: Graph $x > 1$ or $x \leq -5$ (*Hint: remember the open and closed dots*)

OFF COMPUTER EXERCISES

1. Match the signs

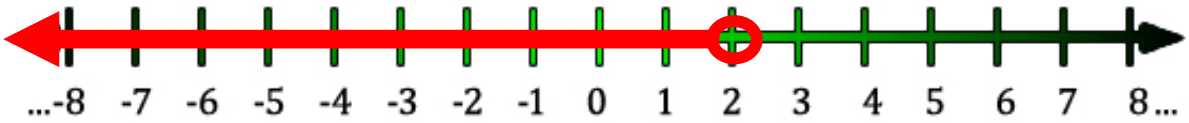


2. Determine what values of x make each inequality true. *Graph each answer.*

(a) $x + 3 < 5$

$x + 3 - 3 < 5 - 3$

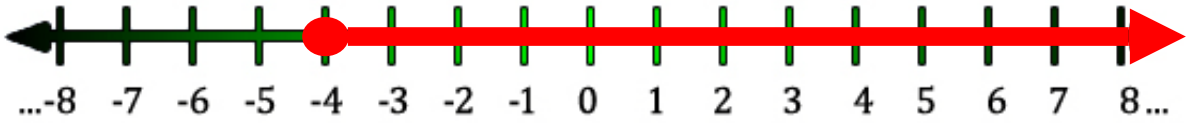
$x < 2$



(b) $\frac{x}{4} \geq -1$

$(4)\frac{x}{4} \geq -1(4)$

$x \geq -4$



(c) $4x - 1 > 5x + 4$

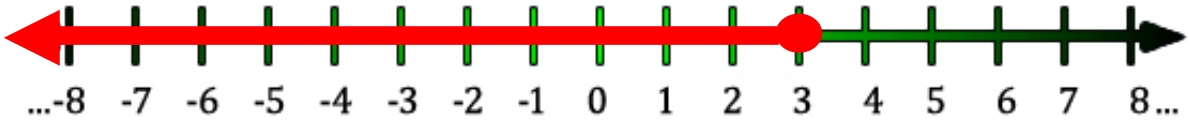
$+1)$ $4x > 5x + 5$

$-5x)$ $-x > 5$

$\times -1)$ $x < -5$

(d) $8x - 1 \leq 5x + 8$

-5x)	$3x - 1 \leq 8$
+1)	$3x \leq 9$
÷3)	$x \leq 3$



(e) $3x - 3 < 5x - 11$

+3)	$3x < 5x - 8$
-5x)	$-2x < -8$
÷-2)	$x > 4$

3. For what values of w is $\frac{w}{4} + \frac{1}{4} \geq \frac{w}{2} - \frac{5}{4}$

$$\frac{w}{4} + \frac{1}{4} \geq \frac{w}{2} - \frac{5}{4}$$

×4)	$w + 1$	$\geq$	$2w - 5$
-1)	w	$\geq$	$2w - 6$
-2w)	$-w$	$\geq$	-6
×-1)	w	$\leq$	6

4. Graph the following:

(a) $x > -2$ and $x \leq 5$

(b) $x \geq -2$ or $x < 6$