Unit 3:
Lesson 01   **Inequality statements**

Read the symbol, > , "greater than."

Read the symbol, < , "less than."

If *a* lies to the left of *b* on a number line, then we can make the statement, **a < b.** (**Read this, "*a* is less than *b*."**)

If *x* lies to the right of *y* on a number line, then we can make the statement, **x > y.** (Read this, "*x* is **greater than** *y*.")

Just remember, "The alligator eats the big one."

**Example 1:** Express "x + 3 is greater than 2y" in symbols.

$$x + 3 > 2y$$

Example 2: The number represented by *m* lies to the right of the number represented by *n* on a number line. Express the inequality relationship between *m* and *n* using "<".

$$n < m$$

When graphing x > a or x < a on a number line just remember that the "inequality arrow" is in the **same direction** as the "graph arrow" (only true when the **variable is on the left side)**.

Graph with an **open circle** as illustrated in the example below.

Example 3: Sketch the graph of x < –5 on a number line.
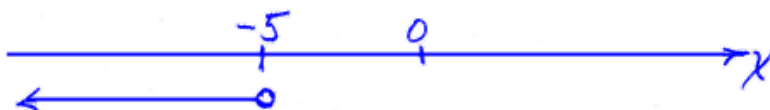
Read the symbol, ≥ , "greater than or equal to."

Read the symbol, ≤ , "less than or equal to."

Graph with a **solid circle** as illustrated in the example below.

Example 4: Sketch the graph of x ≥ 4 on a number line.

Adding (or subtracting) a number to both sides of an inequality:

Suppose *a* and *b* are related by the inequality, then

a > b

When the quantity *c* is added to both sides, the result is

a + c > b + c

Multiplying (or dividing) a number times both sides of an inequality:

Suppose *a* and *b* are related by the inequality, then

a > b

When the quantity *c* is multiplied by both sides, the result is

a(c) > b(c)   if *c* is a **positive** number.

a(c) < b(c)   if *c* is a **negative** number (Note the **reversal** of the inequality symbol.)

Example 5: Rewrite the inequality f < g after subtracting 3 from both sides.

$$f - 3 < g - 3$$

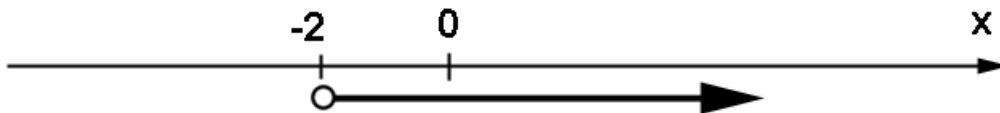**Example 6:** Rewrite the inequality m ≥ n after multiplying 4 times both sides.

$$4m \geq 4n$$

Example 7: Rewrite the inequality x ≥ y after dividing both sides by − 6.

$$x/(-6) \leq y/(-6)$$

Example 8: Rewrite the inequality p ≤ q after adding 2 to both sides.
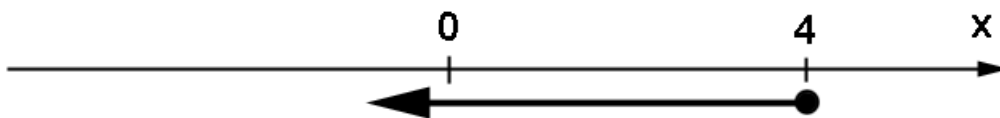
$$p + 2 \leq q + 2$$

Example 9: Write the inequality that describes this graph.

$$x > -2$$

Example 10. Write the inequality that describes this graph.

$$x \leq 4$$

Example 11: Which of the following set of x values is a solution to the inequality of Example 10?   {−6, − 5, −4, −3, −2, −1, 0, 1, 2, 3, 4, 5, 6}

$$\{-6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4\}$$

Assignment:

|	
1. Express "*f* is less than or equal to *m*" in mathematical symbols.	2. Express "*z* is greater than *v*" in mathematical symbols.
3. Express x ≤ k in words.	4. Express w > z in words.
5. Rewrite the inequality f < g after subtracting 3 from both sides.	6. Rewrite the inequality x ≥ y after dividing both sides by – 6.
7. Rewrite the inequality m ≥ n after multiplying 4 times both sides.	8. Rewrite the inequality p ≤ q after adding 2 to both sides.

9. Sketch the graph of $x < 6$ on a number line.

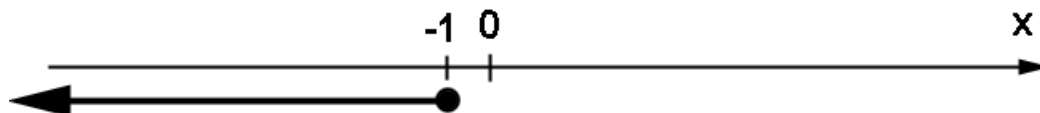10. Sketch the graph of $x \geq -7$ on a number line.

11. Sketch the graph of $x \geq 2.5$ on a number line.

12. Sketch the graph of $x < -3$ on a number line.

13. Write the inequality that describes this graph.
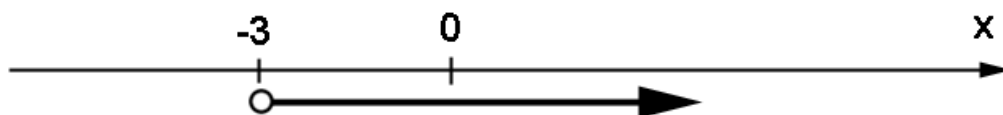
14. Write the inequality that describes this graph.

15. Which of the following set of x values is a solution to the inequality of problem 13?

{– 5, –4, –3, –2, –1, 0, 1, 2, 3, 4, 5}

16. Which of the following set of x values is a solution to the inequality of problem 14?

{– 5, –4, –3, –2, –1, 0, 1, 2, 3, 4, 5}

17. Express "p could be equal to 5; however, it could also be less than 5" in mathematical symbols.

18. Rewrite $2g \geq 11f$ after dividing both sides by -13.

19. Express $m \leq n$ in words.

20. Sketch the graph of $x < 0$ on a number line.