ALGEBRAIC INEQUALITIES

Algebraic inequalities are mathematical equations that compare two quantities using these criteria:

- greater than, **>**;
- greater than or equal to, **≥**;
- less than, **<**; and
- less than or equal to, **≤**.

- Inequalities can be solved using addition, subtraction, multiplication and division.

- One-step inequalities and two-step inequalities are solved by using inverse operations. Most two-step inequalities involve either addition or subtraction with either multiplication or divis

- With **plying or divi** **the ineq** ty sign in orde

- Whe ems, the word ables and signs in order to determine the correct answer.

- Often a **number line** is used to show inequalities. To show an inequality on the number line, a shaded circle is used to represent that the answer is equal to the number. A non-shaded circle means the answer is not equal to the number. A shaded arrow on the number line to the left of a circle means that the answer is less than the circled number. If the shaded arrow is to the right, the answer is greater than the circled number.

- Some algebraic inequalities can contain **variables on both sides of the inequality**. In this case, the variables and numbers need to be moved so there are only variables on one side of the inequality sign and numbers on the other side of the inequality sign before evaluating.

How to use algebraic inequalities

- **Algebraic inequalities** written as words or word problems must be changed into the correct numbers, variables and sign before solving.

- When writing an inequality, translate the words into signs as follows:

  - greater than $>$
  - greater than or equal to $\geq$
  - less than $<$
  - less than or equal to $\leq$

For example, what is the phrase two times a number decreased by four is less then fifty-two as a mathematical inequality?

Ex.

- Once th ality can be evaluated. **To evaluate two-step inequalities, inverse operations are used.** With two-step inequalities, it is very important to isolate the variable before evaluating. Isolating the variable means to get the variable alone on one side of the inequality.

- **The only rule of inequalities that must be remembered is that when a variable is multiplied or divided by a negative number the sign is reversed.**

For example, evaluate -4x + 6 ≥ 34.

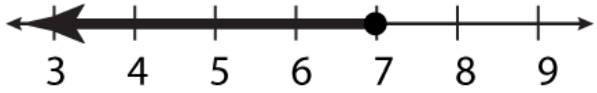
Ex. -4x + 6 ≥ 34 → **isolate the variable by subtracting 6**

$$\begin{array}{rcl} -4x & \geq & 28 \\ \hline -6 & & -6 \\ -4 & & -4 \end{array}$$

→ now solve for x by dividing -4

x ≤ 7 ← **notice that the sign is reversed**

In this inequality, x ≤ 7. If 4 were divided first and then 6 was subtracted, the result would be incorrect. The correct result is **x ≤ 7**, which means that x can be any number that meets this requirement such, as -12, -5, 0, 2, 7 etc. On the number line the answer would look as follows:



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Try Thi

What is the **algebraic inequality** that means a number multiplied by six minus five is greater than or equal to nineteen?

Solve for x, 8x - 10 < 46

Solve for x, x/4 + 12 ≥ 14

Solve for x, 7 - 3x ≤ 43

Solve for x, x/-5 - 9 > -5

Solve for x, x + 4 ≤ 2x – 3

Solve for x, 3x - 6 > x - 8