

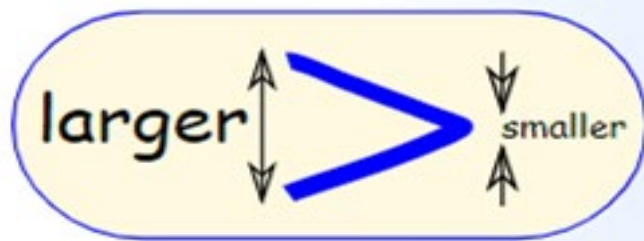
Some Application of Inequalities

Inequalities are used more often in real life than equalities:

- ❖ Businesses use inequalities to control inventory, plan production lines, produce pricing models, and for shipping.
- ❖ Linear programming is a branch of mathematics that uses systems of linear inequalities to solve real-world problems.
- ❖ Financial occupations often require the use of linear inequalities such as accountants, auditors, budget analysts and insurance underwriters to determine pricing and set budgets.

Inequality Symbols

Equality and Inequality



$=$ equal

\neq not equal

$>$ greater than

\geq greater than or equal

$<$ less than

\leq less than or equal

What is a linear Inequality ?

- Linear inequality is an inequality which involves a linear function (with first power).
- Linear inequality contains one of the symbols of inequality
- The solution of a linear inequality in two variable like $Ax+By>C$ is an ordered pair (x,y) that make an inequality true.

Solving Linear Inequalities For One Variable

- Solve the inequality as you would an equation which means that "whatever you do to one side, you must do to the other side".
- If you multiply or divide by a negative number, **REVERSE** the inequality symbol.
- We can write the answer in interval notation.

Steps for Graphing Solution on Number Line

- Use an **open circle** on the graph if your inequality symbol is **greater than or less than**.
- Use a **closed circle** on the graph if your inequality symbol is **greater than or equal to OR less than or equal to**.
- Arrow will point to the **left** if the inequality symbol is **less than**.
- Arrow will point to the **right** if the inequality symbol is **greater than**.

Example

$5 - x < 4$	Original Problem
$5 - 5 - x < 4 - 5$ $\frac{-x}{-1} < \frac{-1}{-1}$ $x > 1$ <div data-bbox="452 590 828 699">Interval Notation (1, ∞)</div>	Subtract 5 from BOTH sides Divide by -1 to make positive. You MUST REVERSE the SIGN since you are dividing by a negative number.
Check: $5 - x < 4$ $5 - 2 < 4$ $3 < 4$	Substitute a number greater than 1, I chose 2. Since 3 is less than 4, this is a true statement and my answer is correct.

How to Solve and Graph a linear Inequality for Two Variable:



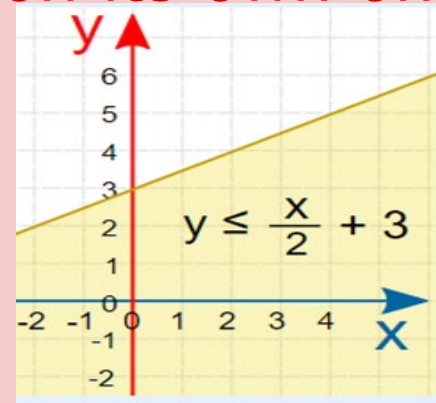
- Rearrange the equation so "y" is on the left and everything else on the right.
- Plot the "**y**=" line (make it a solid line for **y** ≤ or **y** ≥, and a dashed line for **y** < or **y** >).
- Shade above the line for a "greater than" (**y** > or **y** ≥) or below the line for a "less than" (**y** < or **y** ≤).



Example $2y - x \leq 6$

We will need to rearrange this one so "y" is on its own on the left:

- ❖ Start with: $2y - x \leq 6$
- ❖ Add x to both sides: $2y \leq x + 6$
- ❖ Divide all by 2: $y \leq x/2 + 3$



Plot the line $y=x/2+3$ (as a solid line because \leq includes equal to), then shade the area below because y is less than or equal.