



IIT-JEE · CBSE **eBOOKS**

CLASS 11 & 12th



Learning Inquiry
8929 803 804

CLASS 11th

Linear Inequations

misostudy



01. Inequalities

An equation is defined as a statement involving variable (s) and the sign of equality (=). Similarly, we define the term inequation as follows:

Inequation A statement involving variable (s) and the sign of inequality viz, $>$, $<$, \geq or \leq is called an inequation or an inequality.

An inequation may contain one or more variables. Also, it may be linear or quadratic or cubic etc.

Following are some examples of inequations:

- (i) $3x - 2 < 0$
- (ii) $2x^2 + 3x + 4 > 0$
- (iii) $2x + 5y \geq 4$
- (iv) $x^2 - 5x + 4 \leq 0$
- (v) $x^3 + 6x^2 + 11x + 6 \leq 0$

Linear Inequation in One Variable Let a be non-zero real number and x be a variable. Then inequations of the form $ax + b < 0$, $ax + b \leq 0$, $ax + b > 0$ and $ax + b \geq 0$ are known as linear inequations in one variable x .

Linear Inequation in Two Variable Let a and b be non-zero real numbers and x, y be variable. Then inequations of the form $ax + by < c$, $ax + by \leq c$, $ax + by > c$ and $ax + by \geq c$ are known as linear inequations in two variables x and y .

Quadratic Inequation Let a be a non-zero real number. Then an equation of the form $ax^2 + bx + c < 0$, or $ax^2 + bx + c \leq 0$, $ax^2 + bx + c > 0$, or $ax^2 + bx + c \geq 0$ is known as a quadratic inequation.

Solutions of An Inequation

Definition A solution of an inequation is the value (s) of the variable (s) that makes it a true statement.

Solving An Inequation It is the process of obtaining all possible solutions of an inequation.

Solution Set The set of all possible solutions of an inequation is known as its solution set.

Solution Linear Inequalities in One Variable

Solving an inequation is the process of obtaining its all possible solutions.

Rule I Same number may be added to (or subtracted from) both sides of an inequation without change in the sign of inequality.

Rule II Both sides of an inequation can be multiplied (or divided) by the same positive real number without changing the sign of inequality. However, the sign of inequality is reversed when both sides of an inequation are multiplied or divided by a negative number.

Rule III Any term of an inequation may be taken to the other side with its sign changed without affecting the sign of inequality.

A linear inequation in one variable is of the form

$$ax + b < 0, \text{ or } ax + b \leq 0 \text{ or } ax + b > 0 \text{ or } ax + b \geq 0.$$