

## **Simple Inequalities**

### **Topical EU**

1. The manipulative laws that are applicable to equations have to be modified for inequalities.
2. The solution of an Algebraic Inequality may not be unique.

### **Topical EQs**

1. How is an algebraic inequality different from an algebraic equation?
2. Why is the solution of an inequality not unique? (What does it mean to have a unique solution?)

At the end of the lesson, students should be able to

1. Understand the relationships between numbers
2. Solve simple linear inequalities on a number line
3. Compare and contrast the solutions of inequalities with different inequality signs such as  $x > 3$  and  $x \geq 3$
4. Formulate and solve simple problems that can be represented by inequalities
5. Solve linear inequalities and relate these to everyday life.

### **Introduction**

In Mathematics, an equality is a statement about the relative size or order of two objects, or about whether they are the same or not.

<b>Notation</b>	<b>Meaning</b>
$a < b$	$a$ is less than $b$
$a \leq b$	$a$ is less than or equal to $b$
$a > b$	$a$ is more than $b$
$a \geq b$	$a$ is more than or equal to $b$
$a \neq b$	$a$ is not equal to $b$

The world of INEQUALITIES is governed by several rules and properties.

1      **TRANSITIVE PROPERTY** – For any REAL NUMBERS  $a$ ,  $b$  and  $c$ , the try of inequalities state that

a)    if  $a > b$  &  $b > c$ , then  $\underline{a > c}$

b)    if  $a < b$  &  $b < c$ , then  $\underline{a < c}$

c)    if  $a > b$  &  $b = c$ , then  $\underline{a > c}$

d)    if  $a < b$  &  $b = c$ , then  $\underline{a < c}$

2      For any real numbers  $a$ ,  $b$  and  $c$ ,

a)     $a > b \Rightarrow a + c > b + c$

$$a < c \Rightarrow a + c < b + c$$

b)     $a > b \Rightarrow a - c > b - c$

$$a < c \Rightarrow a - c < b - c$$

c)    If  $c > 0$ ,  
 $a > b \Rightarrow ac > bc$

$$a > b \Rightarrow \frac{a}{c} > \frac{b}{c}$$

d)    If  $c < 0$ ,  
 $a > b \Rightarrow ac < bc$   
 $a > b \Rightarrow \frac{a}{c} < \frac{b}{c}$

**Important Note**

If we multiply or divide both sides of an inequality by a **negative** number, we will have to reverse the inequality sign.