

Geometrically, $a > b$ if the point on the real axis corresponding to a lies to the right of the point corresponding to b . For examples $3 < 5$ or $5 > 3$; $-2 < -1$ or $-1 > -2$; $x \leq 3$ means that x is a real number which may be 3 or less than 3.

Rules of inequalities

If a, b , and c are any given real numbers, then:

- 1) Either $a < b, a = b$ or $a > b$;
- 2) $a < b \Rightarrow a \pm c < b \pm c$;
- 3) $a < b$ and $c > 0 \Rightarrow ac < bc$;
- 4) $a < b$ and $c < 0 \Rightarrow ac > bc$ Special case: $a < b \Rightarrow -a > -b$;
- 5) $a > 0 \Rightarrow \frac{1}{a} > 0$;
- 6) If a and b are both positive or negative, then $a < b \Rightarrow \frac{1}{a} > \frac{1}{b}$.

1.3 Intervals

A subset of the real line is called an **interval** if it contains at least two numbers and contains all the real numbers lying between any two of its elements. For example, the set of all real numbers x such that $x > 1$ is an interval, as is the set of all x such that $-2 < x < 5$.

Types of intervals				
	Notation	Set description	Type	Picture
Finite:	(a, b)	$\{x: a < x < b\}$	Open	
	$[a, b]$	$\{x: a \leq x \leq b\}$	Closed	
	$[a, b)$	$\{x: a \leq x < b\}$	Half-open	
	$(a, b]$	$\{x: a < x \leq b\}$	Half-open	
Infinite:	(a, ∞)	$\{x: x > a\}$	Open	
	$[a, \infty)$	$\{x: x \geq a\}$	Closed	