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;  $x \le 3$  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)  $a < b \implies a \pm c < b \pm c$ ;
- 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)  $a > 0 \Longrightarrow \frac{1}{a} > 0;$
- 6) If a and b are both positive or negative, then  $a < b \implies \frac{1}{a} > \frac{1}{b}$ .

1.3 Intervals A subset of the real line is called an interval int contains all the real numbers lying between any two of its elements. For example, the set of all real numbers x  $\partial$ s an interval, as is the set of all x such that -2 < 2

Types of intervals				
	Notation	Set description	Туре	Picture
Finite:	( <i>a</i> , <i>b</i> )	$\{x: a < x < b\}$	Open	$a \xrightarrow{b} b$
	[ <i>a</i> , <i>b</i> ]	$\{x: a \le x \le b\}$	Closed	$a \rightarrow b$
	[ <i>a</i> , <i>b</i> )	$\{x: a \le x < b\}$	Half-open	$a \xrightarrow{\circ} b$
	( <i>a</i> , <i>b</i> ]	$\{x: a < x \le b\}$	Half-open	$a \xrightarrow{a} b$
Infinite:	( <i>a</i> ,∞)	$\{x: x > a\}$	Open	<del>a</del>
	[ <i>a</i> ,∞)	$\{x: x \ge a\}$	Closed	a