Lecture 01

Absolute Values

The absolute value of real number 'a' is denoted by $|a|$ and its distance from a to the origin O on the number line.

→ The absolute value is always positive.

Def

If a is real number, the absolute value of a is.

$$|a| = \begin{cases} a & \text{if } a \geq 0 \\ -a & \text{if } a < 0 \end{cases}$$

Example

Evaluate

$$|2|, \quad |-10|, \quad |5-9|,$$

$$|9-5|$$

Sol

$$|2| = 2$$

$$|-10| = 10$$

$|+5-9| = |-4| = 4$

$|9-5| = |4| = 4$

Algebraic properties of A.V

(1) $|a| \geq 0$ for all real numbers a

(2) $|a| = |-a|$ for all real numbers a

(3) $|ab| = |a||b|$, the absolute value of product of two numbers is product of absolute values.

(4) $\left|\frac{a}{b}\right| = \frac{|a|}{|b|}$, the absolute value of the quotient of two numbers is quotient of absolute values.

Example

Evaluate

$$\left|\frac{7-10}{21}\right|$$

$$= \left|\frac{-3}{21}\right|$$

$$= \frac{|-3|}{|21|}$$

$$= \frac{\cancel{3}}{\cancel{21}}$$

$$= \frac{1}{7}$$

$$\left||-2|-|-4|\right|$$

$$|2-4|$$

$$|-2|$$

$$= 2$$

Ans