

Key Notes

Chapter – 01 Rational Numbers

- Rational numbers are **closed** under the operations of addition, subtraction and multiplication.
 - The operations addition and multiplication are
 - (i) **commutative** for rational numbers.
 - (ii) **associative** for rational numbers.
 - The rational number 0 is the **additive identity** for rational numbers.
 - The rational number 1 is the **multiplicative identity** for rational numbers.
 - The additive inverse of the rational number $\frac{a}{b}$ is $\frac{-a}{b}$ and vice-versa.
 - The **reciprocal or multiplicative inverse** of the rational number $\frac{a}{b}$ is $\frac{b}{a}$ if $\frac{a}{b} \times \frac{b}{a} = 1$.
 - Distributivity of rational numbers: For all rational numbers a, b and c, $a(b + c) = ab + ac$ and $a(b - c) = ab - ac$
 - Rational numbers can be represented on a number line.
 - Between any two given rational numbers there are countless rational numbers. The idea of mean helps us to find rational numbers between two rational numbers.
 - **Positive Rationals:** Numerator and Denominator both are either positive or negative.
Example: $\frac{4}{7}, \frac{-3}{-4}$
 - **Negative Rationals:** Numerator and Denominator both are of opposite signs. Example:
 $\frac{-2}{11}, \frac{4}{-9}$
 - **Additive Inverse:** Additive inverse (negative) $\frac{a}{b} + \frac{-a}{b} = \frac{-a}{b} + \frac{a}{b} = 0$. $\frac{-a}{b}$ is the additive inverse of $\frac{a}{b}$ and $\frac{a}{b}$ is the additive inverse of $\frac{-a}{b}$.
 - **Multiplicative Inverse (reciprocal):** $\frac{a}{b} \times \frac{c}{d} = 1 = \frac{c}{d} \times \frac{a}{b}$ where $\frac{c}{d}$ is the reciprocal of $\frac{a}{b}$. Zero has no reciprocal. The reciprocal of 1 is 1 and of -1 is -1.
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