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Teaching Learning Material

Class – 7th   Subject – Mathematics

Section – All   Subject teacher –Bandana Kumari

Rational Numbers

PROPERTIES OF ADDITION OF RATIONAL NUMBERS

Property 1. Closure Property:

The sum of two rational numbers is always a rational number. i.e., if $\frac{a}{b}$ and $\frac{c}{d}$ are any two rational numbers, then $\frac{a}{b} + \frac{c}{d}$ is also a rational number. This property is known as Closure Property for addition of rational numbers.

For example:- $\frac{5}{4} + \frac{7}{3} = \frac{15 + 28}{12} = \frac{43}{12}$ which is a rational number.

Property 2. Commutative Property:

If $\frac{a}{b}$ and $\frac{c}{d}$ are any two rational numbers, then $\frac{a}{b} + \frac{c}{d} = \frac{c}{d} + \frac{a}{b}$

This property is known as commutative property for addition Of rational numbers.

For example:- $\frac{-2}{7} + \frac{3}{5} = \frac{-2 \times 5}{7 \times 5} + \frac{3 \times 7}{5 \times 7} = \frac{-10}{35} + \frac{21}{35} = \frac{(-10)+21}{35} = \frac{11}{35}$

This property is called commutative property of addition.

Property 3. Associative property:

If $\frac{a}{b}, \frac{c}{d}$ and $\frac{e}{f}$ are any three rational numbers, then

$$\left(\frac{a}{b} + \frac{c}{d}\right) + \frac{e}{f} = \frac{a}{b} + \left(\frac{c}{d} + \frac{e}{f}\right)$$

This property of rational numbers is called Associative Property of Addition of rational numbers.

For Example :

$$\left(\frac{-3}{4} + \frac{5}{6}\right) + \frac{-7}{8} = \left(\frac{-18+20}{24}\right) + \frac{-7}{8} = \frac{2}{24} + \frac{-7}{8} = \frac{2+(-21)}{24} = \frac{-19}{24}$$

This property of rational numbers is called associative property of addition of rational numbers.

Property 4. Property of zero

If $\frac{a}{b}$ be any rational number, then $\frac{a}{b} + 0 = 0 + \frac{a}{b}$

This property is called the Property of Zero.

For example: $\frac{-5}{16} + 0 = \frac{-5}{16} + \frac{0}{16} = \frac{-5+0}{16} = \frac{-5}{16}$

So, we conclude that the sum of any rational number and Zero or the sum of zero and any rational number is the Rational number itself.

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