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RATIONAL NUMBERS

PERIOD 2

SUBJECT : MATHEMATICS
CHAPTER NUMBER: 1
CHAPTER NAME : RATIONAL NUMBERS

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Previous concept

- Rational Number in Mathematics is defined as any number that can be represented in the form of p/q where $q \neq 0$.
- A rational number is positive if both the numerator and denominatorhave same signs.If numerator and denominator have opposite signs then the rationalnumber is negative.
- Zero is a rational number.

Learning outcome

- Students will be able to understand addition of rational numbers.
- Students will be able to understand and apply properties of addition.
- Students will be able to understand and solve real-world problems using addition of rational numbers.

Properties of addition of Rational Numbers

Closure property of addition :

The **closure property** states that for any two **rational numbers** a and b, a + b is also a **rational number**. The result is a **rational number**. So we say that **rational numbers** are closed under **addition**.

2/9 + 4/9 = 6/9 = 2/3 is a **rational number**.

Commutative property of addition

The order in which we add two **rational numbers** does not matter. It will always give the same **sum** no matter which **rational number** we add to the other.

For **example,**

a/b + c/d = c/d + a/b

-7/8 + 5/8 = 5/8 + -7/8 = -2/8 = -1/4

Associative property of addition:

The addition of rational numbers is associative.

If a/b, c/d and e/f are any three rational numbers, then

$a/b + (c/d + e/f) = (a/b + c/d) + e/f$

$1/3 + (1/4 + 3/3) = (1/3 + 1/4) + 3/3$

$\Rightarrow 19/12 = 19/12$

Identity property of addition

Zero is the additive identity for Rational, natural, whole numbers and integers, since adding it to them does not change the result.

3 + 0 = 3
-4/5 + 0 = -4/5
Hence, 0 + a = a + 0 = a, where a can be rational number or natural number or whole number of integer.

Inverse property of addition

The negative of a rational number is called its additive inverse.

The additive inverse of 5/7 = - 5/7

The additive inverse of -5/9 = 5/9

The additive inverse of 5/-9 = 5/9

Hence, the sum of a rational number and its additive inverse = Additive identity

Properties of addition of Rational Numbers

https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-factors-and-multiples/properties-of-numbers/a/properties-of-addition

https://youtu.be/bjVn4WGmNis

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Ex. 1(A) Q. No. 4. (ii). Verify commutative property of addition of following rational numbers: 5/9 and 5/-12

Sol: To prove: $5/9+5/-12=5/-12+5/9$

LHS $=5/9+5/-12$ LCM of 9 and $12=2\times2\times3\times3=36$

LHS $=5\times4/9\times4-5\times3/12\times3$

$=20-15/36=5/36$

RHS $=5/-12+5/9$

$=5\times3/-12\times3+5\times4/9\times4$ ($\because$LCM of 9 and 12 = 36)

$=-15+20/36=5/36$ $\therefore$ RHS = LHS

i.e. $5/9+5/-12=5/-12+5/9$

Hence, the commutative property for the addition of rational numbers is verified.

Home assignment

Exercise 1(A) - 4 to 7

1. Write the additive inverse of zero.
2. What is the reciprocal of a negative rational number?
3. What is the additive inverse of -4/-5 ?

THANKING YOU

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