Rational Numbers

What is a rational number?

A rational number is a number which can be represented in p/q form, where p and q both are integers and $q \neq 0$.

Rational numbers are of two types: Terminating and non- terminating.

Terminating rational numbers:- The rational numbers such as 3/2 = 1.5 is said to be terminating because after a fixed decimal point the number ends.

Non-Terminating rational numbers:- The rational numbers such as 1/3 = 0.333333… is said to be non-terminating because the number does not ends after fixed decimal points and goes on.

Properties of Rational numbers:-

Closure property:

Addition –

When two rational numbers are added the resultant is always a rational number.

Hence this operation holds true value according to closure property.

Example:- 2/9 + 3/9 = 5/9 is a rational number.

Subtraction –

When two rational numbers are subtracted the resultant is always a rational number.

Hence this operation holds true value according to closure property.

Example:- 3/9 – 2/9 = 1/9 is a rational number.

Multiplication –

When two rational numbers are multiplied the resultant is always a rational number.

Hence this operation holds true value according to closure property.

Example:- 2/9 X 3/9 = 6/81 is a rational number.

Division -

When two rational numbers are divided the resultant is always a rational number.

Hence this operation holds true value according to closure property.

Example:- 3/9 ÷ 2/9 = 3/2 is a rational number.

Commutative property:

Addition –

When two rational numbers are added in whatever combination, means if a/b and c/d are rational numbers then a/b + c/d will give the same result as c/d + a/b.

Example:- 3/9 + 2/9 = 5/9 and 2/9 + 3/9 = 5/9.

Subtraction –

When two rational numbers are subtracted in whatever combination, means if a/b and c/d are rational numbers then a/b- c/d will not give the same result as c/d - a/b.

Example:- 3/9 -2/9 =1/9 and 2/9 -3/9 = -1/9.

Multiplication-

When two rational numbers are multiplied in whatever combination, means if a/b and c/d are rational numbers then a/b x c/d will give the same result as c/d x a/b.

Example:- 3/9 x 2/9 = 6/81and 2/9 x 3/9 = 6/81.

Division –

When two rational numbers are divided in whatever combination, means if a/b and c/d are rational numbers then a/b÷c/d will not give the same result as c/d ÷ a/b.

Example:- 3/9÷2/9 = 3/2 and 2/9 ÷3/9 = 2/3.

Associative :

Addition –

When three rational numbers are added in whatever grouping, means if a/b, c/d and e/f are rational numbers then a/b + (c/d + e/f) will give the same result as (a/b + c/d) + e/f

Example:- 3/9 + (2/9 + 5/9) = 10/9 and (3/9 + 2/9 +) + 5/9 = 10/9

Subtraction –

When three rational numbers are subtracted in whatever grouping, means if a/b, c/d and e/f are rational numbers then a/b - (c/d - e/f) will not give the same result as (a/b - c/d) - e/f

Example:- 3/9 - (2/9 -5/9) = 6/9 and (3/9 - 2/9) - 5/9 = -4/9

Multiplication-

When three rational numbers are multiplied in whatever grouping, means if a/b, c/d and e/f are rational numbers then a/b x(c/d x e/f) will give the same result as (a/b x c/d) x e/f

Example:- 3/9 x (2/9 x5/9) = 30/729 and (3/9 x 2/9)x 5/9 = 30/729

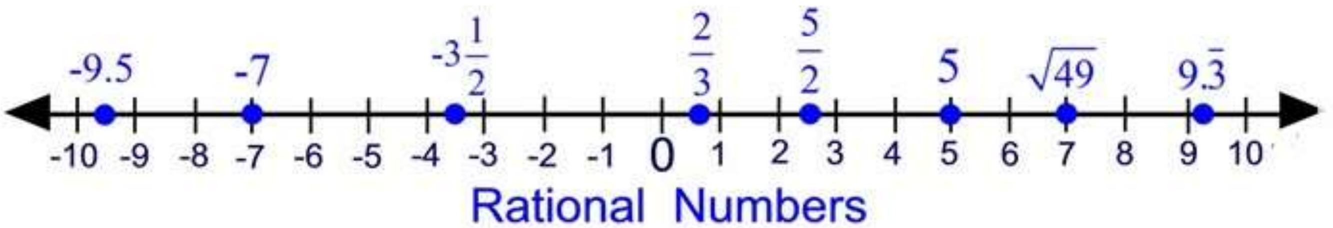
Division –

When three rational numbers are divided in whatever grouping, means if a/b, c/d and e/f are rational numbers then a/b÷(c/d ÷e/f) will give the same result as (a/b ÷c/d) ÷e/f

Example:-2/9 ÷ (4/9 ÷ 1/9) = 1/18 and (2/9 ÷ 4/9) ÷ 1/9 = 7/18

What is a number line?

A number line is a picture of a graduated straight line that serves as an abstraction for real



numbers, denoted by {R}. Every point of a number line is assumed to correspond to a real number and every real number to a point.

Between any 2 rational numbers there exists infinitely many rational numbers
If *a* and *b* are two rational numbers, then (a + b)/2 is a rational number between *a* and *b* such that a < (a + b)/2 < b; from the idea of **mean.**