Rational Numbers

Rational Numbers: A rational number is defined as a number which can be expressed in the form of numerator/denominator, where numerator and denominator are integers and denominator is not equal to zero.

Example:3/8,7/9,-7/4 etc

Positive and Negative Rational numbers: If the numerator and denominator both are positive or both are negative,then it is called positive rational numbers otherwise it is called negative rational numbers.

For Example: 6/7,-4/-3 are positive rational numbers.

-5/7,1/-9 are negative rational numbers.

Standard Form of a Rational Numbers:

A rational number is in its standard form if its denominator is positive and there is no common factor (except) 1 between the numerator and denominator.

For example: 6/7,-4/9

Equivalent Rational number:

If in a rational number, we multiply the numerator and denominator by the same non-zero integer, we obtain another rational number which is equivalent rational number.

Example: -2/3

-2X2/3X2=-4/6

-2X3/3X3=-6/9

Absolute Value of a Rational Number:

The absolute value of a/b is written as |a/b|

Example: Find the absolute value of -2/7

Solution: |-2/7|

2/7

Properties of Rational Numbers:

1) Closure Property:

Addition: For rational numbers a and b,addition of a and b is also a rational number.

Example:1/2+1/3

(3+2)/6

=5/6

Closure property holds true for addition of rational numbers.

Subtraction: For rational number a and b, subtraction of a-b is also a rational number.

Example: 1/2-5/3

(3-10)/6

-7/6

Closure Property holds true for subtraction of rational numbers.

Multiplication: For two rational numbers a and b , multiplication of a and b is also rational number.

Example:4/7 X 3/2

= 12/14

= 6/7

Closure Property holds true for multiplication of rational numbers.

Division: For rational numbers a and b, division - a/b is also a rational number.

Example:(4/6)/(1/6)

=24/5

Closure Property holds true for division of rational numbers.

2)Commutative Property

Addition: For rational number a and b

a+b=b+a

Example: 2/3+4/5

2/3+4/5=4/5+2/3

(10+12)15=(12+10)/15

22/15=22/15

Commutative Property holds true rational numbers.

Subtraction: For rational numbers a and b

a-b not equals to b-a

Example: 6/7-4/5

6/7-4/5=4/5-6/7

(30-28)/35=(28-30)/35

2/35=-2/35

Commutative Property does not hold true for the subtraction of rational numbers.

Multiplication: For rational numbers a and b,

aXb=bXa

Example: 4/7X3/7

4/7X3/7=3/7X4/7

12/49=12/49

Division: For rational numbers a and b,

a/b is not equals b/a

Example: (4/5)/1/3

(4/5)/(1/3) is not equals to (1/3)/(4/5)

12/5 is not equals 5/12

Commutative Property doesn't hold for the division of rational numbers.

3)Associative Property:

Addition: For rational numbers a ,b and c,

a+(b+c)=(a+b)+c

Example: 1/3+(1/4+2/3)=(1/3+1/4)+2/3

1/3+11/12=7/12+2/3

15/12=15/12

Subtraction: For rational numbers a,b and c,

a-(b-c) is not equal to (a-b)-c

Multiplication: For rational numbers a,b,c,

aX(bXc)=(aXb)Xc

Example: 1/2 X(3/4X5/6)=(1/2X3/4)X5/6

1/2X(15/24)=3/8X5/6

1/2X5/8=15/48

5/16=5/16

Division: For rational numbers a,b and c,

a/(b/c)is not equal to (a/b)/c

4)Distributive Property:

Addition: For rational numbers a,b and c,

aX(b+c)=aXb+aXc

Subtraction: For rational numbers a,b and c

aX(b-c)=aXb-aXc

Property of Zero Or Additive Identity:

When Zero is added to a rational number,the sum of rational number is same.

Example: 4/5

= 4/5+0

= 4/5

Property of Multiplicative identity:

When 1 is multiplied by rational number, product is same as the rational number.

Example: 5/6

= 5/6X1

= 5/6