Maths Assignment

CLASS VIII

Chapter 1

RATIONAL NUMBER

Before knowing what is Rational Number , you need to know first:

1-**NATURAL NUMBERS :** A Number include the positive integers which starts from 1 to infinite are called natural numbers.
Eg: 1, 2,3, ... etc.

2-**WHOLE NUMBERS** : A number defined as the positive numbers including zero. Whole number does not contain any decimal and fractional part.
Eg:0,1,2,3..... etc.

3-**INTEGERS** :An integers is a whole numbers that can be positive , negative or zero .
Eg: -5,1,3.14,303,.... ,etc.

RATIONAL NUMBERS

The numbers which can be expressed in the form p/q, where p and q are two inetegers and q is not equal to 0 is called rational numbers.
Eg:-1/4, 4/5, etc.

Eg:- 6 is a rational number because it can be expressed in the form of p/ q i.e. 6/1 but 6/0 is not a rational number. (since q is not equal to 0)

[All whole numbers are Rational numbers]

TYPES OF RATIONAL NUMBERS

(1) POSITIVE RATIONAL- A rational number is said to be positive if its numerator and denominator are either both positive or both negative
Eg:- 5/6 , -2/-6 ...etc.

(2) NEGATIVE RATIONAL-A rational number is said to be negative if its numerator and denominator are of opposite signs.
Eg:- -4/5 , 5/-12 ...etc.

PROPERTIES OF RATIONAL NUMBERS

PROPERTY 1:-

If a/b is a rational number and m is a non zero integer then,
$a/b = a\times m / b\times m$
such Rational numbers are called equivalent rational numbers.

PROPERTY 2:-
If a/b is a rational number and m is a common divisor of a and b then,
$a/b = a\div m / b\div m$

PROPERTY 3:-
Let a/b and c/d be two rational numbers then,
$a/b=c/d$
$\Rightarrow (a\times d)=(b\times c)$

STANDARD FORM OF RATIONAL NUMBERS
A rational number a/b is said to be in the standard form if a and b are integers having no common divisor other than 1 and b is positive.

COMPARISON OF RATIONAL NUMBERS

(1) Every positive Rational number is greater than 0
(2) Every negative rational number is less than 0

METHOD TO COMPARE:-

(**1**) Express each of the given Rational numbers with positive denominator.
(**2**) Take the LCM of these positive denominator
(**3**) Express each rational number (obtained in step 1) with this LCM as common denominator
(**4**) The numbers having the greater numerator is greater.

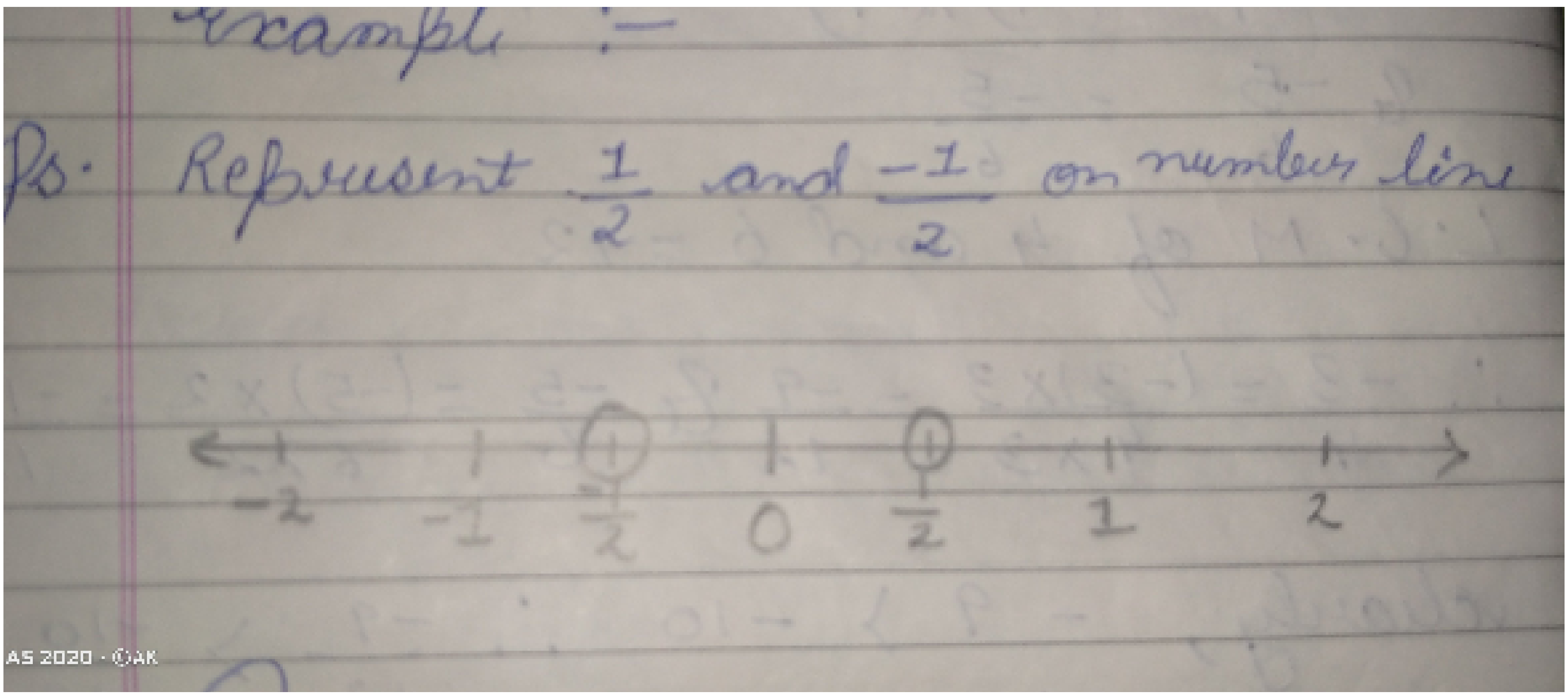
EXAMPLE:-
Which of the numbers 3/-4 or -5/6 is greater?
solution:-
First we write each of the numbers with positive denominator
so 3/-4= -3/4
and -5/6 =-5/6

LCM OF 4 and 6 =12
Now, -3/4 =-3/4×3/3=-9/12
and -5/6 =-5×2/6×2=-10/12

REPRESENTATION OF RATIONAL NUMBERS ON REAL LINE

The rational number are the numbers which can be represented on the number line.

To represent rational, we divide the distance between two consecutive part into'n' number of parts.



PROPERTIES OF ADDITION OF RATIONAL NUMBERS

PROPERTY 1:-
(closure property)

The sum of two Rational numbers is always a rational number
If a/b and c/d are any two rational numbers,then
(a/b +c/d) is also a rational number

PROPERTY 2:-
(commutative law)

Two rational numbers can be added in any order ,Thus for any two rational numbers a/b and c/d ,
we have (a/b +c/d) =(c/d+a/b)

PROPERTY 3:-
(associative law)

While adding three rational numbers,they can be grouped in any order . Thus for any three rational numbers a/b, c/d, e/f ,we have
(a/b +c/d) +e/f = a/b +(c/d +e/f)

PROPERTY 4:-
(existence of additive identity)

0 is a rational number such that the sum of rational number and 0 is the Rational number itself.thus,
(a/b+0)= (0+a/b) =a/b , for every rational number a/b
[0 is called additive identity for rational]

PROPERTY 5:-
(existence of additive inverse)

For every rational number a/b , there exists a rational number -a/b such that
{a/b + (-a/b)} = {a+(-a/b}/b =0/b =0
and similarly (-a/b +a/b) =0
Thus,{a/b+(-a/b) }={(-a/b)+a/b}=0
[-a/b is called additive inverse of a/b]

SUBTRACTION OF RATIONAL NUMBERS

PROPERTY 1:-

For rational number a/b and c/d

we define:-
$(a/b - c/d) = a/b + (-c/d) = a/b +$
(additive inverse of c/d)

<u>PROPERTIES OF MULTIPLICATION OF RATIONAL NUMBERS</u>

PROPERTY 1:-
(closure property)

The product of two rational numbers is always a rational number.
If a/b and c/d are any two rational numbers then ,
$(a/b \times c/d)$ is also a rational number

PROPERTY 2:-
(associative law)

While multiplying three or more Rational numbers, they can be grouped in any order
For any rationals a/b ,c/d ,e/f
we have,
$(a/b \times c/d) \times e/f = a/b \times (c/d \times e/f)$

PROPERTY 3:-
(commutative law)

Two rational numbers can be multiplied in any order.
For any rational number a/b & c/d we have ,
$(a/b \times c/d) = (c/d \times a/b)$

PROPERTY 4:-
(existence of multiplicative identity)

For any rational numbers a/b , we have,
$(a/b \times 1) =(1\times a/b) =a/b$
[1 is called multiplicative identity for rationals]

PROPERTY 5 :-
(existence of multiplicative inverse)

Every nonzero rational numbers a/b has it's multiplicative inverse b/a thus,
$(a/b \times b/a)= (b/a\times a/b) =1$

PROPERTY 6:-
(distributive law of multiplication over addition)

For any three rational numbers a/b , c/d, e/f we have ,
a/b ×(c/d +e/f) =(a/b×c/d) +(a/b×e/f)

PROPERTY 7:-
(multiplicative property of 0)

Every rational number multiplied with 0 gives 0.
Thus, for any rational number a/b we have,
(a/b ×0)=(0×a/b) =0

PROPERTIES OF DIVISION OF RATIONAL NUMBERS

PROPERTY 1:-
(closure property)

If a/b and c/d are any two rational numbers such that c/d is not equal to the 0 Then,
(a/b÷c/d) is also a rational number.

PROPERTY 2:-
(property of 1)

For every rational number a/b ,we have:
(a/b÷1) =a/b

PROPERTY 3 :-

For every nonzero rational numbers a/b,
we have ,(a/b ÷a/b) =1

INSTRUCTIONS

- *Go through all the solved examples*

- *Try to solve all the questions of chapter of 1. from RS Agarwal in your school Maths copy.*

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