

## Class - Work

## Ch- Number System

- **Rational Number** → The numbers which can be written in the form of  $\frac{p}{q}$  where  $p$  and  $q$  are integers and  $q \neq 0$  are called rational numbers.

For eg →  $\frac{2}{3}, 0, -2, \frac{5}{4}$  etc

- Some properties of rational numbers

1. All natural numbers, integers, whole numbers and simple fraction, are rational numbers.
2. All terminating repeating decimal numbers are rational numbers.
3. All non-terminating repeating decimal numbers are rational numbers.

- **Irrational number**:- The numbers which can't be written in the form of  $\frac{p}{q}$  where  $p$  and  $q$  are integers and  $q \neq 0$

For eg →  $\sqrt{2}, \sqrt{3}, 2.020020002 \dots$

- Property of Irrational numbers

1. All non-terminating non repeating are Irrational numbers.

For eg →  $0.030330333 \dots$

~~International numb~~

Real Number  $\rightarrow$  Combination of rational and irrational numbers are called real numbers.

H.W

Date - 8/4/2025

Example-1 Are the following statements true or false? Give reasons for your answers.

i) Every whole number is a natural number.

$\Rightarrow$  False, because zero is a whole number but not a <sup>natural</sup> number.

ii) Every integers is a rational number.

$\Rightarrow$  True, because every integer  $m$  can be expressed in the form  $\frac{m}{1}$ , and so it is a rational number.

iii) Every rational number is an integer.

False, because  $\frac{3}{5}$  is not an integer.

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Ex: 1.1

1. Is zero a rational number? Can you write it in the form  $\frac{p}{q}$ , where  $p$  and  $q$  are integers and  $q \neq 0$ ?

Solve  $\rightarrow$  Yes, zero is a rational number because zero can be written in form of  $\frac{p}{q}$  as  $\frac{0}{1}$  or  $\frac{0}{2}$  or  $\dots$  or  $\frac{0}{100}$  where  $p=0$   $q=1$  or  $2$   $\dots$  or  $100$ .

2. Find six rational number between 3 and 4

Solve  $\rightarrow$  Six rational numbers between 3 and 4

Write no. 3 and 4 in rational form

$$3 = \frac{3}{1} \quad 4 = \frac{4}{1}$$

Multiplying numerator and denominator both by

$$k+1=7$$

$$\text{So } 3 = \frac{3}{1} = \frac{3 \times 7}{1 \times 7} = \frac{21}{7}$$

$$4 = \frac{4}{1} = \frac{4 \times 7}{1 \times 7} = \frac{28}{7}$$

So six rational numbers between  $\frac{21}{7}$  and  $\frac{28}{7}$  are

$$\frac{22}{7}, \frac{23}{7}, \frac{24}{7}, \frac{25}{7}, \frac{26}{7}, \frac{27}{7}$$

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3. Find five rational numbers between  $\frac{3}{5}$  and  $\frac{4}{5}$

Solve  $\rightarrow$  Multiplying both with  $5+1=6$

$$\frac{3 \times 6}{5 \times 6} = \frac{18}{30} \quad \text{and} \quad \frac{4 \times 6}{5 \times 6} = \frac{24}{30}$$

$$\frac{19}{30}, \frac{20}{30}, \frac{21}{30}, \frac{22}{30}, \frac{23}{30}$$

So, Five rational number between  $\frac{3}{5}$  and  $\frac{4}{5}$  is

$$\frac{19}{30}, \frac{20}{30}, \frac{21}{30}, \frac{22}{30}, \frac{23}{30}$$

Example  $\rightarrow$  2 Find five rational numbers between 1 and 2.

Solution-1: Recall that to find a rational number between  $r$  and  $s$ , you can add  $r$  and  $s$  and divide the sum by 2, that is  $\frac{r+s}{2}$  lies between  $r$  and  $s$ . So,  $\frac{3}{2}$  is a number between 1 and 2. You can proceed in this manner to find four more rational number between 1 and 2. These four numbers are  $\frac{5}{4}, \frac{11}{8}, \frac{13}{8},$  and  $\frac{7}{4}$

Solution-2: The other option is to find all the five rational numbers in one step. Since we want five numbers, we want five numbers, we write 1 and 2 as rational numbers with denominator  $5+1$ ,

i.e.,  $1 = \frac{6}{6}$  and  $2 = \frac{12}{6}$  Then you can check that

$$\frac{7}{6}, \frac{8}{6}, \frac{9}{6}, \frac{10}{6} \text{ and } \frac{11}{6} \text{ are all rational numbers}$$

between 1 and 2

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numbers are  $\frac{7}{6}$ ,  $\frac{4}{3}$ ,  $\frac{3}{2}$ ,  $\frac{5}{3}$  and  $\frac{11}{6}$

## Home-work

Date → 9/04/2025

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4. State whether the following statements are true or false. Give reasons for your answers.

i) Every natural number is a whole number.

Solve ⇒ Every natural number is a whole number.

This statement is true because the set of natural numbers is represented as  $N = \{1, 2, 3, \dots\}$  and the set of whole number is  $W = \{0, 1, 2, 3, \dots\}$ .

ii) ~~This~~ Every integer is a whole number.

Solve ⇒ This statement is false because whole number are defined as the collection of numbers that only include whole number.

iii) Every rational number is a whole number.

Solve ⇒ This statement is false because a rational number can be expressed as decimal. whole number is a positive number without a fraction or decimal. But, a rational number is any number that can be expressed as a fraction.