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CLASS – 9

MATHS

Chapter - 1

Number System

Part – 1

Number

Vikas Saini

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OVERVIEW

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1. Number
2. Irrational Number
3. Real Number & their Decimal Expansions
4. Operations on Real Numbers
5. Laws of Exponents for Real Numbers

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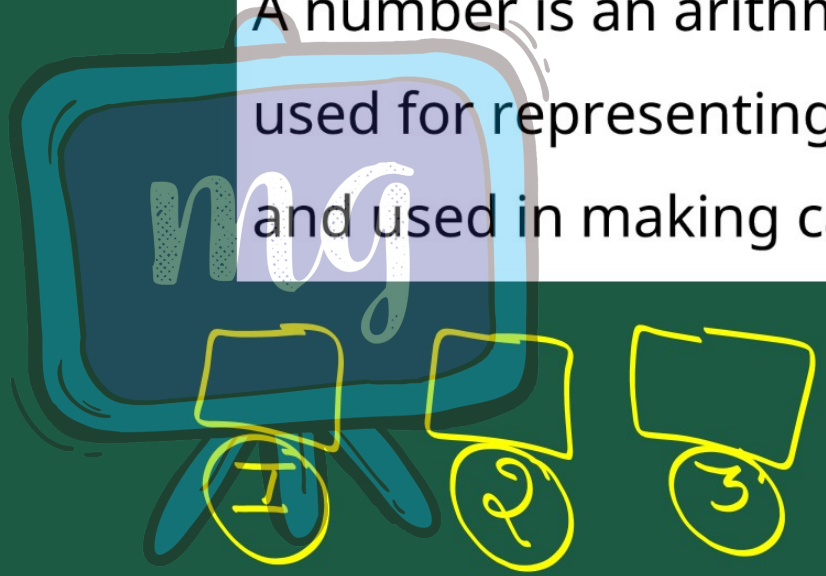
NUMBER

A number is an arithmetic value used for representing the quantity and used in making calculations.



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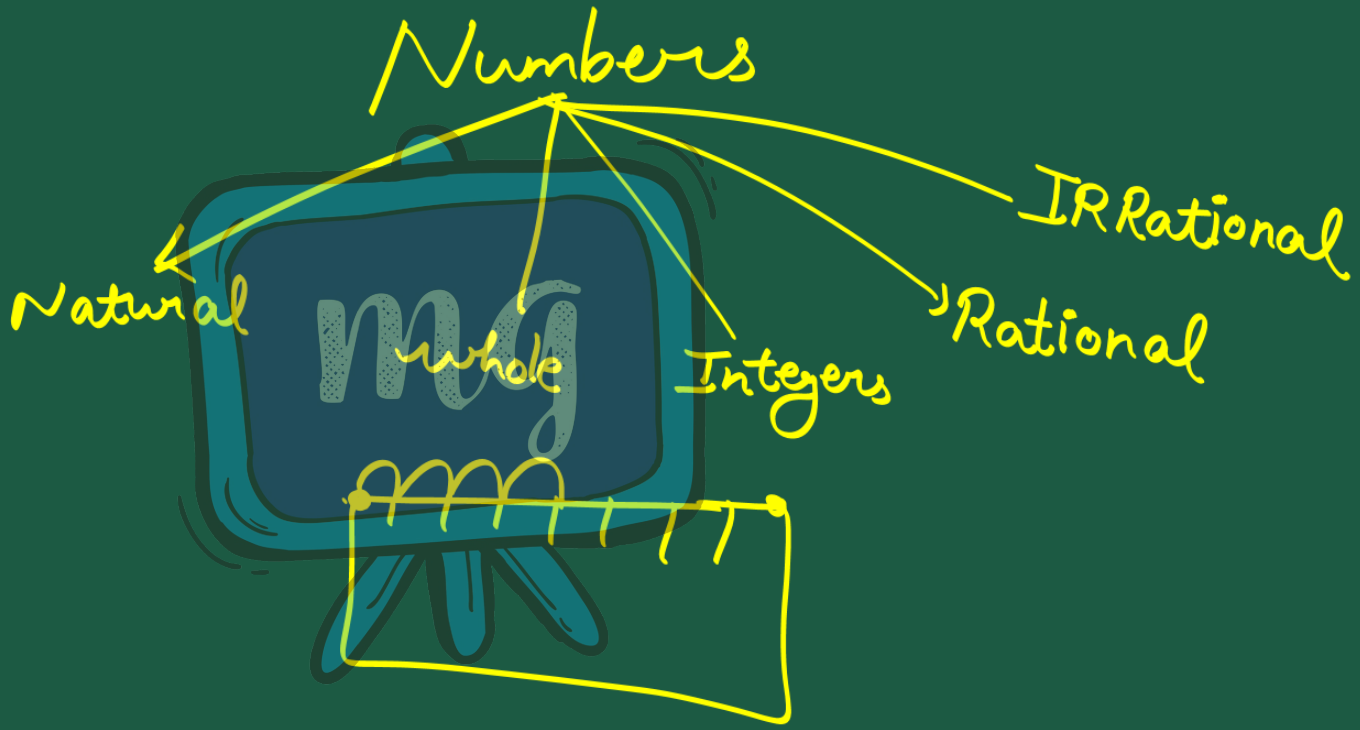

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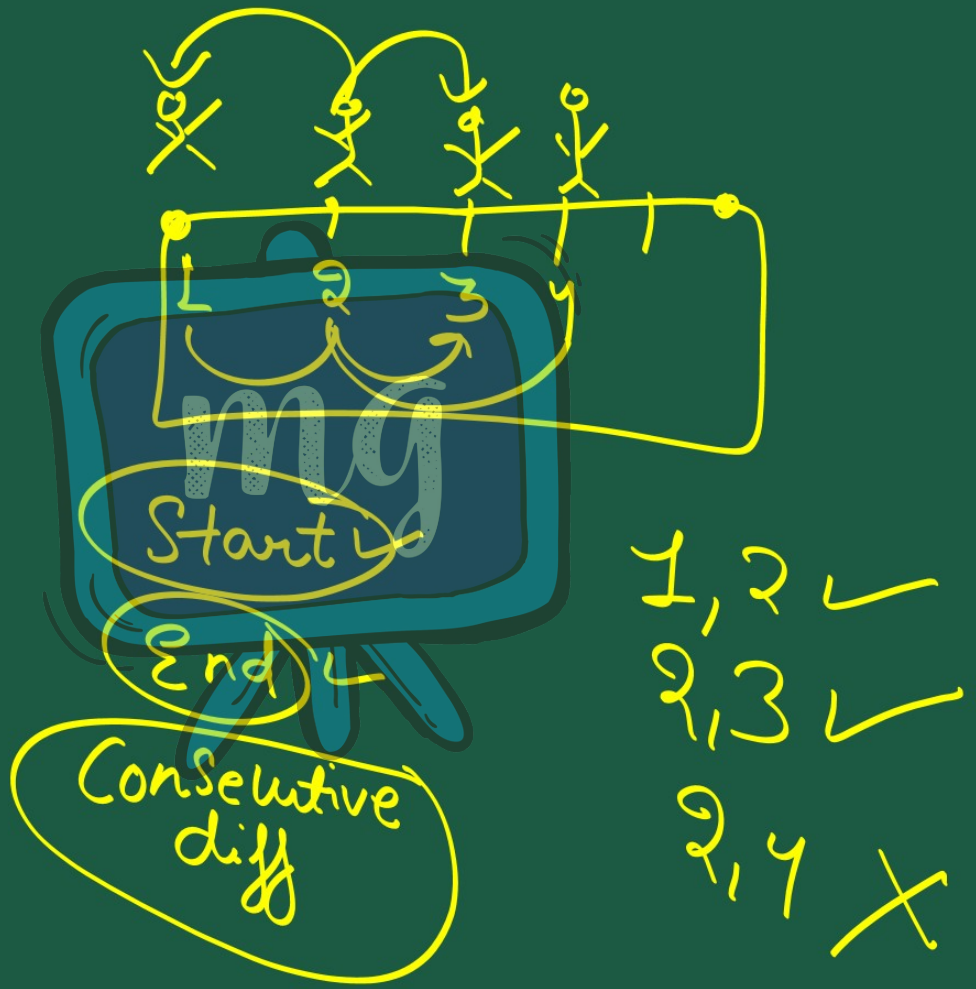

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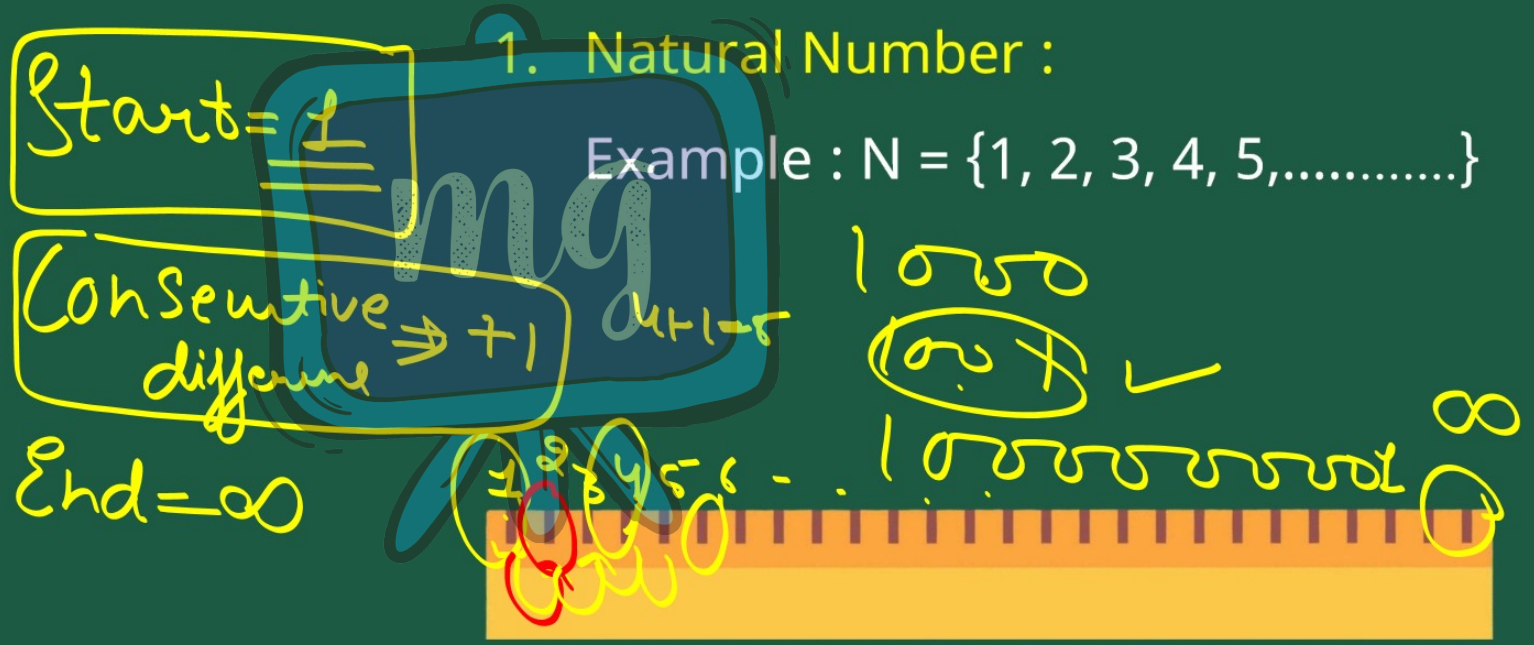
TYPES OF NUMBERS

1. Natural Number :

Example : N = {1, 2, 3, 4, 5,.....}



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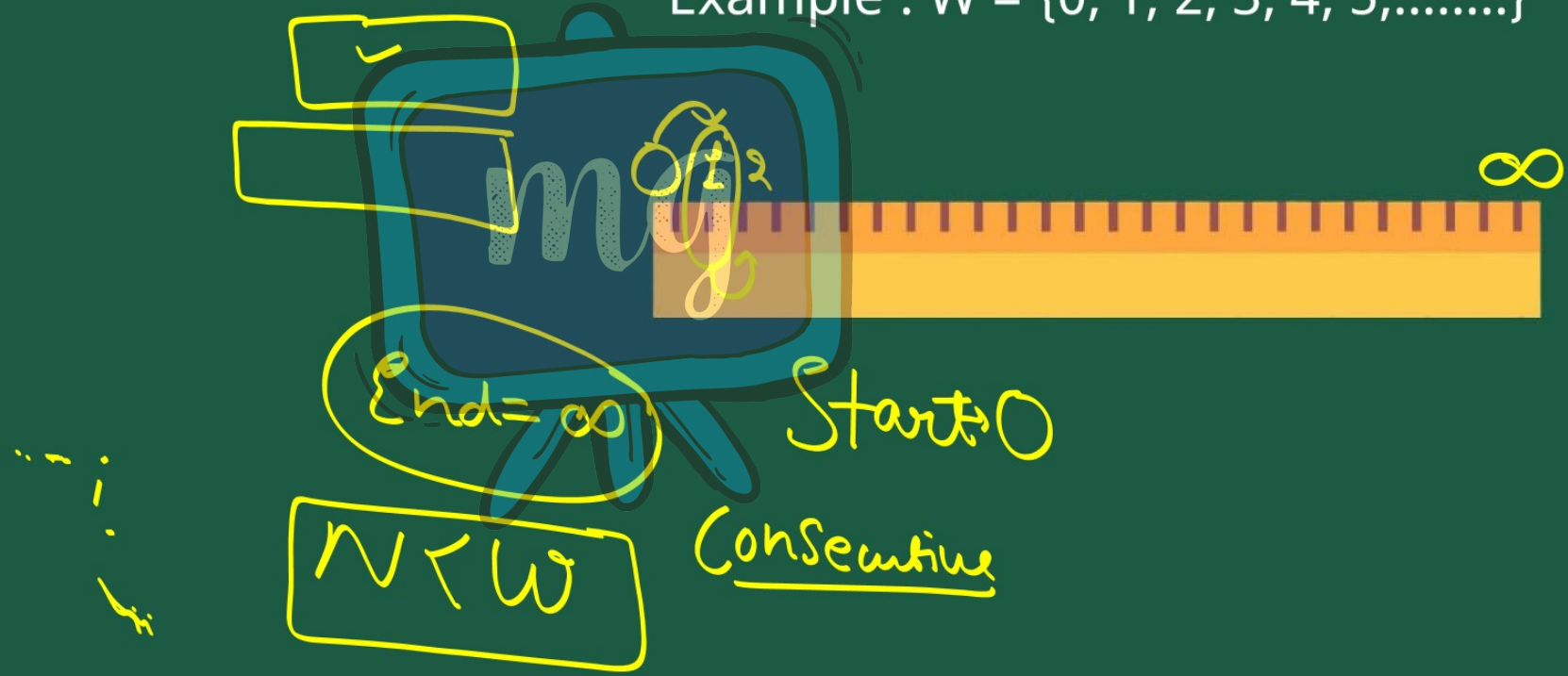
2. Whole Number :

Example : W = {0, 1, 2, 3, 4, 5,.....}



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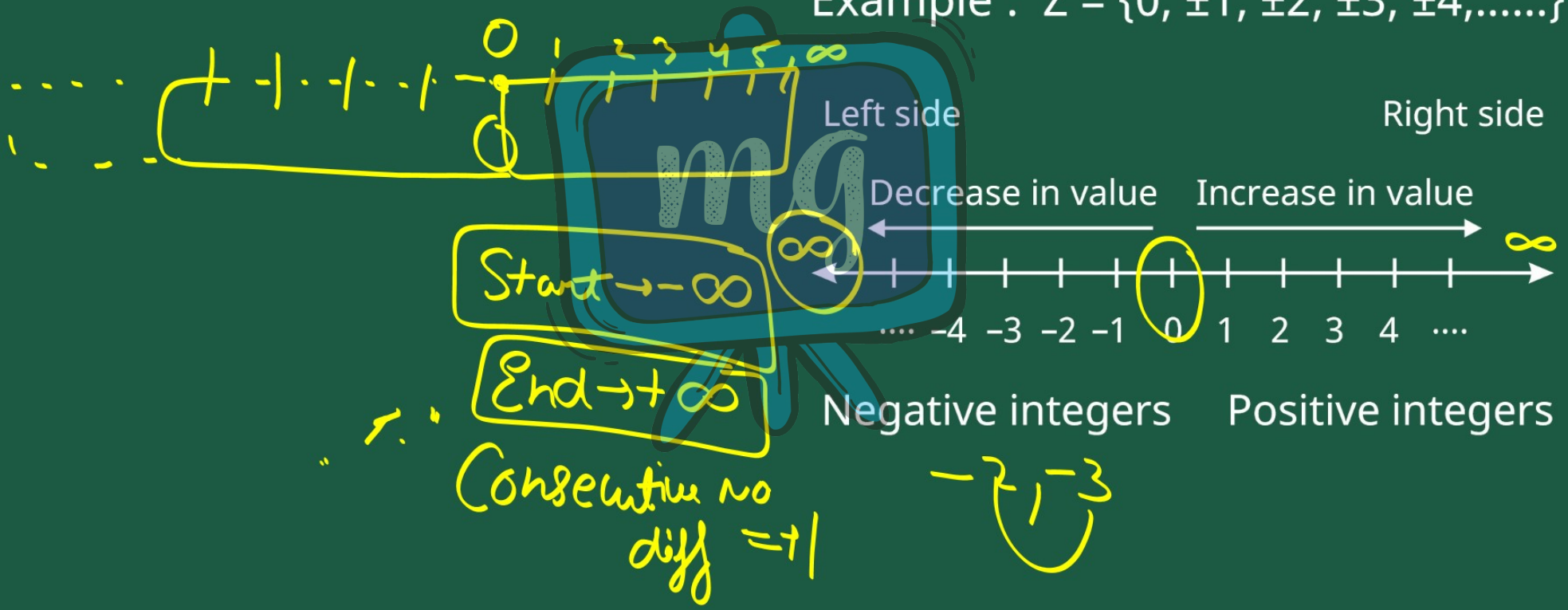
3. Integers :

Example : $Z = \{0, \pm1, \pm2, \pm3, \pm4, \ldots\ldots\}$



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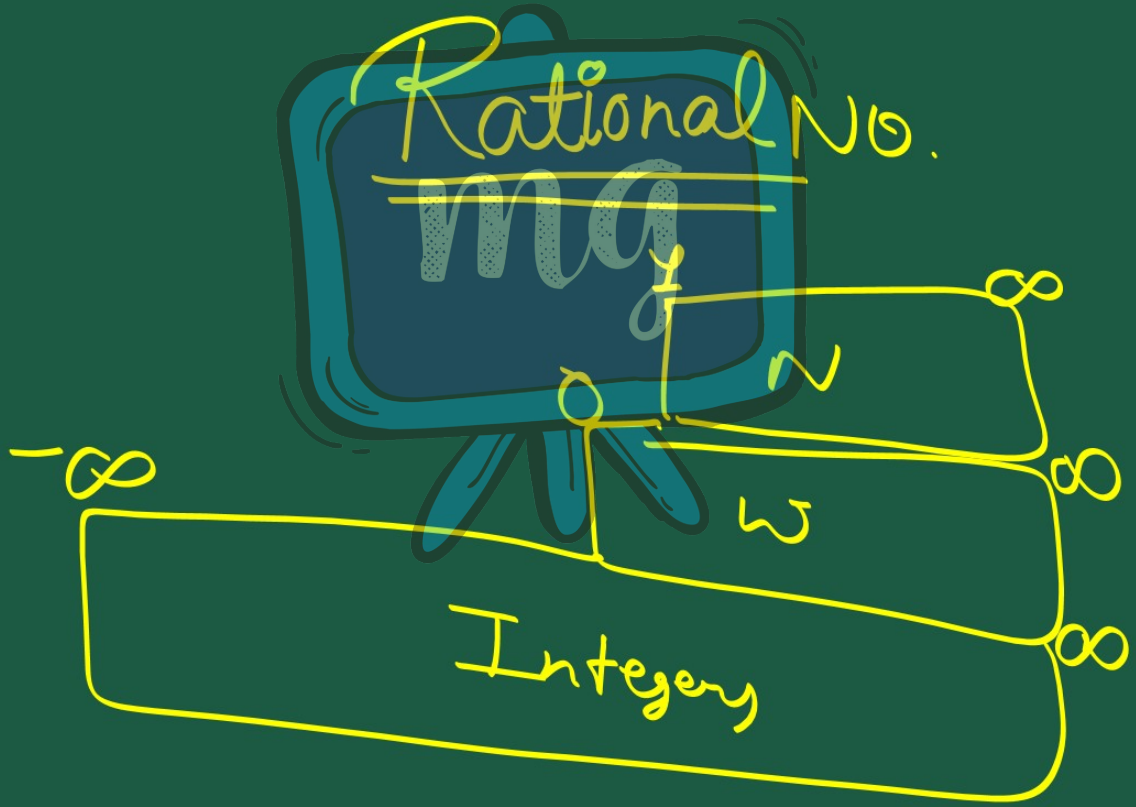

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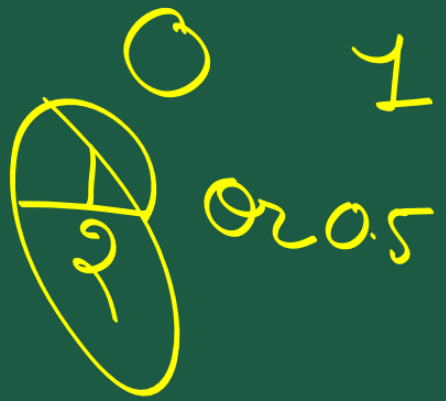

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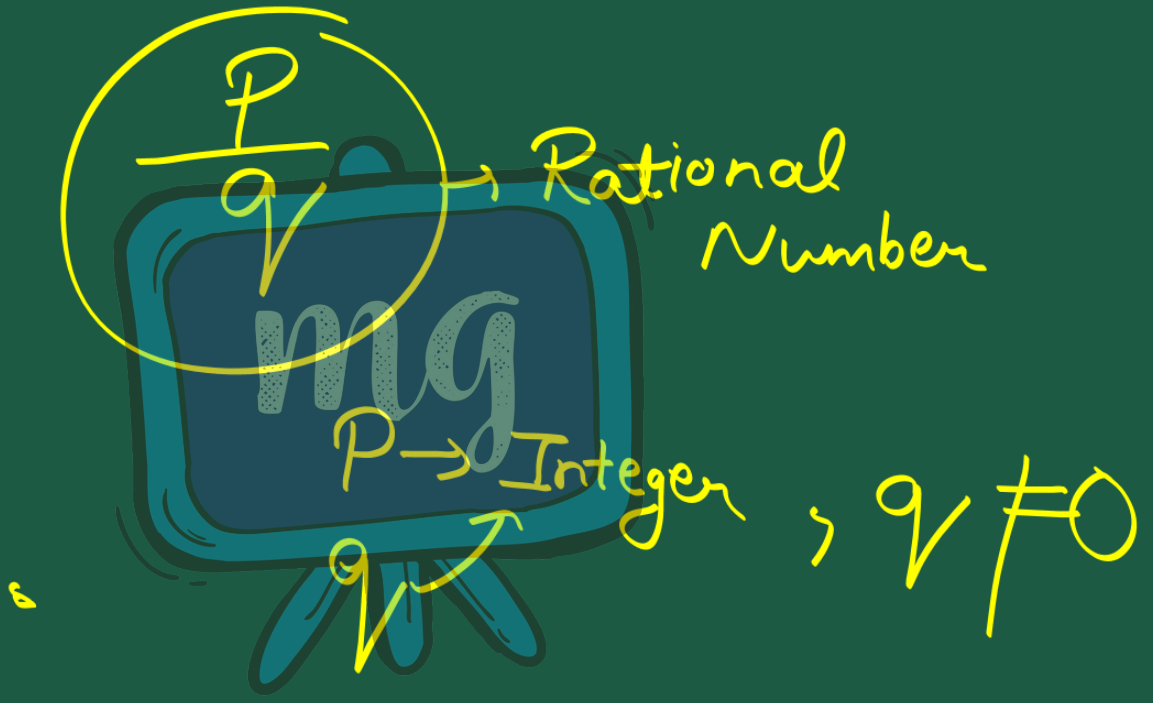

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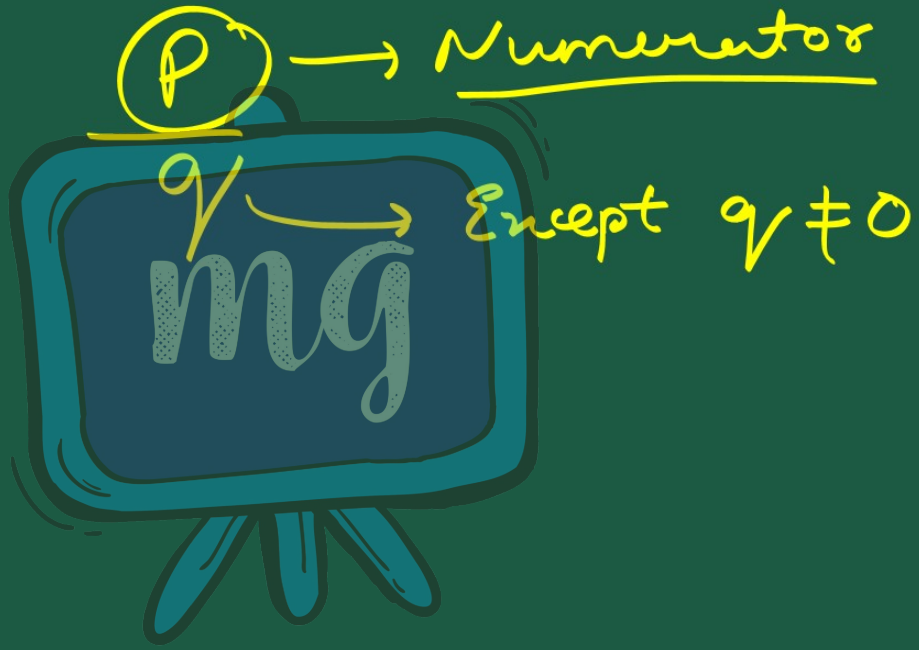

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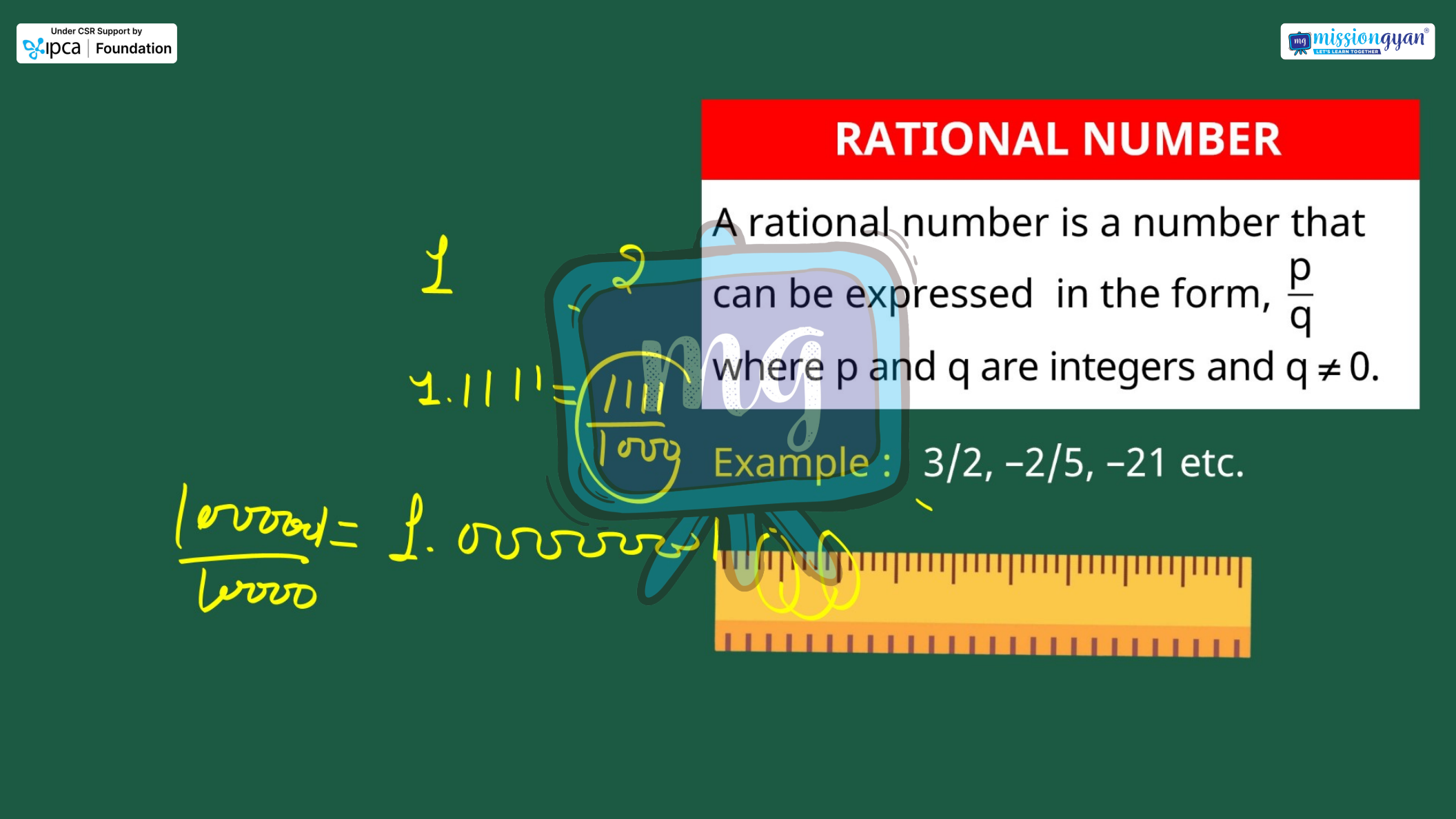
RATIONAL NUMBER

A rational number is a number that can be expressed in the form, $\frac{p}{q}$ where p and q are integers and $q \neq 0$.

Example : 3/2, –2/5, –21 etc.



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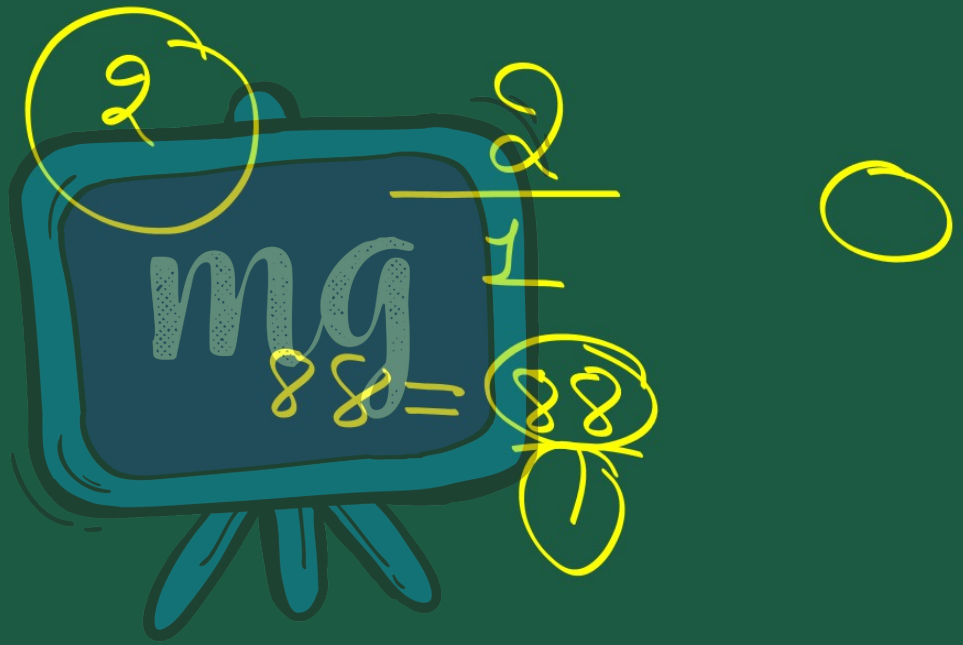

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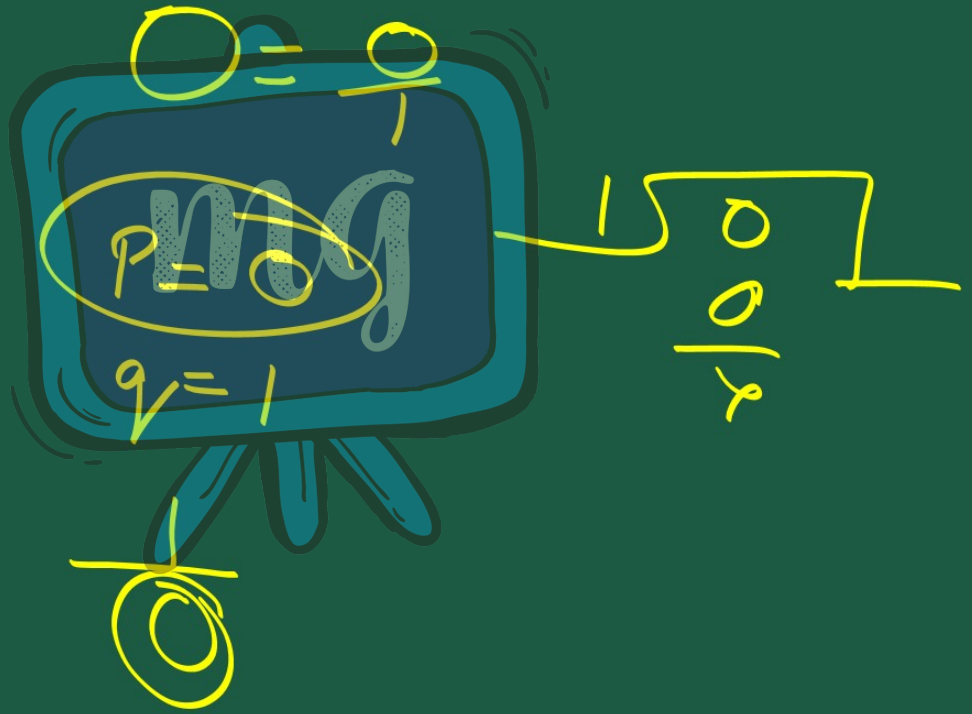

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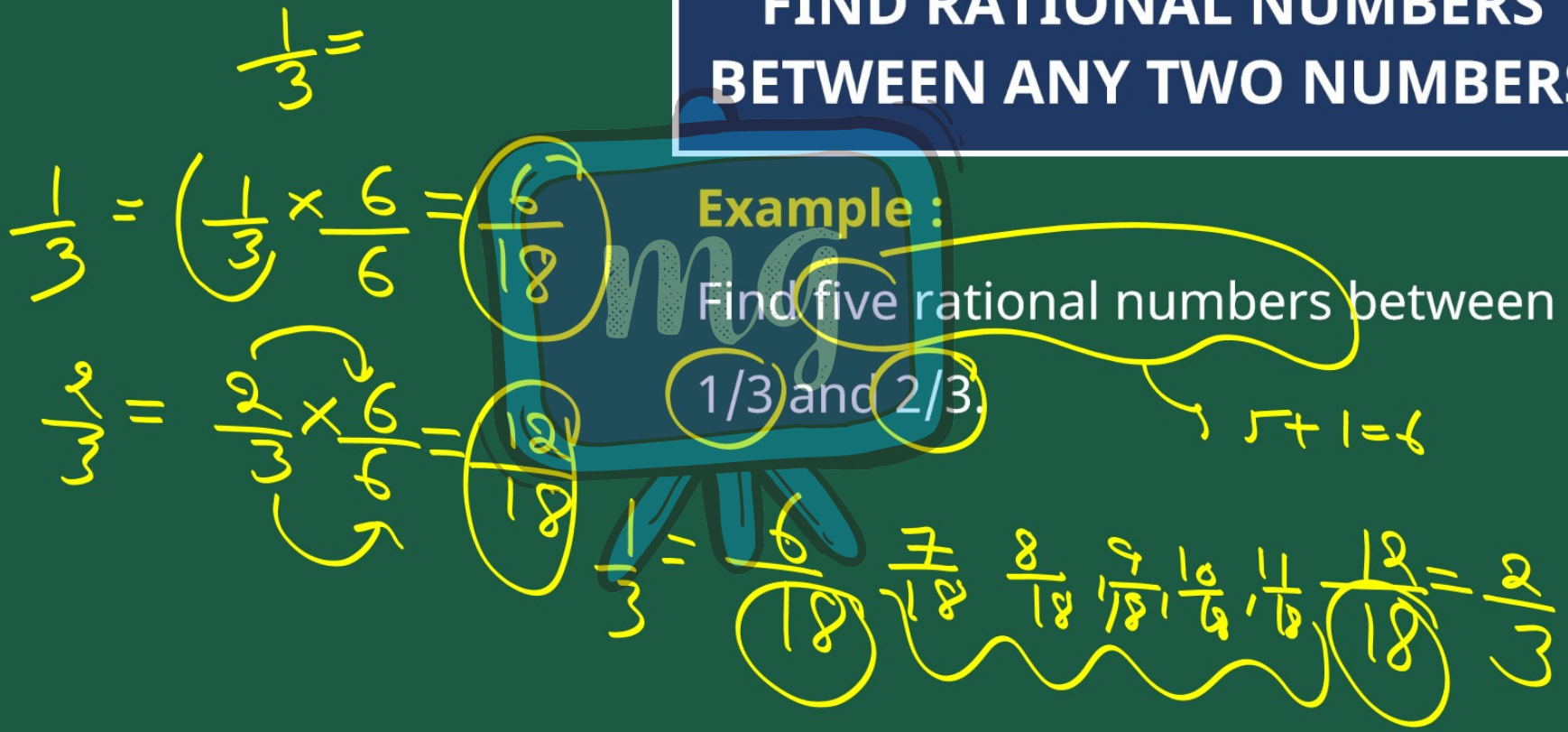
FIND RATIONAL NUMBERS BETWEEN ANY TWO NUMBERS

Example :

Find five rational numbers between 1/3 and 2/3.



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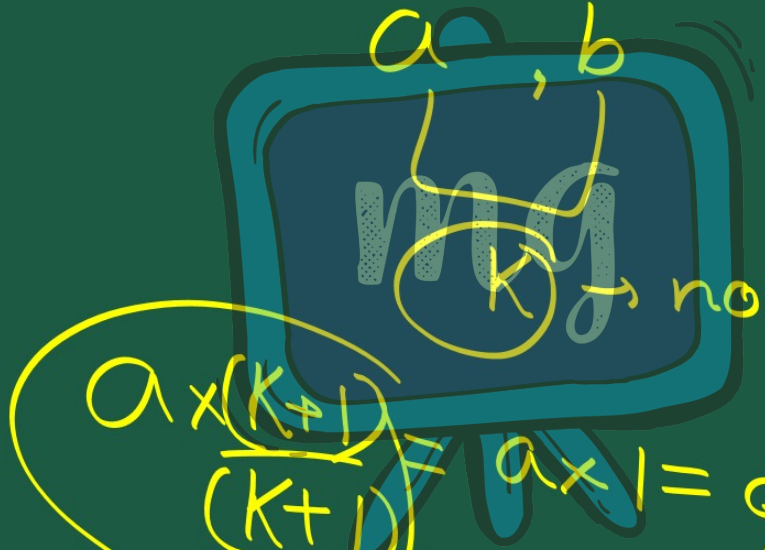

a, b

$(K+1)$

$K \rightarrow$ no. of Rational No. btw a, b

$a \times \frac{(K+1)}{(K+1)} = a \times 1 = a$

$b \times \frac{K+1}{K+1} = b$

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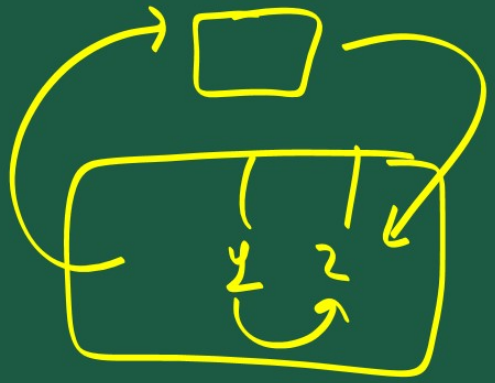

Example 1 :

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

I. Every whole number is a natural number.

II. Every integer is a rational number.

III. Every rational number is an integer.

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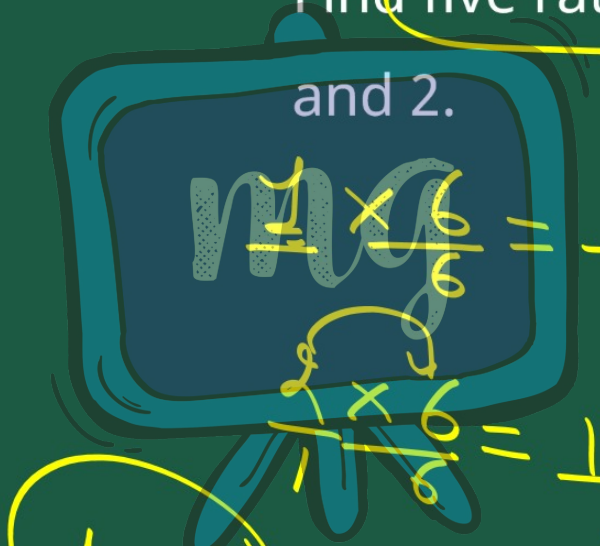
Example 2 :

Find five rational numbers between 1 and 2.



5+1=6

$1 \times \frac{6}{6} = \frac{6}{6}$

$\frac{6}{6} \times \frac{6}{6} = \frac{12}{6}$

$1 = \frac{6}{6}$, $\frac{7}{6}$, $\frac{8}{6}$, $\frac{9}{6}$, $\frac{10}{6}$, $\frac{11}{6}$, $2 = \frac{12}{6}$

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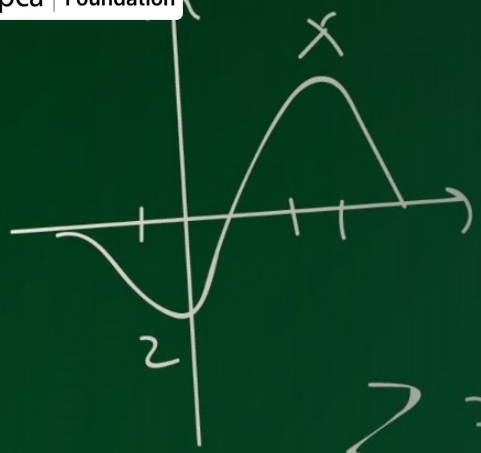

EXERCISE 1.1

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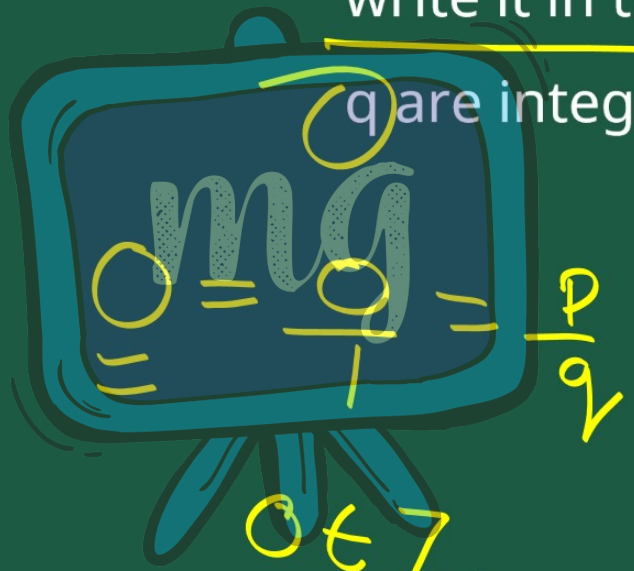
1. Is zero a rational number? Can you write it in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$?



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2. Find six rational numbers between 3 and 4.



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

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

$3 = \frac{21}{7}, \frac{22}{7}, \frac{23}{7}, \frac{24}{7}, \frac{25}{7}, \frac{26}{7}, \frac{27}{7}, \frac{28}{7} = 4$

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

$5+1=6$

$\frac{3}{5} \times \frac{6}{6} = \frac{18}{30}$

$\frac{4}{5} \times \frac{6}{6} = \frac{24}{30}$

$\frac{3}{5} = \frac{18}{30}$

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

$\frac{24}{30} = \frac{4}{5}$

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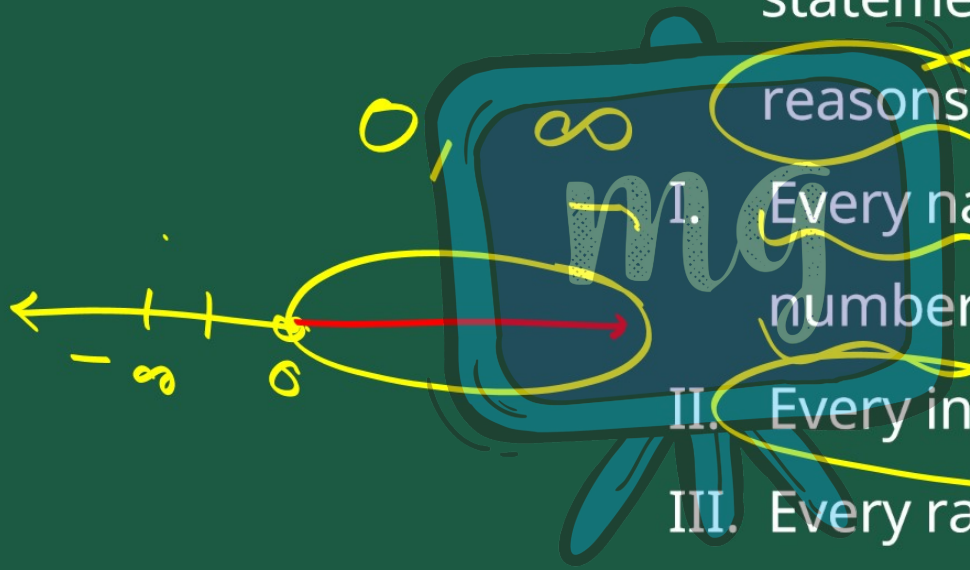

4. State whether the following statements are true or false. Give reasons for your answers.

I. Every natural number is a whole number. True

II. Every integer is a whole number. False

III. Every rational number is a whole number. False

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LEARNING OUTCOME

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1. Various types of numbers
2. Explore the relation between various type of numbers
3. Infinitely many rational numbers can be inserted between two given numbers 0

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ASSESSMENT

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1 The value of $\left(\frac{1}{2}\right) \div \left(\frac{3}{5}\right)$ is equal to :

A $\frac{3}{10}$

B $\frac{3}{5}$

C $\frac{6}{5}$

D $\frac{5}{6}$

$\frac{1}{2} \div \frac{3}{5} = \frac{1}{2} \times \frac{5}{3} = \frac{5}{6}$

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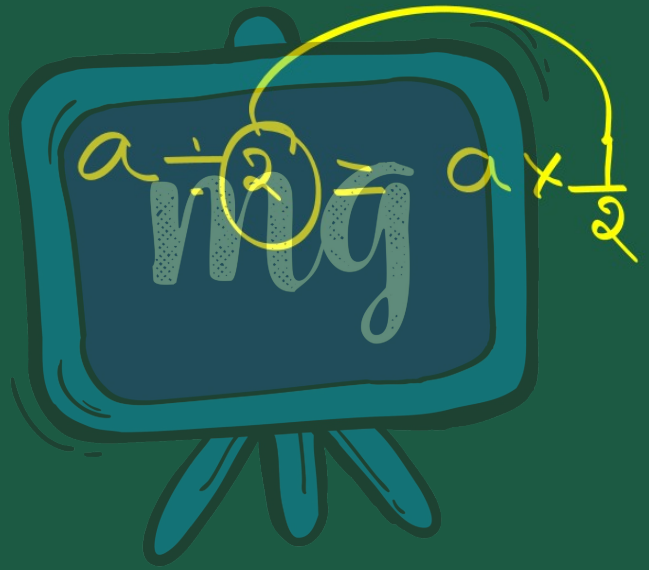

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ASSESSMENT

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2 The three rational numbers between 3 and 4 are :

A 5/2, 6/2, 7/2

B 13/4, 14/4, 15/4

C 12/7, 13/7, 14/7

D 11/4, 12/4, 13/4

$\frac{3 \times 4}{4} = \frac{12}{4}$

$\frac{4 \times 4}{4} = \frac{16}{4}$

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ASSESSMENT

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3 How many rational numbers exist between any two given rational numbers?

A One

B Zero

C Finitely many

D Infinitely many