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CLASS – 9

MATHS

CHAPTER - 1

Number System

Part – 2

Irrational 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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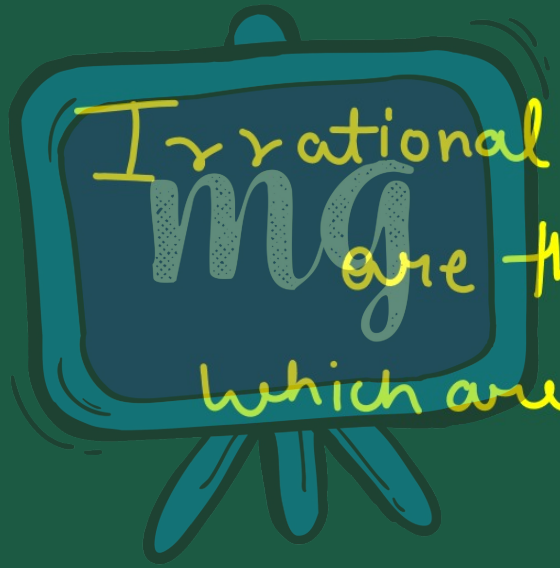
IRRATIONAL NUMBERS



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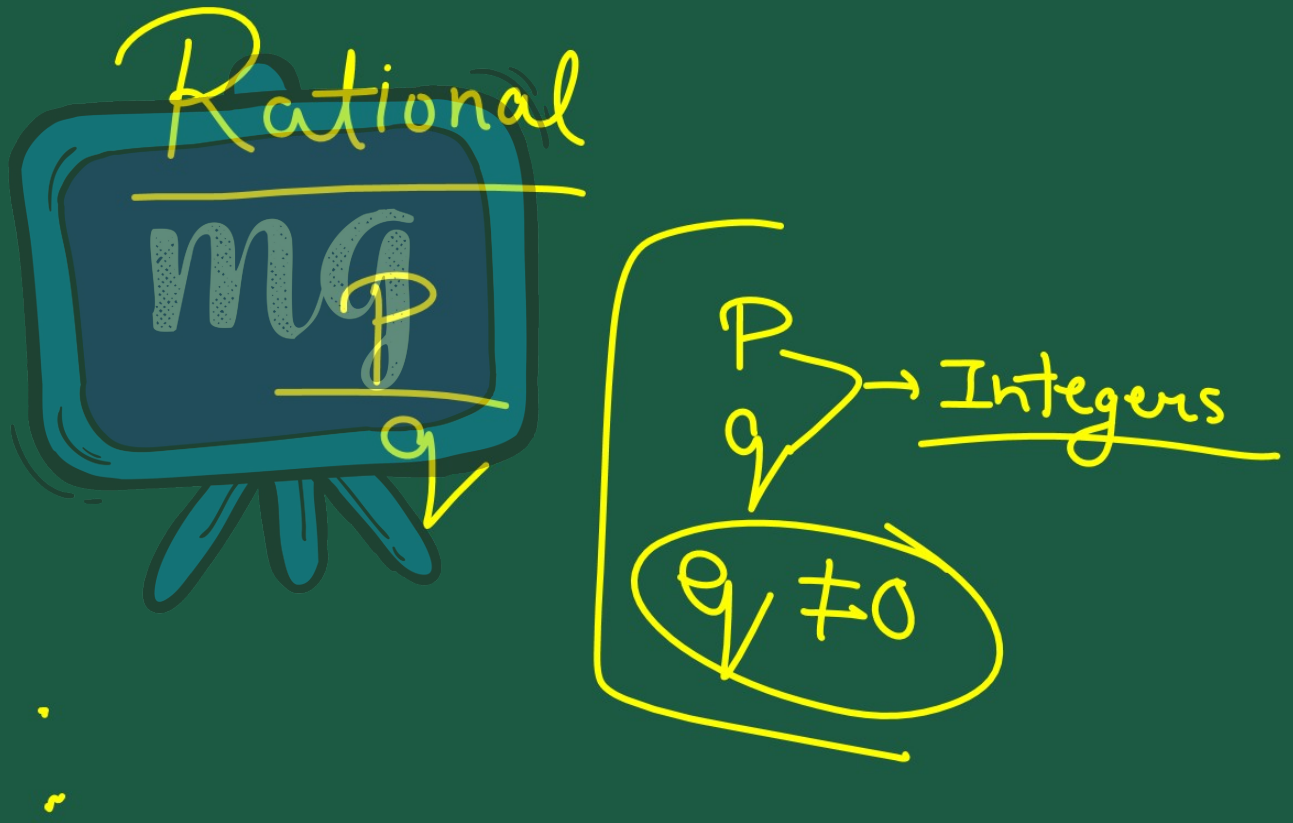

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IRRATIONAL NUMBERS

An irrational number is a number that can not be expressed form $\frac{p}{q}$, where p and q are integers and $q \neq 0$.

Examples :

1. $\sqrt{2}, \sqrt{3}, \sqrt{5}, \sqrt{6}, \ldots\ldots\ldots$
2. π, e
3). Nonterminating & Non Repeating decimal No.

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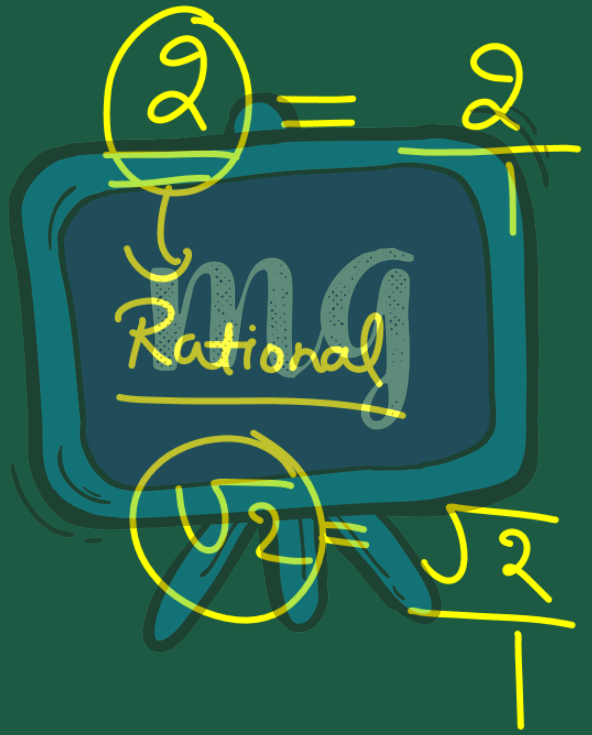

$2 \in I$

$1 \in I$

$1 \neq 0$

$2 \div 1 = 2$

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Irrational No.

$\sqrt{2} = \frac{\sqrt{2}}{1}$

$\sqrt{2} \notin I$

$1 \notin I$

$\frac{p}{q}$ p, q → Integer $q \neq 0$

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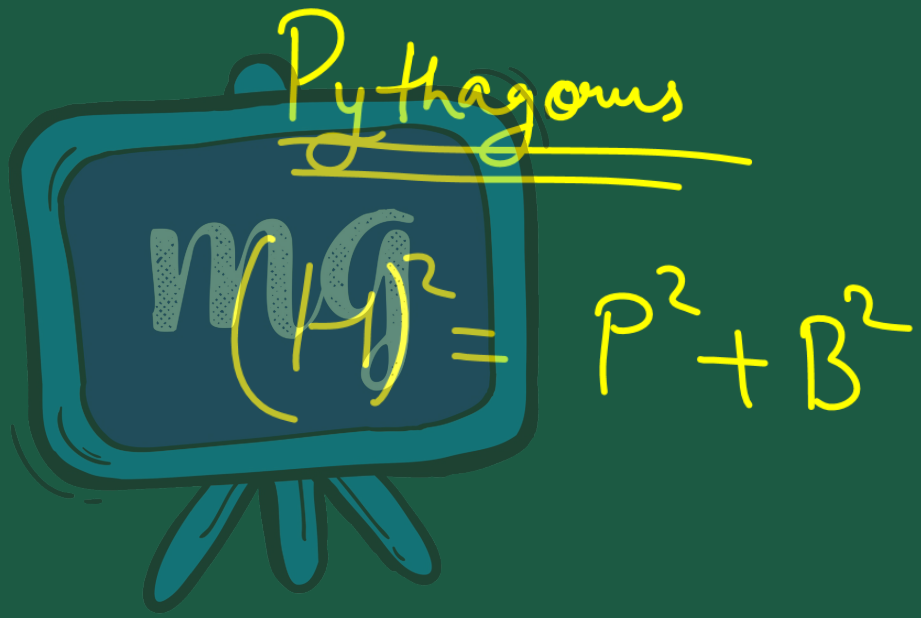

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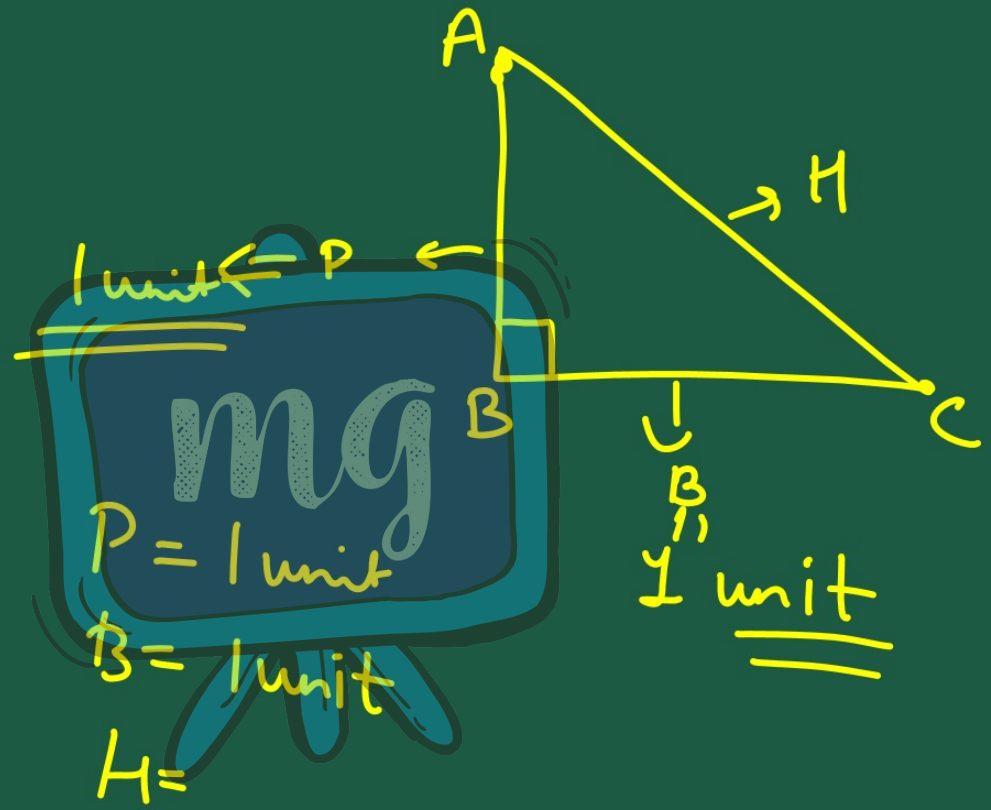

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$H^2 = P^2 + B^2$

$H^2 = (1)^2 + (1)^2$

$H^2 = 1 + 1$

$H^2 = 2$

$H = \sqrt{2}$

$2 = x^2$ ✗

$\sqrt{2} =$ irr

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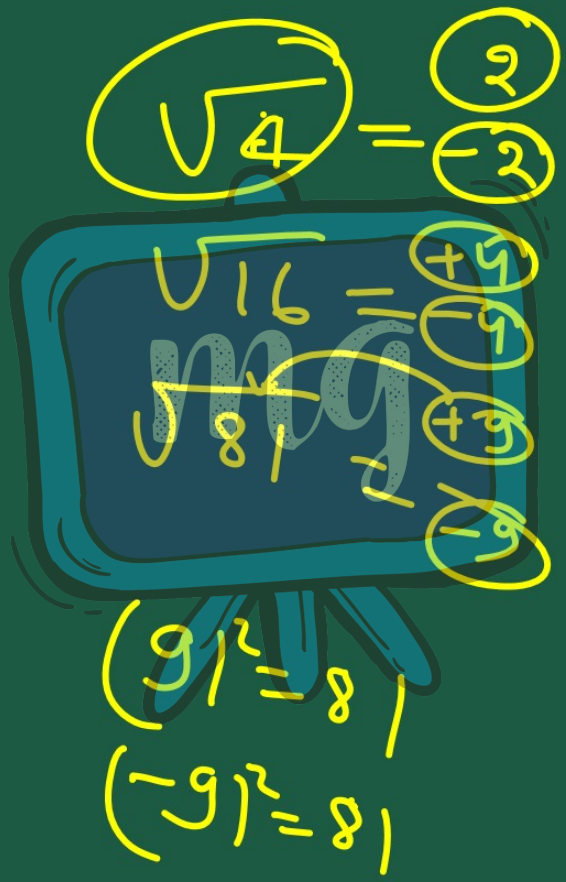

$\sqrt{2} = ?$

$\sqrt{2}$

$(1)^2 = 1$

$(2)^2 = 4$

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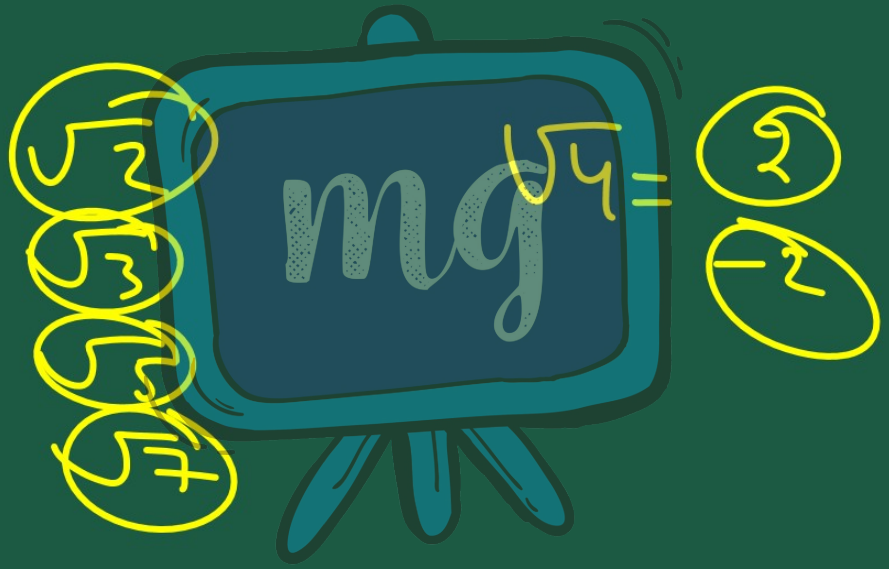

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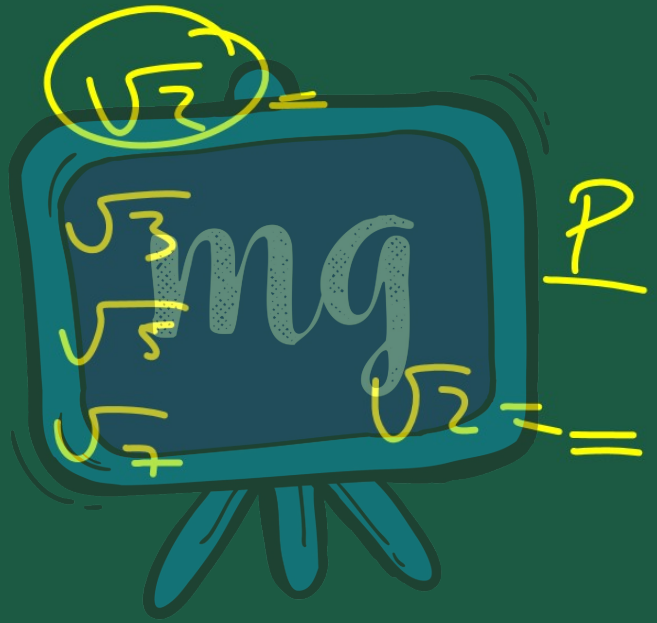

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Question :

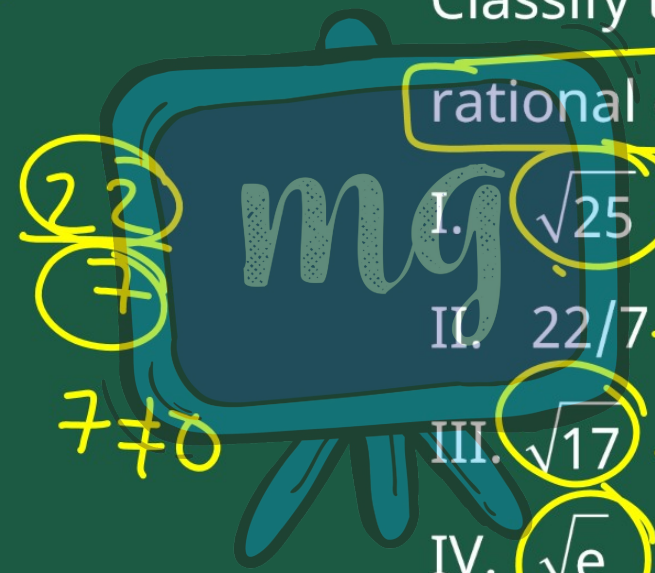
$\sqrt{17} = - \ldots$

Classify the following numbers as rational or irrational :

$\frac{22}{7}$

$7 \neq 0$

I. $\sqrt{25} = 5, -5 \rightarrow$ Rational



II. $22/7 \rightarrow$ Rational No.

III. $\sqrt{17} \rightarrow$ Irrational

IV. $\sqrt{e} \rightarrow$ Irrational

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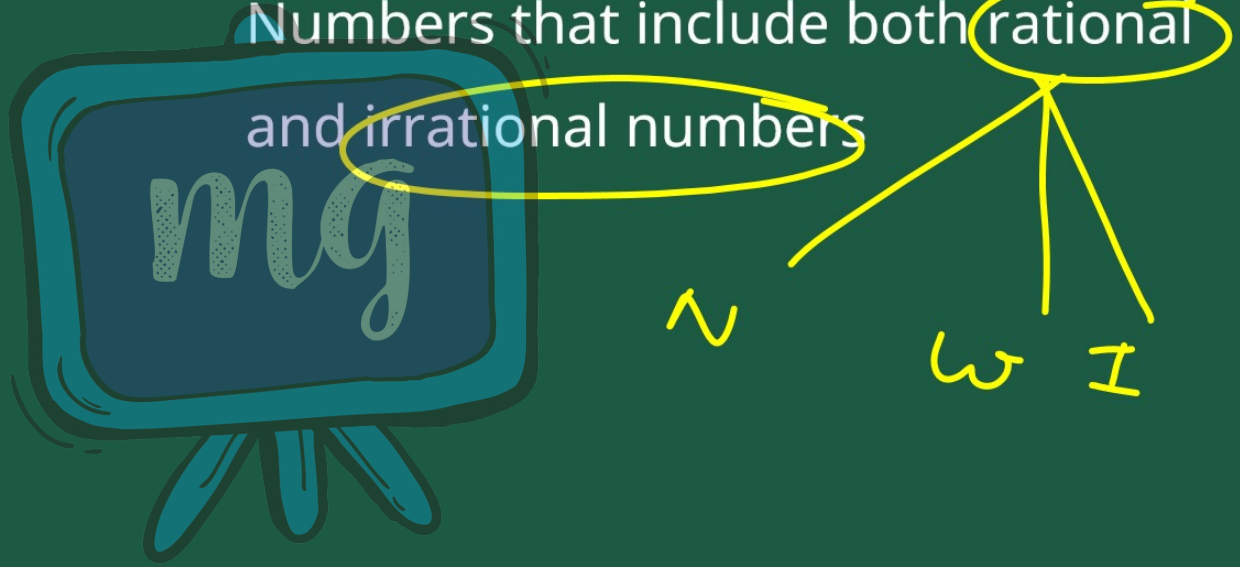
REAL NUMBERS

Numbers that include both rational and irrational numbers



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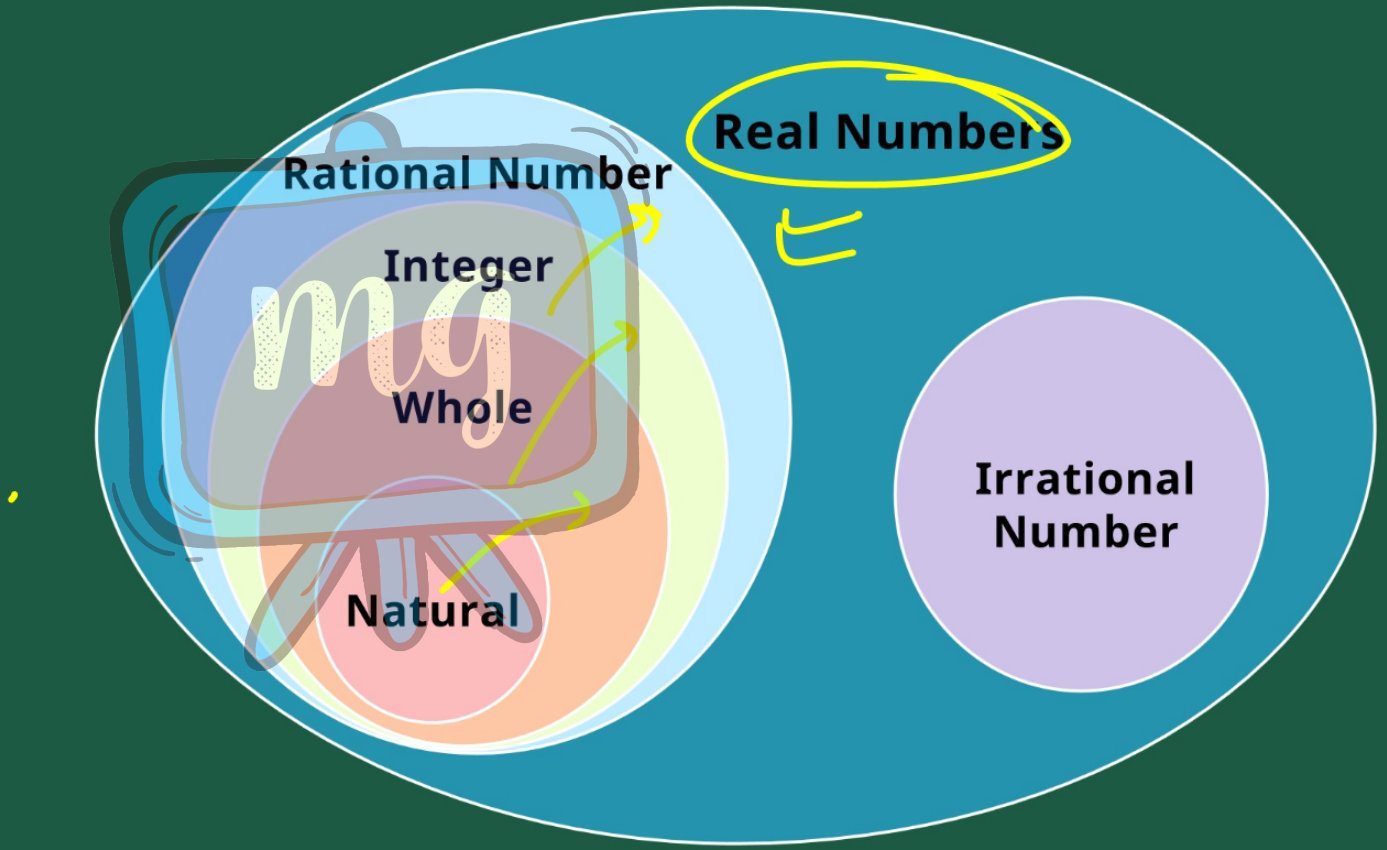

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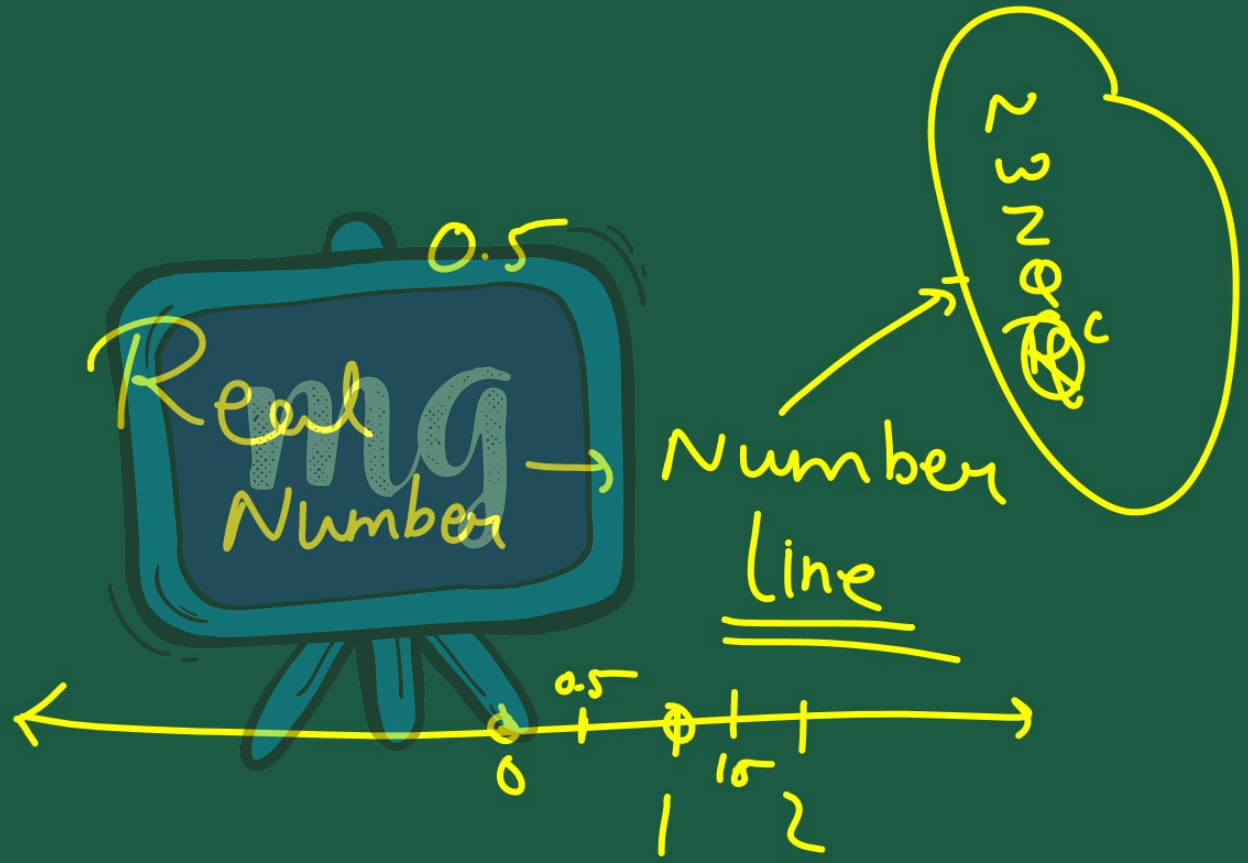

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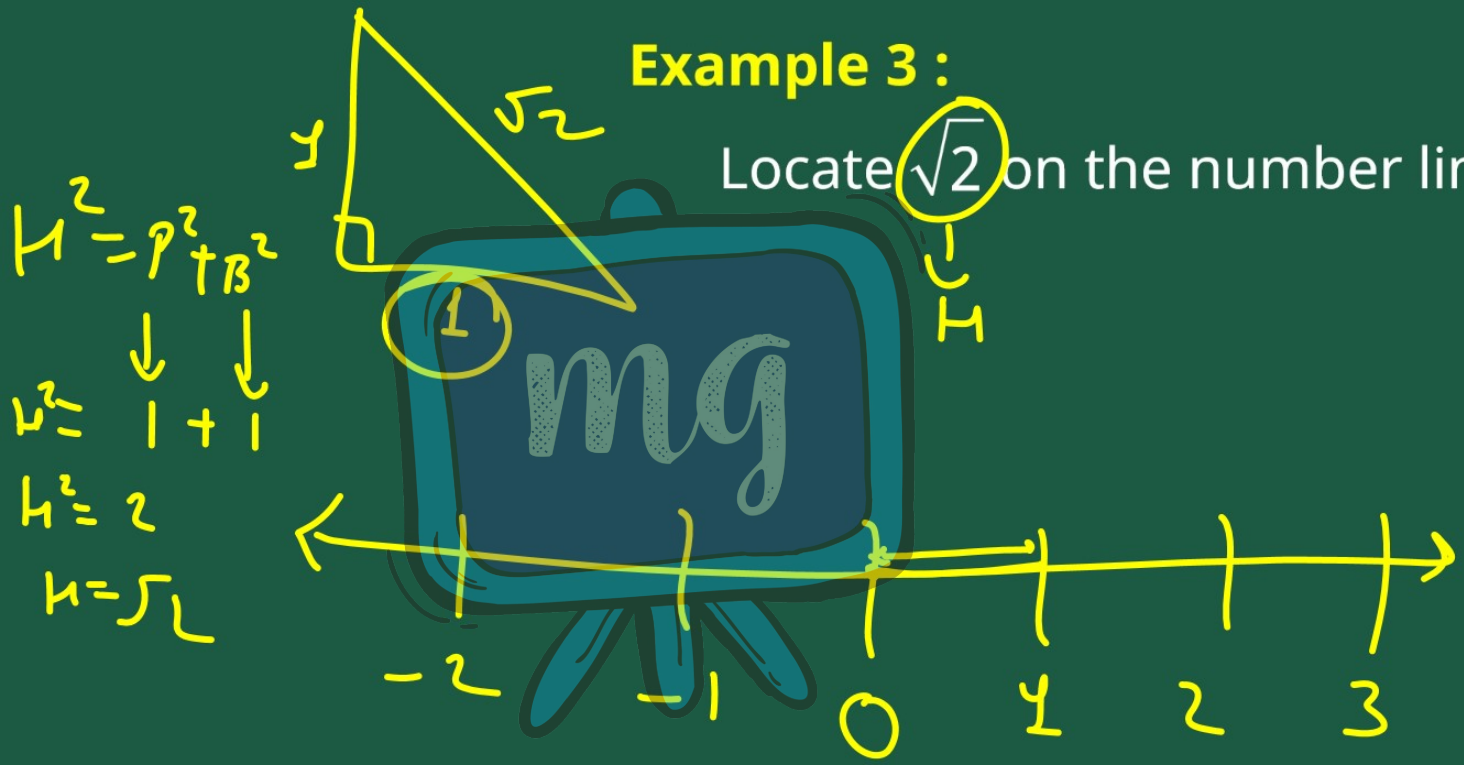
Example 3 :

Locate $\sqrt{2}$ on the number line.



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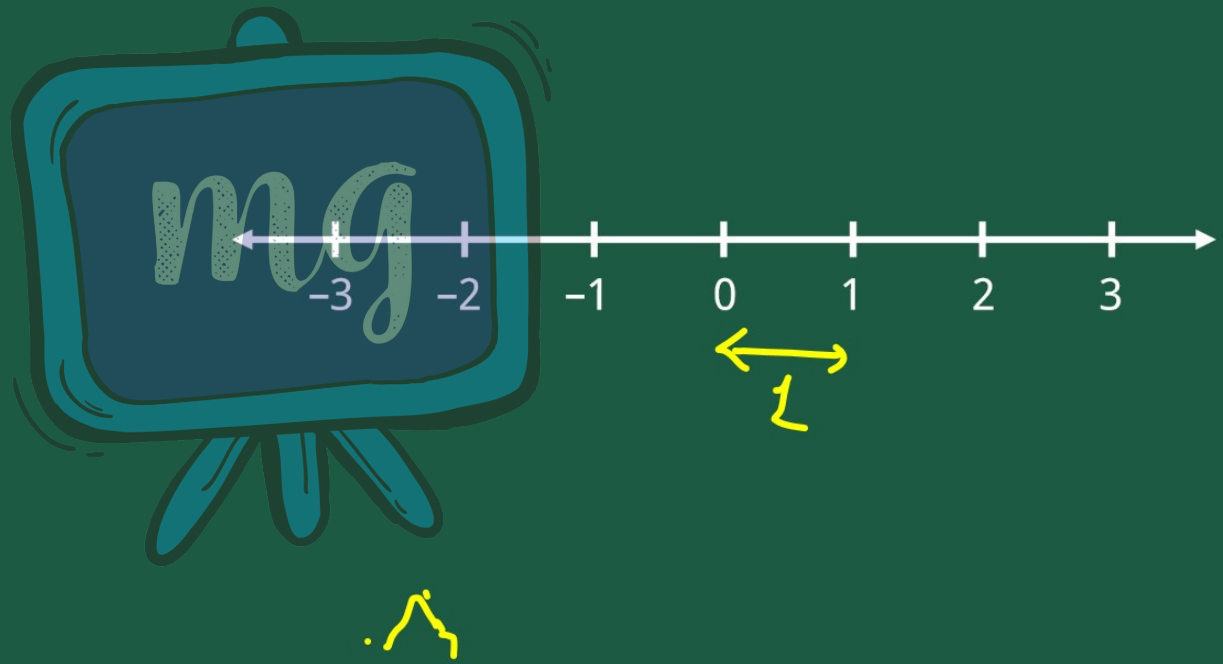

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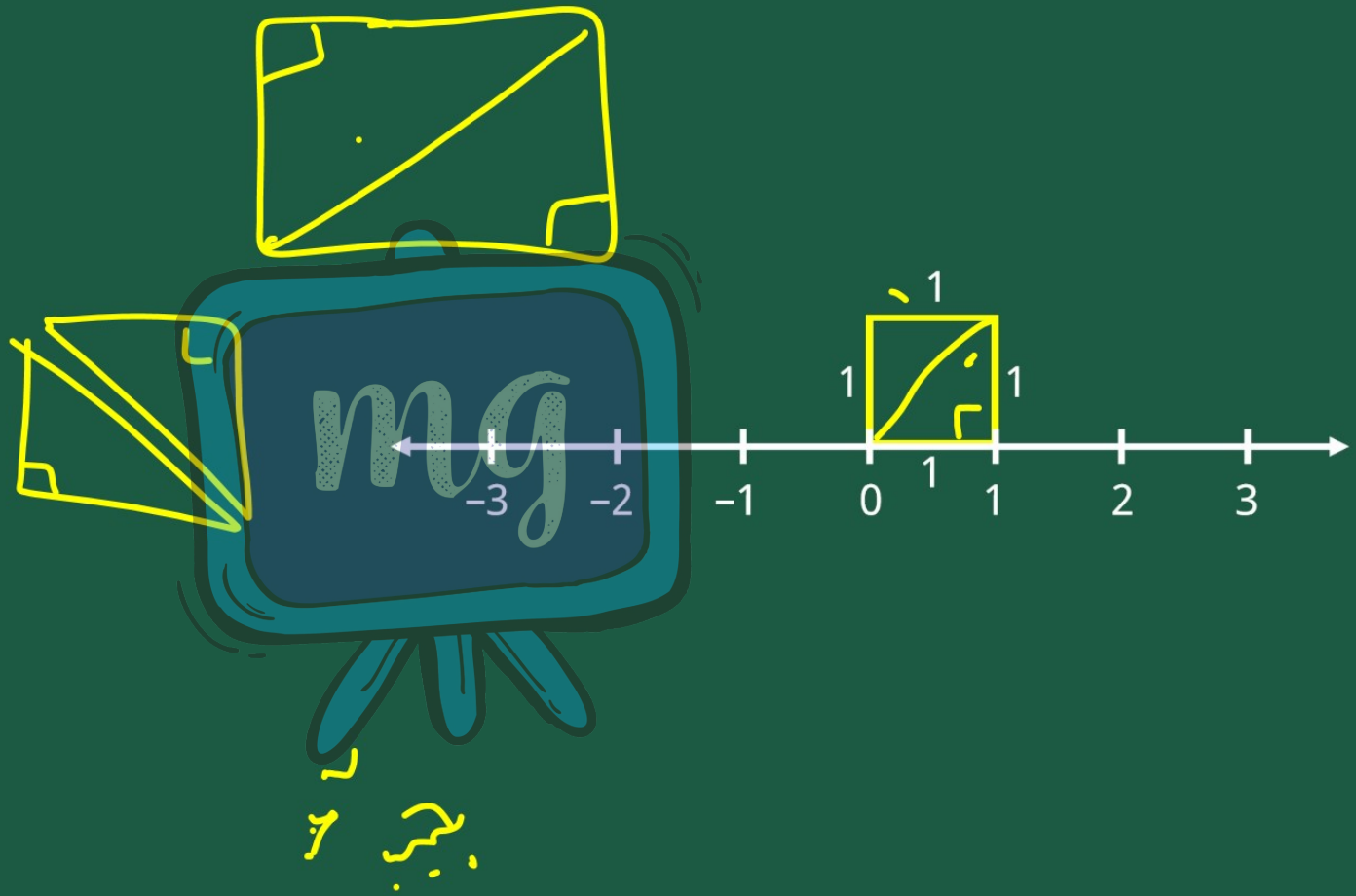

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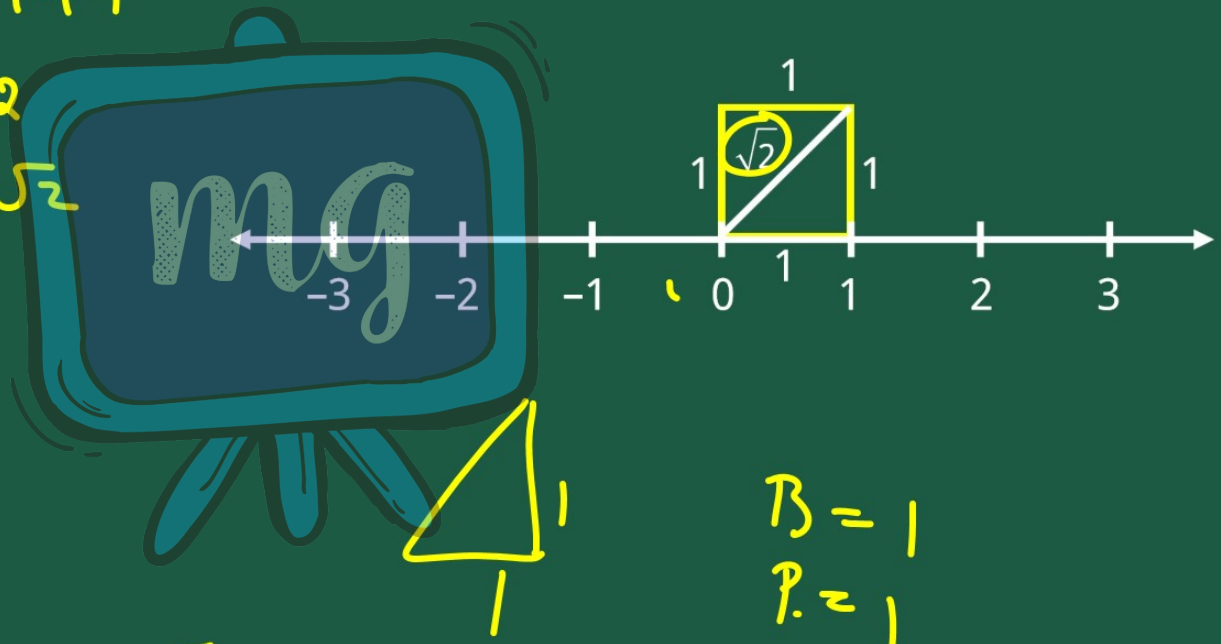
$H^2 = (1)^2 + (1)^2$

$H^2 = 1 + 1$

$H^2 = 2$

$H = \sqrt{2}$



$B = 1$

$P = 1$

$H^2 = P^2 + B^2$

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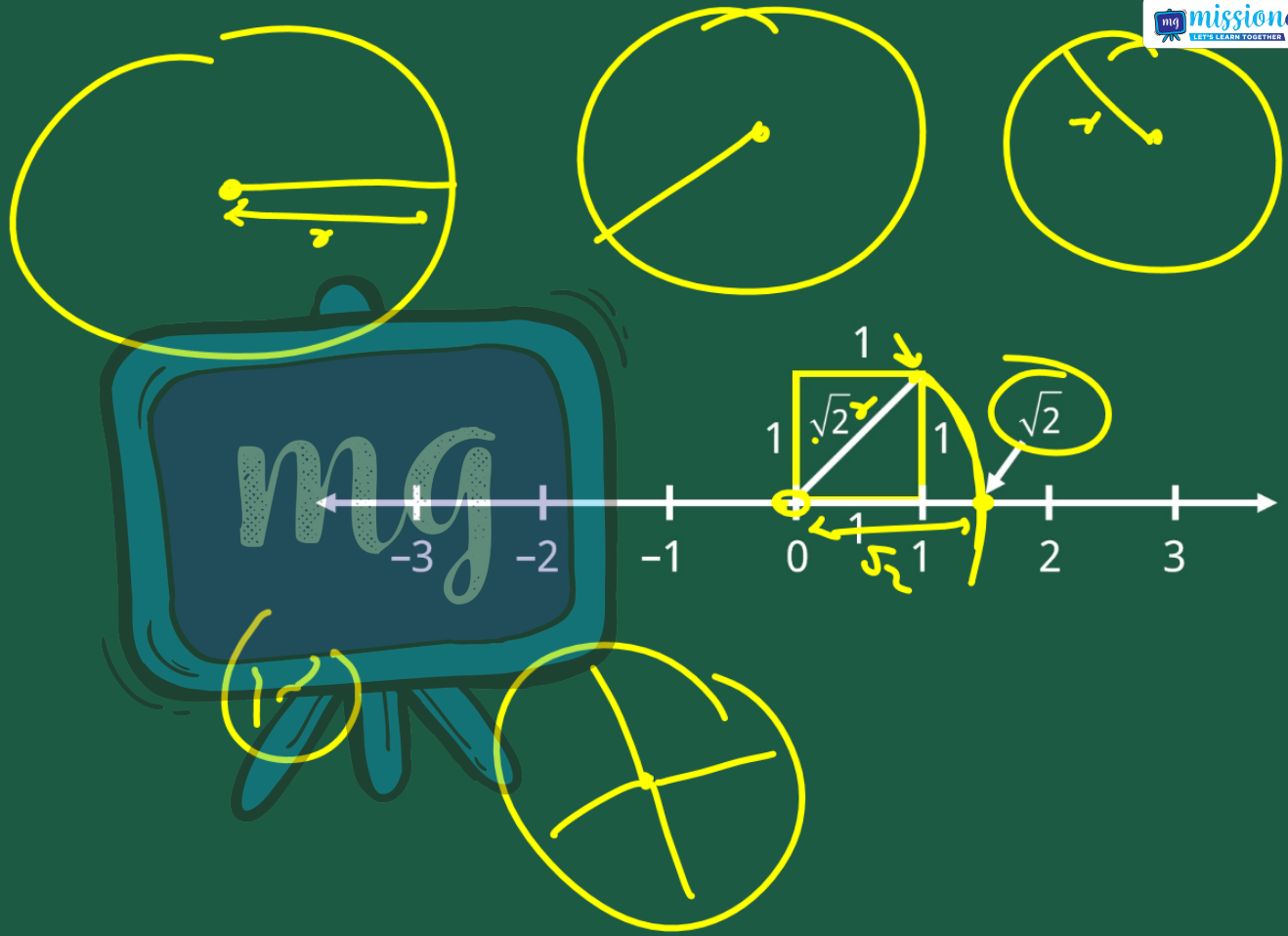

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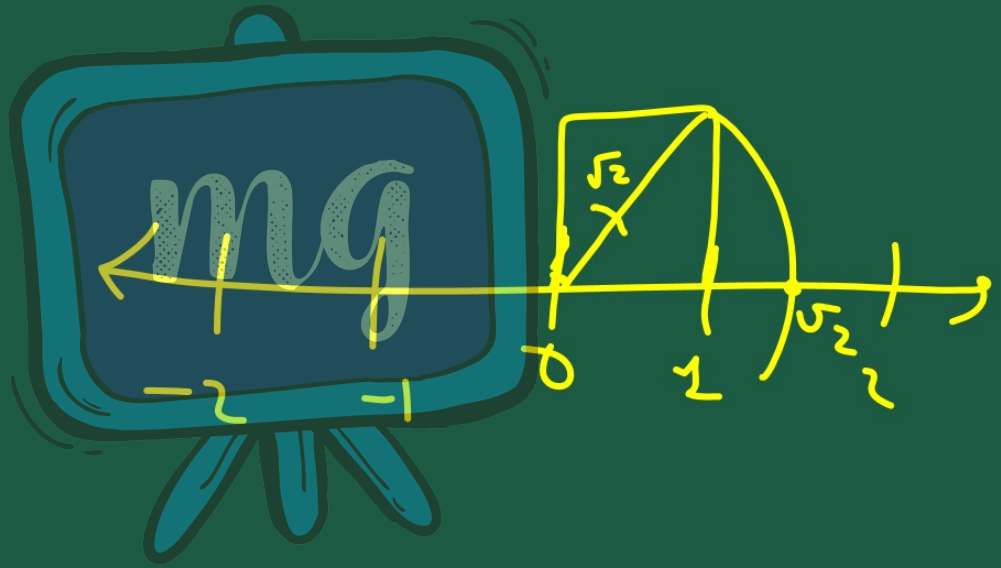

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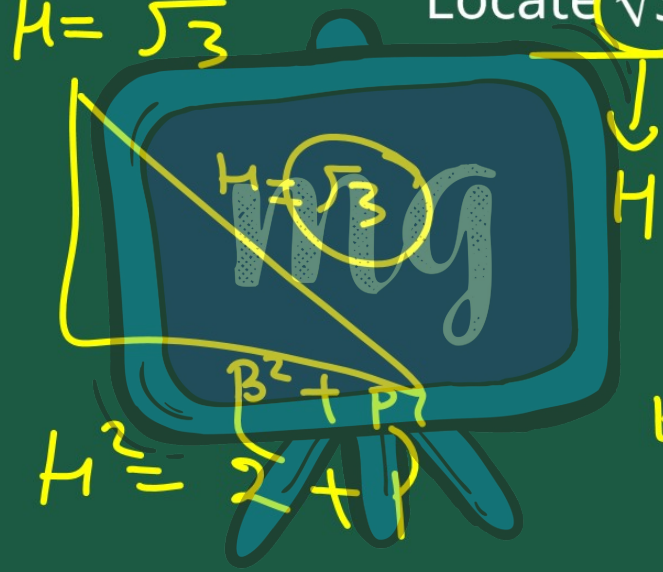
P = 1

B = √2

H = √3

Example 4 :

Locate $\sqrt{3}$ on the number line.



H

$H^2 = 3$

$H^2 = P^2 + B^2$

$2^3 + 1$

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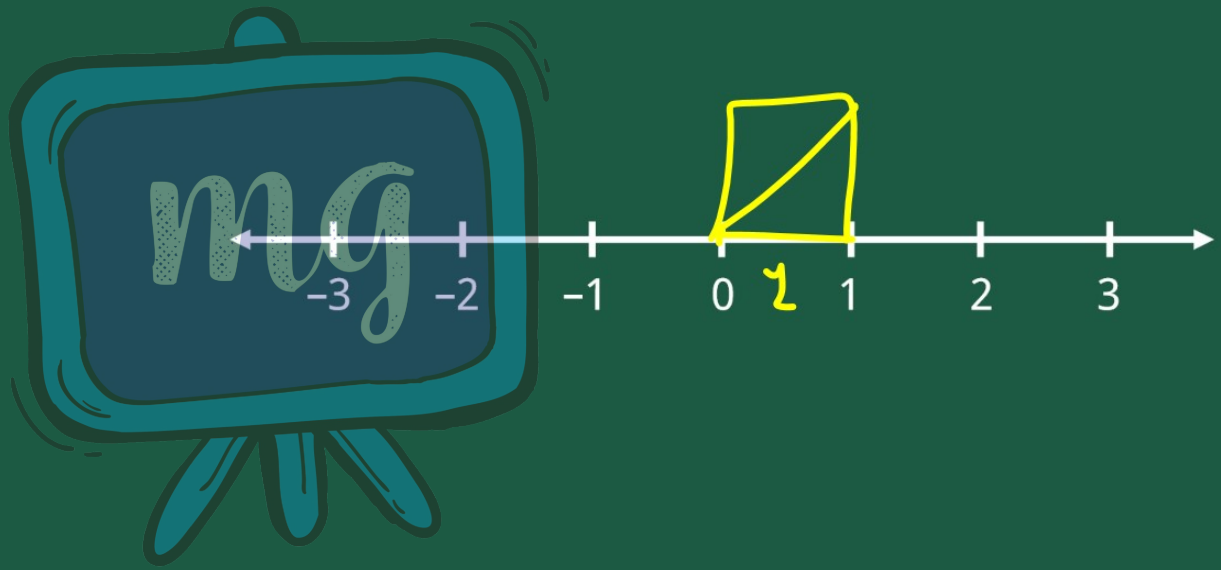

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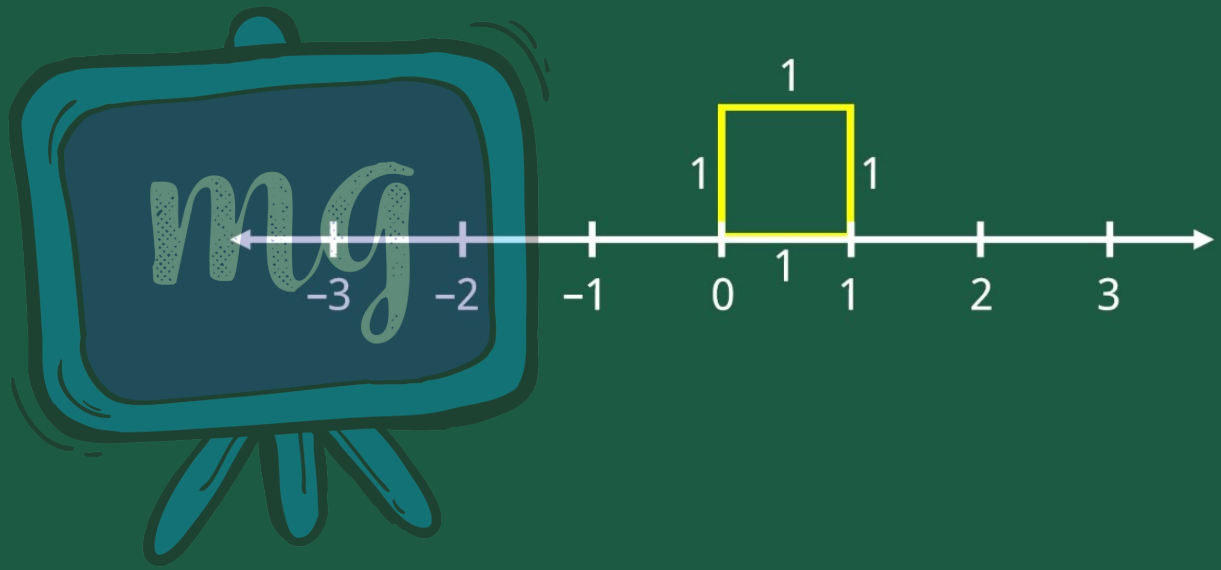

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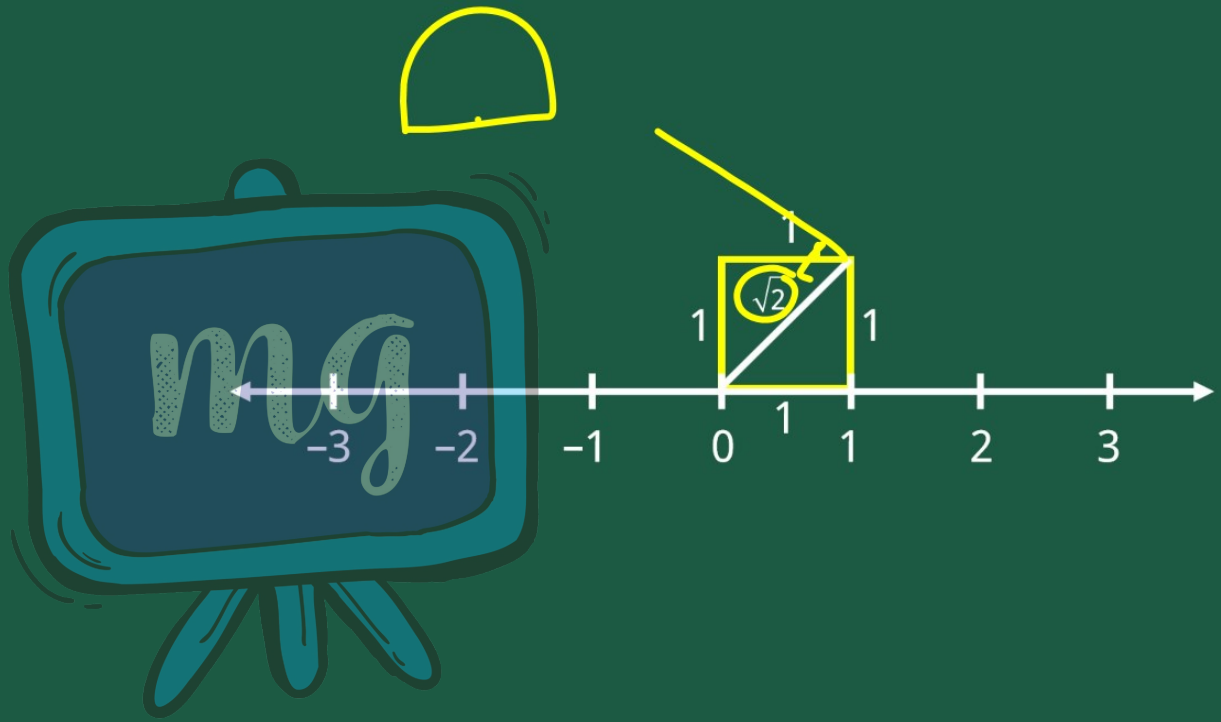

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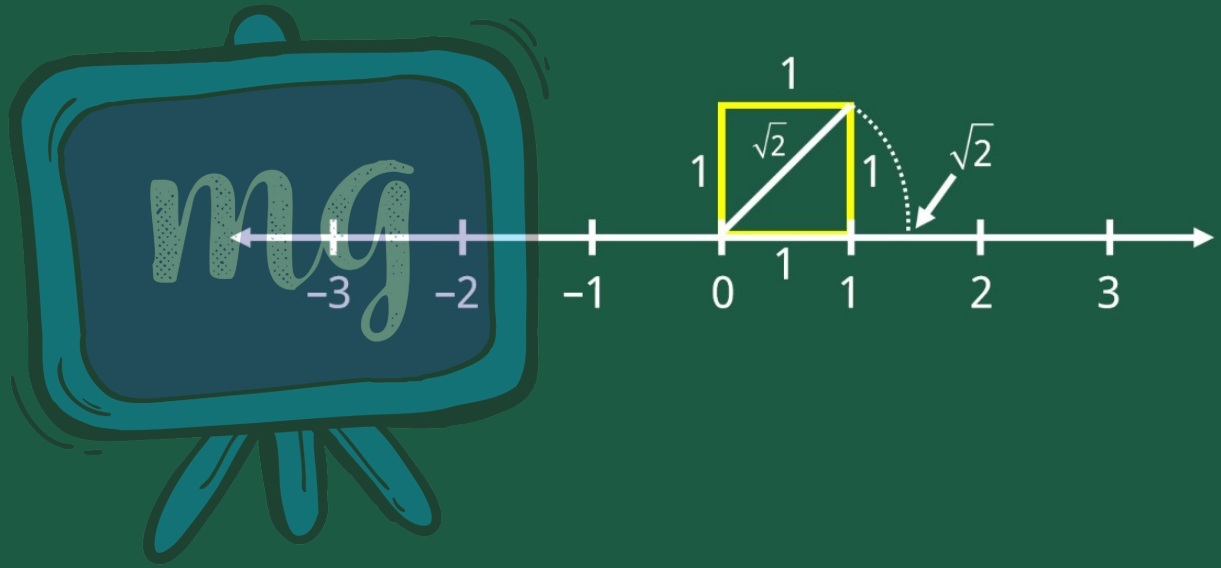

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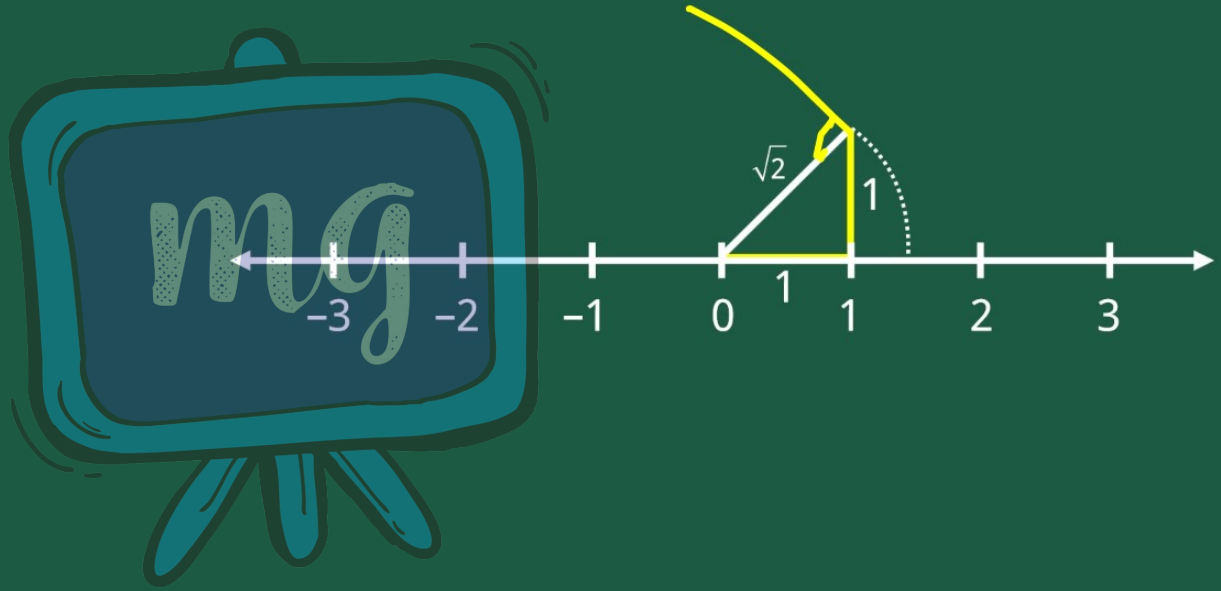

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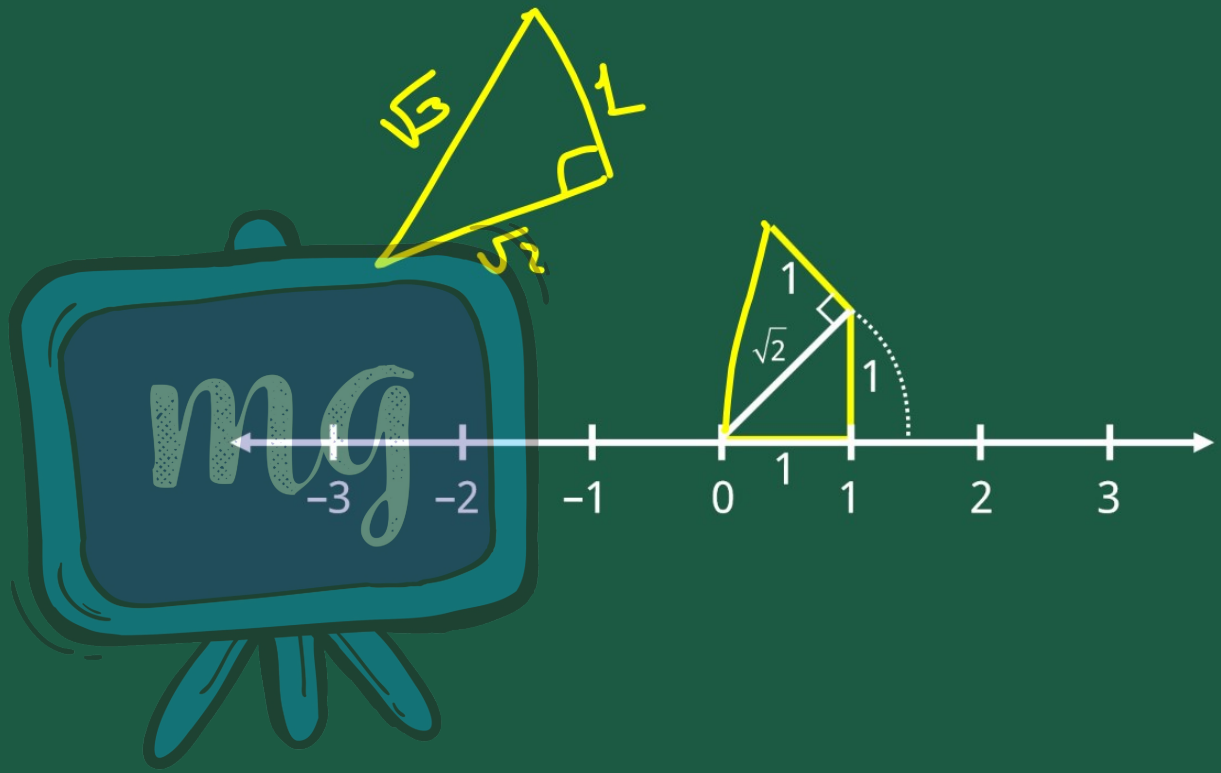

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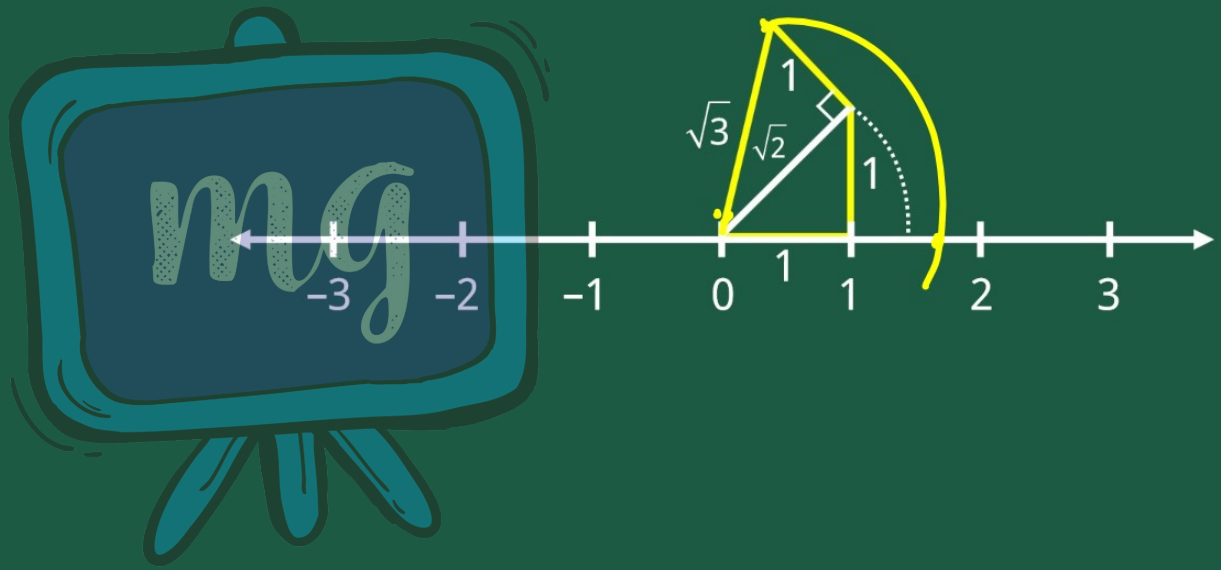

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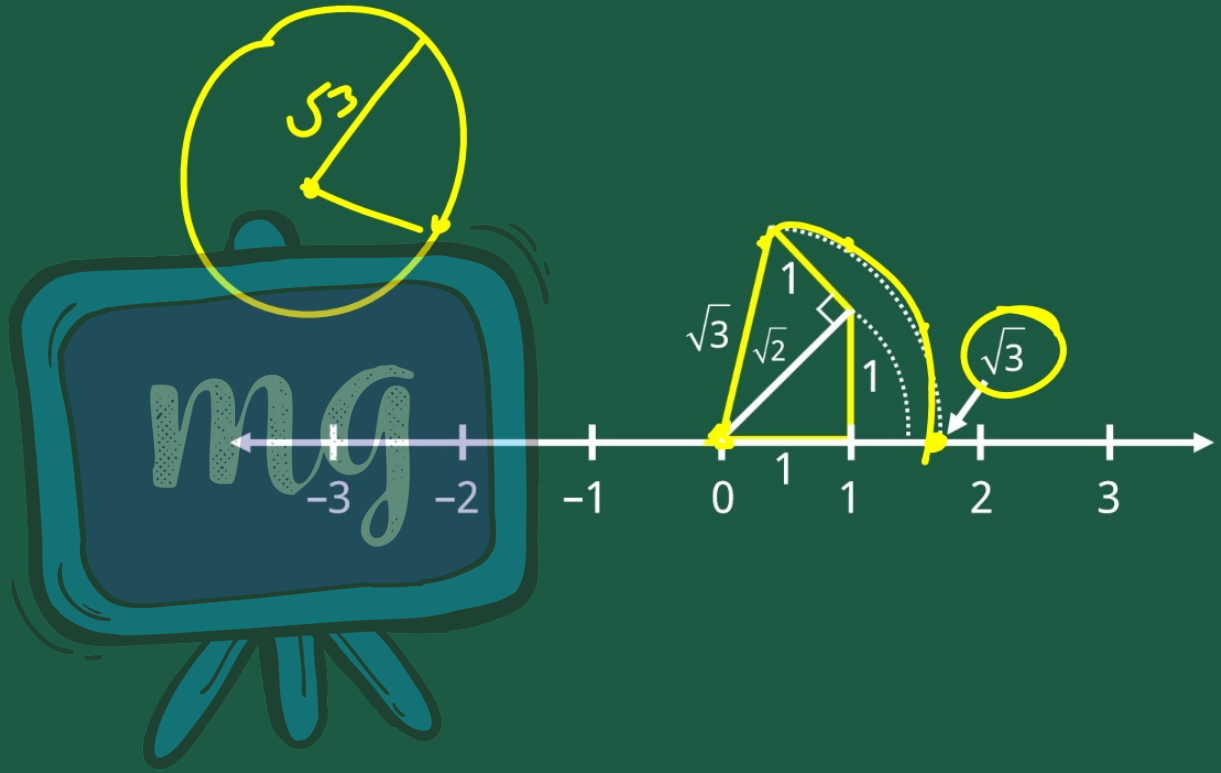

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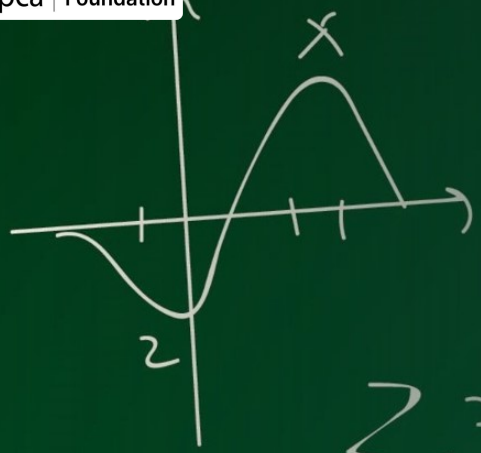
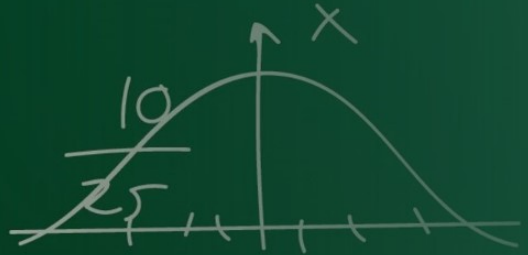


$\frac{\sqrt{3}}{4} = (a^2)$

$a^2 + b^2 = c^2$

$\Delta = \Delta r - \left(1 - \frac{v^2}{c^2}\right) \Delta^2$

$A = \pi r^2$



EXERCISE 1.2

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1. State whether the following statements are true or false. Justify your answers.

I. Every irrational number is a real number. True



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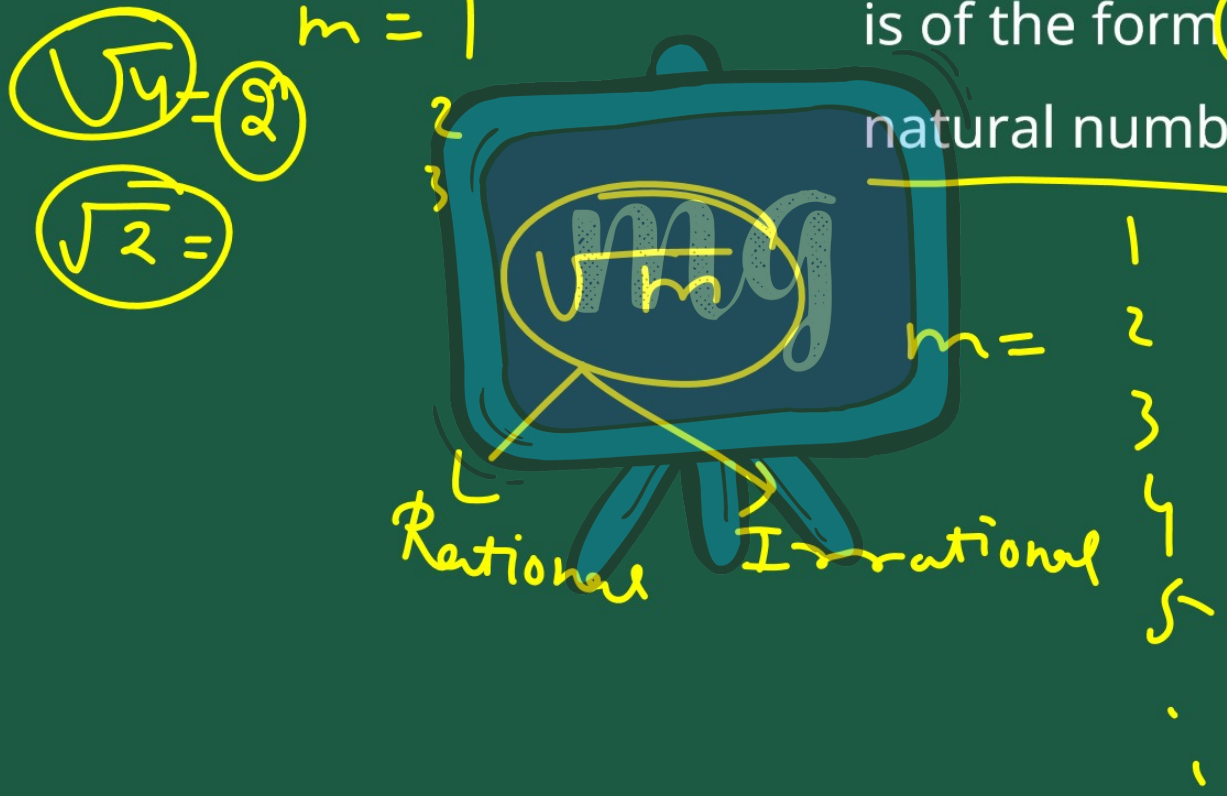
II. Every point on the number line is of the form $\sqrt{m}$, where m is a natural number. True



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III. Every real number is an irrational number. False



ϕ ϕ^c

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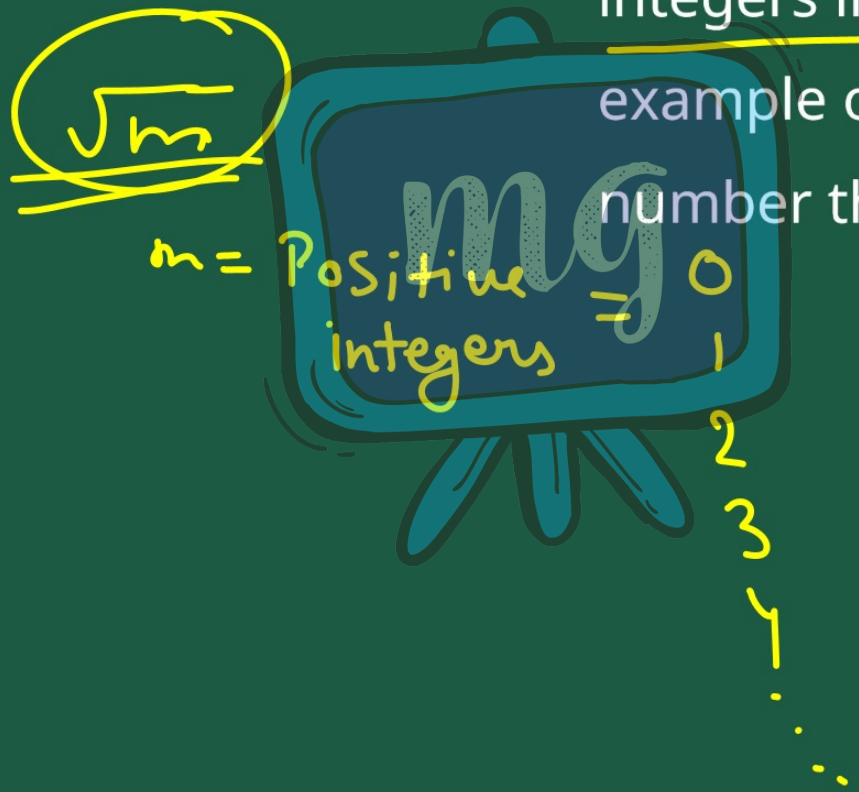
2. Are the square roots of all positive integers irrational? If not, give an example of the square root of a number that is a rational number.



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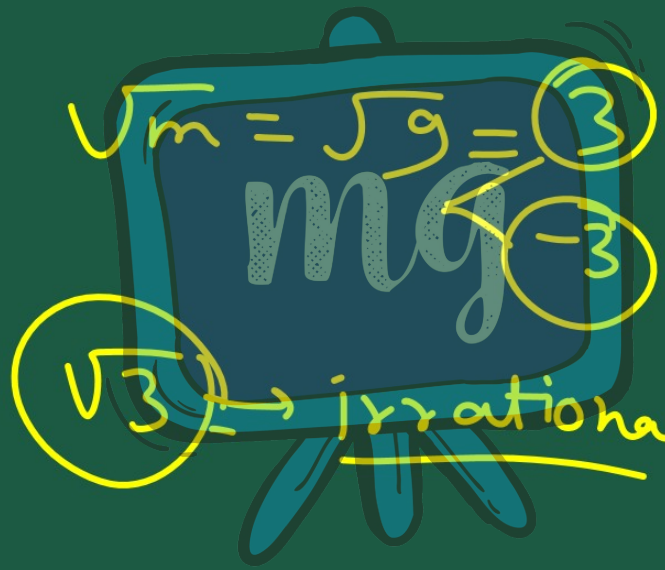
$m = g$



$\sqrt{m} = \sqrt{g} = 3$

$= \sqrt{g} \rightarrow$ Rational

-3

$\sqrt{3} \rightarrow$ irrational

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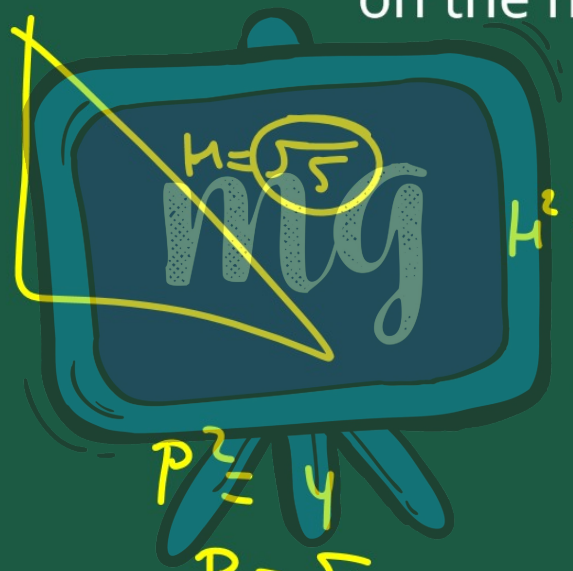
3. Show how $\sqrt{5}$ can be represented on the number line.



$H^2 = P^2 + B^2 = 5$

$H^2 = 5$

$H = \sqrt{5}$

$P^2 = 4$

$P = \sqrt{4} = 2$

$B = 1$

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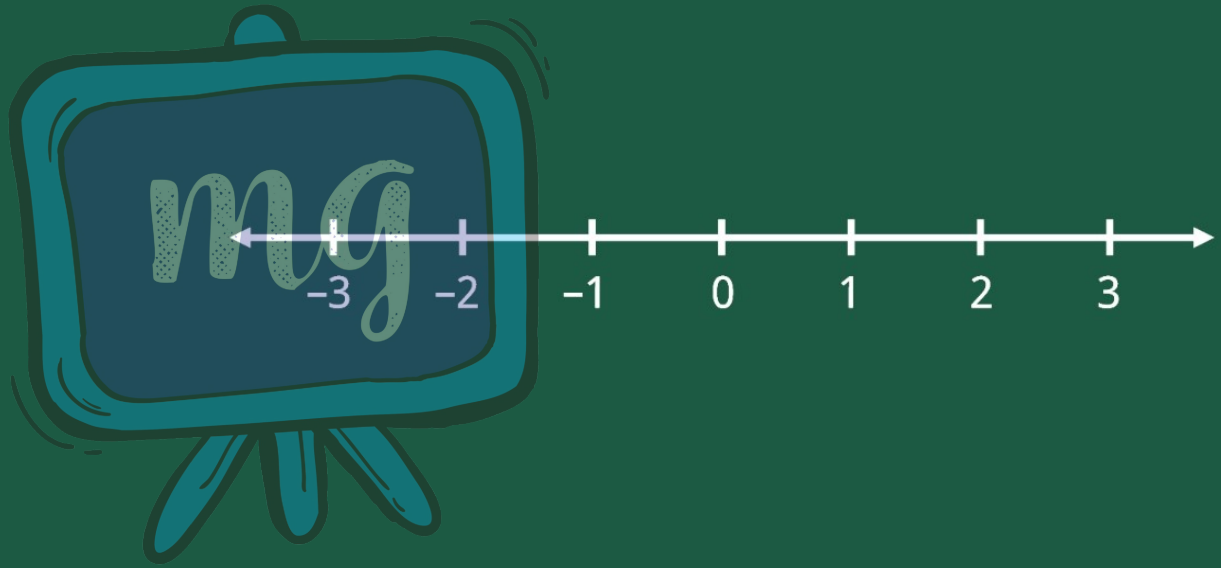

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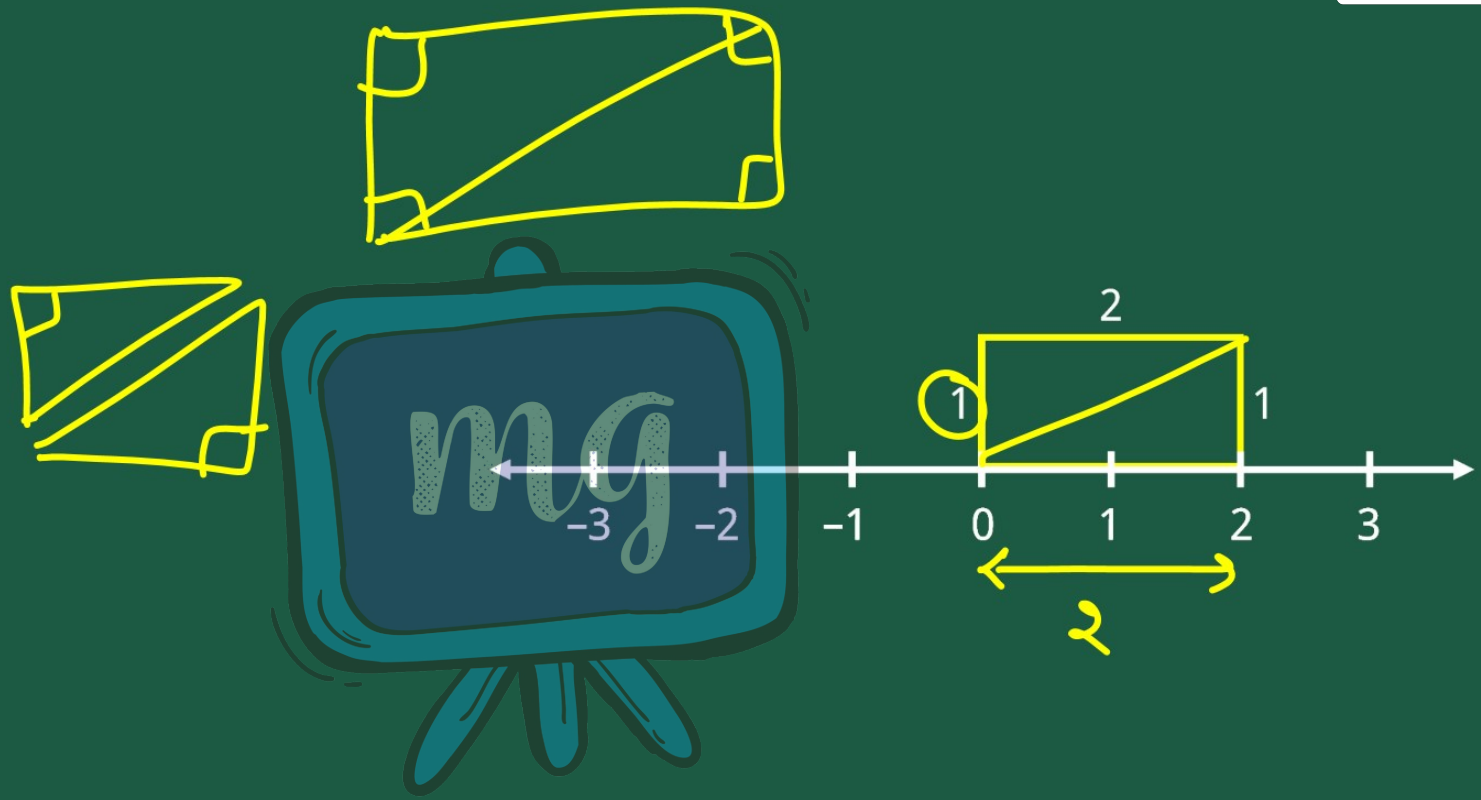

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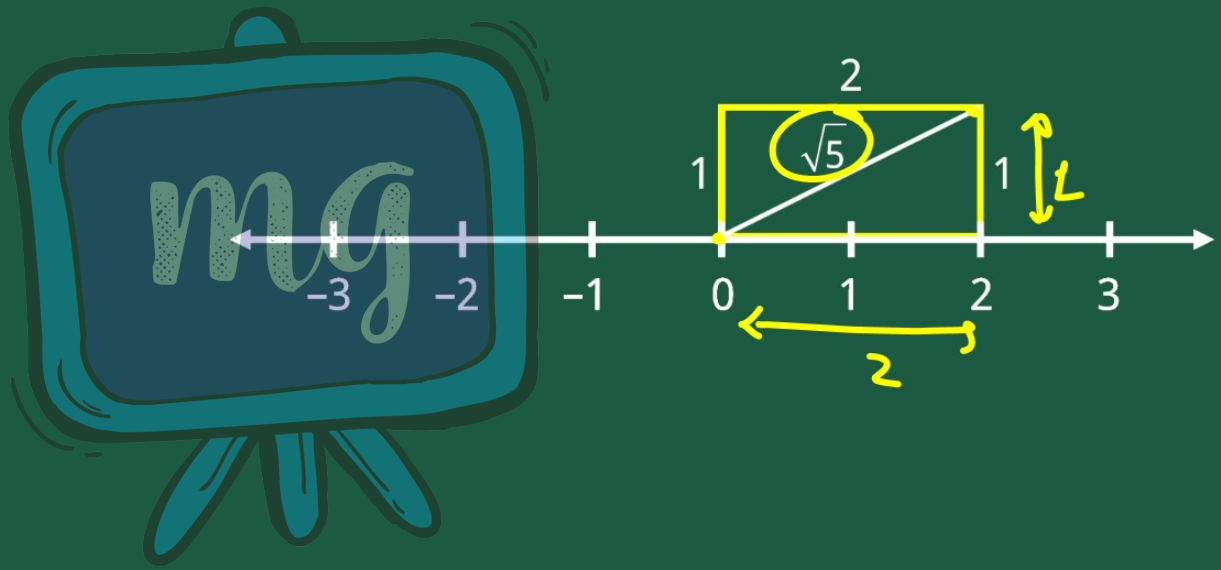

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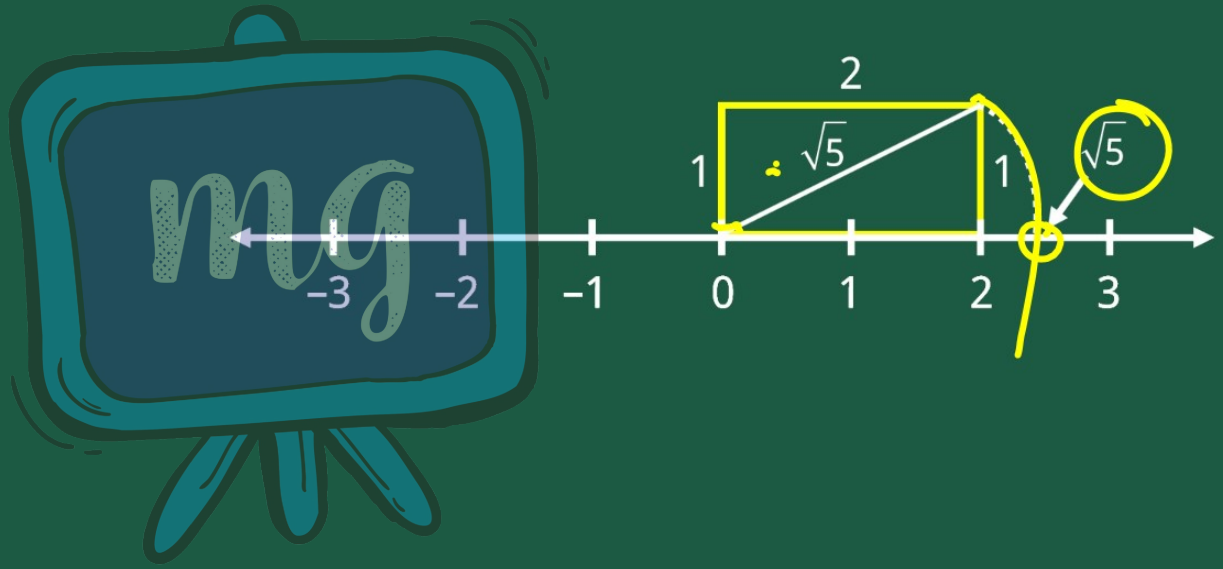

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LEARNING OUTCOMES

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1. Define Irrational Numbers
2. Identify Rational & Irrational Numbers
3. Locate Irrational Numbers on Number Line

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ASSESSMENT

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1 Which of the following is an irrational number

A $\sqrt{16}$

B $\frac{\sqrt{12}}{\sqrt{3}}$

C $\sqrt{12}$

D $\sqrt{100}$

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ASSESSMENT

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2 Which of the following is not an irrational number?

A π

B $2+\sqrt{3}$

C $\sqrt{16}$

D $(\sqrt{2}+1)^2$