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CLASS – 9

MATHS

CHAPTER - 1

Number System

Part – 6

Operations on Real Numbers

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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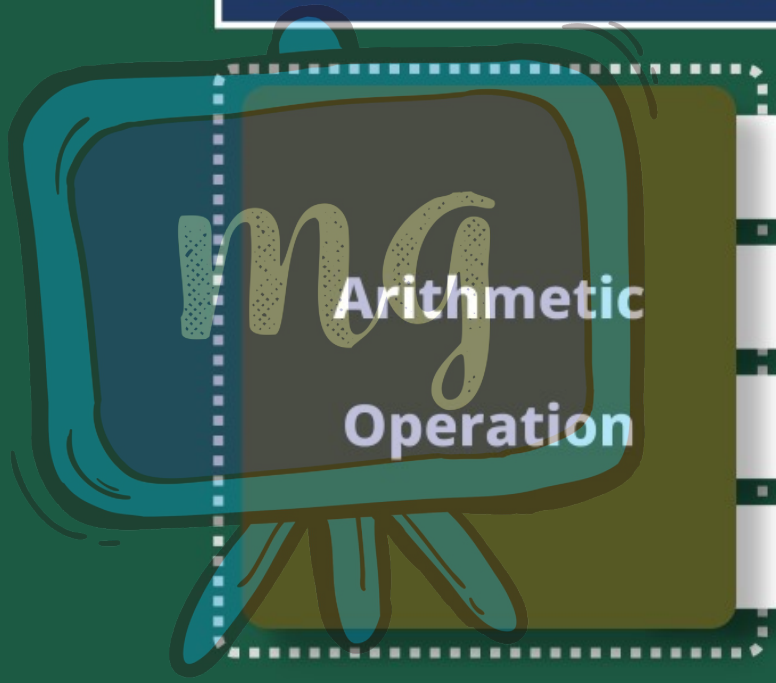
OPERATIONS ON REAL NUMBERS



- Addition
- Subtraction
- Multiplication
- Division

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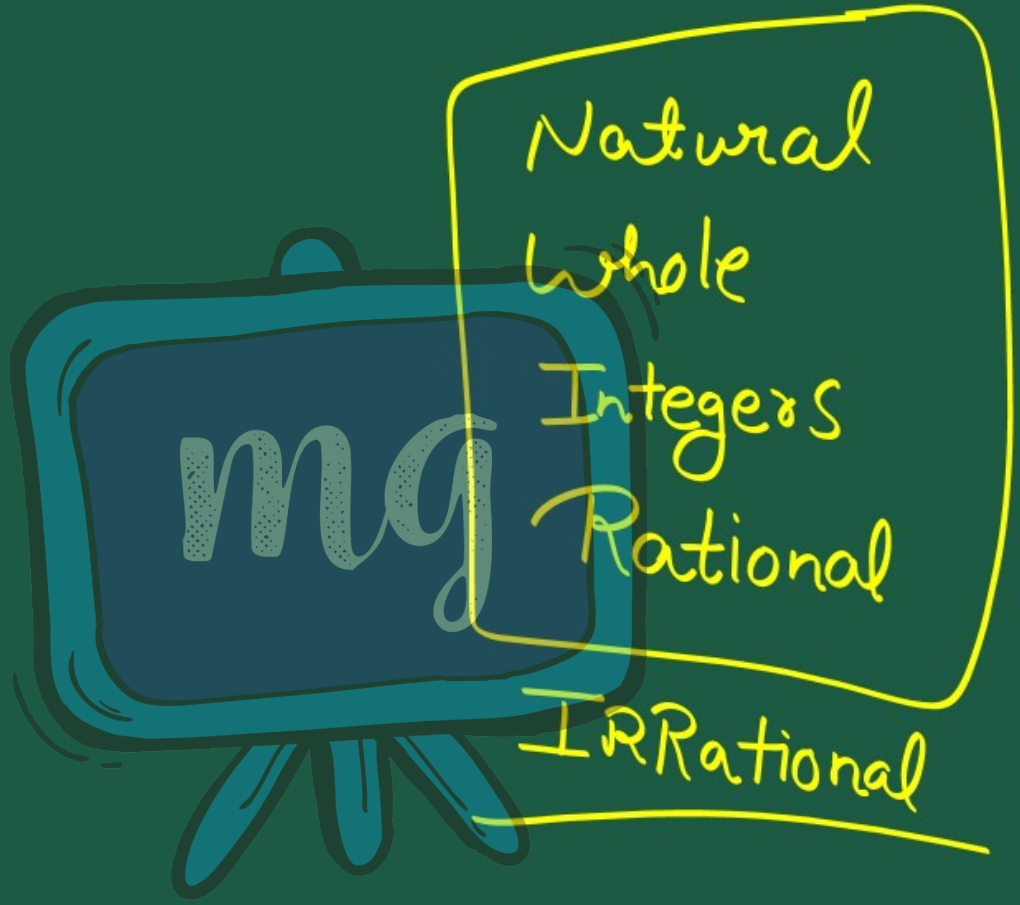

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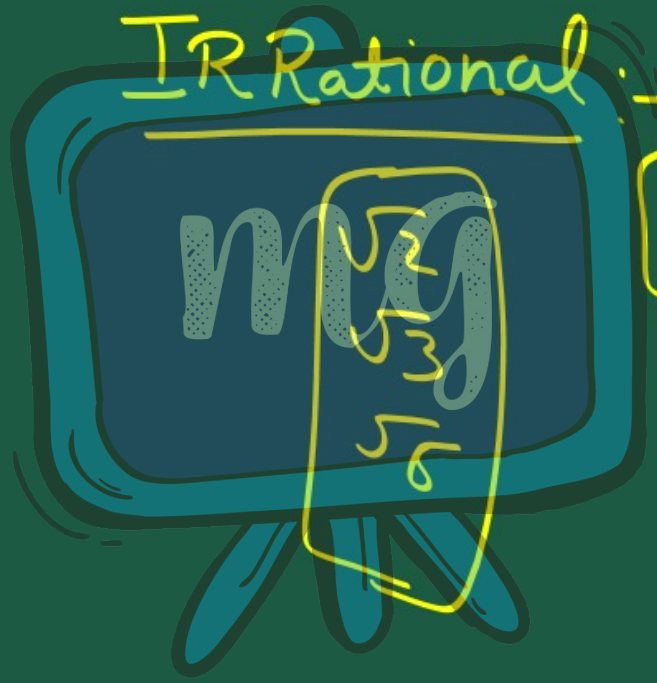

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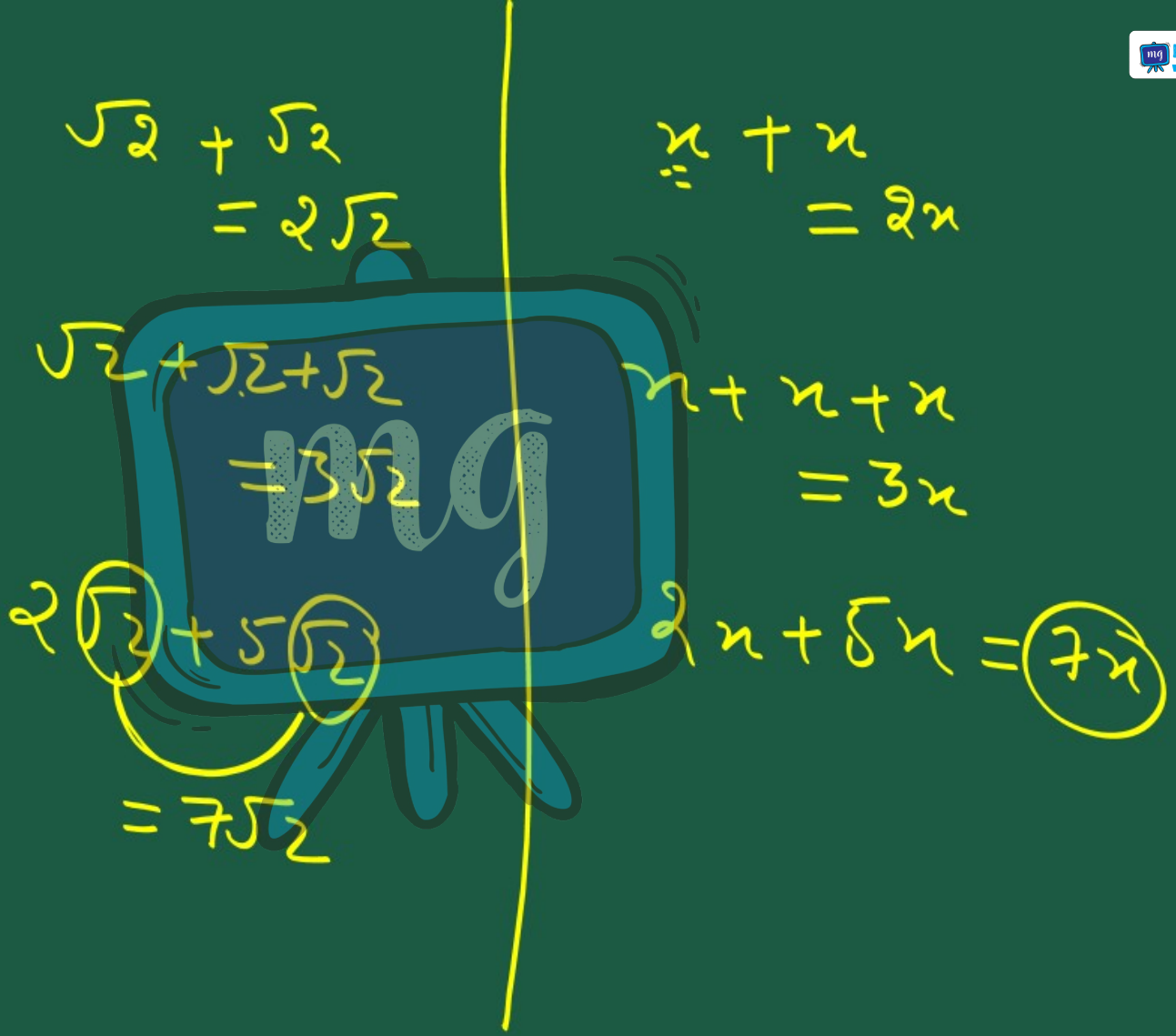

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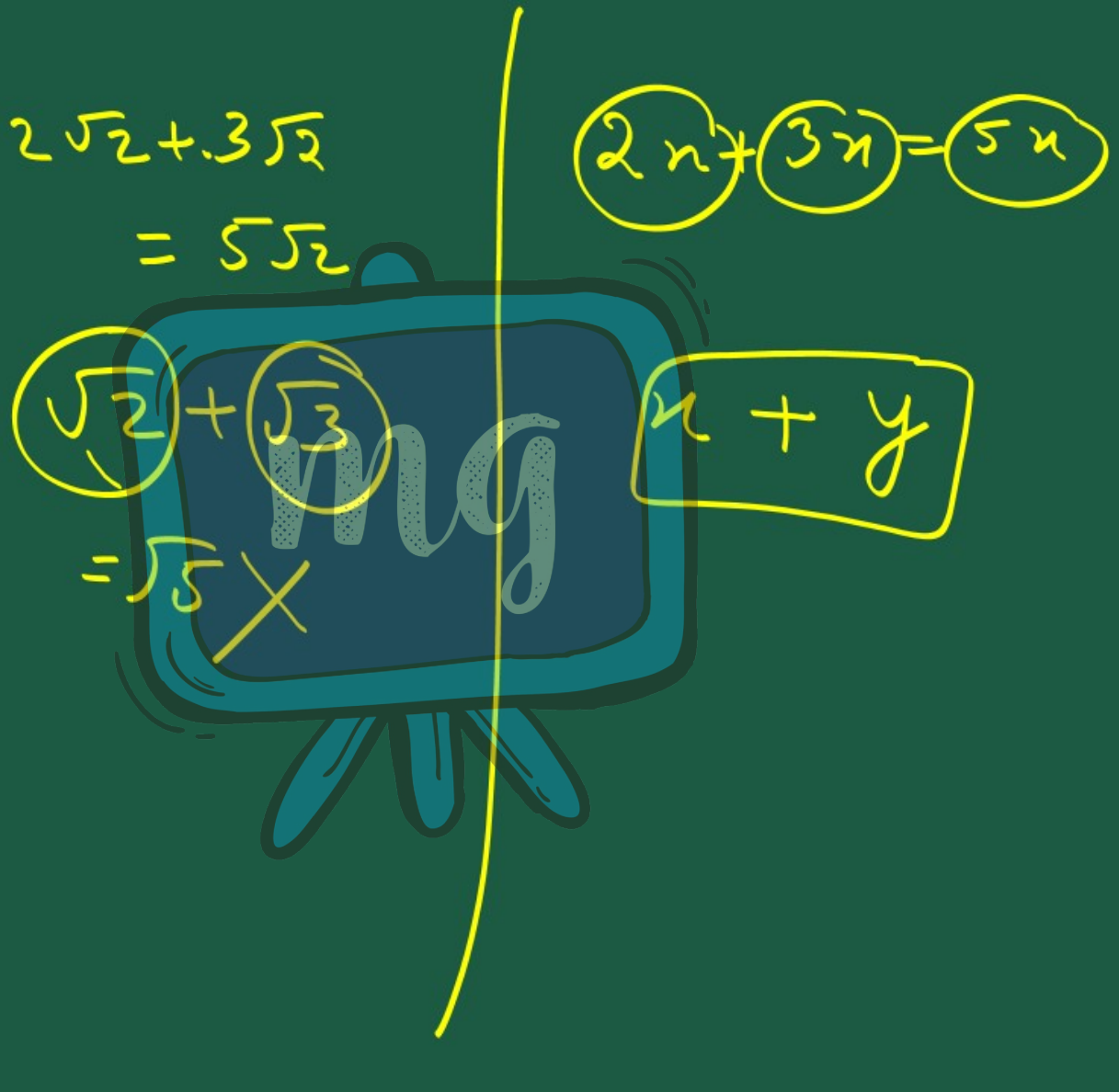

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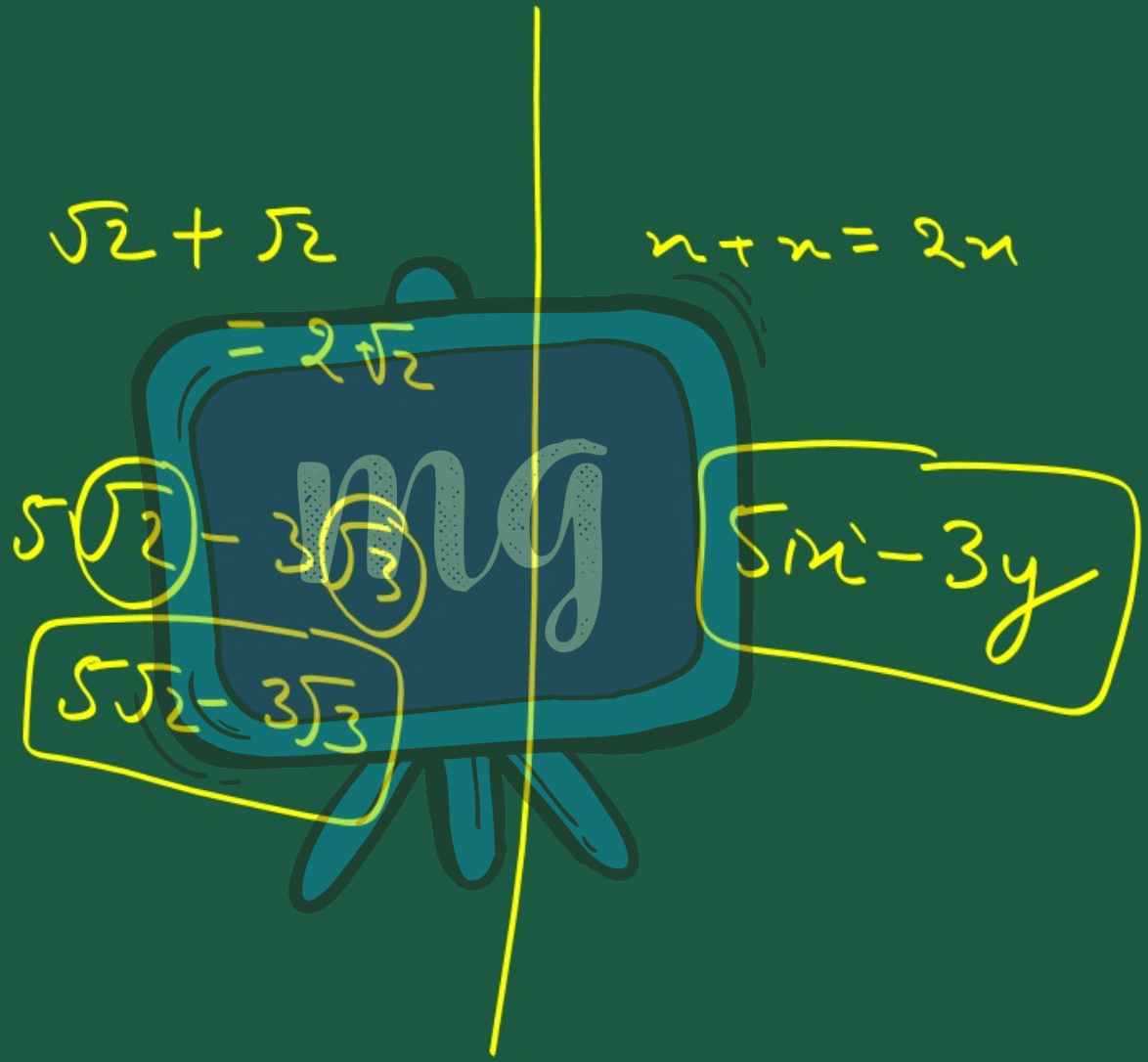

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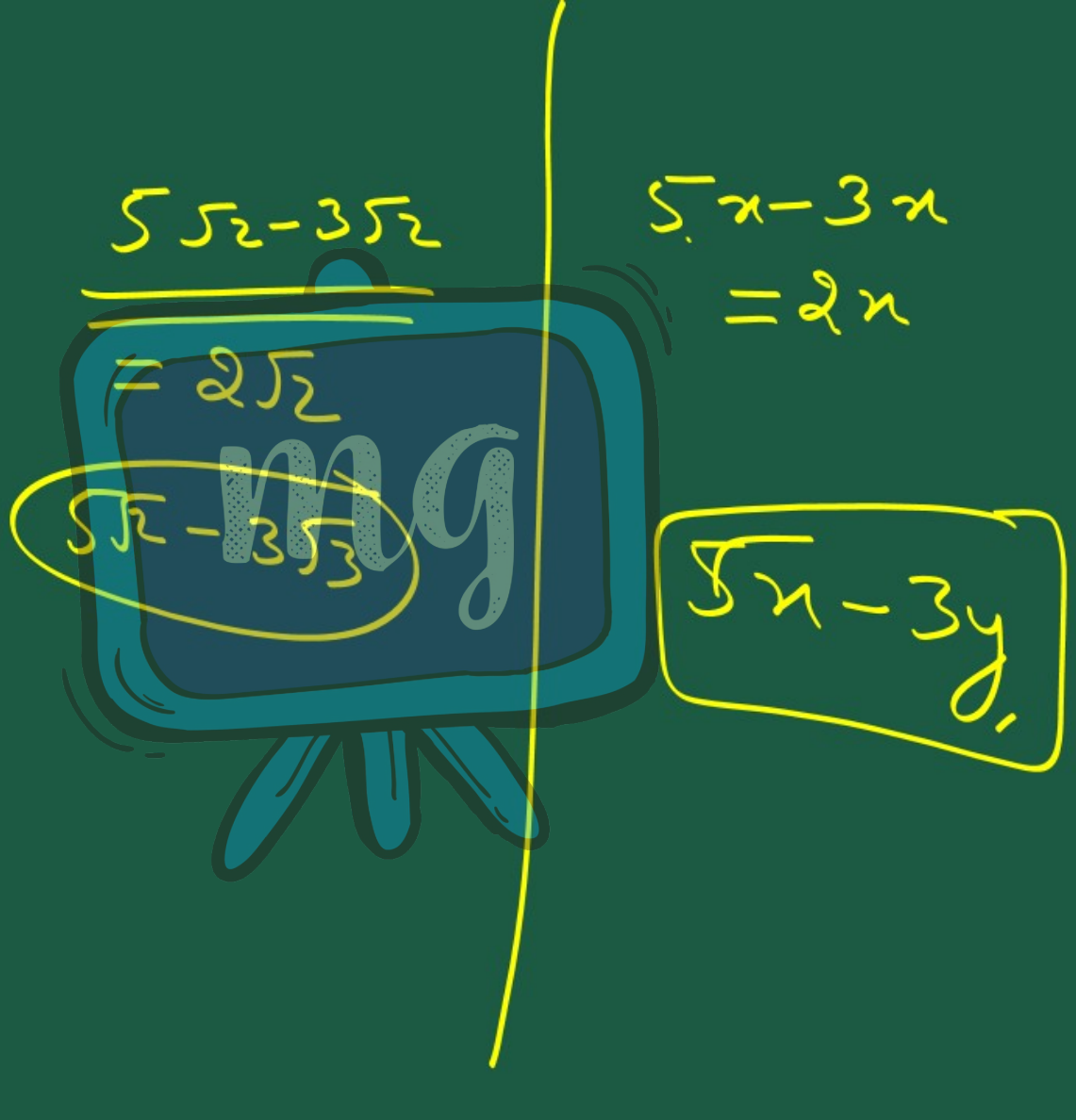

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$x \times x = x^2$

$x \times y = xy$

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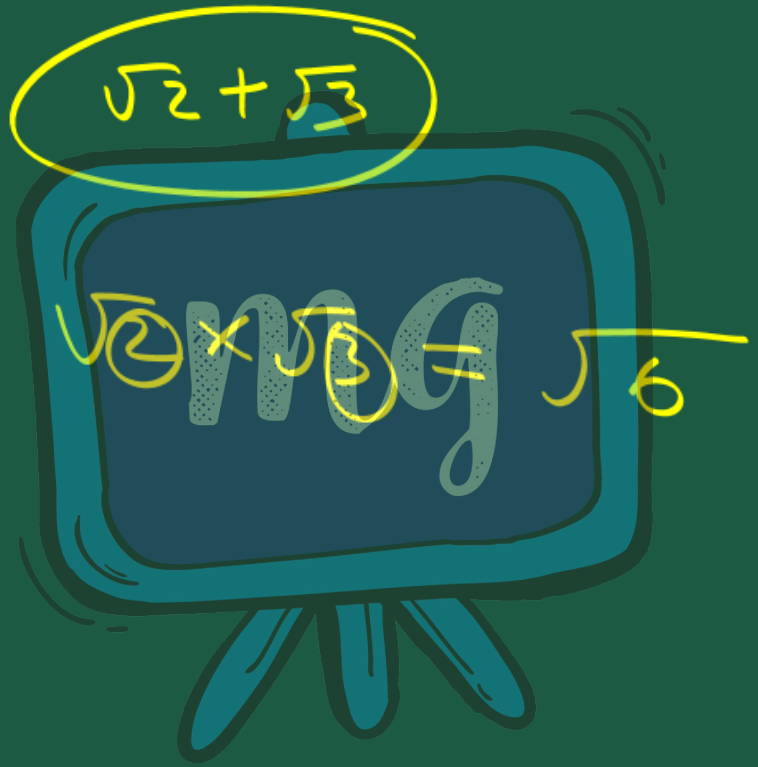

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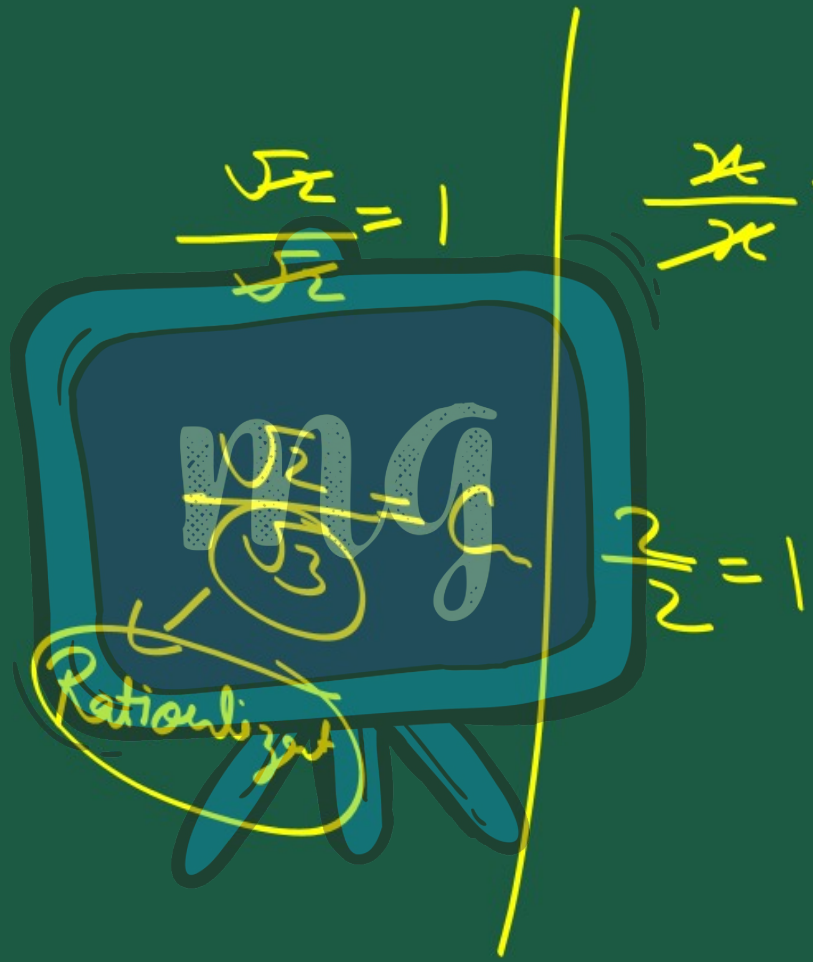

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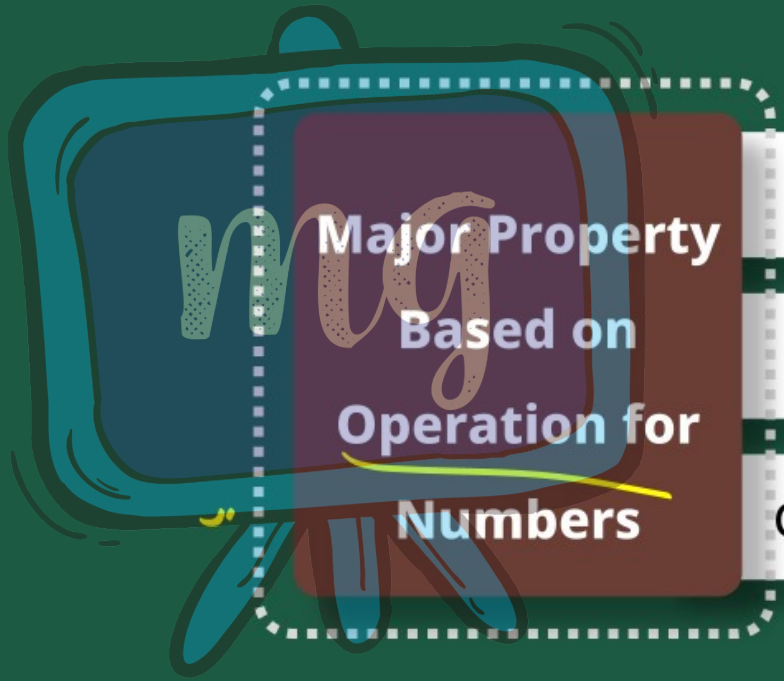

- Closure Property
- Associative Property
- Commutative Property

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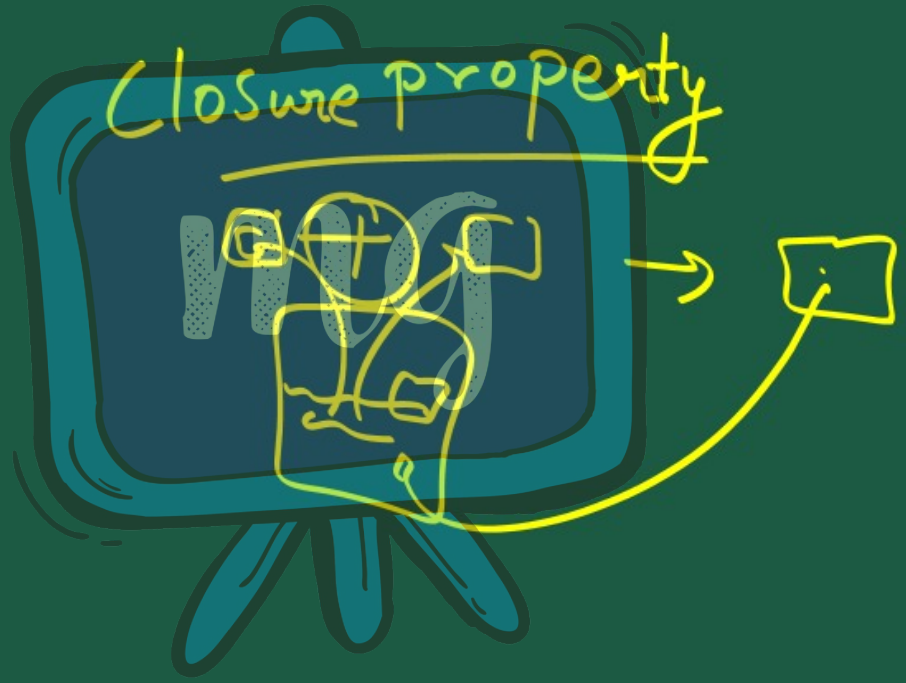

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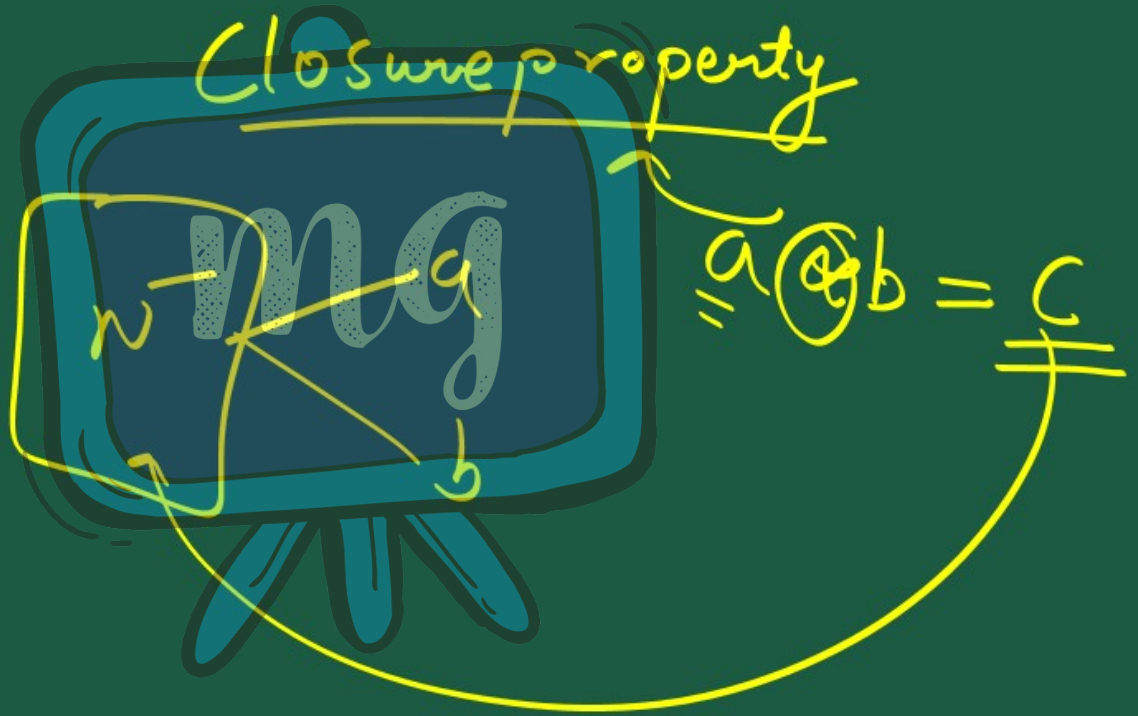

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$1 \times 7 = 7$

$1 + 7 = 8$



for addition Natural Number are closure.

$1 - 7 = -6$

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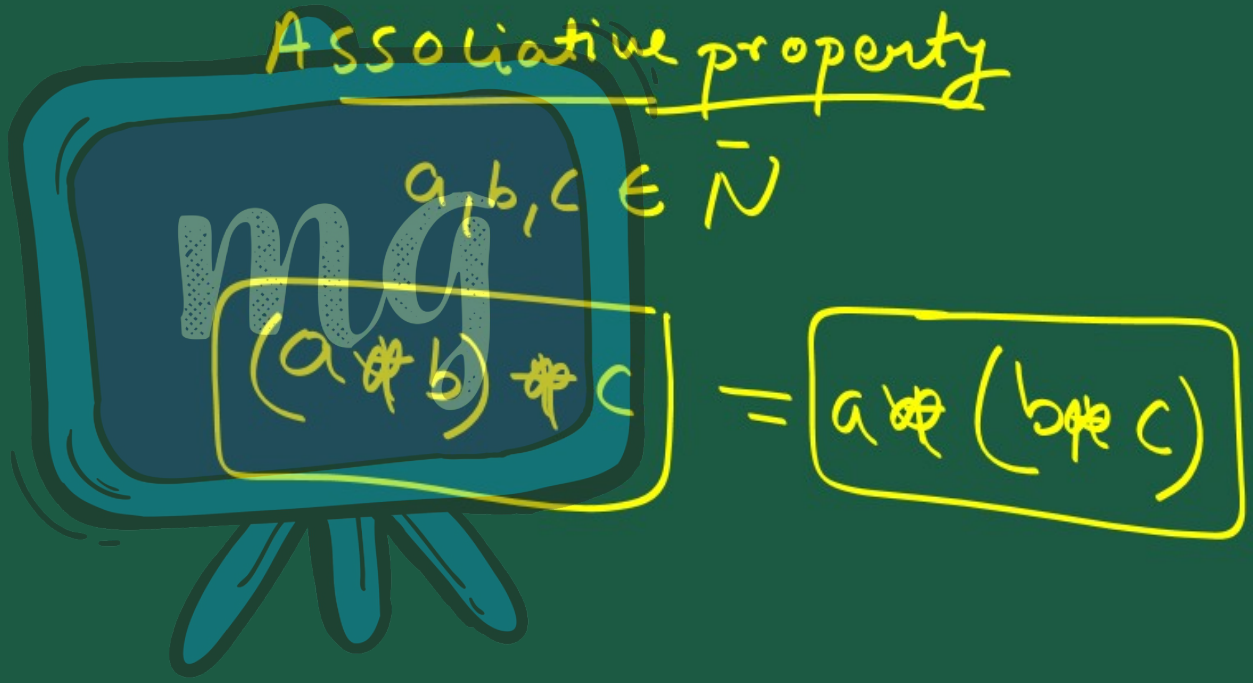

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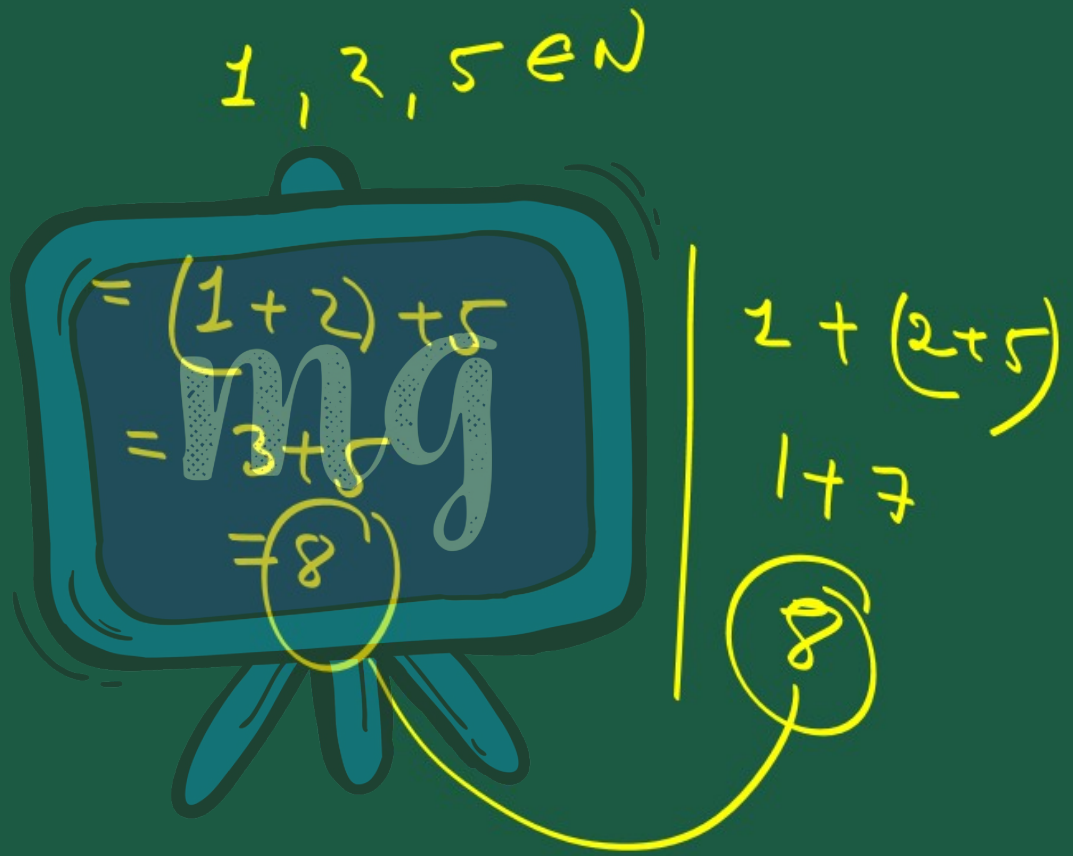

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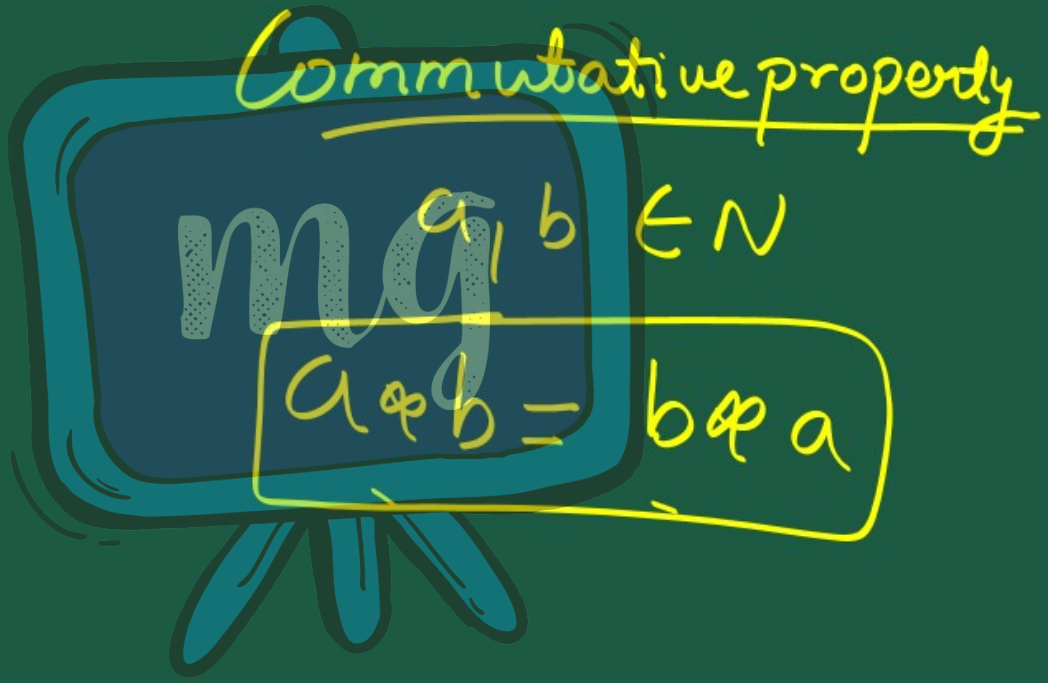

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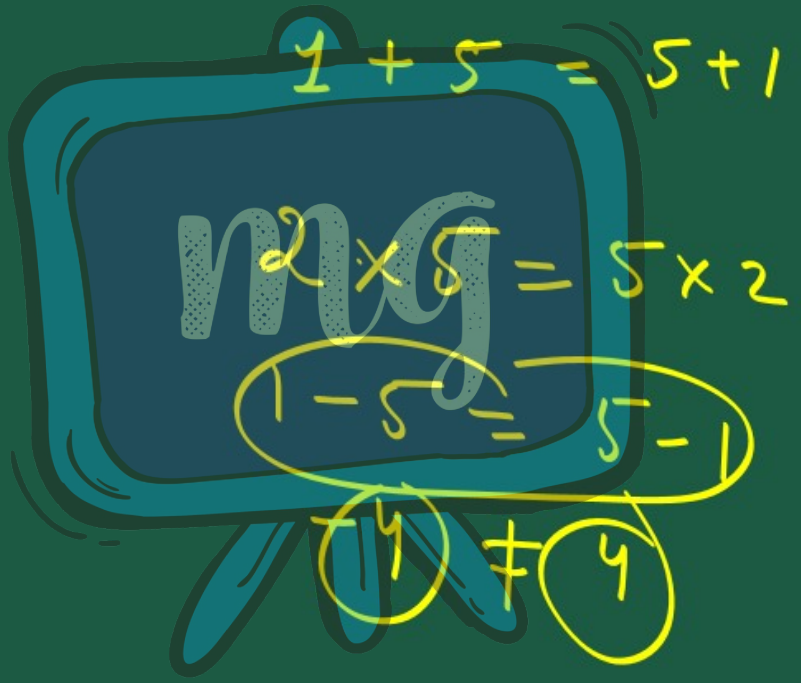

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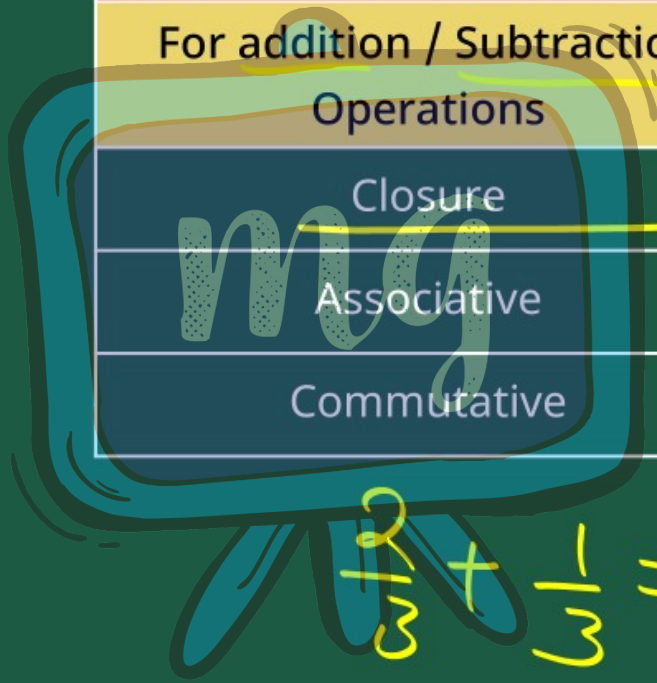
Observation from Property & Operations

For addition / Subtraction Operations	Rational Numbers	Irrational Numbers
Closure	✓	×
Associative	✓	✓
Commutative	✓	✓



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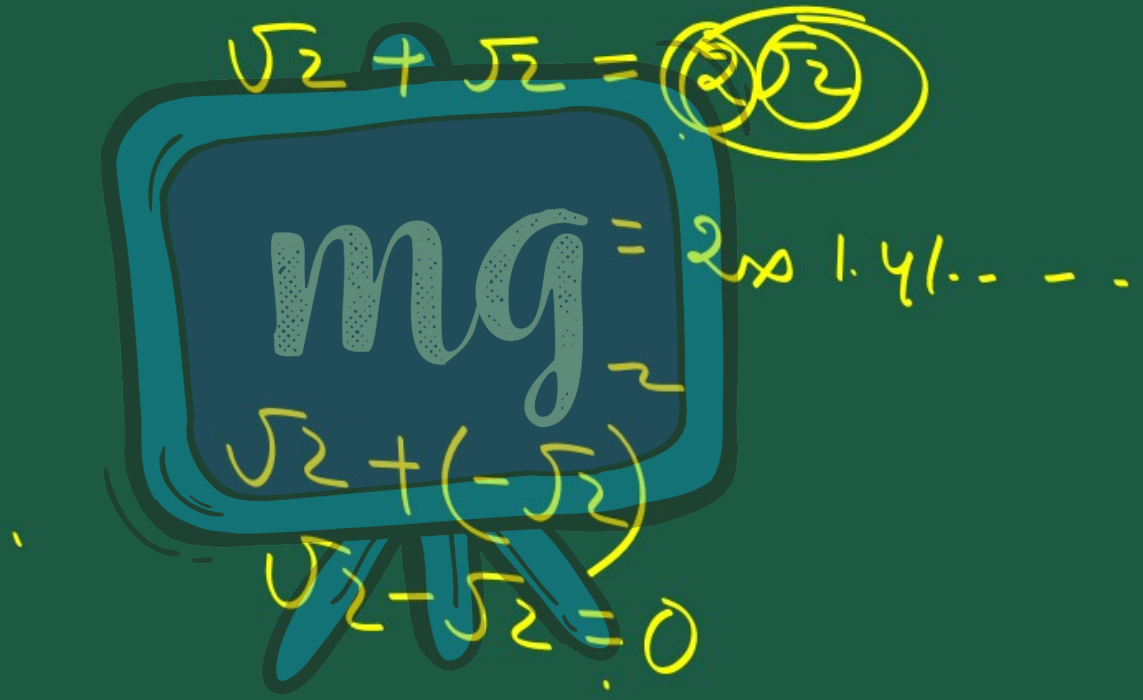

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Observation from Property & Operations		
For Multiplication / Division Operations	Rational Numbers (Except Zero)	Irrational Numbers
Closure	✓	✗
Associative	✓	✓
Commutative	✓	✓

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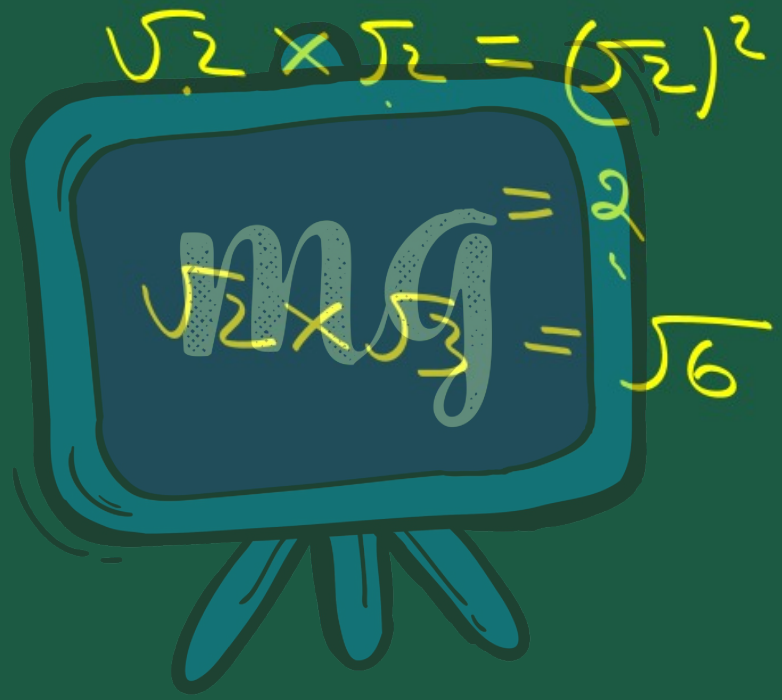

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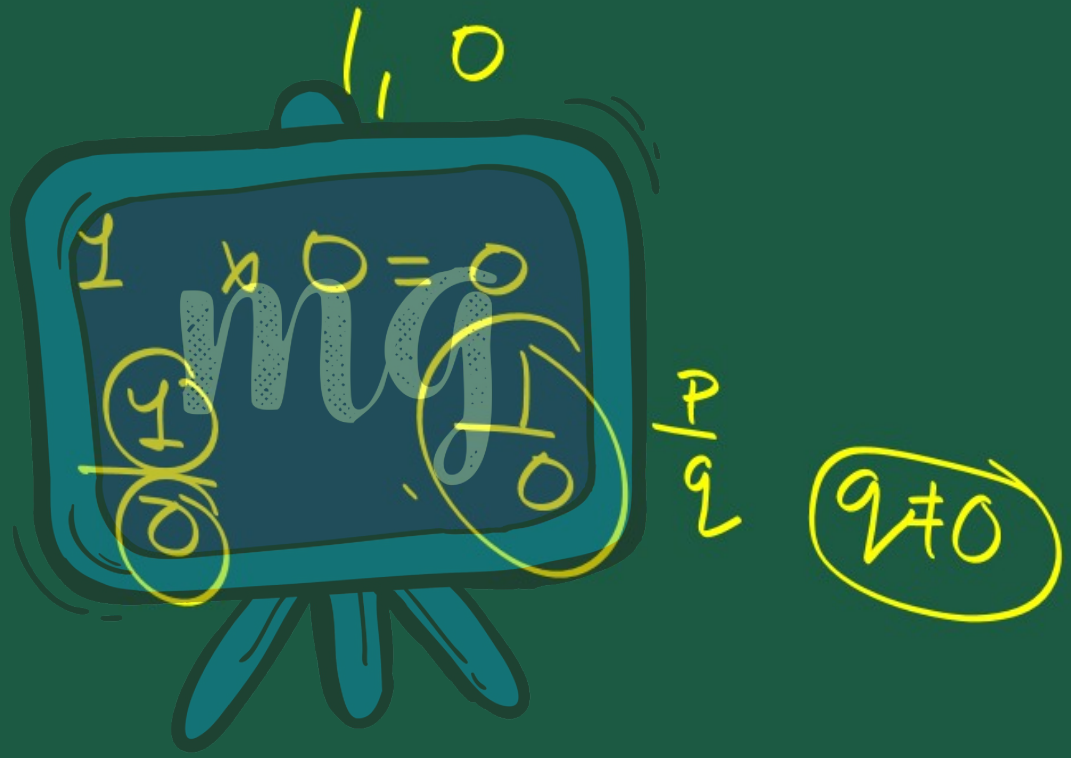

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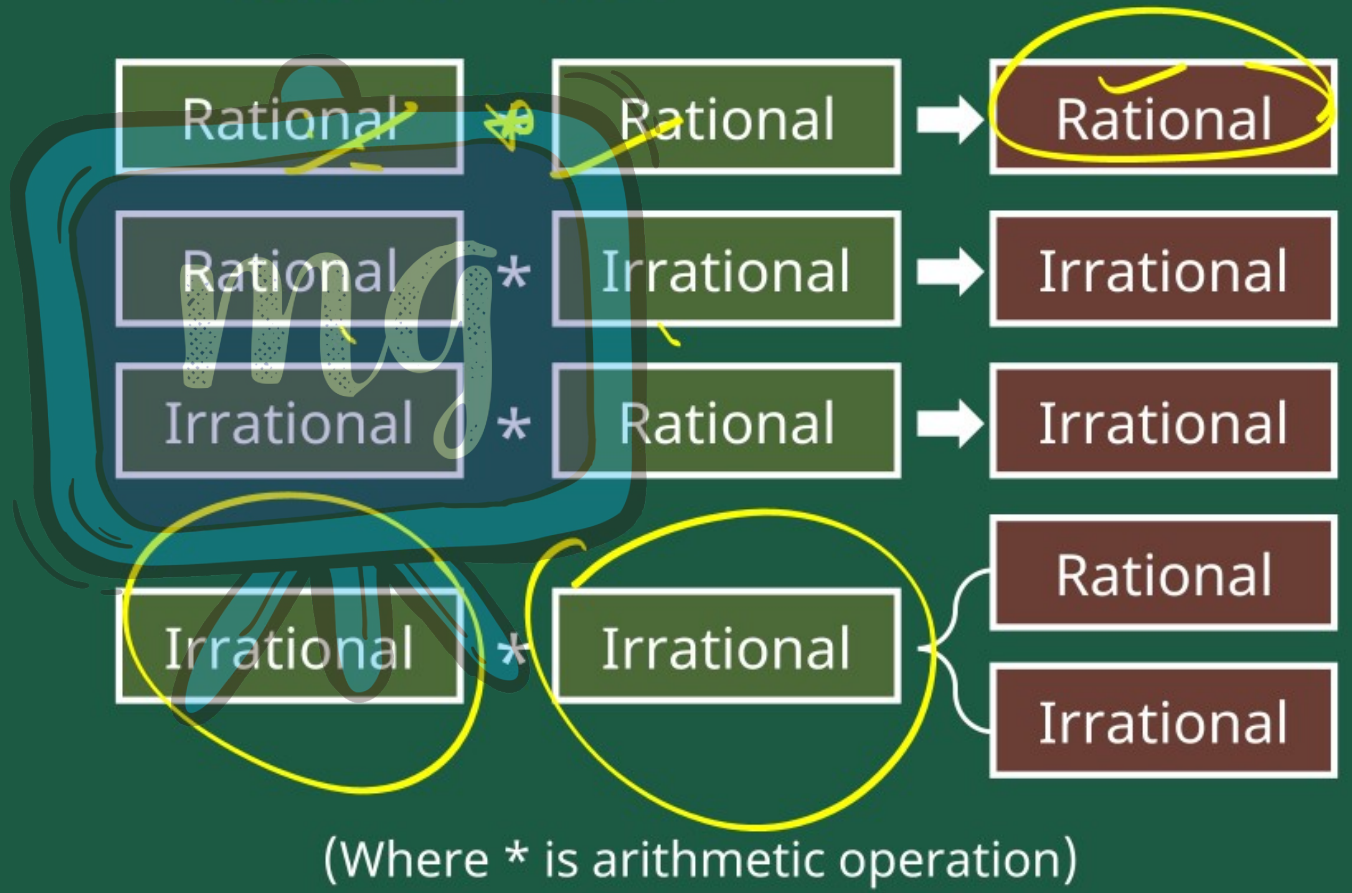
$2 \times \sqrt{2} = 2\sqrt{2}$



(Where * is arithmetic operation)

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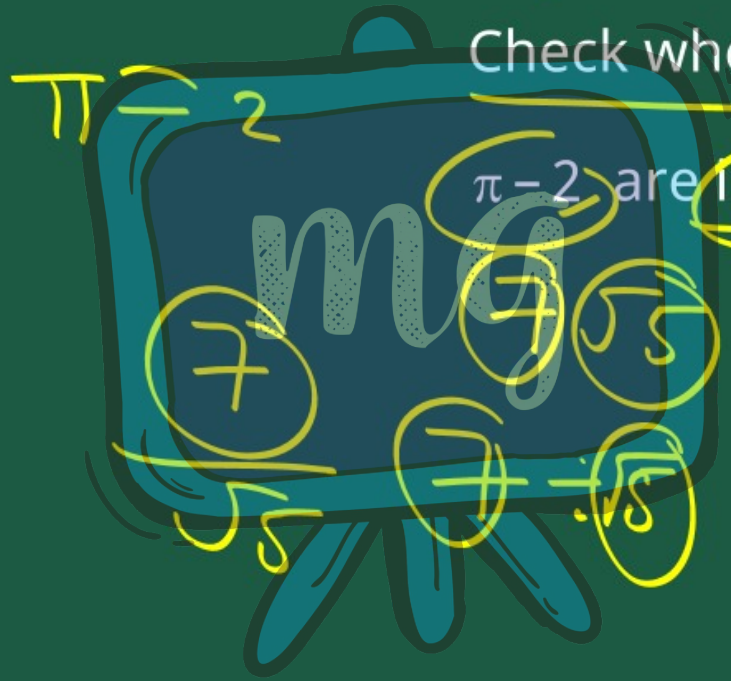
Example 11 :

Check whether $7\sqrt{5}$, $\frac{7}{\sqrt{5}}$, $\sqrt{2+21}$, $\pi - 2$ are irrational numbers or not.



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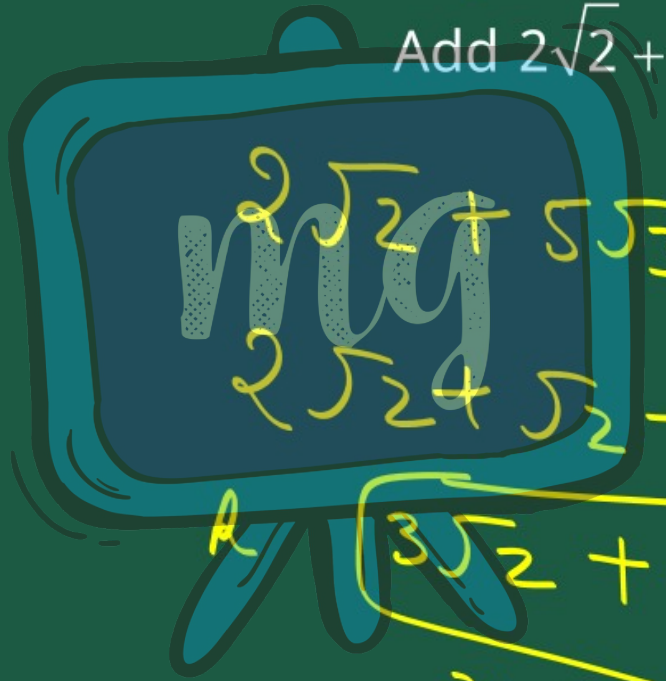
Example 12 :

Add $2\sqrt{2}+5\sqrt{3}$ and $\sqrt{2}-3\sqrt{3}$.



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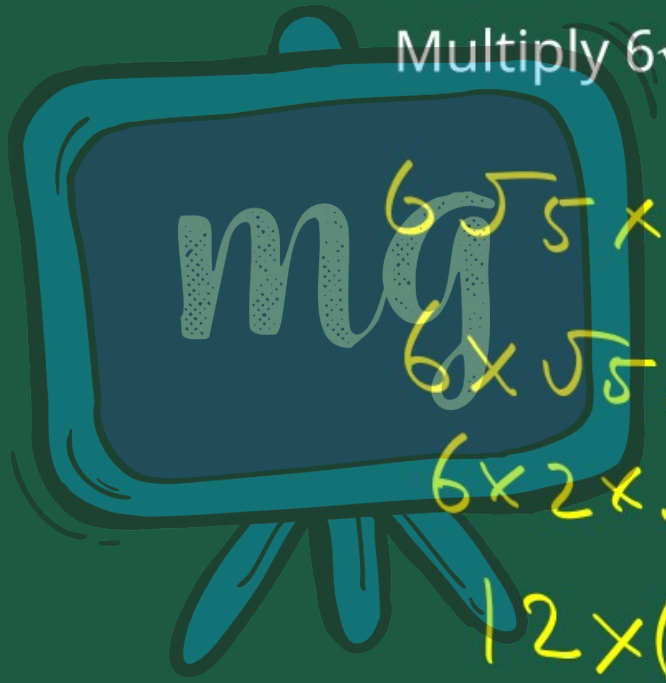
Example 13 :

Multiply $6\sqrt{5}$ by $2\sqrt{5}$.



$6\sqrt{5} \times 2\sqrt{5}$

$6 \times \sqrt{5} \times 2 \times \sqrt{5}$

$6 \times 2 \times \sqrt{5} \times \sqrt{5}$

$12 \times (\sqrt{5} \times \sqrt{5})$

$12 \times 5 = 60$

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Example 14 :

Divide $8\sqrt{15}$ by $2\sqrt{3}$.

$8\sqrt{15} \div 2\sqrt{3}$

$$\frac{8\sqrt{15}}{2\sqrt{3}} = \frac{8 \times \sqrt{15}}{2 \times \sqrt{3}}$$

$$= \frac{4 \times 2 \times \sqrt{5} \times \sqrt{3}}{2 \times \sqrt{3}} = 4\sqrt{5}$$

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REPRESENTING REAL NUMBERS ON THE NUMBER LINE



Example : Represent $\sqrt{3.5}$ on number line

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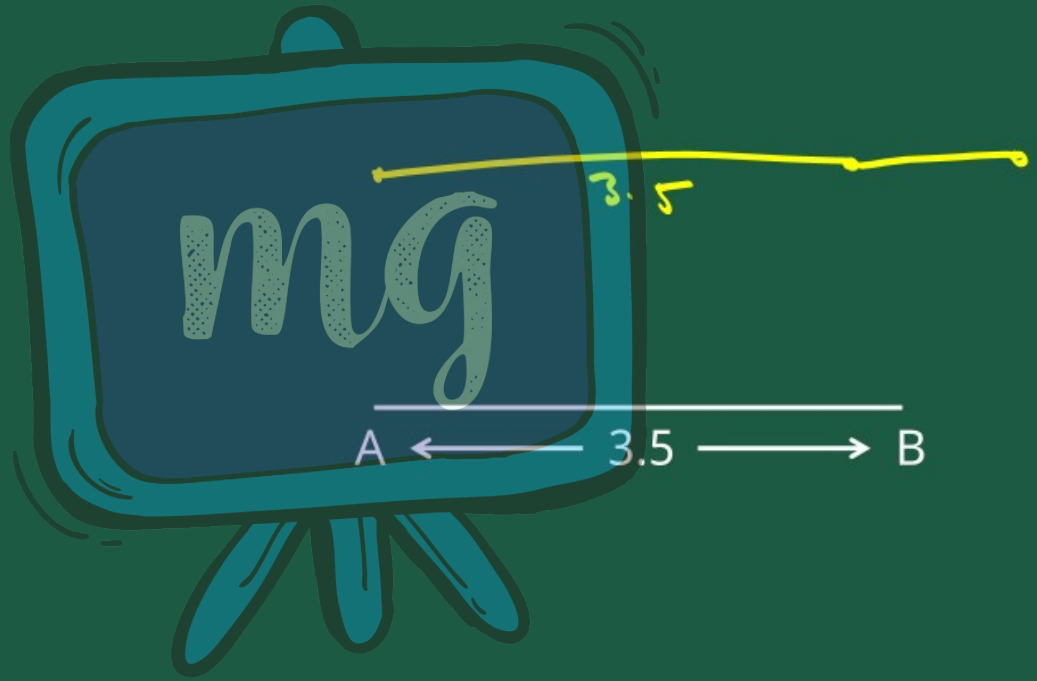

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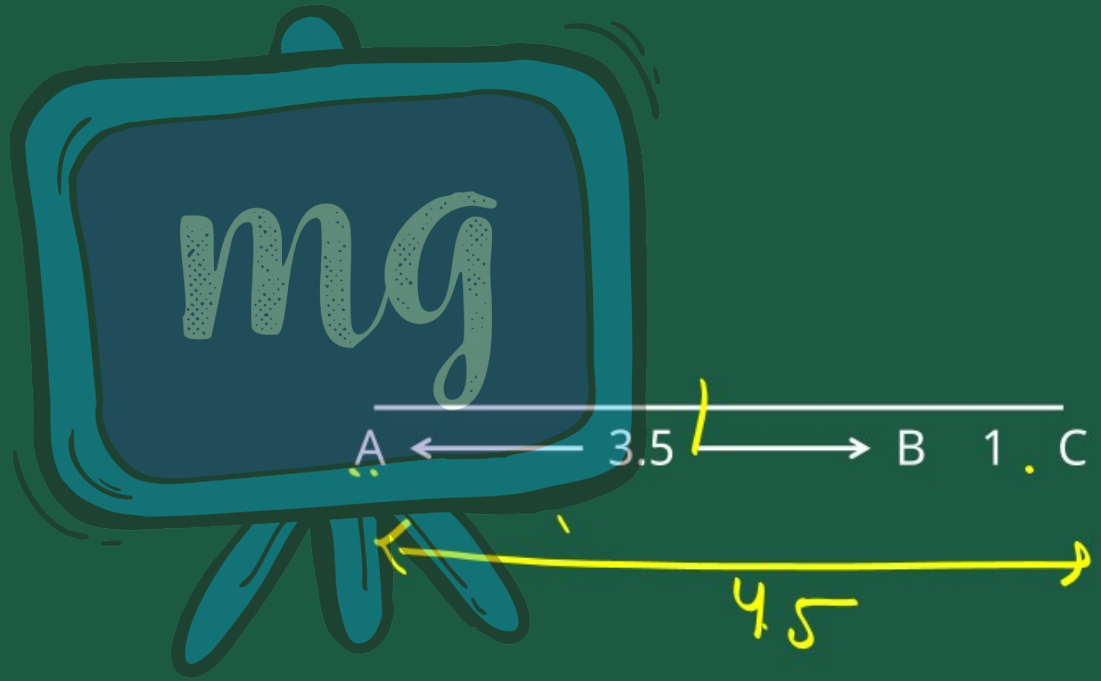

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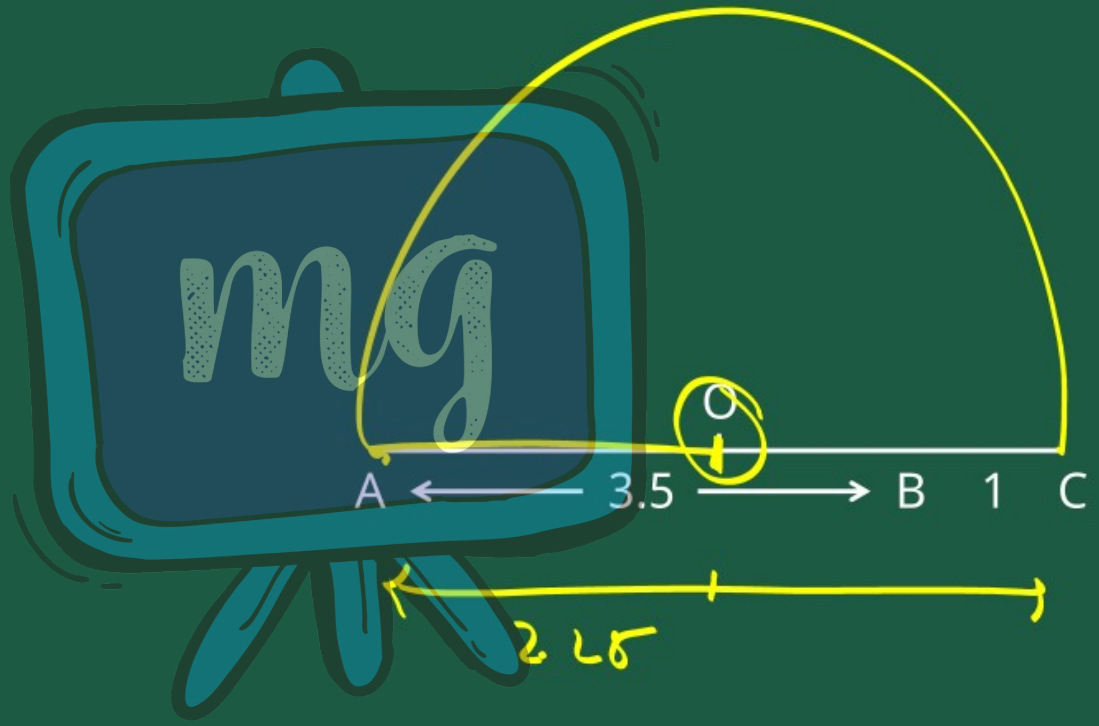

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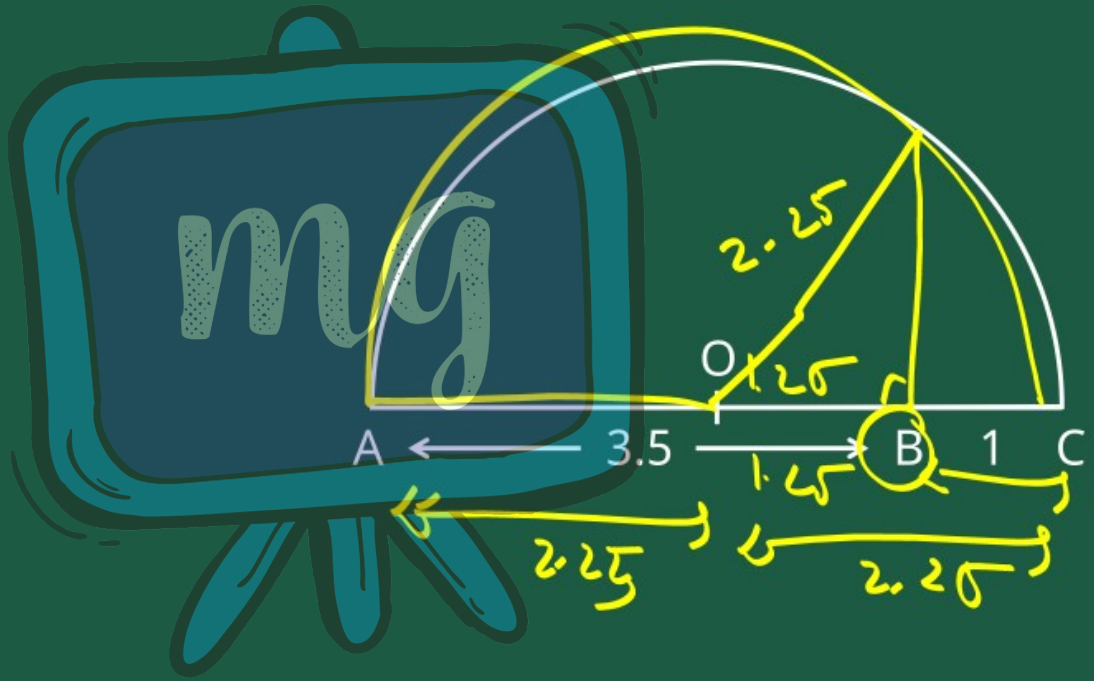

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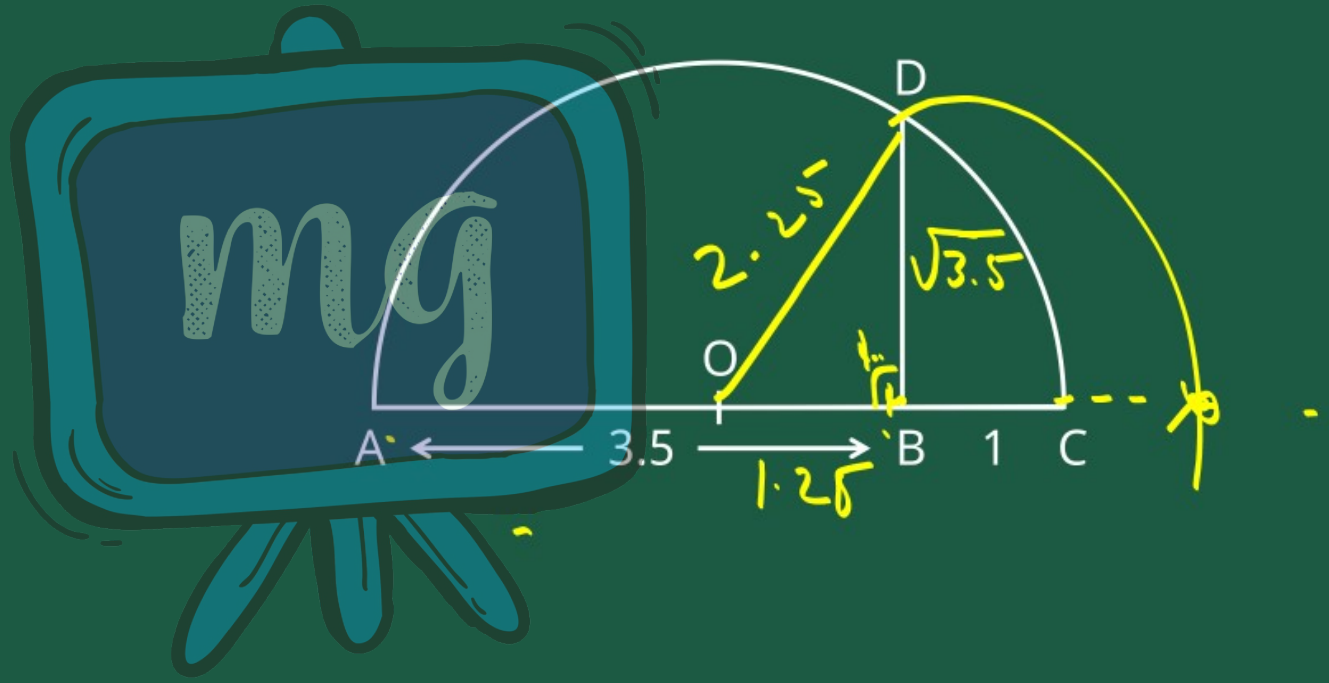

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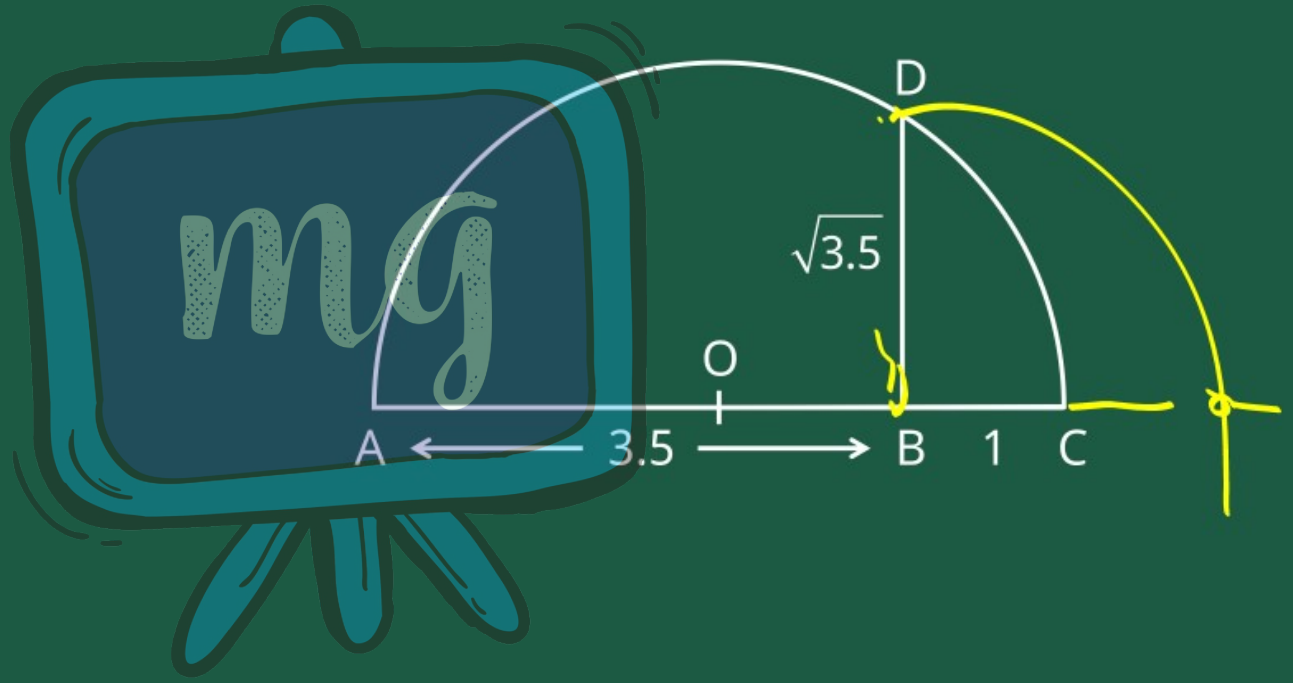

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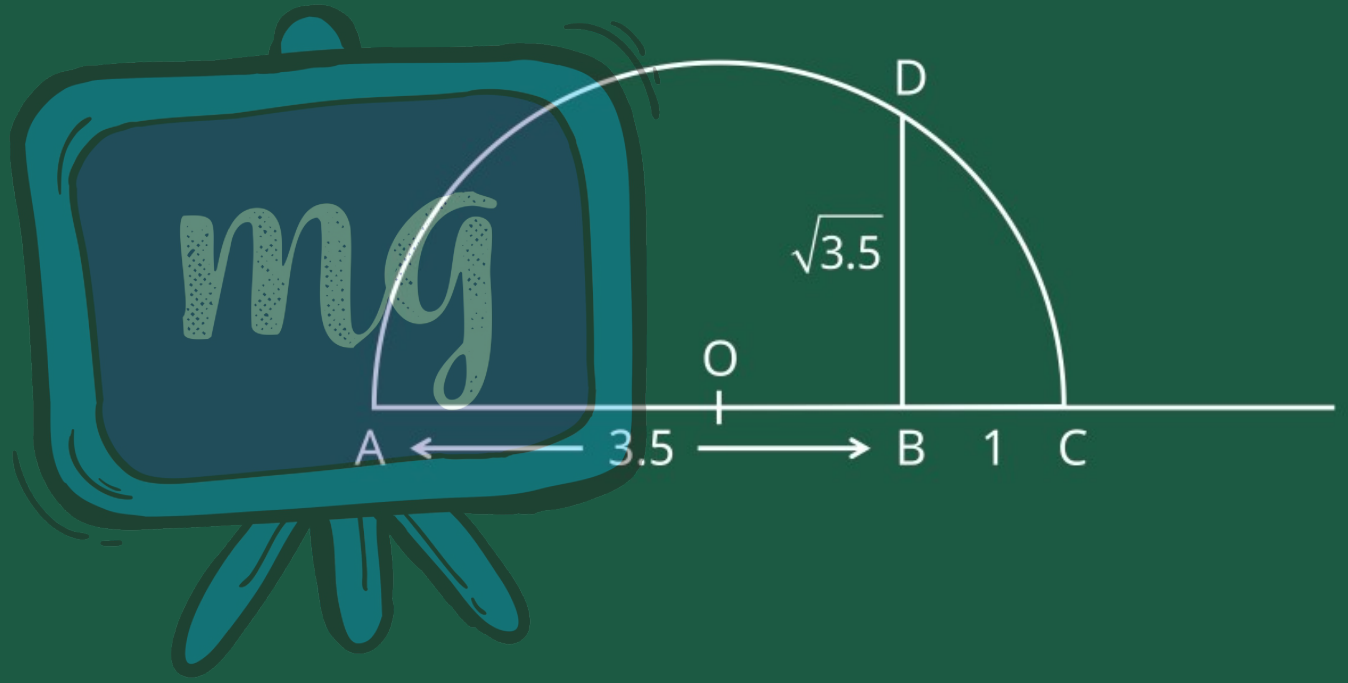

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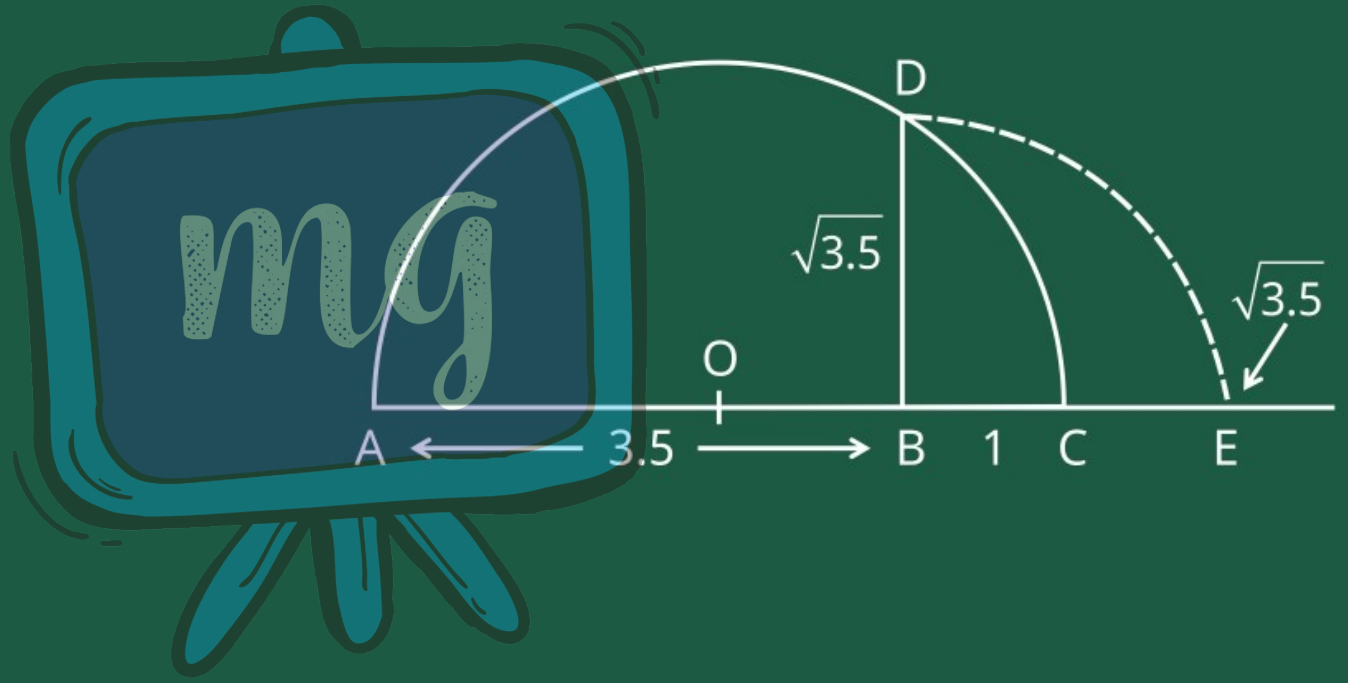

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LEARNING OUTCOMES

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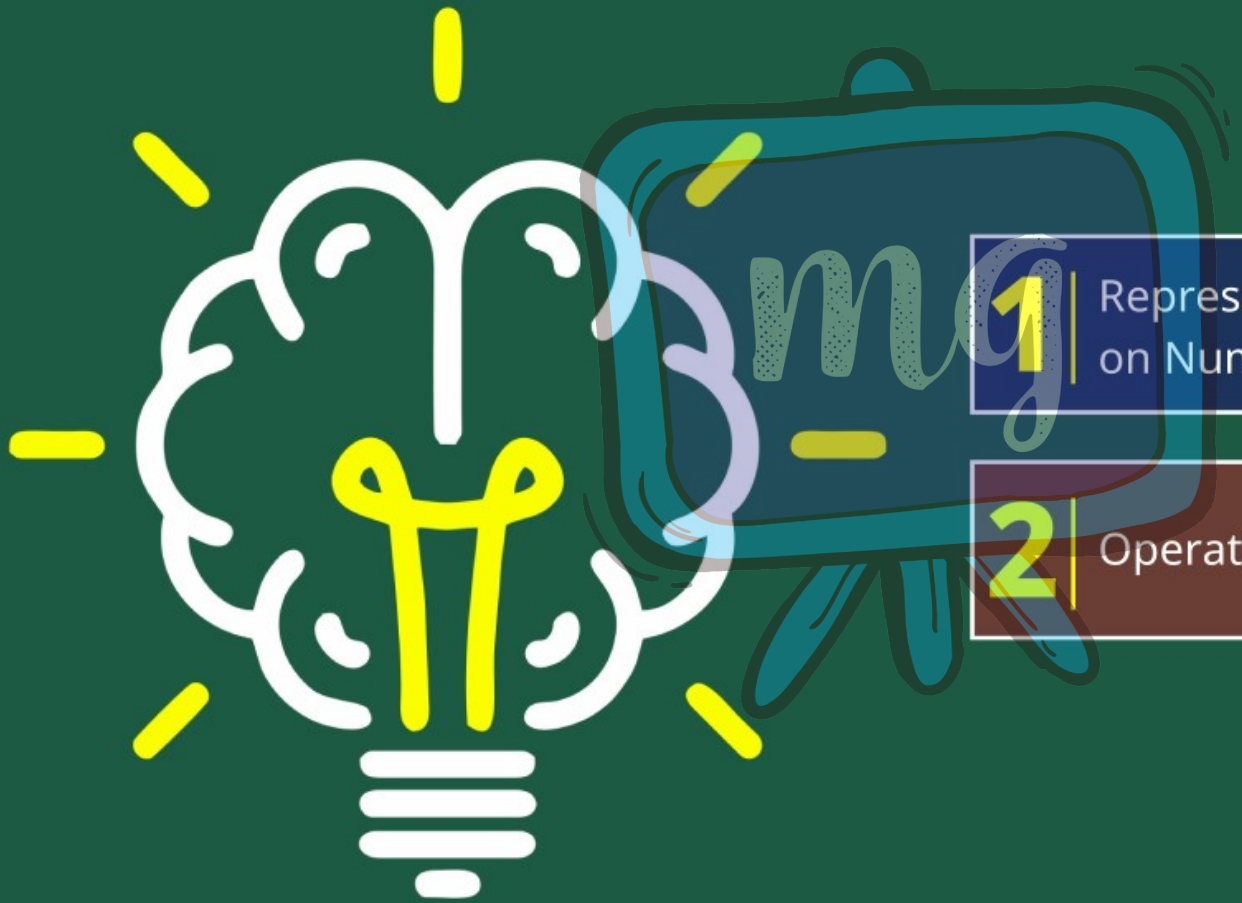

1. Representation of Real Numbers on Number Line
2. Operation on Irrational Numbers

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ASSESSMENT

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1 $\frac{2\sqrt{7}}{7\sqrt{7}}$ is an Irrational Number.

A True

B False

$\frac{2\sqrt{7}}{7\sqrt{7}} = \frac{2 \times \sqrt{7}}{7 \times \sqrt{7}}$

$\frac{2}{7}$

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ASSESSMENT

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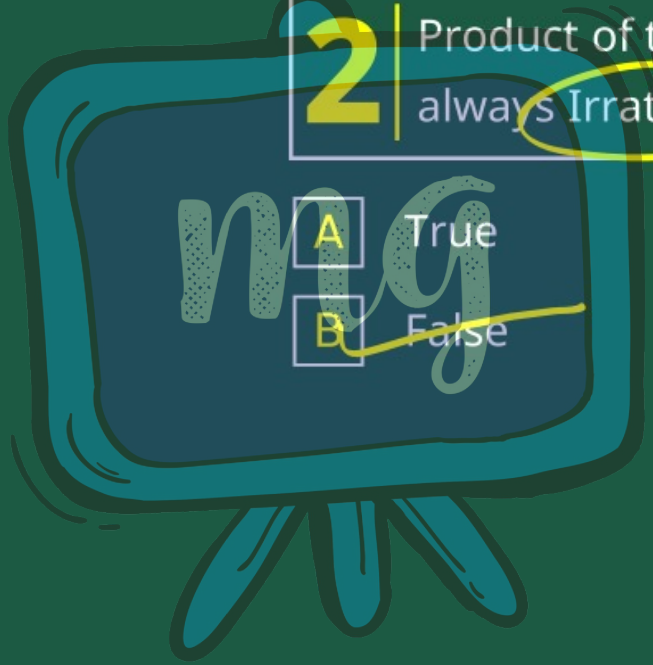

2 Product of two Irrational Number is always Irrational.

A True

B False