

PRAAYAS

JEE 2026

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Mathematics

Basic Maths

Lecture - 01

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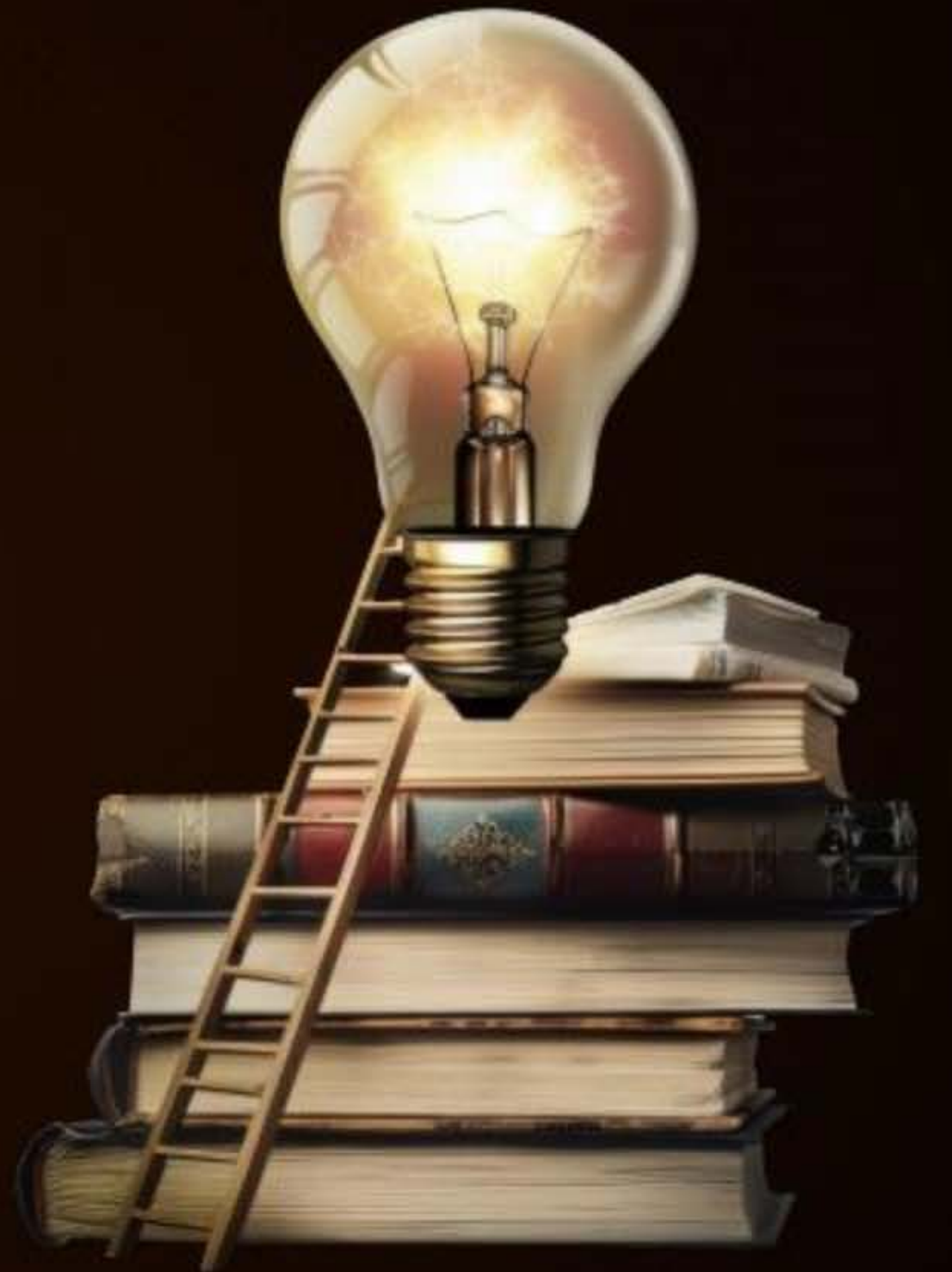
Topics *To be covered*



A Margdarshan

B Number System

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मागदिशनि

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Path to Success



MY INTRODUCTION

Mentored -

1, 4, 5, 7, 8, 10, 11, 12, 15, 18, 20, 61, 116, 151, 183

and many more in **JEE ADVANCED**

- Teaching Experience of more than **20 years** in Kota **ATDB.uno**
- HOD and Joint Director in a renowned institute in Kota
- Secured **Rank 1** in M. Sc. Entrance at **IIT Roorkee**
- Secured **Rank 1** in M. Sc. Entrance at **IIT Bombay**
- Secured **Rank 5** in M. Sc. Entrance at **IIT Kanpur**





सफलता के सात नियम

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पहला

!! Teacher पर विश्वास न करें !!



दूसरा

Speed और Content पर जान ना दें !

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तीसरा

खाली होकर ATDB.uno Class Attend करें !



चौथा

कभी भी अपने आप को किसी से
Compare मत करना
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“ ना किसी से प्रतिस्पर्धा
ना किसी से होड़...
मेरी अपनी है मंजिल
मेरी अपनी है दोड़ ... ”



पाँचवा

Consistency

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“ ना हारना जरूरी है,
ना जीतना जरूरी है,
जिंदगी के खेल के मैदान में सिर्फ
Consistency रखना जरूरी है। ”



छटा

भटकने से बचे & Negative लोगो से दूर रहे !

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**“ राह पकड़ तू एक चला
चल पा जायेगा अपनी
मधुशाला... ”**

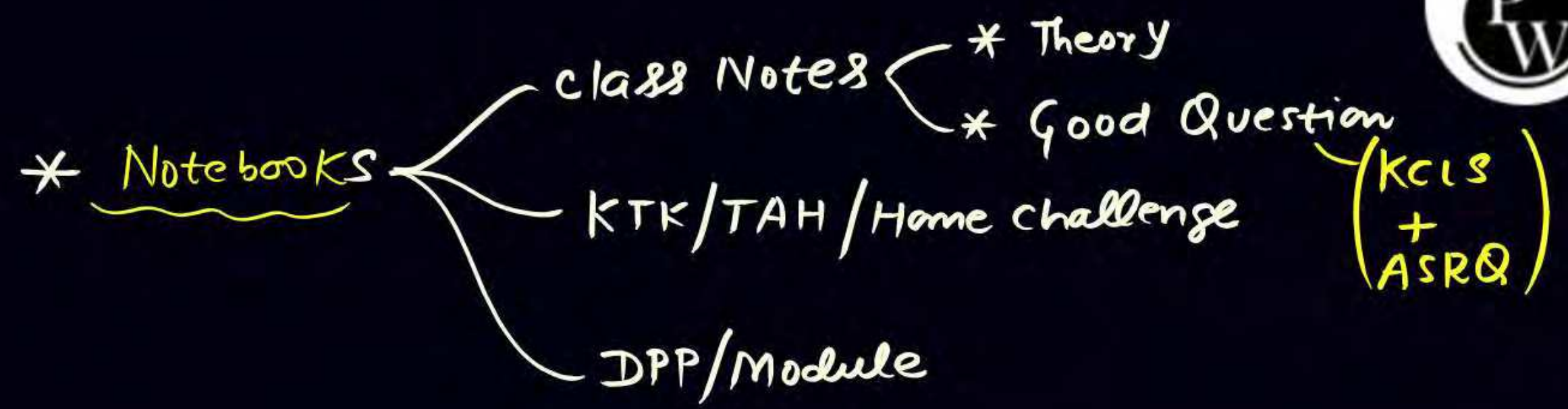


सातवा

किसी भी Subject में Backlog ना बनने दें

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**“ ऑनलाइन का सबसे
बड़ा रोग.. Backlog ”**



QUESTION



Did you take any coaching for IIT JEE previously in online or offline Mode in Class XIIth ?

- A** Yes, but I did not study properly 49 %
- B** Yes, I completed my entire syllabus properly 56 %
- C** No, I only prepared for my School Exams 45 %
- D** No, but I did some self study for IIT JEE

QUESTION

Kyaa Mehnat Karney ke liyay Tyaar ho ?

- A** Yes, Sir hum aapke saath hai **85 %**
- B** Bahut zyaada mehnat nahi hoti Sir **85 %**

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How do you want me to teach you?

A) From very Basics to Advance 98%.

B) Basics Aata hai bs Advance pe focus karivay 2%.

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Kya aap mujhse phelay

Kabhi padhay hai?

A) Yes - 15%.

B) No - 82%.



Basic Maths

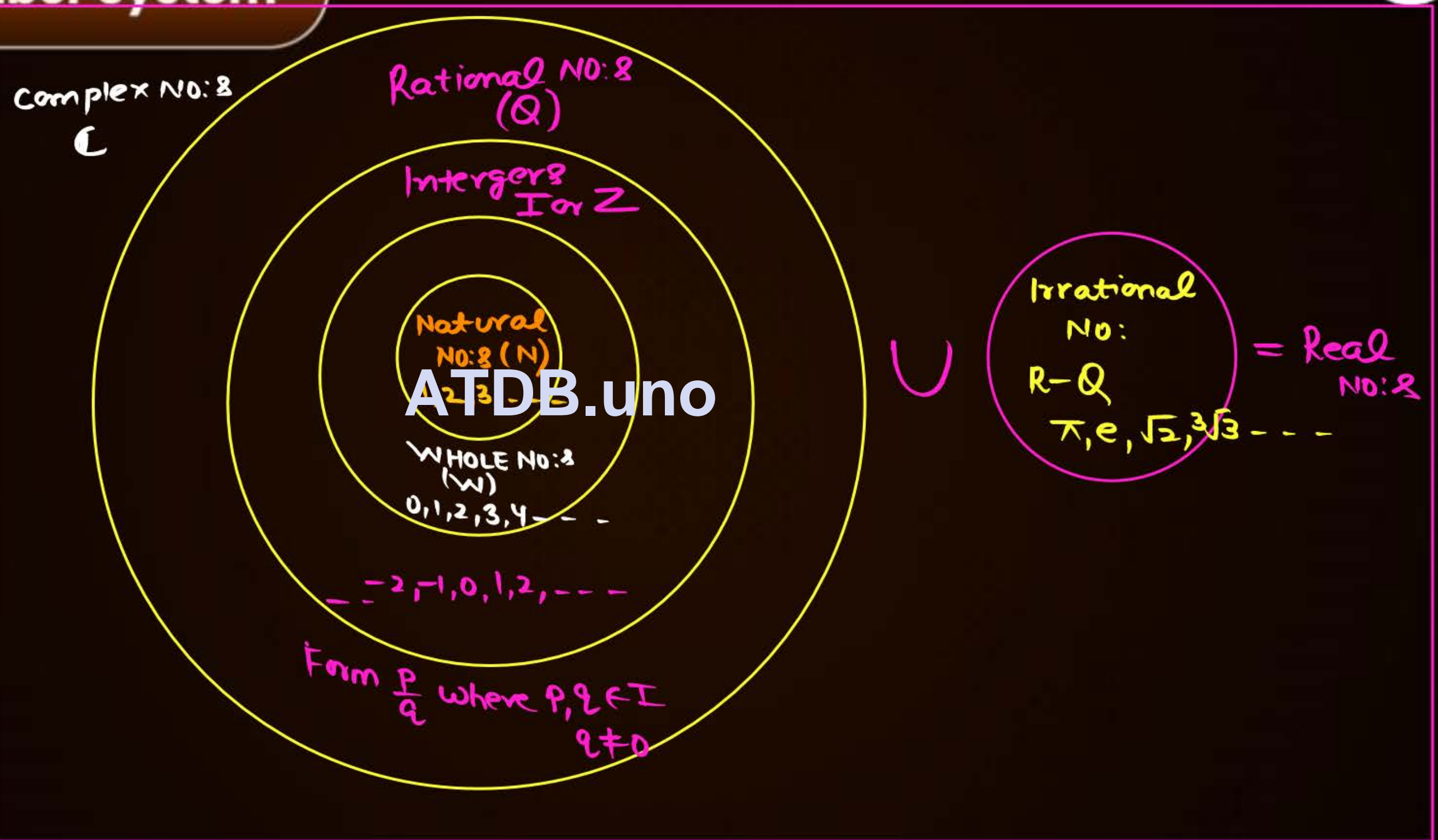
आरंभ

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Basic Maths



Number System



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Rational NO: 8 (In lowest term)

$$\frac{a}{b}$$

a — Numerator
b — Denominator

Terminating Decimals

Ex: $\frac{9}{2} = 4.5$
 $\frac{6}{2} = 3.0$
 $\frac{14}{5} = 2.8$

Recurring/Repeating Decimal

Ex: $\frac{10}{3} = 3.333\dots = 3.\bar{3} = 3.\dot{3}$

Ex: $\frac{1}{7} = 0.\overline{142857}$

Ex: $\frac{22}{7}$

- Denominator of form = $2^m \cdot 5^n$, $m, n \in \mathbb{N}$
- ✓ $\frac{27}{20} = 5^1 \cdot 2^2$
 - ✓ $\frac{81}{160} = 5^1 \cdot 2^5$
 - ✓ $\frac{51}{50} = 5^2 \cdot 2^1$



Irrational No:8. : Non repeating, Non Terminating
 (Naa Toh repeat karre
 $3\frac{22}{7}$ Naa hi Khatam ho)

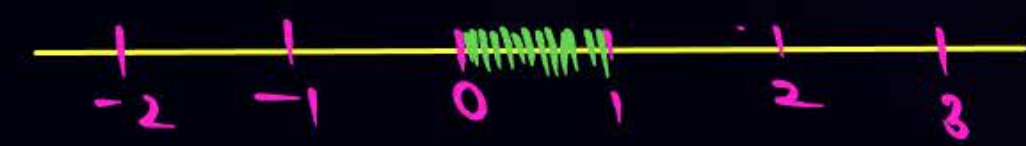
~~$\pi = \frac{22}{7}$~~

$\pi \approx \frac{22}{7}$

- ★ $\sqrt{2} = 1.4142135623731 - - - -$
- ★ $\sqrt{3} = 1.732050807568 - - -$
- ★ $\pi = 3.14159265358979 - - -$
- ★ $e = 2.718281828 - - - -$

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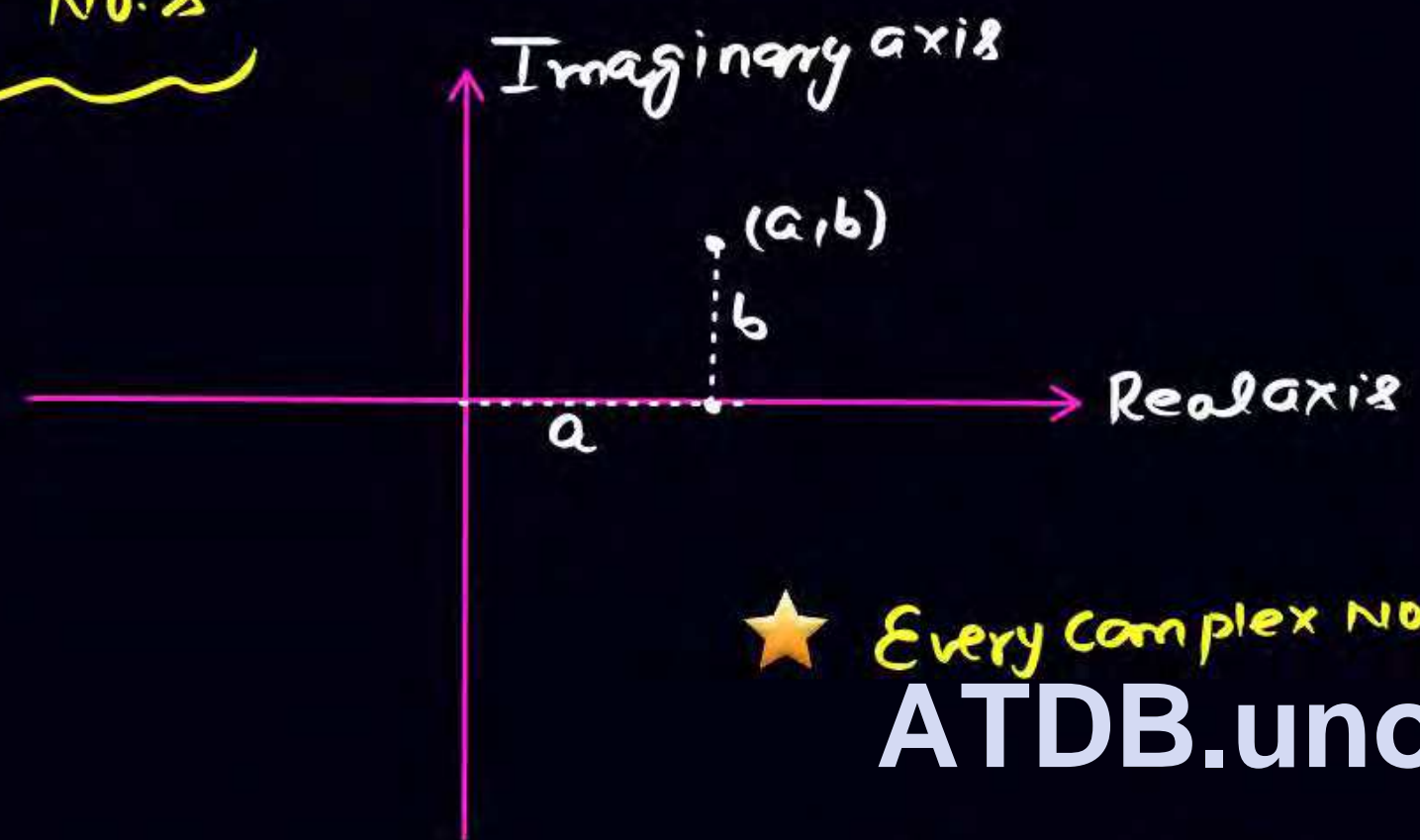
Number line



$e = 1 + \frac{1}{1!} + \frac{1}{2!} + \frac{1}{3!} + \frac{1}{4!} + \dots \infty$



Complex No: 8



★ Every complex No: is of FORM $z = a + ib$, $a, b \in \mathbb{R}$

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★ Every Real No: is a Complex No: b'coz $a \in \mathbb{R}$ can be written as $a + 0i$



Some Important Symbols



1. \forall : for all or for every

2. **S.t.** : Such that

3. \exists : there exists

4. **lly** : Similarly

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5. **Q.E.D** : Quad Erat Demon stratum

6. \equiv : Equivalent to

7. \approx : Approximately equal to

8. \in : Belongs to



Yeh sab thodi naa Aataa hai IIT mai



QUESTION [IIT JEE 2010]

The value(s) of $\int_0^1 \frac{x^4(1-x)^4}{1+x^2} dx$ is(are)

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A $\frac{22}{7} - \pi$

B $\frac{2}{105}$

C 0

D $\frac{71}{15} - \frac{3\pi}{2}$

QUESTION



Fill in the Blanks:

1. Rational \pm Rational = Rational

2. Rational \times Rational = Rational

3. Rational \div (Rational \neq 0) = Rational

4. Rational \pm irrational = Irrational

5. (Rational \neq 0) \times irrational = Irrational

QUESTION



Fill in the Blanks:

6. Irrational \pm Irrational = Can be rational or Irrational $\left\{ \begin{array}{l} \text{Ex: } \sqrt{3} + (-\sqrt{3}) = 0 \in \mathbb{Q} \\ \text{Ex: } \sqrt{3} + (-2\sqrt{3}) = -\sqrt{3} \notin \mathbb{Q} \end{array} \right.$
7. Irrational \times Irrational = Can be rational or Irrational $\left\{ \begin{array}{l} \text{Ex: } (\sqrt{2}-1)(\sqrt{2}+1) = 1 \in \mathbb{Q} \\ \text{Ex: } \sqrt{2} \cdot \sqrt{3} = \sqrt{6} \notin \mathbb{Q} \end{array} \right.$
8. Irrational \div Irrational = Can be rational or Irrational $\left\{ \begin{array}{l} \text{Ex: } \frac{\sqrt{3}}{\sqrt{3}} = 1 \in \mathbb{Q} \\ \text{Ex: } \frac{\sqrt{6}}{\sqrt{3}} = \sqrt{2} \notin \mathbb{Q} \end{array} \right.$
9. If $a + \sqrt{b} = c + \sqrt{d}$. Then = $a=c$ & $b=d$
(where $a, c, b, d \in \mathbb{Q}$, b, d are not perfect square)

$$a - c = \sqrt{d} - \sqrt{b}$$

\downarrow \mathbb{Q} \downarrow \sqrt{d} \downarrow \sqrt{b}
 should be rational
 \downarrow
 $a=c$ $d=b$

QUESTION



State True or False :

- a. Every rational number is real **True**
- b. Every real number is not a complex number **False**
- c. Rational \times irrational is always irrational **False** $0 \times \sqrt{3} = 0 \in \mathbb{Q}$
- d. $\frac{5432753}{40}$ is a recurring decimal **False**
 $\frac{5432753}{40} = 5! \cdot 2^3$
- e. If denominator of a fraction has only 2s or 5s in its prime factorization then it is terminating decimal. **True**

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QUESTION

Number of real values(s) of x satisfying $x^2 - \frac{1}{x+3} = 9 - \frac{x-3}{x^2-9}$

- A** 1 Rational
- B** $\pi - 3.14 \neq 0$ Irrational
- C** $\pi - \frac{22}{7} \neq 0$ Irrational
- D** 0
- E** 2

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$$x^2 - \frac{1}{x+3} = 9 - \frac{x-3}{x^2-9}$$

$$x^2 - \frac{1}{x+3} = 9 - \frac{x-3}{(x+3)(x-3)}$$

$$x^2 - \frac{1}{x+3} = 9 - \frac{1}{x+3}, \quad x \neq 3$$

$$x^2 = 9$$

$$x = -3, 3$$

$$-9 \div 2$$

$$-9 = 2 \times (-5) + 1$$

Remainder



Kaam Ki Baat



$$2 \div 0 = 0.5 + 2 \\ = 0.6 + 2$$

Yaad rahay agar hum Numerator & denominator mai koi expression cancel kartay hai toh vah zero nahi hona chahiyay.

Division by zero is not defined

$$\begin{array}{r} -5 \overline{) -9} \quad x \\ -10 \\ \hline 1 \end{array} \quad \begin{array}{r} 4 \overline{) 9} \quad x \\ 8 \\ \hline 1 \end{array} \quad \begin{array}{r} -3 \overline{) 10} \quad -3-x \\ 9 \\ \hline 1 \end{array}$$

$$a, b \in \mathbb{I}, b \neq 0$$

$a \div b$ — 2 unique Integers — x, r

Quotient

$$a = b \cdot x + r$$

remainder

$$0 \leq r < |b|$$



Yaad Rakho



SQUARES

$1^2 = 1$	$11^2 = 121$	$21^2 = 441$
$2^2 = 4$	$12^2 = 144$	$22^2 = 484$
$3^2 = 9$	$13^2 = 169$	$23^2 = 529$
$4^2 = 16$	$14^2 = 196$	$24^2 = 576$
$5^2 = 25$	$15^2 = 225$	$25^2 = 625$
$6^2 = 36$	$16^2 = 256$	$26^2 = 676$
$7^2 = 49$	$17^2 = 289$	$27^2 = 729$
$8^2 = 64$	$18^2 = 324$	$28^2 = 784$
$9^2 = 81$	$19^2 = 361$	$29^2 = 841$
$10^2 = 100$	$20^2 = 400$	$30^2 = 900$

CUBES

$2^3 = 8$	$9^3 = 729$
$3^3 = 27$	$10^3 = 1000$
$4^3 = 64$	$11^3 = 1331$
$5^3 = 125$	$12^3 = 1728$
$6^3 = 216$	$13^3 = 2197$
$7^3 = 343$	$14^3 = 2744$
$8^3 = 512$	$15^3 = 3375$



Yaad Rakho



Square Roots

$$\sqrt{2} \simeq 1.414$$

$$\sqrt{3} \simeq 1.732$$

$$\sqrt{5} \simeq 2.236$$

$$\sqrt{6} \simeq 2.449$$

$$\sqrt{7} \simeq 2.645$$

$$\sqrt{10} \simeq 3.162$$

$$\pi \simeq 3.14159$$

$$e \simeq 2.71828$$

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THANK
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YOU