PRAYAS

JEE 2026

Mathematics

Basic Maths

Lecture - 01

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Topics *to be covered*

A Margdarshan

B Number System

मार्गदर्शन

ATDB.uno

Path to Success

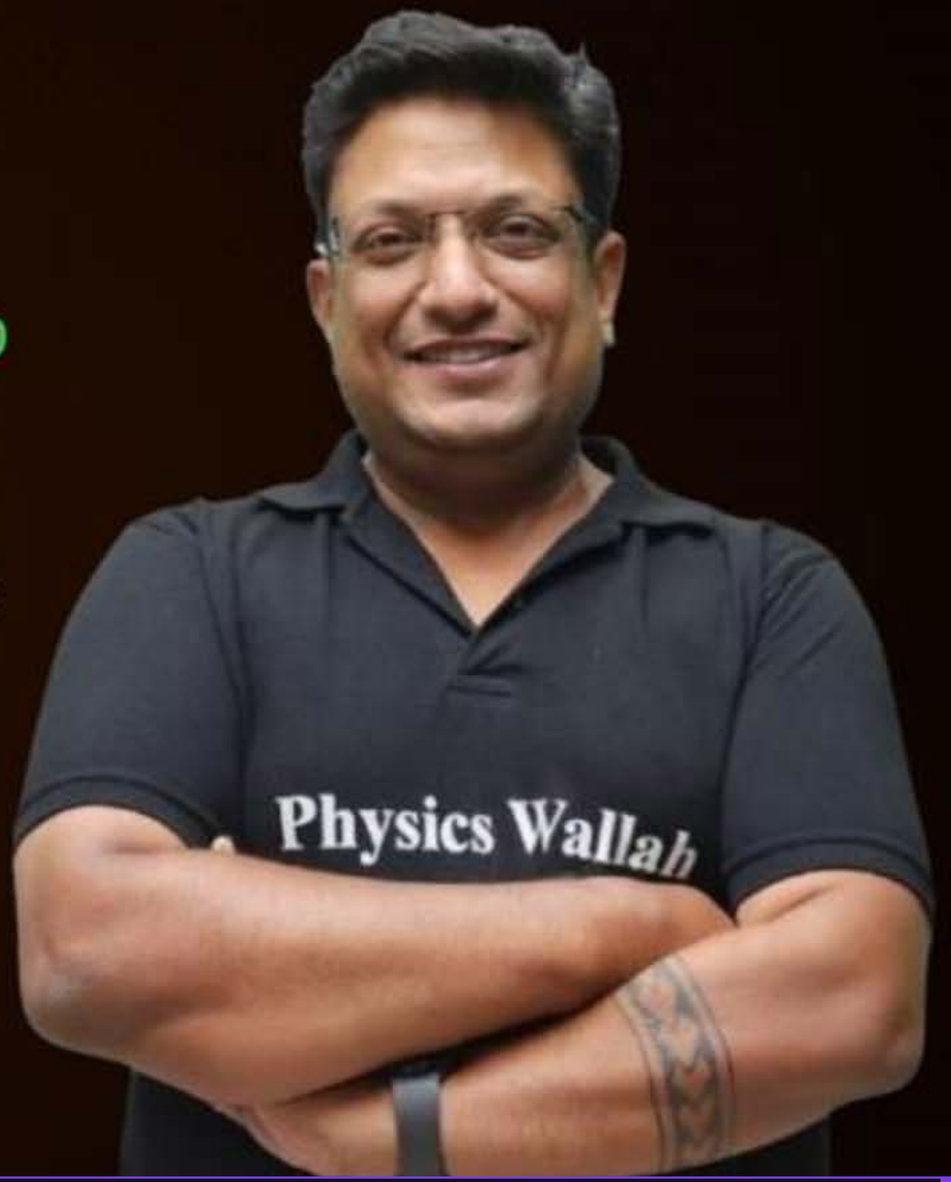
MY INTRODUCTION

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
- 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

पहला

!! Teacher का विश्वास न करें !!

दूसरा

Speed और Content पर ज्ञान ना दें !

तीसरा

खाली होकर Class Attend करें !

चौथा

कभी भी अपने आप को किसी से Compare मत करना

“ ना किसी से पतिस्पर्धा
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 !

“ 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 6 %.

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 5%

How do you want me to teach you?

A) from very Basics to Advance 98%

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

kyaa Aap mujhse Phelay Kabhi Padhay hai?

A) Yes — 15%.

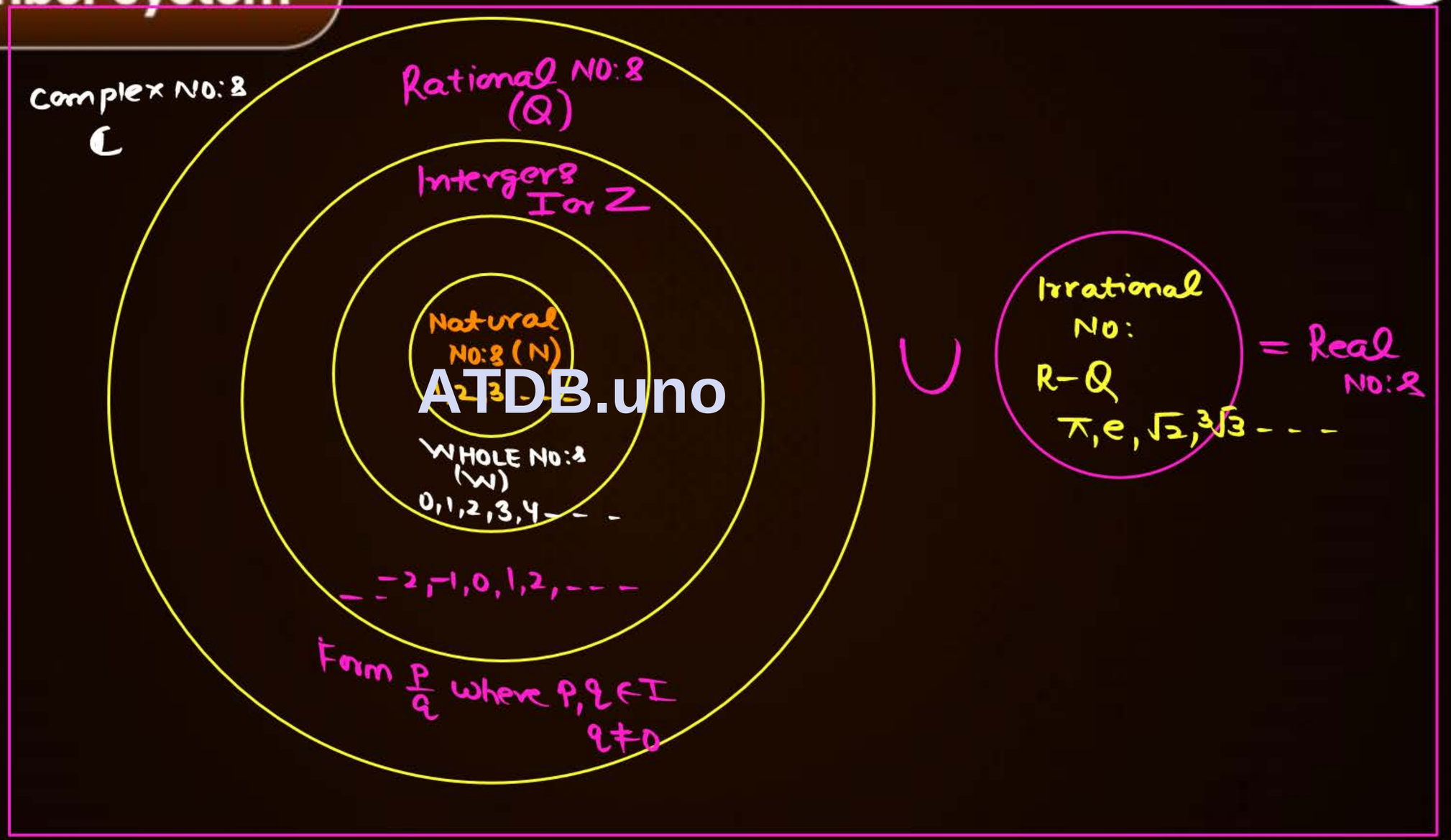
B) No — 82%.

Basic Maths

आरंभ

Basic Maths

Number System



Rational NO: s (In lowest term)

$\frac{a}{b}$ — a: Numerator, b: Denominator

Terminating Decimals

Ex: $\frac{9}{2} = 4.5$

$\frac{6}{2} = 3.0$

$\frac{14}{5} = 2.8$

→ Denominator of form $= 2^m \cdot 5^n$, $m, n \in W$

✓ $\frac{27}{20} = 5^1 \cdot 2^2$

✓ $\frac{81}{160} = 5^1 \cdot 2^5$

✓ $\frac{51}{50} = 5^2 \cdot 2^1$

Reccurring/Repeating Decimal

$\frac{10}{3} = 3.333\ldots = 3.\overline{3} = 3.\dot{3}$

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

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

Irrational No:s : Non repeating, Non Terminating

(Naa Toh repeat kare
Naa hi Khatam ho)

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

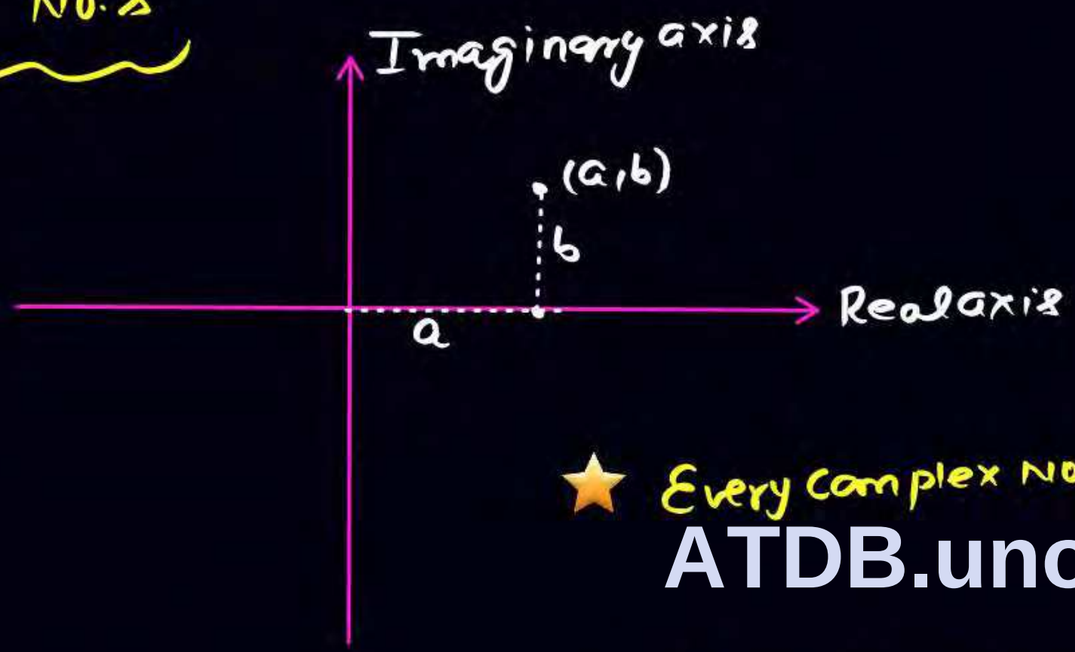
$\pi \approx \frac{22}{7}$

- $\sqrt{2} = 1.4142135623731\ldots$
- $\sqrt{3} = 1.732050807568\ldots$
- $\pi = 3.14159265358979\ldots$
- $e = 2.7182818284\ldots$

Number line

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

Complex No: s



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

★ Every Real No: is a Complex No: b'coz $a \in R$ 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
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)

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 ± Rational = Rational

2. Rational × Rational = Rational

3. Rational ÷ (Rational ≠ 0) = Rational

4. Rational ± irrational = Irrational

5. (Rational ≠ 0) × irrational = Irrational

QUESTION

Fill in the Blanks:

6. Irrational ± Irrational = Can be rational or Irrational
   - Ex: $\sqrt{3} + (-\sqrt{3}) = 0 \in Q$
   - Ex: $\sqrt{3} + (-2\sqrt{3}) = -\sqrt{3} \notin Q$

7. Irrational × Irrational = can be rational or irrational
   - Ex: $(\sqrt{2}-1)(\sqrt{2}+1) = 1 \in Q$
   - Ex: $\sqrt{2} \cdot \sqrt{3} = \sqrt{6} \notin Q$

8. Irrational ÷ Irrational = Can be rational or irrational
   - Ex: $\frac{\sqrt{3}}{\sqrt{3}} = 1 \in Q$
   - Ex: $\frac{\sqrt{6}}{\sqrt{3}} = \sqrt{2} \notin Q$

9. If $a + \sqrt{b} = c + \sqrt{d}$. Then = $a = c$ & $b = d$
   (where a, c, b, d ∈ Q , b, d are not perfect square)

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

Q — should be rational

$a = c$ ⇒ $b = d$

QUESTION

State True of False :

a. Every rational number is real True

b. Every real number is not a complex number False

c. Rational × irrational is always irrational False $0 \times \sqrt{3} = 0 \in \mathbb{Q}$

d. $\frac{5432753}{40}$ is a recurring decimal False

$40 = 5^1 \cdot 2^3$

e. If denominator of a fraction has only 2s or 5s in its prime factorization then it is terminating decimal. True

QUESTION

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

$\frac{1}{0}$ $\frac{0}{0}$

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

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

$x^2 = 9$

$x = -3, 3$

$-9 \div 2$

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

Remainder

(A) 1

(B) $\pi - 3.14 \neq 0$ — Rational

(C) $\pi - \frac{22}{7} \neq 0$ — Irrational, Irrational, 0

(D) 0

(E) 2

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

$a, b \in I \quad , b \neq 0$

$a \div b$ — 2 unique Integers — x, r

$a = b \cdot x + r$ (x — Quotient, r — remainder)

$0 \leq r < |b|$

$-9 \div 2$: $2 \overline{)-9}$, -10, quotient -5 — x, remainder 1 — y

$9 \div 2$: $2 \overline{)9}$, 8, quotient 4 — x, remainder 1 — r

$10 \div -3$: $-3 \overline{)10}$, 9, quotient -3 — x, remainder 1 — r

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

Square Roots	
$\sqrt{2} \simeq 1.414$	$\sqrt{3} \simeq 1.732$
$\sqrt{5} \simeq 2.236$	$\sqrt{6} \simeq 2.449$
$\sqrt{7} \simeq 2.645$	$\sqrt{10} \simeq 3.162$
$\pi \simeq 3.14159$	$e \simeq 2.71828$