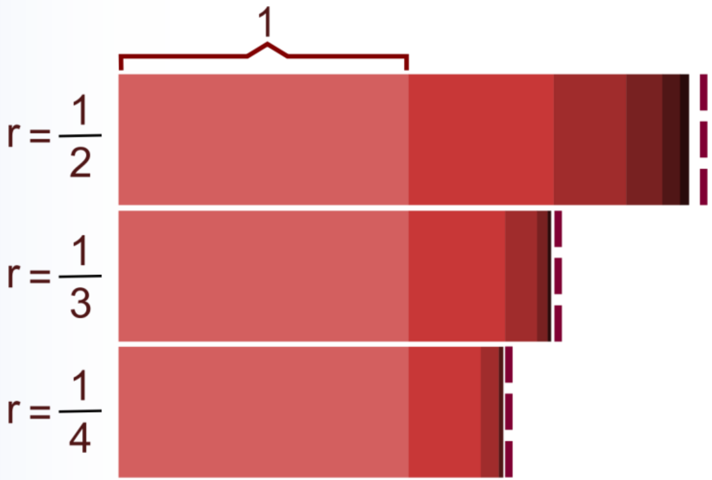
jee LIVE daily 3.0

Geometric Progression - 2

Sequences & Series

4



jee LIVE daily 3.0

Sameer Chincholikar

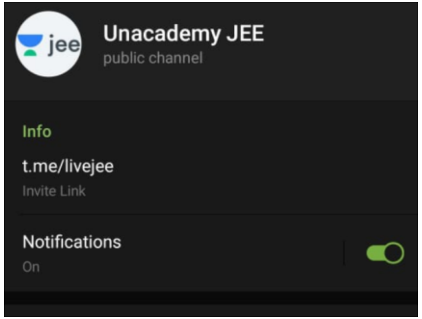
B.Tech, M.Tech - IIT-Roorkee

- **10+** years Teaching experience
- Taught **1 Million+** Students
- **100+** Aspiring Teachers Mentored

sameer_iitr

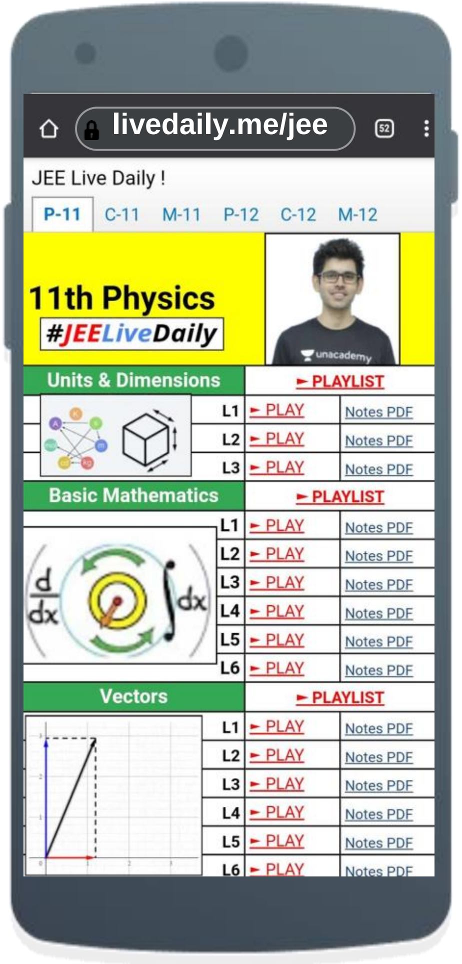
#JEE Live Daily

Telegram Channel



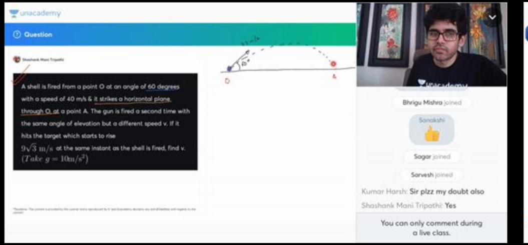
livedaily.me/jee

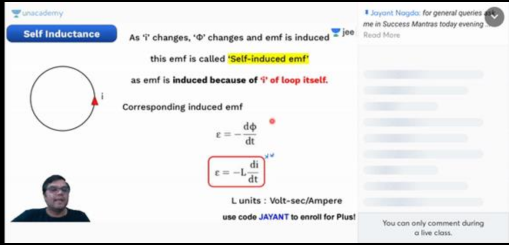
jee

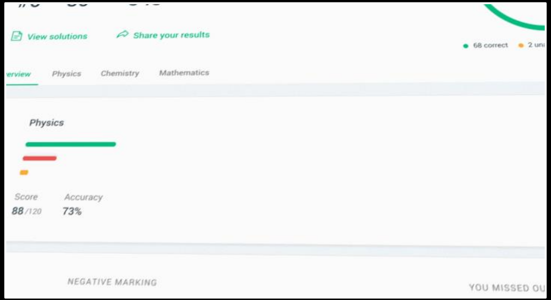


Unacademy Subscription

jee







✚ LIVE Class Environment

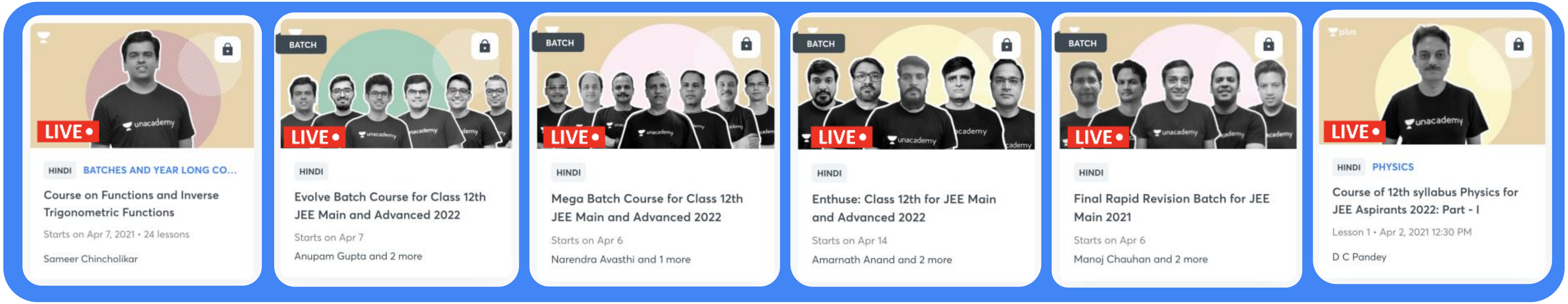
- ✚ **LIVE Polls** & **Leaderboard**
- ✚ **LIVE Doubt** Solving
- ✚ **LIVE** Interaction

✚ Performance Analysis

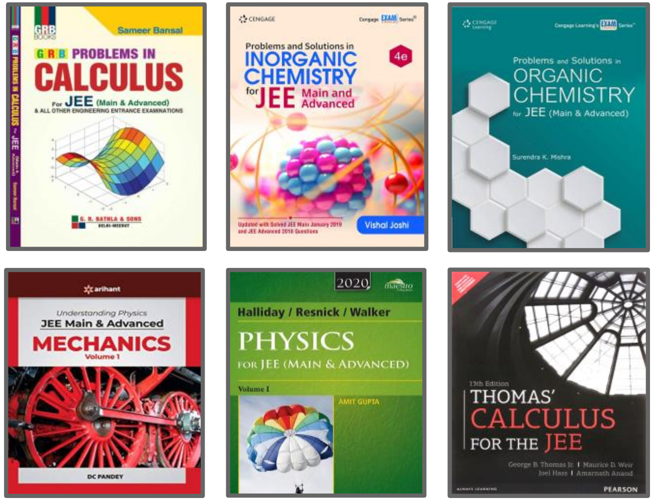
- ✚ **Weekly Test Series**
- ✚ **DPPs** & **Quizzes**

India's **BEST** Educators

Unacademy Subscription



If you want to be the **BEST**
"Learn" from the **BEST**




jee
Top Results
Bratin Mondal
100 %ile
unacademy
Amaiya Singhal 99.97
Adnan 99.95
Ashwin Prasanth 99.94
Tanmay Jain 99.86
Kunal Lalwani 99.81
Utsav Dhanuka 99.75
Aravindan K Sundaram 99.69
Manas Pandey 99.69
Mihir Agarwal 99.63
Akshat Tiwari 99.60
Sarthak Kalankar 99.59
Vaishnovi Arun 99.58
Devashish Tripathi 99.52
Maroof 99.50
Tarun Gupta 99.50
Siddharth Kaushik 99.48
Mihir Kothari 99.39
Sahil 99.38
Vaibhav Dhanuka 99.34
Pratham Kadam 99.29
Shivam Gupta 99.46
Shrish 99.28
Yash Bhaskar 99.10
Subhash Patel 99.02
Ayush Kale 98.85
Ayush Gupta 98.67
Megh Gupta 98.59
Naman Goyal 98.48
MIHIR PRAJAPATI 98.16

jee

IIT JEE subscription

PLUS | ICONIC

- India's Best Educators
- Interactive Live Classes
- Structured Courses & PDFs
- Live Tests & Quizzes
- Personal Coach
- Study Planner

24 months No cost EMI	₹2,100/mo	+10% OFF ₹50,400
18 months No cost EMI	₹2,363/mo	+10% OFF ₹42,525
12 months No cost EMI	₹2,888/mo	+10% OFF ₹34,650
6 months No cost EMI	₹4,200/mo	+10% OFF ₹25,200
3 months	₹5,250/mo	+10% OFF ₹15,750
1 month	₹6,200/mo	

11th / 9, 10

12th / Drop

SAMEERLIVE

jee

IIT JEE subscription

PLUS | ICONIC

- India's Best Educators
- Interactive Live Classes
- Structured Courses & PDFs
- Live Tests & Quizzes
- Personal Coach
- Study Planner

24 months	No cost EMI	₹3,750/mo	+10% OFF ₹90,000
18 months	No cost EMI	₹4,000/mo	+10% OFF ₹72,000
12 months	No cost EMI	₹4,875/mo	+10% OFF ₹58,500
6 months	No cost EMI	₹5,700/mo	+10% OFF ₹34,200

11th / 9, 10

12th / Drop

To be paid as a one-time payment

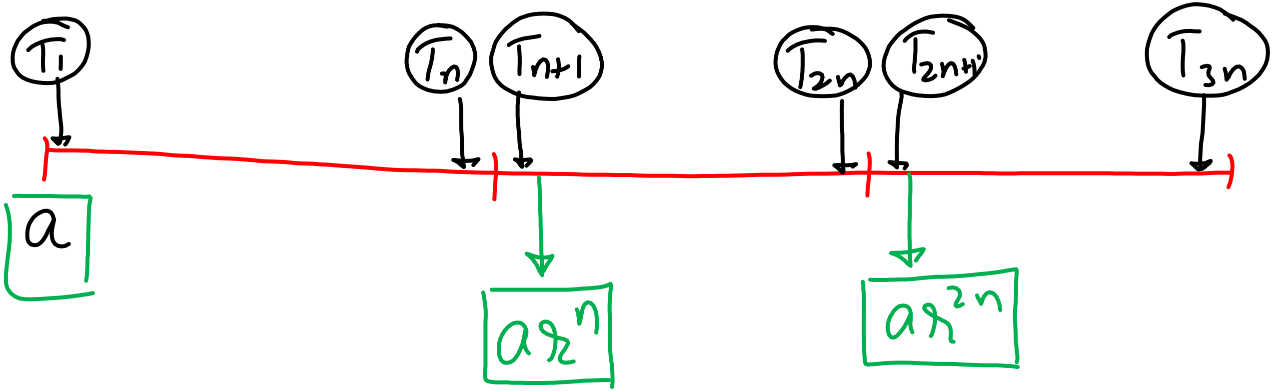
SAMEERLIVE

LET'S BEGIN!!

Homework Question

If in a G.P. of 3n terms, S_1 denotes the sum of the first n terms, S_2 the sum of the second block of n terms & S_3 the sum of the last n terms, then S_1, S_2, S_3 are in

A. A.P. **B.** G.P. **C.** H.P. **D.** None of these



$$S_1 = \frac{a(r^n-1)}{(r-1)}\ ;\ S_2 = \frac{a\boxed{r^n}(r^n-1)}{(r-1)}\ ;\ S_3 = \frac{a\boxed{r^{2n}}(r^n-1)}{(r-1)}$$

$S_1 \; ; \; S_1 r^n \; ; \; S_1 r^{2n}$

$\underbrace{}_{r^n} \; \underbrace{\phantom{r^n \; ; \; S_1 r^{2n}}}_{r^n}$

$\Rightarrow \boxed{G.P.}$

Properties of G.P.

Properties of G.P.

1. The common ratio can be positive or negative but not zero.

Properties of G.P.

2 If a, b, c are in G.P. $\Rightarrow b^2 = a.c$

$$\frac{b}{a} = \frac{c}{b} \Rightarrow \boxed{b^2 = ac}$$

If p^{th}, q^{th} and r^{th} terms of a G.P. are themselves in G.P., then p, q, r are in

A. A.P. **B.** G.P. **C.** H.P. **D.** None of these

$$\begin{cases} T_p = A \cdot R^{p-1} \\ T_q = A R^{q-1} \\ T_r = A R^{r-1} \end{cases}$$

T_p, T_q, T_r in G.P

$$T_q^2 = (T_p)(T_r)$$

$$\cancel{A^2} R^{2q-2} = (\cancel{A} R^{p-1})(\cancel{A} \cdot R^{r-1})$$

$$R^{2q-2} = R^{(p+r-2)}$$

$$2q - \cancel{2} = p + r - \cancel{2}$$

$$\boxed{q = \frac{p+r}{2}} \Rightarrow p, q, r \longrightarrow \underline{\underline{A.P}}$$

If a, b, c are in G.P., then the equation $ax^2 + 2bx + c = 0$ and $dx^2 + 2ex + f = 0$ have a common root, if $\frac{d}{a}, \frac{e}{b}$ and $\frac{f}{c}$ are in

A. A.P. **B.** G.P. **C.** H.P. **D.** None of these

$$\boxed{b^2 = ac} \text{ --- (1)}$$

$$D = 4b^2 - 4(a)(c)$$
$$= 4(b^2 - ac)$$
$$= 0$$

Now:

$$ax^2 + 2bx + c = 0$$

$$\left(\begin{array}{c}\text{Sum of}\\ \text{roots}\end{array}\right) = (\alpha + \alpha) = \frac{-2b}{a}$$

$\boxed{\alpha = -\frac{b}{a}}$

$\because \; dx^2 + 2ex + f = 0$

has a common root

with $ax^2 + 2bx + c = 0$

$\therefore \left(-\frac{b}{a}\right)$ is root of

$dx^2 + 2ex + f = 0$

$\Rightarrow d\left(-\frac{b}{a}\right)^2 + 2e\left(-\frac{b}{a}\right) + f = 0$

$\Rightarrow b^2 d - 2abe + a^2 f = 0$

$\Rightarrow \frac{b^2 d}{ab^2} + \frac{a^2 f}{ab^2} = \frac{2abe}{ab^2}$

$\Rightarrow \left(\frac{d}{a}\right) + \frac{af}{b^2} = 2\left(\frac{e}{b}\right)$

$$\left(\frac{d}{a}\right) + \frac{\cancel{a}f}{\cancel{a}c} = 2\left(\frac{e}{b}\right)$$

$$\Rightarrow \frac{d}{a}, \frac{e}{b}, \frac{f}{c} \longrightarrow A.P.$$

If x, 2x + 2, 3x + 3, ... are in G.P., then the fourth term is

A. 27 **B.** -27 **C.** 13.5 **D.** -13.5

$x, (2x+2), (3x+3) \longrightarrow G.P.$

$\Rightarrow (2x+2)^2 = x(3x+3)$

$\Rightarrow 4x^2 + 8x + 4 = 3x^2 + 3x$

$\Rightarrow x^2 + 5x + 4 = 0$

$(x+1)(x+4) = 0$

$\boxed{x = -1}$; $x = -4$

Reject

(∵ terms become zero)

$x = -4$

<u>terms are:</u>

$-4, \ -6, \ -9, \ -\frac{27}{2}$

$\boxed{r = \frac{3}{2}}$

Properties of G.P.

3 Considering Numbers in G.P.

3-terms : $\frac{a}{r}, \boxed{a}, ar, ar^2$

4-terms : $\frac{a}{r^3}, \boxed{\frac{a}{r}, ar}, ar^3$

jee

Properties of G.P.

4

The Product of the terms of an G.P. equidistant from the beginning & end is constant and equal to the Product of first & last terms.

Eg: $a, ar, ar^2, ar^3, ar^4, ar^5, ar^6, ar^7, ar^8$

$\boxed{a^2r^8}$

jee

Properties of G.P.

5

If each term of an G.P. is multiplied or divided or raised to the power by the same non zero number, then the resulting sequence is also a G.P.

$a, ar, ar^2, ar^3 \longrightarrow$ G.P. (r)

$(ka), (ka)r, (ka)r^2, (ka)r^3 \longrightarrow$ G.P. (r)

$a^2, a^2r^2, a^2r^4, a^2r^6 \longrightarrow$ G.P. (r^2)

Properties of G.P.

6

If $a_1, a_2, a_3, \ldots\ldots\ldots$ and $b_1, b_2, b_3, \ldots\ldots\ldots$ are two G. P's with common ratio r_1 and r_2 respectively then the sequence $a_1b_1, a_2b_2, a_3b_3, \ldots\ldots$ is also a G.P. with common ratio $r_1 \cdot r_2$.

$a, \; ar, \; ar^2 \longrightarrow$ G.P.

$b, \; bR, \; bR^2 \longrightarrow$ G.P.

$(ab), \; (ab)(rR), \; (ab)(rR)^2 \longrightarrow$ G.P.

jee

Properties of G.P.

7

If $a_1, a_2, a_3, \ldots\ldots\ldots$ are in G.P. where each $a_i > 0$, then $\log a_1, \log a_2, \log a_3 \ldots\ldots$ are in A.P. & its converse is also true.

G.P.: $a, ar, ar^2, ar^3, \ldots$

AP: $\log a, \log(ar), \log(ar^2), \log(ar^3), \ldots$

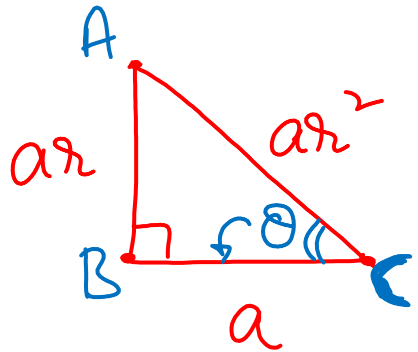
$(\log a), (\log a) + \log r, (\log a) + 2\log r, (\log a) + 3\log r$

$$\log(m \cdot n) = \log m + \log n$$

$$\log m^{\alpha} = \alpha \log m$$

If the sides of a right angled triangle are in G.P., then the cosine of the greater acute angle is

A. $\frac{1}{1+\sqrt{5}}$ **B.** $\frac{1}{1-\sqrt{5}}$ **C.** $\frac{1+\sqrt{5}}{2}$ **D.** None of these



$\Rightarrow \boxed{r > 1}$

Now :

$$(ar^2)^2 = (ar)^2 + (a)^2$$

$$r^4 = r^2 + 1$$

let : $r^2 = t$

jee

$$t^2 - t - 1 = 0$$

$$t = \frac{1 \pm \sqrt{1+4}}{2}$$

$$t = \frac{1 \pm \sqrt{5}}{2}$$

r^2

$\therefore$ r^2 is +ve.

$$r^2 = \left(\frac{\sqrt{5}+1}{2}\right)$$

Now.

$$\cos\theta = \frac{a}{ar^2} = \frac{1}{r^2} = \frac{2}{\sqrt{5}+1}$$

Suppose a, b, c are in A.P. and a^2, b^2, c^2 are in G.P. if $\boxed{a < b < c}$ and $a+b+c=\frac{3}{2}$. Then the value of a is

A. $\frac{1}{2\sqrt{2}}$

B. $\frac{1}{2\sqrt{3}}$

C. $\frac{1}{2}-\frac{1}{\sqrt{3}}$

D. $\frac{1}{2}-\frac{1}{\sqrt{2}}$ ✓

$a, b, c \Rightarrow$ A.P.

$\boxed{2b = a + c}$ — (1)

Also: $a^2, b^2, c^2 \Rightarrow$ G.P.

$(b^2)^2 = (a^2)(c^2)$

$\boxed{b^2 = \pm ac}$ — (2)

Now:

$a+b+c = \frac{3}{2}$

$2b + b = \frac{3}{2}$

$\Rightarrow \boxed{b = \frac{1}{2}}$

jee

use in Eqⁿ ① :

$$\boxed{a+c=1} \quad (3)$$

use in Eqⁿ ② :

$$\boxed{ac=\pm\frac{1}{4}} \quad (4)$$

Case-1 : $c=\frac{1}{4a}$

$$\Rightarrow a+\frac{1}{4a}=1$$

$$\Rightarrow 4a^2+1=4a$$

$$\Rightarrow 4a^2-4a+1=0$$

$$\Rightarrow (2a-1)^2=0$$

$$\Rightarrow \boxed{a=\frac{1}{2}} \rightarrow \text{Reject } (\because a<b)$$

Case-2: $c = -\frac{1}{4a}$

$\Rightarrow a - \frac{1}{4a} = 1$

$\Rightarrow 4a^2 - 1 = 4a$

$\Rightarrow 4a^2 - 4a - 1 = 0$

$a = \frac{4 \pm \sqrt{16+16}}{2(4)}$

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

$\left(\frac{1}{2} + \frac{1}{\sqrt{2}}\right)$ ↳ Reject $(\because a < b)$

$\left(\frac{1}{2} - \frac{1}{\sqrt{2}}\right)$ ✓ $\boxed{\text{accept}}$

Let a, b and c be in G.P. with common ratio r, where a ≠ 0 and $\boxed{0 < r \le 1/2.}$ If 3a, 7b and 15c are the first three terms of an A.P., then the 4th term of this A.P. is:

April 10, 2019

A. 2/3 a **B.** 5 a **C.** 7/3 a **D.** a ✓

$a, b, c \rightarrow G.P.$

$\boxed{a,\ ar,\ ar^2}$

$3a, 7b, 15c \rightarrow A.P.$

$\Rightarrow 14b = 3a + 15c$

$\Rightarrow 14(\cancel{a}r) = 3\cancel{a} + 15(\cancel{a}r^2)$

$$15r^2 - 14r + 3 = 0$$

$$15r^2 - 5r - 9r + 3 = 0$$

$$(5r-3)(3r-1) = 0$$

$$\Rightarrow r = \frac{1}{3}, \frac{3}{5}$$

$$\therefore \boxed{0 < r \leq \frac{1}{2}} \Rightarrow \boxed{r = \frac{1}{3}}$$

AP will be:

$$3a,\ 7\left(a\left(\tfrac{1}{3}\right)\right),\ 15\left(a\left(\tfrac{1}{9}\right)\right),$$

$$3a,\ \frac{7a}{3},\ \frac{5a}{3},\ \boxed{\frac{\cancel{3}a}{\cancel{3}}} \rightarrow \boxed{a}$$

#JEELiveDaily Schedule

jee

11th

Namo Sir | Physics

6:00 - 7:30 PM

Ashwani Sir | Chemistry

7:30 - 9:00 PM

Sameer Sir | Maths

9:00 - 10:30 PM

12th

Jayant Sir | Physics

1:30 - 3:00 PM

Anupam Sir | Chemistry

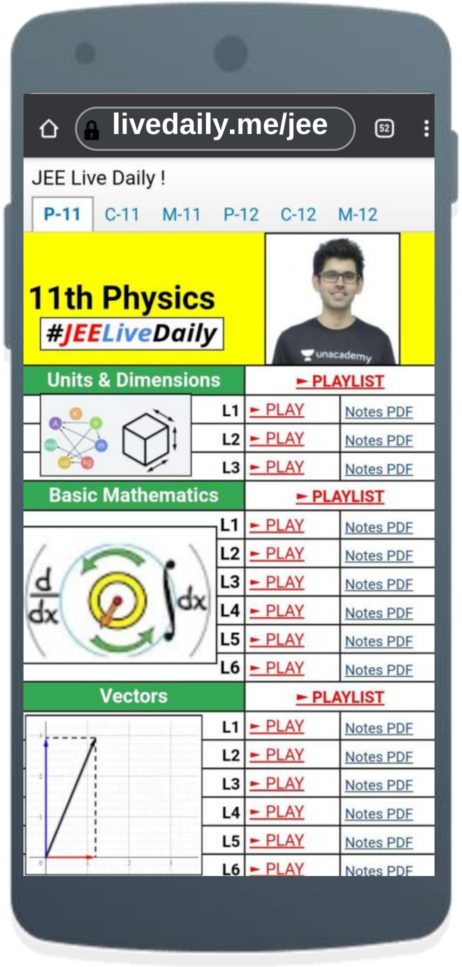
3:00 - 4:30 PM

Nishant Sir | Maths

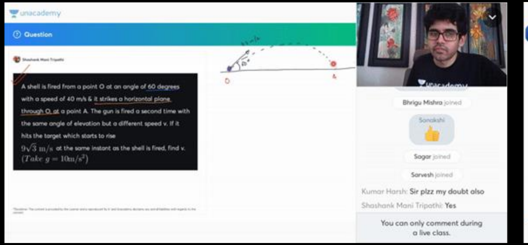
4:30 - 6:00 PM

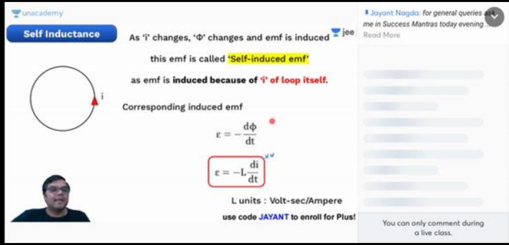
livedaily.me/jee

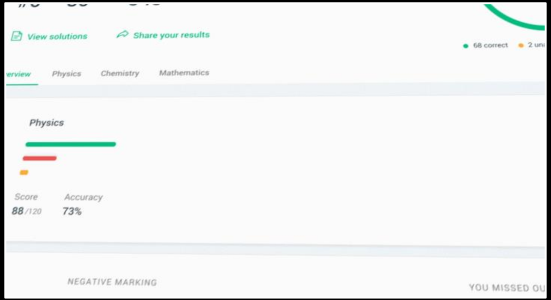
jee



Unacademy Subscription







+ LIVE Class Environment

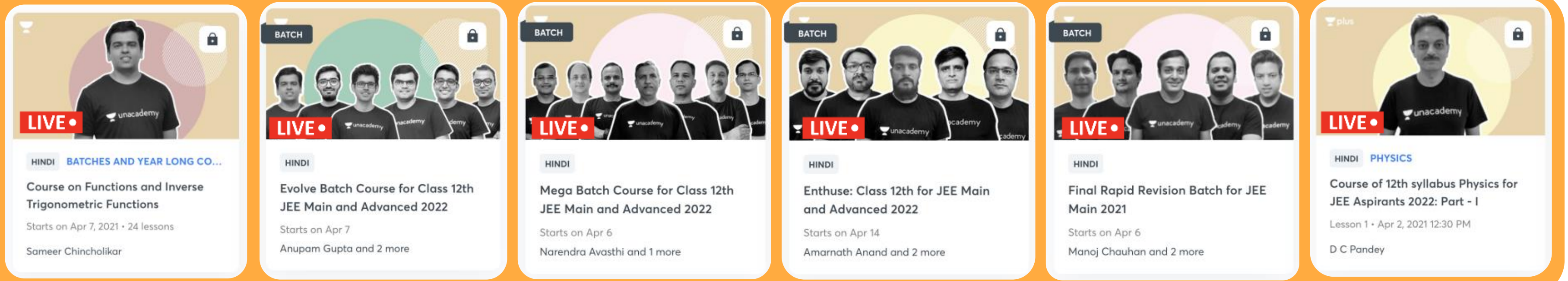
- **LIVE Polls** & **Leaderboard**
- **LIVE Doubt** Solving
- **LIVE** Interaction

+ Performance Analysis

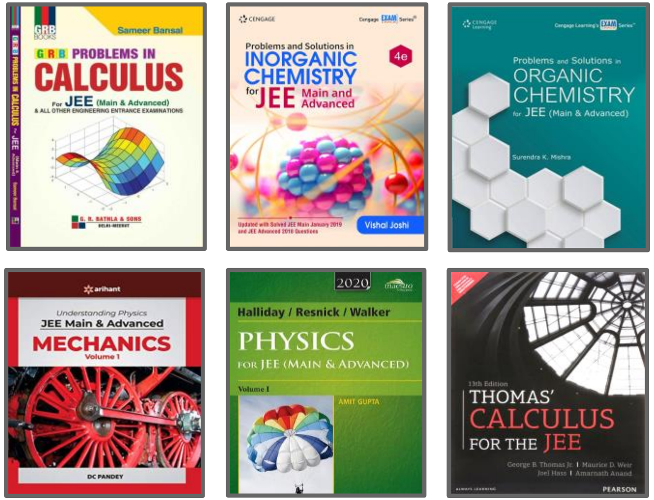
- **Weekly Test Series**
- **DPPs** & **Quizzes**

India's **BEST** Educators

Unacademy Subscription



If you want to be the **BEST**
"Learn" from the **BEST**



jee

Top Results 🏆

Bratin Mondal

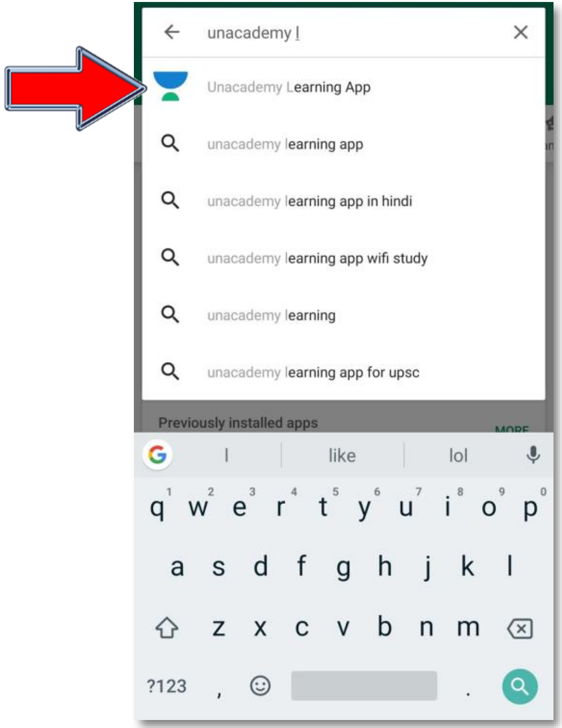
100 %ile

Amaiya Singhal 99.97 | Adnan 99.95 | Ashwin Prasanth 99.94 | Tanmay Jain 99.86 | Kunal Lalwani 99.81 | Utsav Dhanuka 99.75 | Aravindan K Sundaram 99.69 | Manas Pandey 99.69 | Mihir Agarwal 99.63 | Akshat Tiwari 99.60

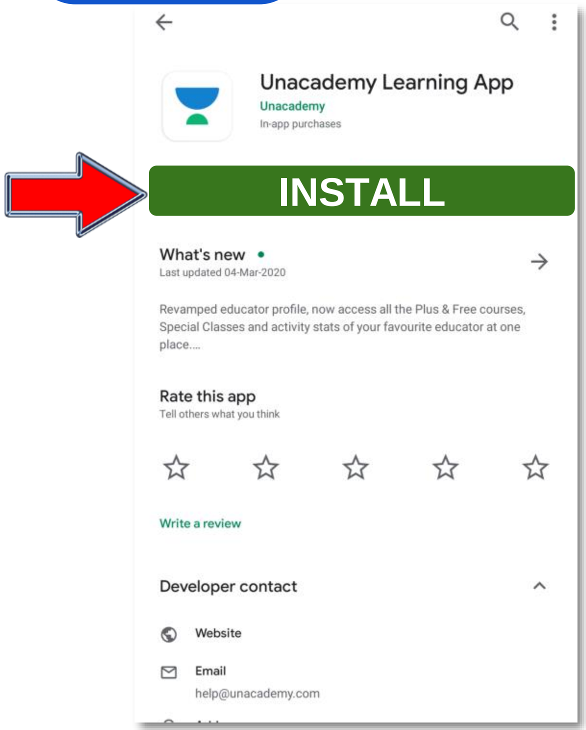
Sarthak Kalankar 99.59 | Vaishnovi Arun 99.58 | Devashish Tripathi 99.52 | Maroof 99.50 | Tarun Gupta 99.50 | Siddharth Kaushik 99.48 | Mihir Kothari 99.39 | Sahil 99.38 | Vaibhav Dhanuka 99.34 | Pratham Kadam 99.29

Shivam Gupta 99.46 | Shrish 99.28 | Yash Bhaskar 99.10 | Subhash Patel 99.02 | Ayush Kale 98.85 | Ayush Gupta 98.67 | Megh Gupta 98.59 | Naman Goyal 98.48 | MIHIR PRAJAPATI 98.16

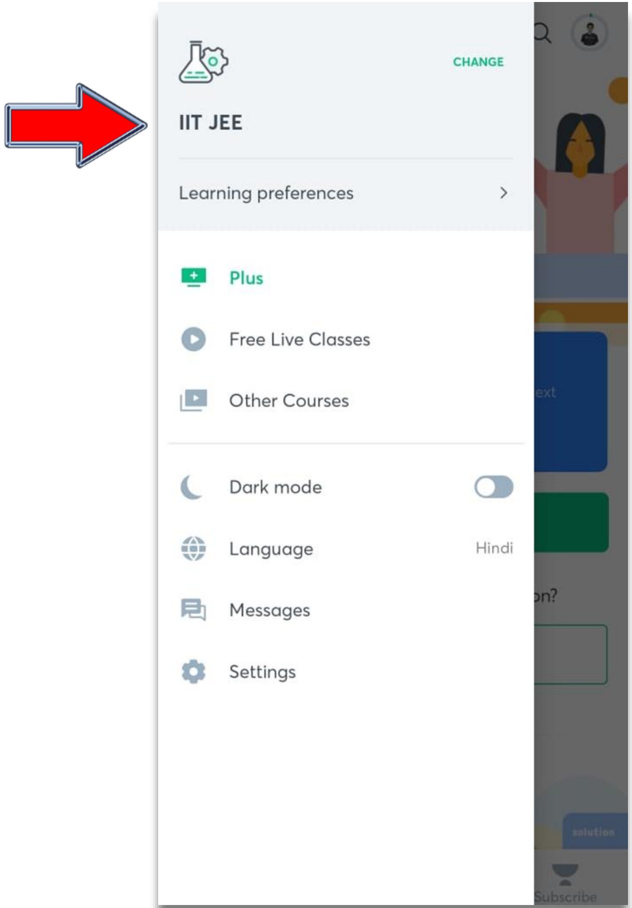
Step 1


unacademy l
Unacademy Learning App
unacademy learning app
unacademy learning app in hindi
unacademy learning app wifi study
unacademy learning
unacademy learning app for upsc
Previously installed apps
like
lol
?123

Step 2


Unacademy Learning App
Unacademy
In-app purchases
INSTALL
What's new
Last updated 04-Mar-2020
Revamped educator profile, now access all the Plus & Free courses, Special Classes and activity stats of your favourite educator at one place....
Rate this app
Tell others what you think
Write a review
Developer contact
Website
Email
help@unacademy.com

jee


CHANGE
IIT JEE
Learning preferences
Plus
Free Live Classes
Other Courses
Dark mode
Language
Hindi
Messages
Settings
Subscribe

jee

IIT JEE subscription

PLUS | ICONIC

- India's Best Educators
- Interactive Live Classes
- Structured Courses & PDFs
- Live Tests & Quizzes
- Personal Coach
- Study Planner

24 months	₹2,100/mo	
No cost EMI	+10% OFF ₹50,400	
18 months	₹2,363/mo	
No cost EMI	+10% OFF ₹42,525	
12 months	₹2,888/mo	
No cost EMI	+10% OFF ₹34,650	
6 months	₹4,200/mo	
No cost EMI	+10% OFF ₹25,200	
3 months	₹5,250/mo	
	+10% OFF ₹15,750	
1 month	₹6,300/mo	

11th / 9, 10

12th / Drop

SAMEERLIVE

jee

IIT JEE subscription

PLUS | ICONIC

- India's Best Educators
- Interactive Live Classes
- Structured Courses & PDFs
- Live Tests & Quizzes
- Personal Coach
- Study Planner

24 months No cost EMI	₹3,750/mo +10% OFF ₹90,000
18 months No cost EMI	₹4,000/mo +10% OFF ₹72,000
12 months No cost EMI	₹4,875/mo +10% OFF ₹58,500
6 months No cost EMI	₹5,700/mo +10% OFF ₹34,200

11th / 9, 10

12th / Drop

To be paid as a one-time payment

SAMEERLIVE

unacademy

IIT JEE BUMPER OFFER

12 MONTHS	2 MONTHS SUBSCRIPTION FREE TILL IIT JEE 2022
24 MONTHS	3 MONTHS SUBSCRIPTION FREE TILL IIT JEE 2023
3 MONTHS	1 MONTH SUBSCRIPTION FREE TILL IIT JEE 2021


unacademy
jee LIVE daily
Test Series 2022
Test Series 2023
9th & 23rd June | 9 AM to 12 PM
unacademy
unacademy
unacademy
unacademy
unacademy
unacademy

Upcoming Batches in June

unacademy

All Stars Batch : JEE Main 2021 — Started on 9th June 2021

Emerge Batch (Class 11th) : JEE Main & Advanced 2023 — Starts on 16th June 2021

Early Excel Batch for Droppers : JEE Main & Advanced 2022 — Starts on 16th June 2021

Evolve Batch (Class 12th) : JEE Main & Advanced 2022 — Starts on 16th June 2021

Thank You

+ SUBSCRIBE

@sameer_iitr

#JEE Live Daily

jee

LIKE & SHARE

PDF Download Now !