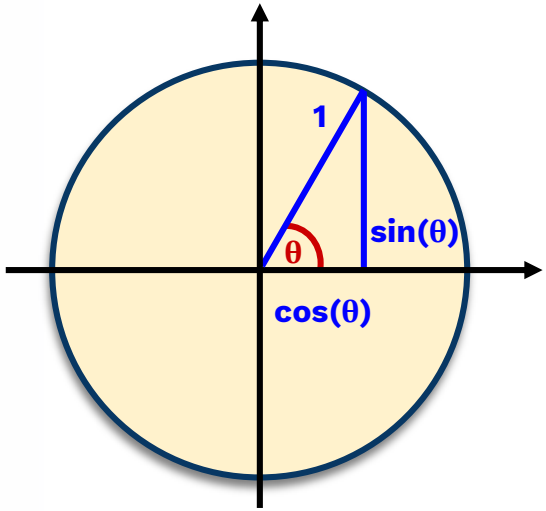
jee LIVE daily 3.0

Conditional Identities

Trigonometry 12

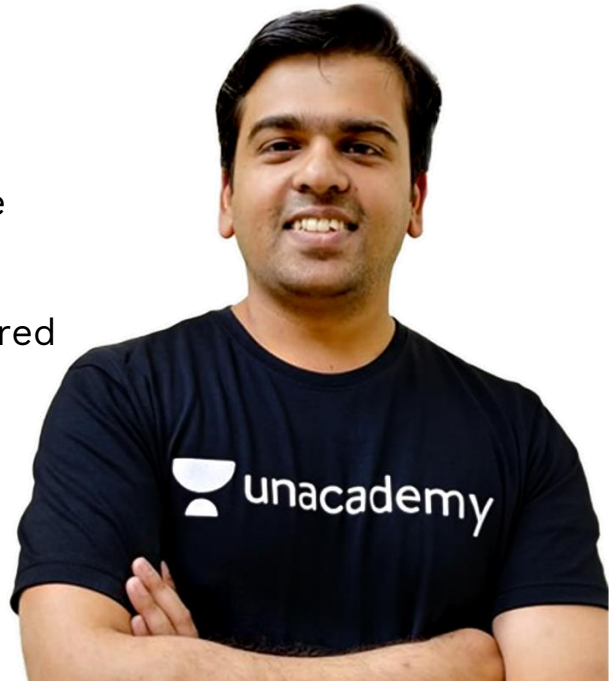


jee LIVE daily 3.0

Sameer Chincholikar

B.Tech, M.Tech - IIT-Roorkee

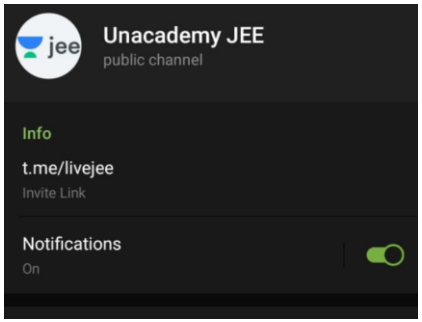
- **10+** years Teaching experience
- Taught **1 Million+** Students
- **100+** Aspiring Teachers Mentored



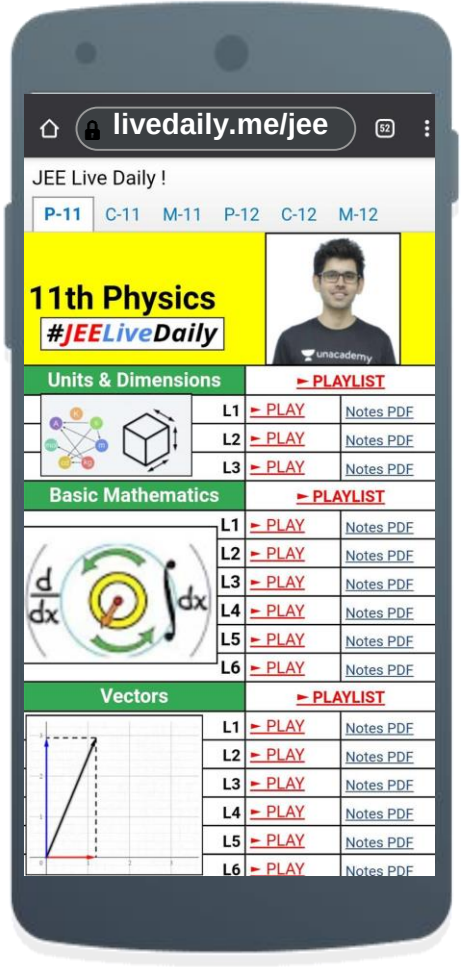
sameer_iitr

#JEE Live Daily

Telegram Channel

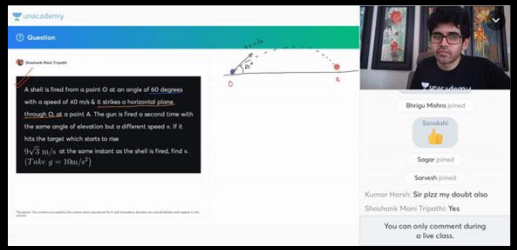


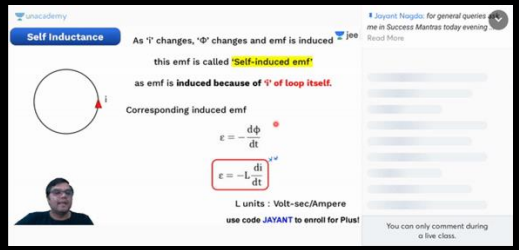
livedaily.me/jee

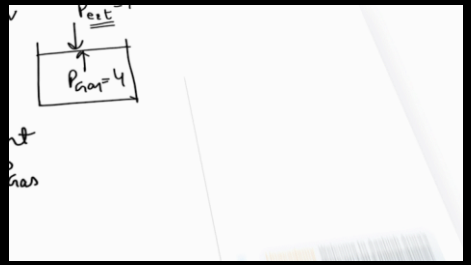


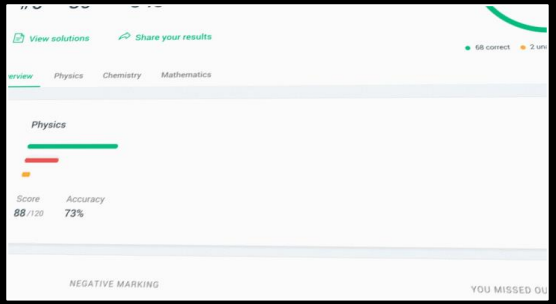
Unacademy Subscription

jee









+ LIVE Class Environment

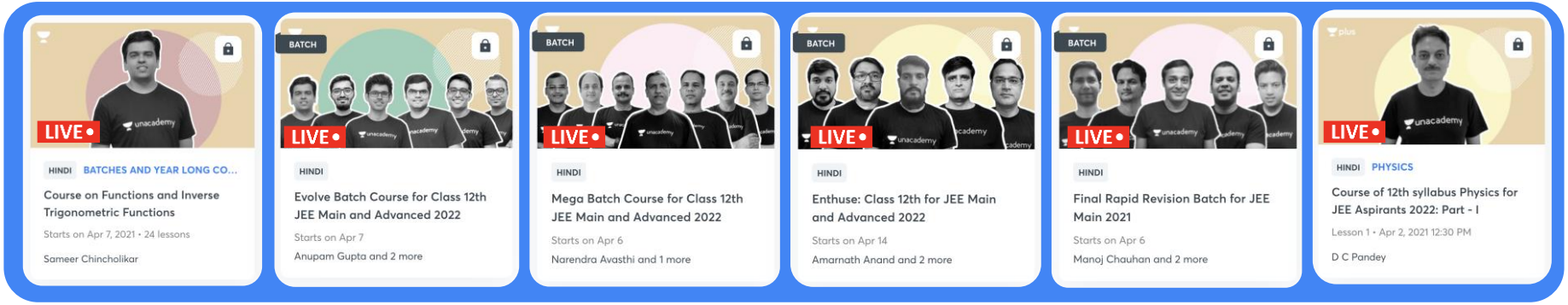
- + **LIVE Polls** & **Leaderboard**
- + **LIVE Doubt** Solving
- + **LIVE** Interaction

+ Performance Analysis

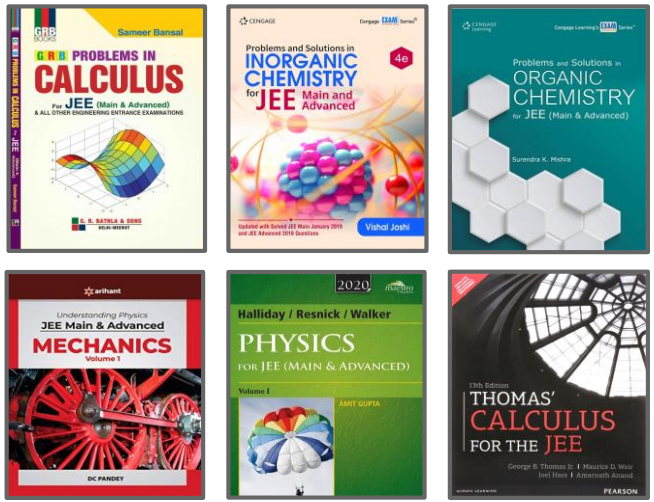
- + **Weekly Test Series**
- + **DPPs** & **Quizzes**

India's **BEST** Educators

Unacademy Subscription



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



jee

Top Results

Bratin Mondal

100 %ile

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

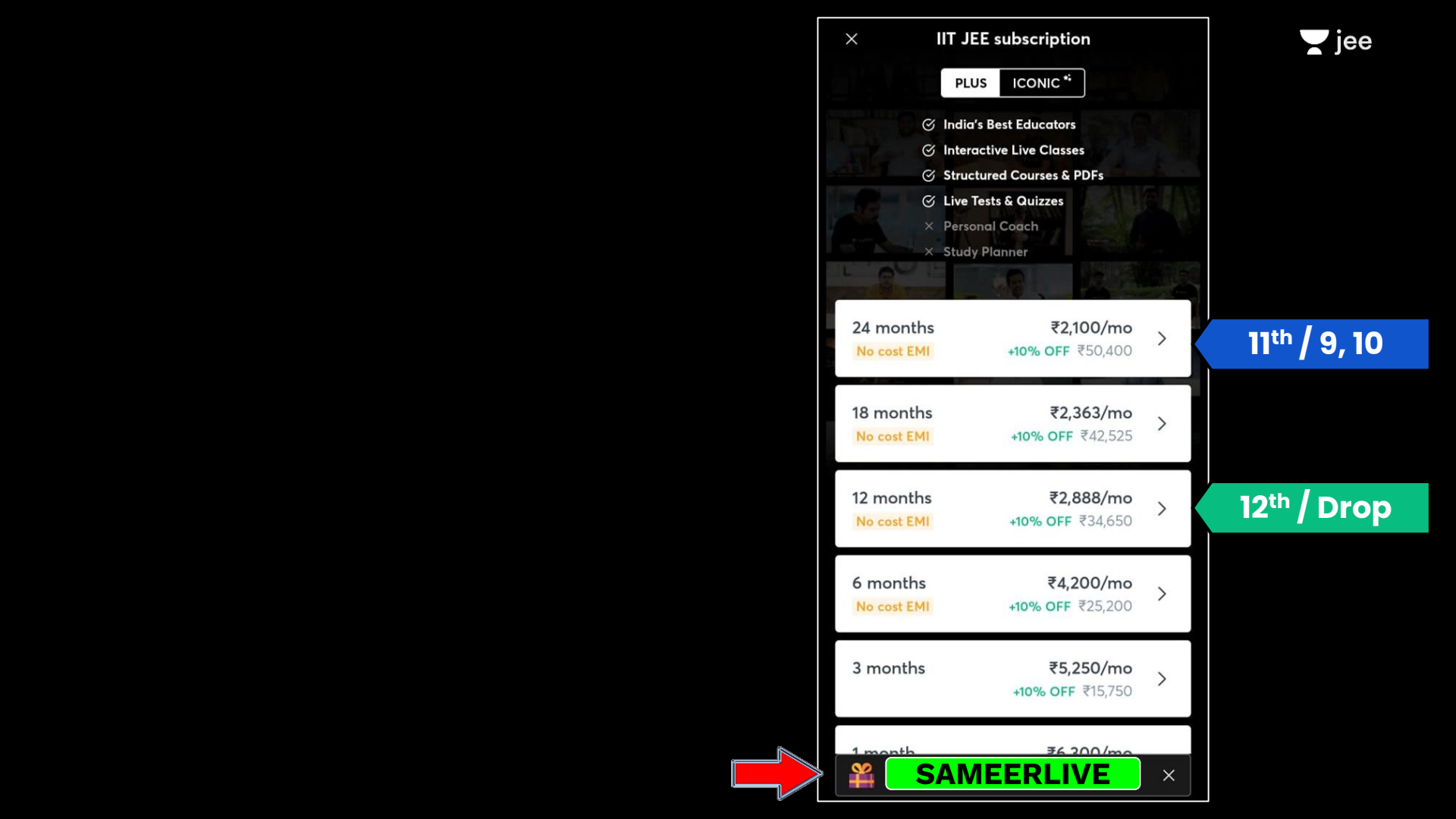
Ayush Kale
98.85

Ayush Gupta
98.67

Megh Gupta
98.59

Naman Goyal
98.48

MIHIR PRAJAPATI
98.16

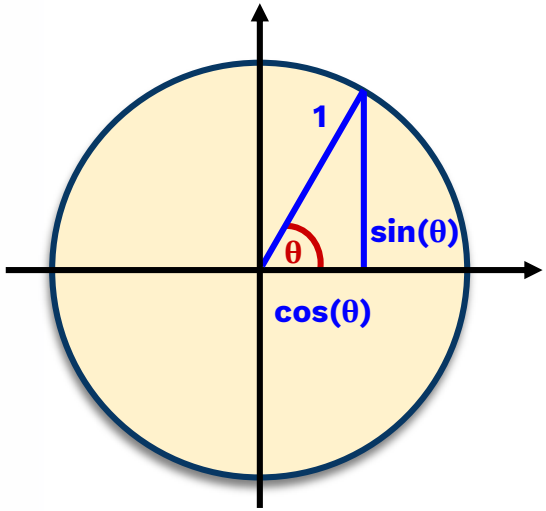

IIT JEE subscription
PLUS
ICONIC
India's Best Educators
Interactive Live Classes
Structured Courses & PDFs
Live Tests & Quizzes
Personal Coach
Study Planner
24 months
No cost EMI
₹2,100/mo
+10% OFF ₹50,400
18 months
No cost EMI
₹2,363/mo
+10% OFF ₹42,525
12 months
No cost EMI
₹2,888/mo
+10% OFF ₹34,650
6 months
No cost EMI
₹4,200/mo
+10% OFF ₹25,200
3 months
₹5,250/mo
+10% OFF ₹15,750
SAMEERLIVE
jee
11th / 9, 10
12th / Drop

LET'S BEGIN!!

jee LIVE daily 3.0

Conditional Identities

Trigonometry 12




Practical Example
jee
Cost: Rs. 2500
Profit: Rs. 250
All Tables
Budget Constraint: Rs. 50,000
Space Constraint: 60 Pieces
Cost: Rs.500
Profit: Rs. 75
All Chairs
unacademy
CONDITIONAL IDENTITIES

In ΔABC find the value of $\left(\frac{\sin 2A + \sin 2B + \sin 2C}{\sin A \sin B \sin C}\right)$

A. 1 **B.** 2 **C.** 3 **D.** 4

$A + B + C = \pi \Rightarrow (A + B) = (\pi - C)$

$\sin 2A + \sin 2B + \sin 2C = \lambda \sin A \sin B \sin C$

$C = \pi - (A + B)$

Shortcuts.

$A = B = C = 60^\circ$

3. $\left(\frac{\sqrt{3}}{2}\right)$

$\left(\frac{\sqrt{3}}{2}\right)\left(\frac{\sqrt{3}}{2}\right)\left(\frac{\sqrt{3}}{2}\right) = \frac{3\sqrt{3}}{8}$

$$\sin 2A + \sin 2B + \sin 2C$$

$$2\sin(A+B)\cos(A-B) + \sin 2C$$

$$(\pi - C)$$

$$2\sin C\cos(A-B) + 2\sin C\cos C$$

$$(2\sin C)(\cos(A-B) + \cos C)$$

$$(2\sin C)\left(\cos(A-B)+\cos(\pi-(A+B))\right)$$

$$(2\sin C)\left(\cos(A-B)-\cos(A+B)\right)$$

$$(2\sin C)\Big((\cos A\cos B+\sin A\sin B)-(\cos A\cos B-\sin A\sin B)\Big)$$

$$=(2\sin C)(2\sin A\sin B)$$

$$=\boxed{4\sin A\sin B\sin C}$$

In a triangle ABC, value of $\frac{\sin A + \sin B + \sin C}{6 \cos\frac{A}{2} \cos\frac{B}{2} \cos\frac{C}{2}}$ is equal to:

A. 1/4 **B.** 2 **C.** 3 **D.** 2/3

$A + B + C = \pi \Rightarrow (A + B) = (\pi - C)$

$\sin A + \sin B + \sin C$

$2 \sin\left(\frac{A+B}{2}\right) \cos\left(\frac{A-B}{2}\right) + \sin C$

$2 \sin\left(\frac{\pi}{2} - \frac{C}{2}\right) \cos\left(\frac{A-B}{2}\right) + \sin C$

Shortcut:

$A = B = C = 60^\circ$

$\frac{3\left(\frac{\sqrt{3}}{2}\right)}{6\left(\frac{\sqrt{3}}{2}\right)\left(\frac{\sqrt{3}}{2}\right)\left(\frac{\sqrt{3}}{2}\right)}$

$= \frac{2}{3}$

$$2\cos\frac{C}{2}\cos\left(\frac{A-B}{2}\right) + 2\sin\frac{C}{2}\cos\frac{C}{2}$$

$$= 2\cos\frac{C}{2}\left[\cos\left(\frac{A-B}{2}\right) + \sin\frac{C}{2}\right]$$

$$= \left(2\cos\frac{C}{2}\right)\left[\cos\left(\frac{A-B}{2}\right) + \sin\left(\frac{\pi}{2} - \frac{A+B}{2}\right)\right]$$

$$= \left(2\cos\frac{C}{2}\right)\left[\cos\left(\frac{A-B}{2}\right) + \cos\left(\frac{A+B}{2}\right)\right]$$

$$= \left(2\cos\frac{C}{2}\right)\left[\left(\cos\frac{A}{2}\cos\frac{B}{2} + \sin\frac{A}{2}\sin\frac{B}{2}\right) + \left(\cos\frac{A}{2}\cos\frac{B}{2} - \sin\frac{A}{2}\cdot\sin\frac{B}{2}\right)\right]$$

$$= \left(4\cos\frac{A}{2}\cos\frac{B}{2}\cos\frac{C}{2}\right)$$

If $x + y + z = \frac{\pi}{2}$, then value of $\left(\frac{\cos 2x + \cos 2y + \cos 2z - 1}{\sin x . \sin y . \sin z}\right)$ is equal to:

A. 4 **B.** 2 **C.** 1 **D.** None

$\cos 2x + \cos 2y + \cos 2z - 1$

$2\cos(x+y)\cos(x-y) + \cos 2z - 1$

$\left(\frac{\pi}{2} - z\right)$

$(1 - 2\sin^2 z)$

$A = B = C = 30^\circ$

$\left[3\left(\frac{1}{2}\right) - 1\right]$

$\left(\frac{1}{2}\right)\left(\frac{1}{2}\right)\left(\frac{1}{2}\right)$

$= 4$

$$2\sin\gamma\cos(x-y) - 2\sin^2\gamma$$

$$= (2\sin\gamma)(\cos(x-y) - \sin\gamma)$$

$$\sin\gamma \rightarrow \left(\frac{\pi}{2} - (x+y)\right)$$

$$= (2\sin\gamma)(\cos(x-y) - \cos(x+y))$$

$$= (2\sin\gamma)(2\sin x \sin y)$$

In A+B+C = π, then $\cos^2 A + \cos^2 B + \cos^2 C$ =

A. 1 + 2 cos A cos B cos C → 5/4

B. 1 - 2 cos A cos B cos C = 3/4

C. 2 - 2 cos A cos B cos C → 7/4

D. 2 + 2 cos A cos B cos C → 9/4

E. $1 - 2\sin\frac{A}{2}\sin\frac{B}{2}\sin\frac{C}{2}$

$\cos^2 A + \cos^2 B + \cos^2 C$

$\frac{1+\cos 2A}{2} + \frac{1+\cos 2B}{2} + \cos^2 C$

$1 + \frac{1}{2}(\cos 2A + \cos 2B) + \cos^2 C$

$\cos 2\theta = 2\cos^2\theta - 1$

$\cos^2\theta = \frac{1+\cos 2\theta}{2}$

$\cos^2 B - \sin^2 A$

$= \cos^2 A - \sin^2 B$

$= \cos(A+B)\cos(A-B)$

$$1 + \frac{1}{2}\left(2\cos(A+B)\cos(A-B)\right) + \cos^2 C$$

$\cos(A+B) \rightarrow (\pi - C)$

$$= 1 - \cos C \cos(A-B) + \cos^2 C$$

$$= 1 - \cos C\left[\cos(A-B) - \cos C\right]$$

$-\cos C \rightarrow \cos(\pi - (A+B))$

$$= 1 - \cos C\left[\cos(A-B) + \cos(A+B)\right]$$

$$= 1 - \cos C (2\cos A \cos B)$$

$$= \boxed{1 - 2\cos A \cos B \cos C}$$

Shortcut: $\boxed{A + B + C = \pi}$

$$\cos^2 A + \cos^2 B + \cos^2 C$$

$A = B = C = 60^\circ$

3/4

If $A + B + C = \frac{\pi}{2}$, $\tan A \tan B + \tan B \tan C + \tan C \tan A$ is equal to:

A. 1

B. 0

C. $\tan A \tan B \tan C$

D. $\cot A \cot B \cot C$

$A + B + C = \frac{\pi}{2}$

$(A + B) = \left(\frac{\pi}{2} - C\right)$

$\tan(A+B) = \tan\left(\frac{\pi}{2} - C\right)$

$\frac{\tan A + \tan B}{1 - \tan A \tan B} = \cot C = \frac{1}{\tan C}$

$\tan A \tan C + \tan B \tan C = 1 - \tan A \tan B$

If $A + B + C = \pi$, then $\sin^2 A + \sin^2 B - \cos^2 C =$

A. $1 + 2 \cos A \cos B \cos C$

B. $1 - 2 \cos A \cos B \cos C$

C. $2 - 2 \cos A \cos B \cos C$

D. $2 + 2 \cos A \cos B \cos C$

$$\sin^2 A - (\cos^2 C - \sin^2 B)$$

$$\sin^2 A - (\cos(B+C)\cos(B-C))$$

$\cos(B+C) \rightarrow (\pi - A)$

$$1 - \cos^2 A + \cos A \cos(B-C)$$

$$1+\cos A\left(\cos(B-C)-\cos A\right)$$

$$\cos A = \cos(\pi-(B+C))$$

$$1+\cos A\left(\cos(B-C)+\cos(B+C)\right)$$

$$\boxed{1+2\cos A\cos B\cos C}$$

If A + B + C = π, then **sin 2A + sin 2B - sin 2C =**

A. 4 sin A sin B sin C

B. 4 cos A cos B sin C

C. 4 cos A sin B cos C

D. 4 sin A cos B cos C

HW-1

If $A + B + C = \frac{3\pi}{2}$, then

$\cos 2A + \cos 2B + \cos 2C + 4 \sin A \sin B \sin C =$

A. 0 **B.** 1 **C.** 2 **D.** 4

HW-2

#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

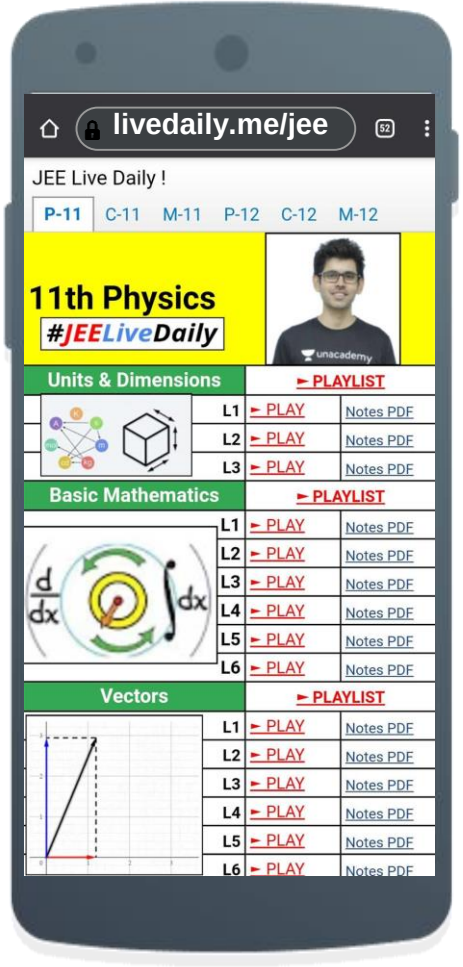
Anupam Sir | Chemistry

3:00 - 4:30 PM

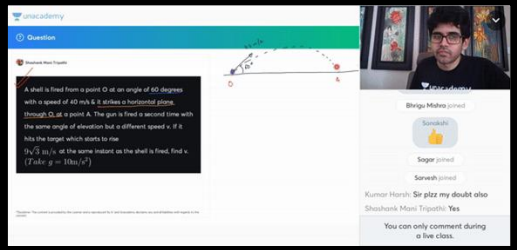
Nishant Sir | Maths

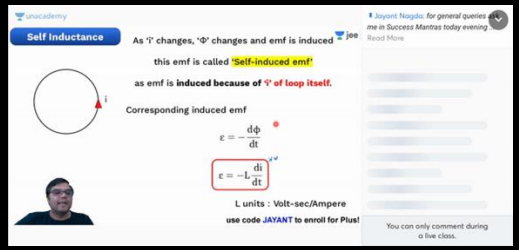
4:30 - 6:00 PM

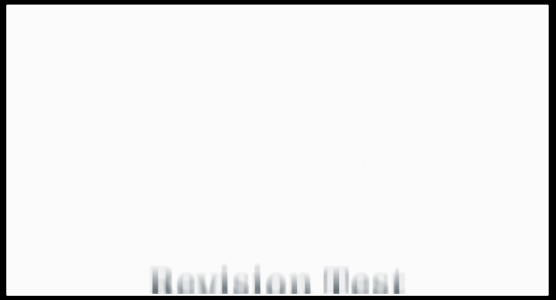
livedaily.me/jee

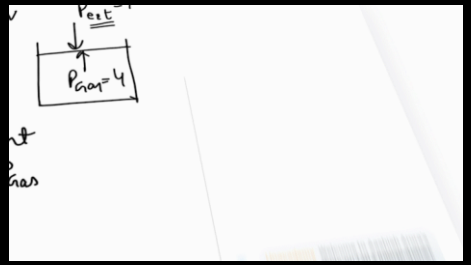


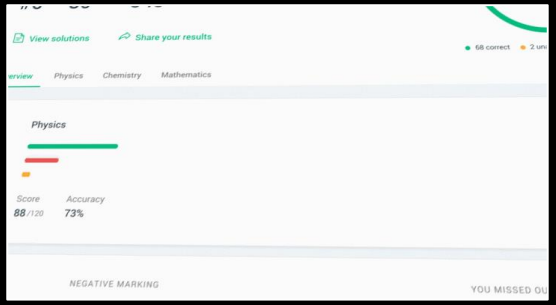
Unacademy Subscription











+ LIVE Class Environment

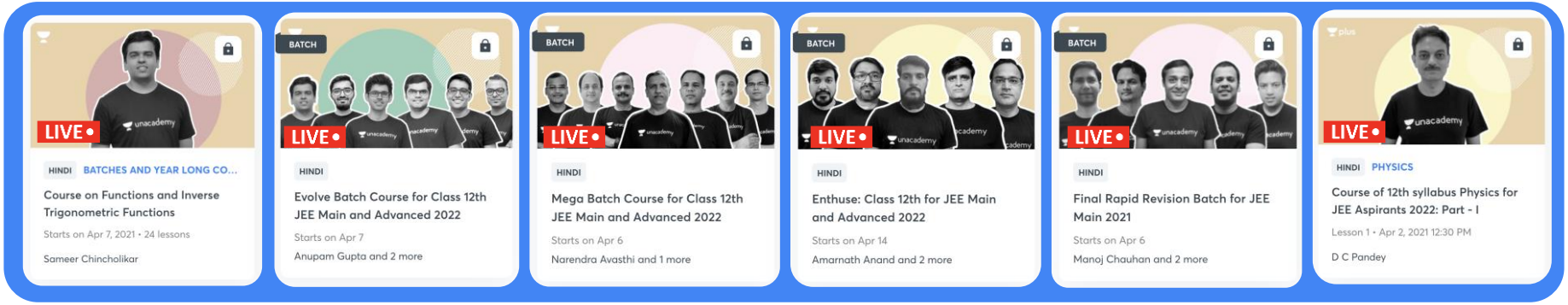
- **LIVE Polls** & **Leaderboard**
- **LIVE Doubt** Solving
- **LIVE** Interaction

+ Performance Analysis

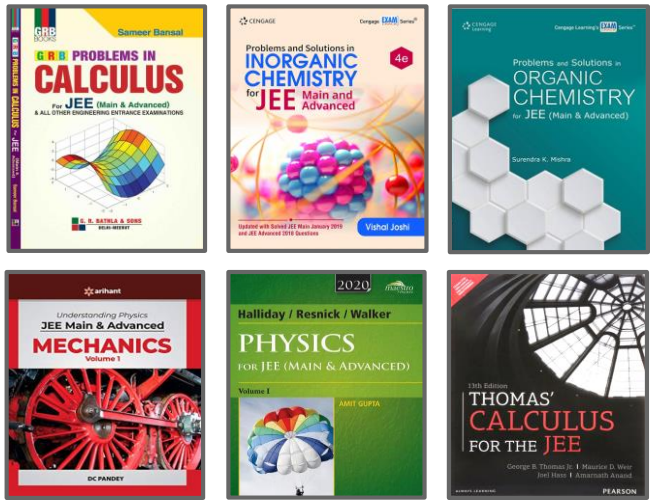
- **Weekly Test Series**
- **DPPs** & **Quizzes**

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

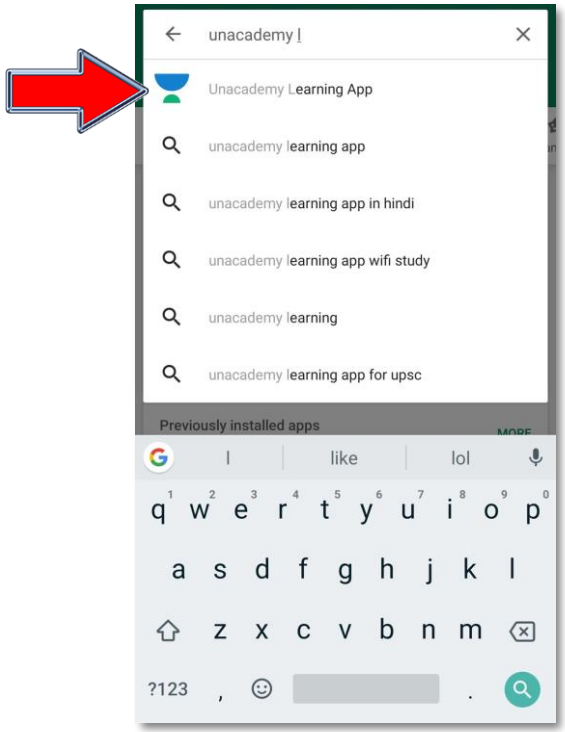
Megh Gupta
98.59

Naman Goyal
98.48

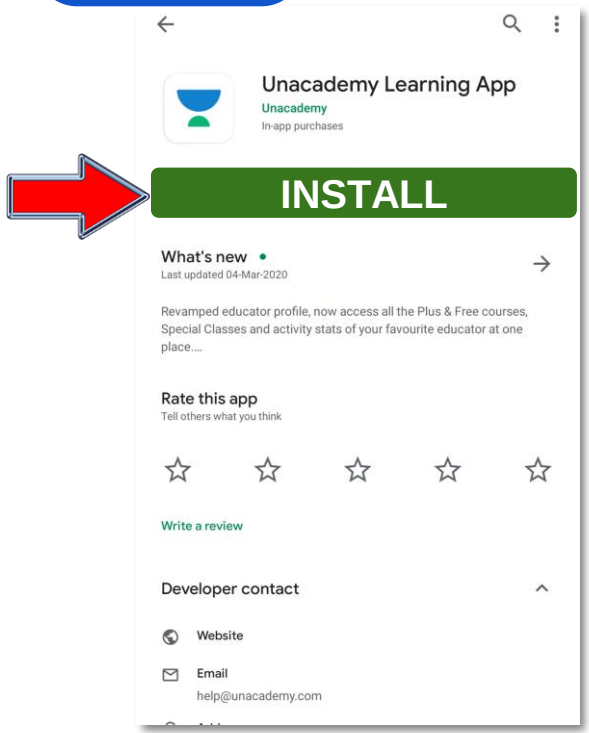
MIHIR PRAJAPATI
98.16

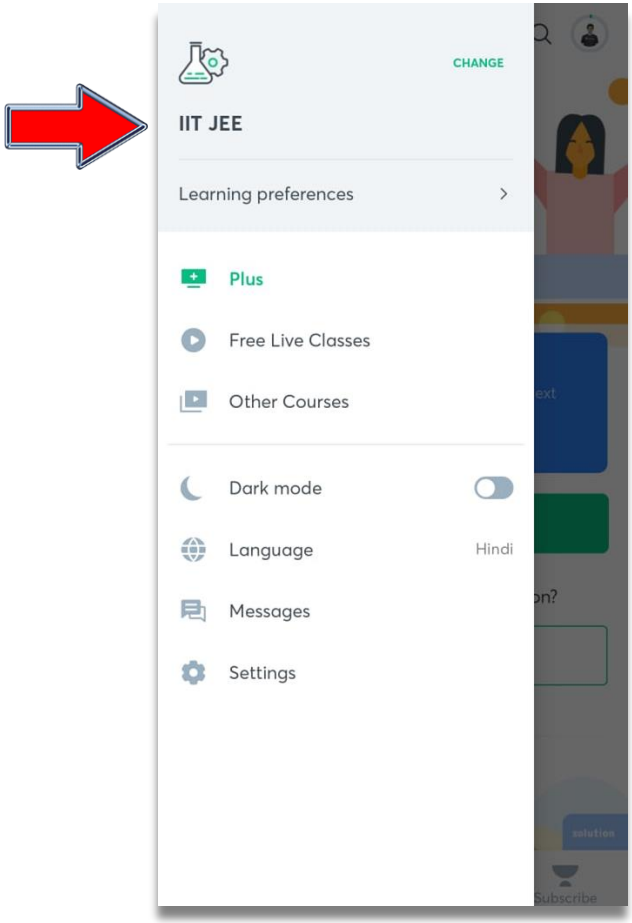
jee

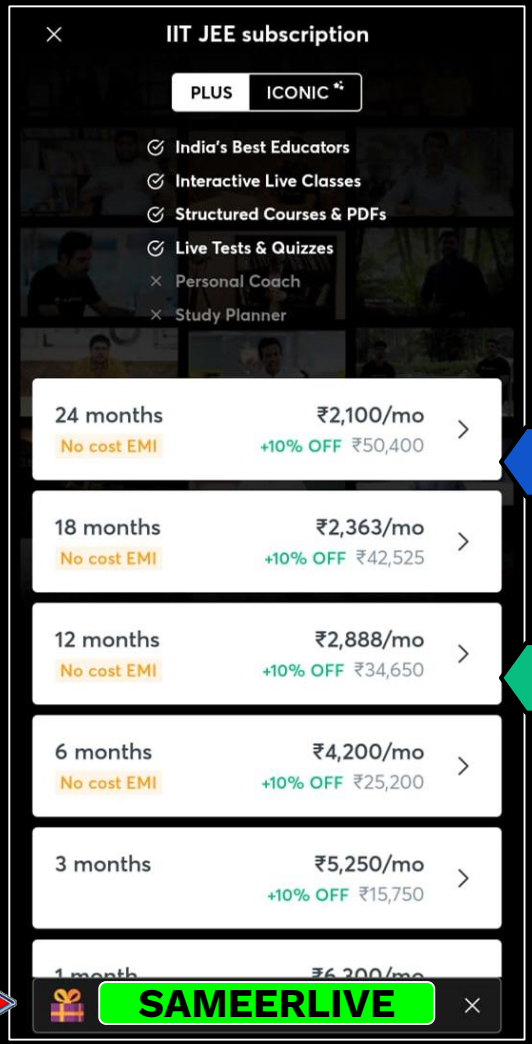
Step 1



Step 2




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



jee

11th / 9, 10

12th / Drop

jee

EMERGE 3.0 BATCH

JEE Main & Advanced 2023

Starting on 12th May

unacademy

UNACADEMY COMBAT

Every Sunday |
11 am Onwards

Win Scholarships
worth 4 Cr+

IIT JEE T-20
Test Series

May 15 |
6:30 PM Onwards

Win Daily Amazon vouchers
and Scholarship worth
Rs 3 CR*

Enroll Now for FREE

Use Code - SAMEERLIVE

unacademy

IIT JEE MEGA SUBSCRIPTION OFFER

For 2022 Aspirants

Buy 1 Year Unacademy Subscription and get additional

2 MONTHS FREE

For 2023 Aspirants

Buy 2 Year Unacademy Subscription and get additional

3 MONTHS FREE

Last Date
12th May

Thank You

+ SUBSCRIBE

@sameer_iitr

#JEE Live Daily

jee

LIKE & SHARE

PDF Download Now !