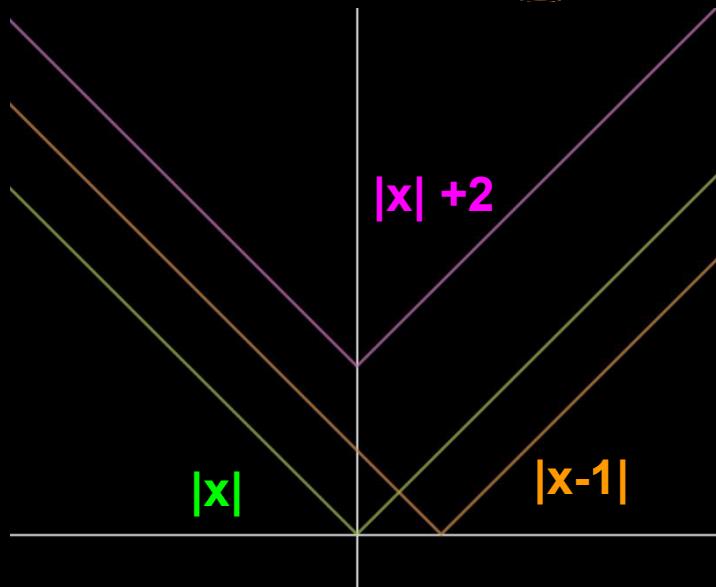


# Functions

DPP 2

Modulus Function



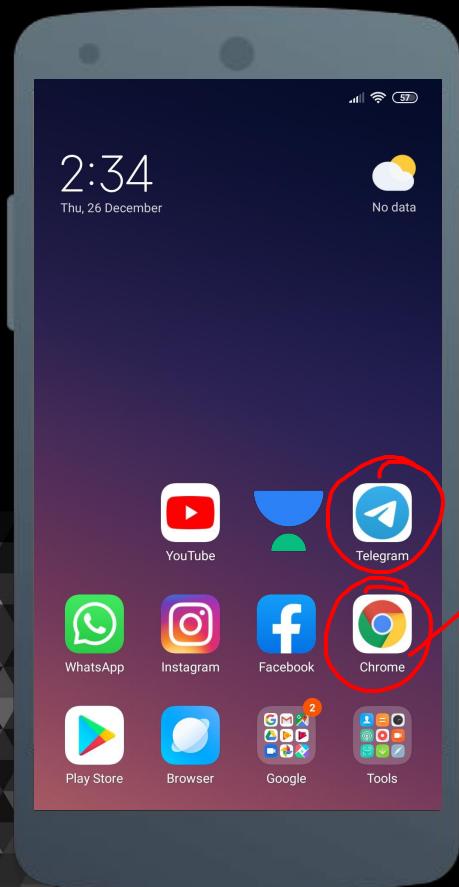


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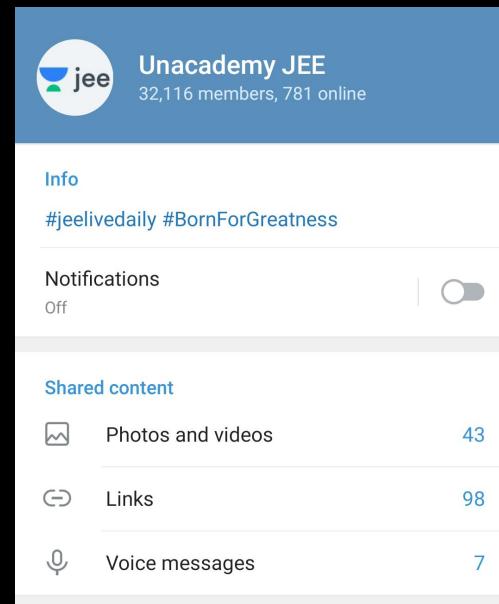


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The screenshot shows a Telegram group named 'Unacademy JEE'. The group has 32,116 members and 781 online users. The 'Info' section includes hashtags #jeelivedaily and #BornForGreatness. The 'Notifications' section shows the toggle switch is off. The 'Shared content' section provides statistics for photos and videos (43), links (98), and voice messages (7).

Category	Count
Photos and videos	43
Links	98
Voice messages	7

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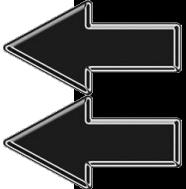
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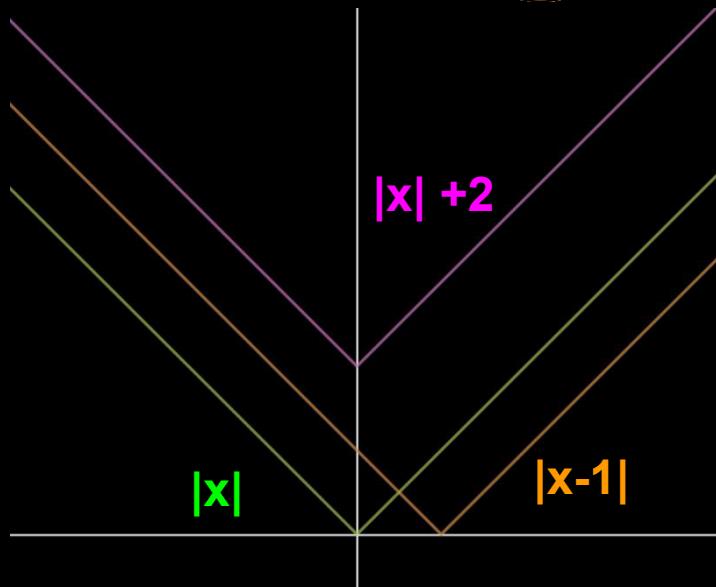


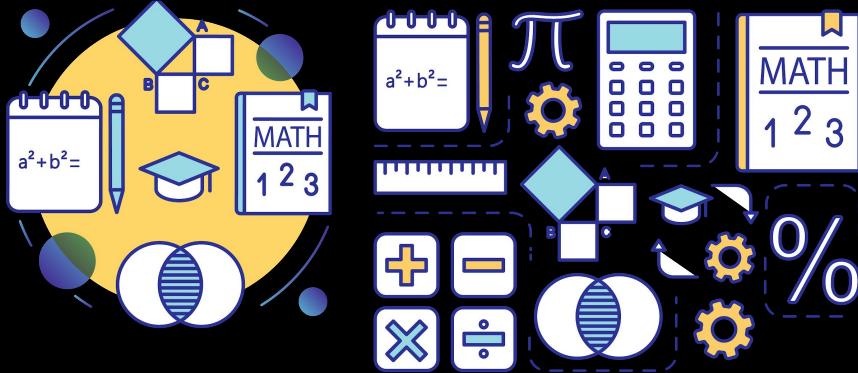
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# Functions

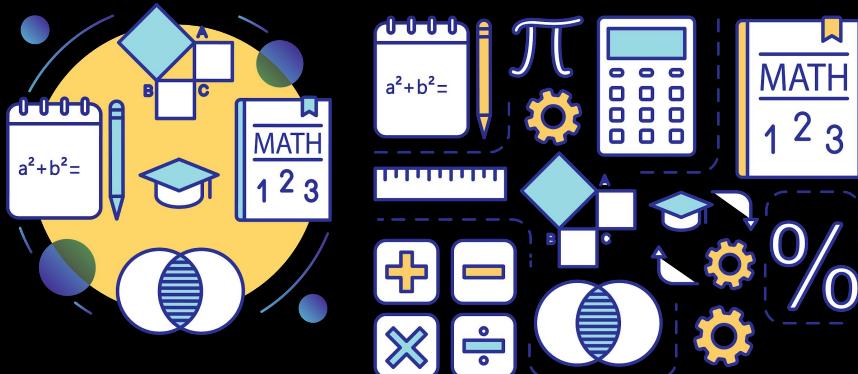
DPP 2

Modulus Function





# Homework Discussion





Find the domain of  $f(x) = \sqrt{\left| \frac{2x-1}{x^2-1} \right| - 1}$

$$\left| \frac{2x-1}{x^2-1} \right| \geq 1$$

LHS:  $\frac{2x-1}{x^2-1} \geq 1$

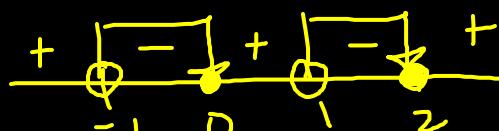
$$\frac{2x-1}{x^2-1} - 1 \geq 0$$

$$\frac{2x-1 - x^2 + 1}{x^2-1} \geq 0$$

$$\frac{-x^2 + 2x}{x^2 - 1} \geq 0 \quad \left\{ \begin{array}{l} n^6 \\ (-1, 0] \cup (1, 2] \end{array} \right.$$

$$\frac{x^2 - 2x}{x^2 - 1} \leq 0$$

$$\frac{x(x-2)}{(x-1)(x+1)} \leq 0$$



$$\frac{2x-1}{x^2-1} \leq -1$$

$$\frac{2x-1}{x^2-1} + 1 \leq 0$$

$$\frac{2x-1+x^2-1}{x^2-1} \leq 0$$

$$\frac{(x^2+2x-2)}{(x^2-1)} \leq 0$$

~~for~~:  $x^2+2x-2 = 0$

$$x = \frac{-2 \pm \sqrt{4+8}}{2}$$

$$\boxed{x = -1 \pm \sqrt{3}}$$

$$\alpha = (-1 - \sqrt{3})$$

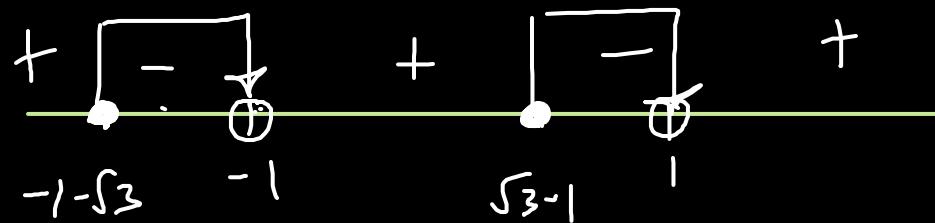
$$\beta = (\sqrt{3} - 1)$$

$$(x-\alpha)(x-\beta)$$

$$\frac{(x-\alpha)(x-\beta)}{(x-1)(x+1)} \leq 0$$

$$\alpha = -1 - \sqrt{3}$$

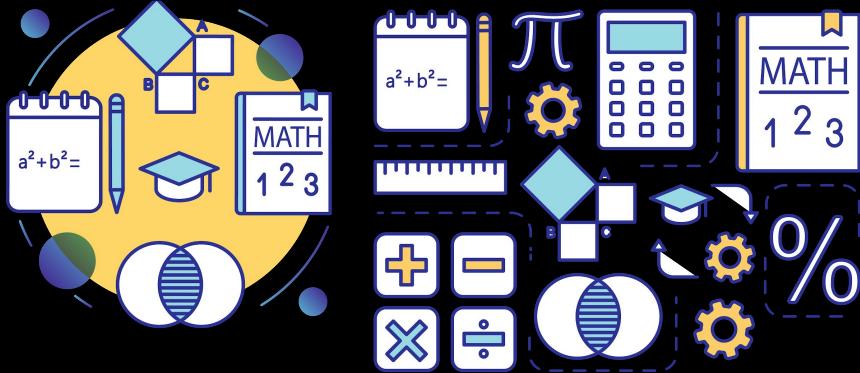
$$\beta = \sqrt{3} - 1$$



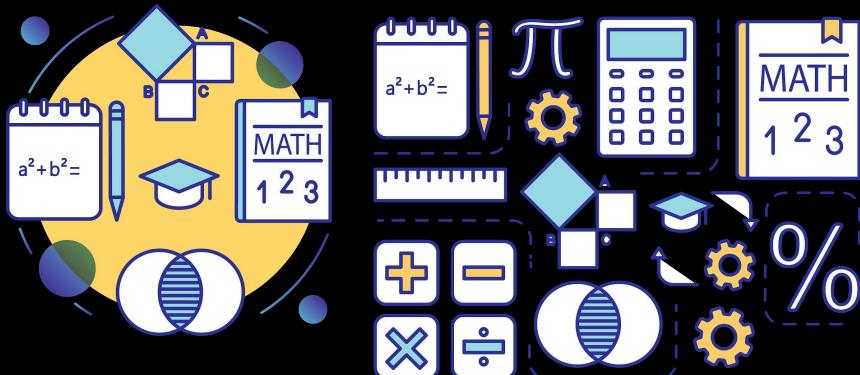
$$x \in [-1 - \sqrt{3}, -1) \cup (\sqrt{3} - 1, 1)$$

$\textcircled{-2}$

Ans:  $\textcircled{1} \cup \textcircled{2}$



# Practice Problems





If  $|x - 1| - 5 = 2$ , then the number of distinct values of  $x$  is

A. 1

B. 2

C. 3

D. 4

5

$$|f(x)| = 2$$

=

D. 4

$$|x - 1| - 5 = 2$$

or

$$|x - 1| - 5 = -2$$

$$|x - 1| = 7$$

$$|x - 1| = 3$$

$$x - 1 = 7$$

$$\boxed{x = 8}$$

$$x - 1 = -7$$

$$\boxed{x = -6}$$

$$x - 1 = 3$$

$$\boxed{x = 4}$$

$$x - 1 = -3$$

$$\boxed{x = -2}$$





$|x^2 + 6x + p| = x^2 + 6x + p \quad \forall x \in \mathbb{R}$  where p is a prime number then the least possible value of p is

A. 7

B. 11

C. 5

D. 13

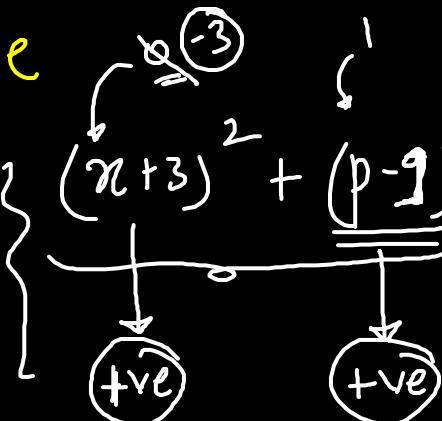
5

$$|f^{(n)}| = f^{(n)}$$

$$|n| = \begin{cases} n & ; n \geq 0 \\ -n & ; n < 0 \end{cases}$$

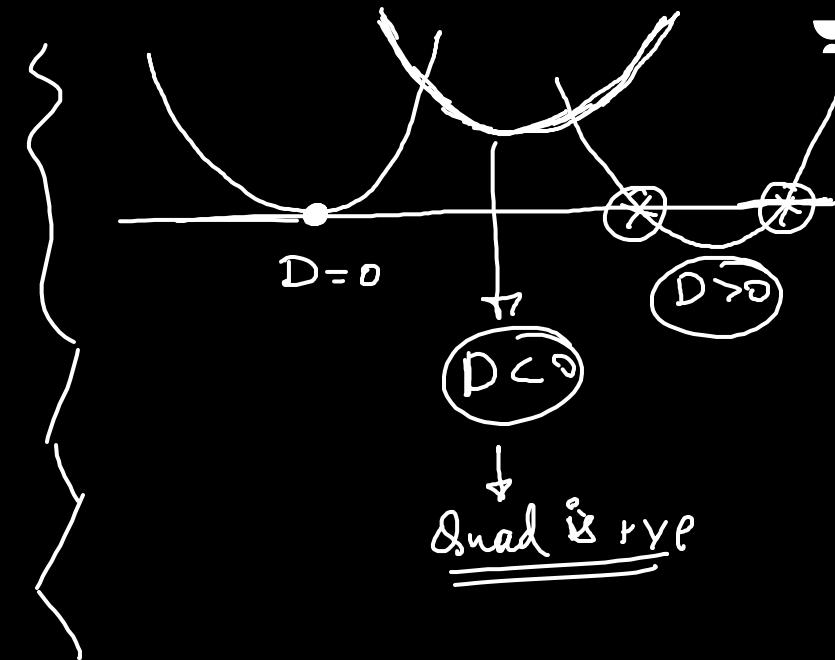
$\Rightarrow f^{(n)}$  is always +ve

$$\therefore \underbrace{n^2 + 6n + p}_{\geq 0} \geq 0 \quad \left\{ \begin{array}{l} (n+3)^2 + (p-9) \geq 0 \\ (n+3)^2 - 9 + p \geq 0 \end{array} \right.$$



$$P - q \geq 0$$

$$\boxed{P \geq q}$$





The number of values of  $x$  satisfying the equation  $|2x + 3| + |2x - 3| = 4x + 6$ , is

A. 1



B. 2



C. 3



D. 4

$$\begin{aligned} -2n - \cancel{2} - 2n + \cancel{2} \\ = 4n + b \end{aligned}$$

$$8n = -6$$

$$\boxed{n = -\frac{3}{4}} \quad \times$$

$$(2n + \cancel{3})$$

$$-(2n - \cancel{3})$$

$$= 4n + \cancel{6}$$

$$\theta = 4n$$

$$\boxed{n = 0}$$

~~$$2n + \cancel{3} + 2n - \cancel{3} = 4n + 6$$~~

~~$$0 = 6$$~~

X



Solve for  $x \in \mathbb{R} \mid x^2 - x - 6 \mid = x + 2$

A.  $x \in \{2, 4\}$

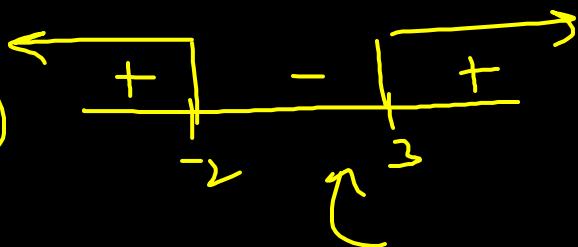
B.  $x \in \{-2, 4\}$

C.  $x \in \{-2, 2\}$

D.  $x \in \{-2, 2, 4\}$

5

$$x^2 - x - 6 \rightarrow (x-3)(x+2)$$



C.  $\therefore \text{mod } (+)$

$x \in (-\infty, -2] \cup [3, \infty)$

$$x^2 - x - 6 = x + 2$$

$$x^2 - 2x - 8 = 0$$

$$(x-4)(x+2) = 0$$

$$x = -2, 4$$

✓      ✓

$$\boxed{C-2} \mod \{-\} \quad \left\{ \begin{array}{l} -n^2 + x + 6 = x + 2 \\ n^2 - 4 = 0 \\ n = \textcircled{+2}, \textcircled{-2} \end{array} \right.$$



$$|x^2 + 4x + 3| + 2x + 5 = 0$$

$$x^2 + 4x + 3 \Rightarrow (x+1)(x+3)$$

5

A. Two integral solutions

C. One rational & one irrational solution

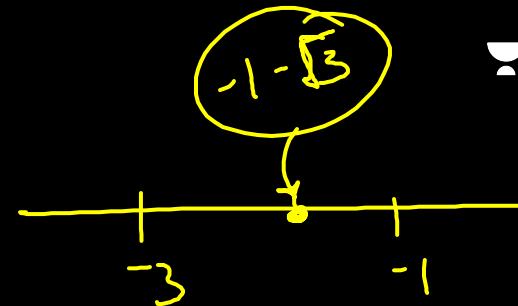
B. Two irrational solutions

D. No solutions

C-1 : mod → + :  $x \in (-\infty, -3] \cup [-1, \infty)$

$$\begin{aligned} x^2 + 4x + 3 + 2x + 5 &= 0 \\ x^2 + 6x + 8 &= 0 \\ (x+4)(x+2) &= 0 \\ x &= -4 \quad -2 \times \end{aligned}$$

C-2 : mod  $\rightarrow$   $\ominus$  :  $x \in (-3, -1)$



$$-x^2 - 4x - 3 + 2x + 5 = 0$$

$$-x^2 - 2x + 2 = 0$$

$$x^2 + 2x - 2 = 0$$

$$x = \frac{-2 \pm \sqrt{4 + 8}}{2}$$

$$\boxed{x = -1 \pm \sqrt{3}}$$

✓

-1 -  $\sqrt{3}$  ✓  
 -1 +  $\sqrt{3}$  ✗

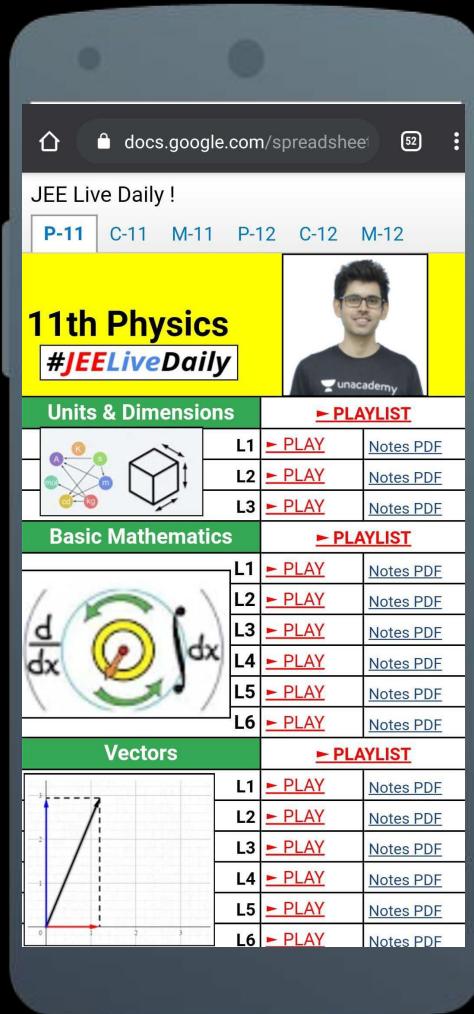


For  $a \leq 0$ , determine all real roots of the equation  $x^2 - 2a|x - a| - 3a^2 = 0$

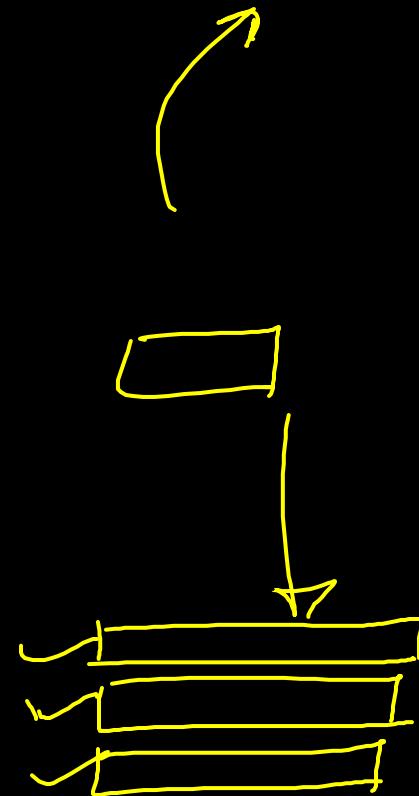
Ans.



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The screenshot shows a live question from Rohit Sachan. The question asks to solve a reaction where  $\text{NO}_2^+$  reacts with  $\text{H}_2\text{O}$ . A handwritten note on the right shows the mechanism:  $\text{NO}_2^+$  attacks the oxygen of a water molecule, which is labeled as "e⁻ deficient". The product is shown as  $\text{HNO}_3 / \text{H}_2\text{SO}_4$ .

ROHIT SACHAN:  
Sir please solve the one more doubt...

Q. In the following reaction,  $\text{NO}_2^+$  reacts with  $\text{H}_2\text{O}$ . The structure of the major product X is -

$\text{NO}_2^+ + \text{H}_2\text{O} \rightarrow \text{X}$

Handwritten note:

$\text{NO}_2^+$   
 $E^+ \rightarrow$  attacks on  
e⁻ rich system

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Question

ROHIT SACHAN:

Sir please solve the one more doubt...

16. In the following reaction,  $\text{NO}_2$  reacts with  $\text{H}_2\text{SO}_4$ . X is the structure of the major product 'X' is -

$\text{NO}_2^- \rightarrow \text{attacker on } \epsilon \text{ rich system}$

$\text{NO}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{X}$

$\text{X} = \text{aniline}$

$\text{e}^- \text{ deliquescent}$

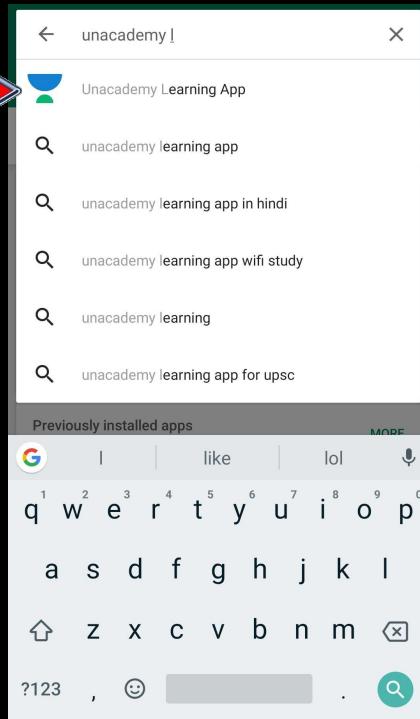
$\text{H}_2\text{SO}_4$

$\text{S} = 60^\circ$

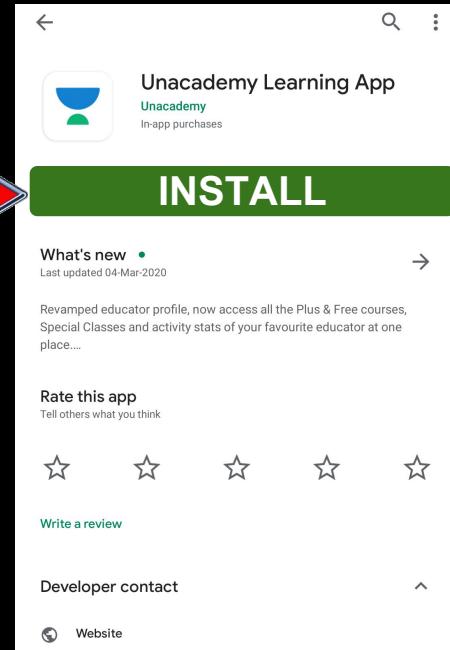
Participants (from top to bottom):

- Srinandan Dutta Chaudhuri right
- Rohit Sachan Sir Baa rha mera
- Srinandan Dutta Chaudhuri right
- Shoaib Alam Left
- Vsvsgsg Right
- Prashant Singh joined
- Rohit Sachan Left

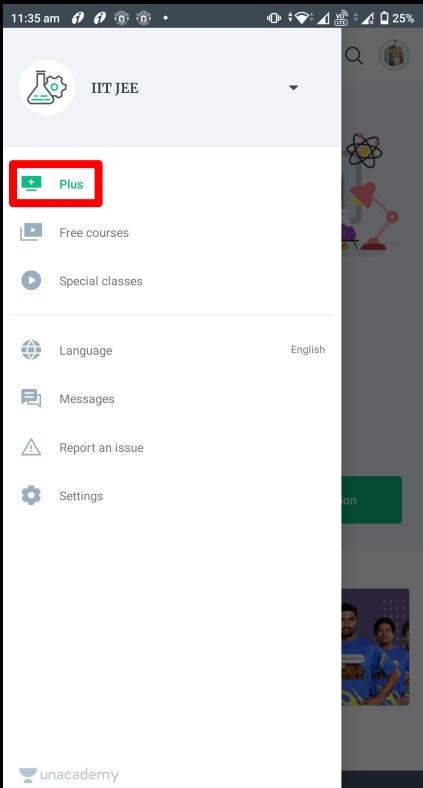
# Step 1



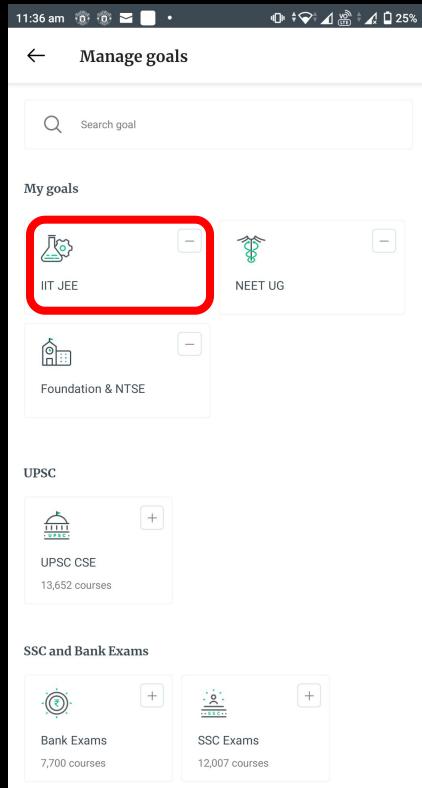
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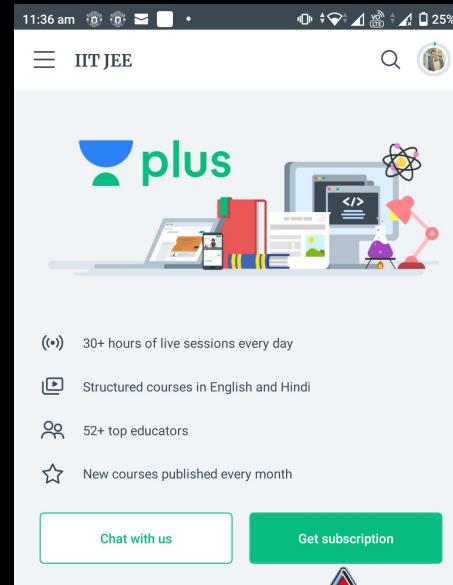
# Step 3



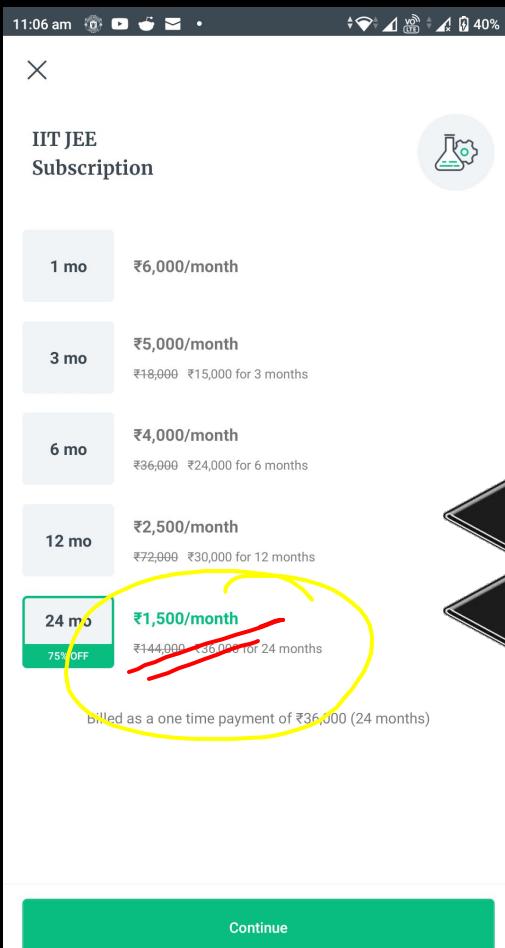
# Step 4



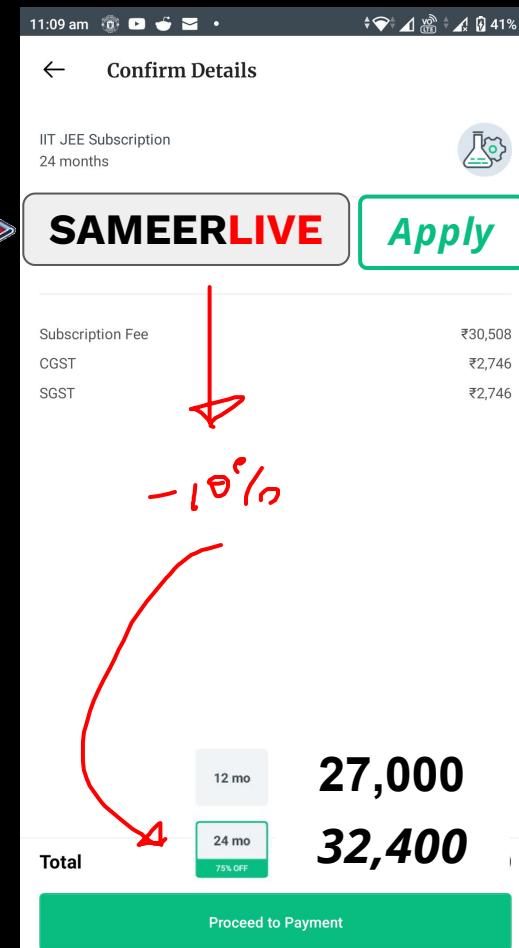
# Step 5



# Step 6



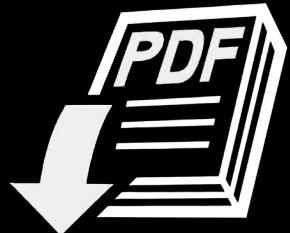
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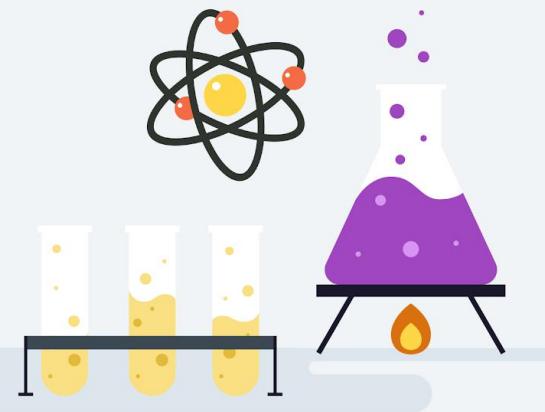
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