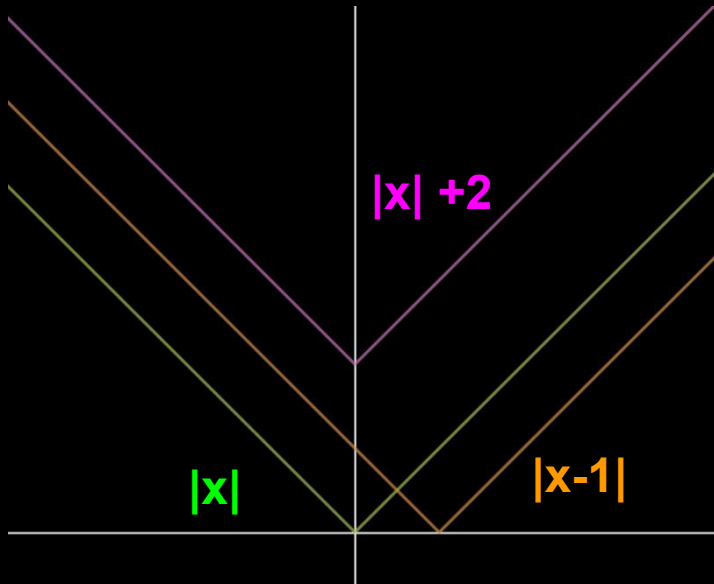


# Functions

**DPP**

**4**

**Modulus Function**





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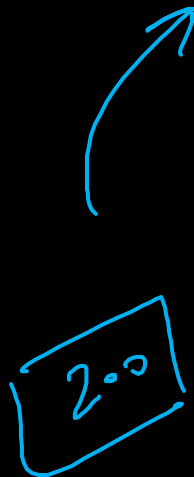
|    | ▶ <u>PLAYLIST</u> |                           |
|----|-------------------|---------------------------|
| L1 | ▶ <u>PLAY</u>     | <a href="#">Notes PDF</a> |
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| L3 | ▶ <u>PLAY</u>     | <a href="#">Notes PDF</a> |

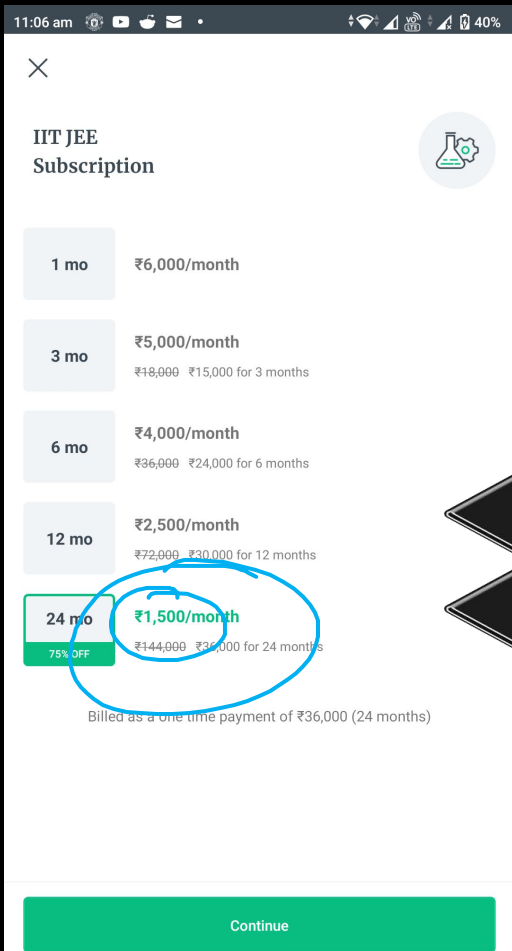
### Basic Mathematics

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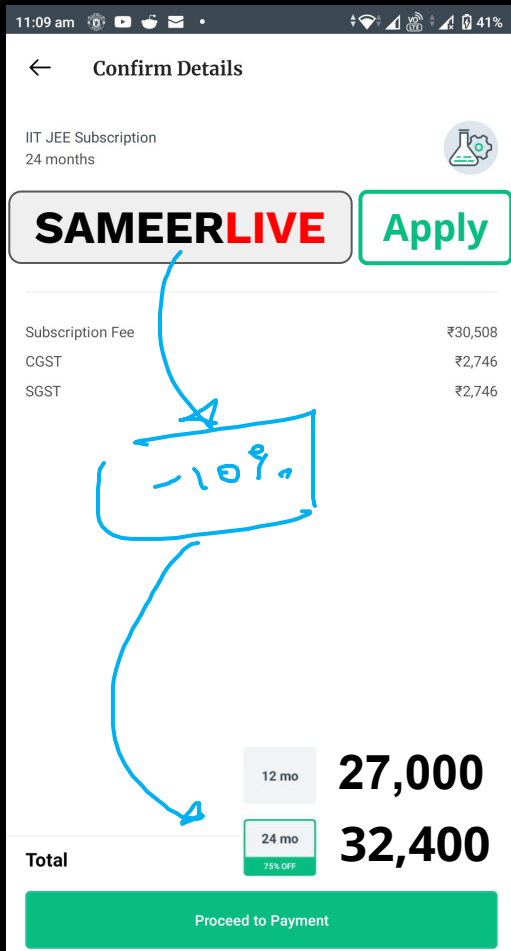
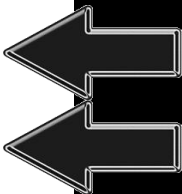
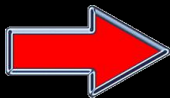
### Vectors

|    | ▶ <u>PLAYLIST</u> |                           |
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| L3 | ▶ <u>PLAY</u>     | <a href="#">Notes PDF</a> |
| L4 | ▶ <u>PLAY</u>     | <a href="#">Notes PDF</a> |
| L5 | ▶ <u>PLAY</u>     | <a href="#">Notes PDF</a> |
| L6 | ▶ <u>PLAY</u>     | <a href="#">Notes PDF</a> |





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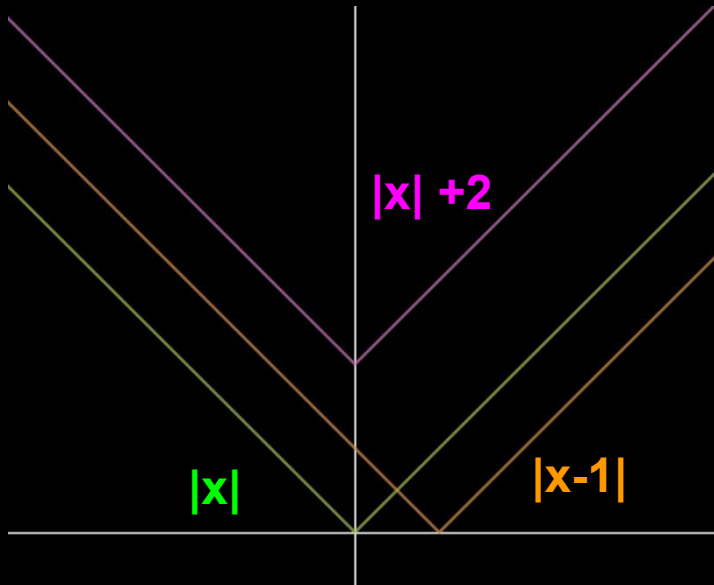
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# Functions

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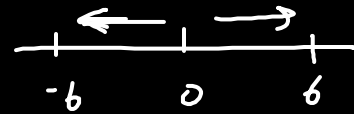




# Homework Discussion



Solve for x:  $||2x - 1| - 4| \leq 2$



$[C-1]: |2x-1|-4 \leq 2$      $(1) \quad (2)$      $[C-2]: |2x-1|-4 \geq -2$

$$\begin{aligned} |2x-1| &\leq 6 \\ \downarrow \\ -6 &\leq (2x-1) \leq 6 \end{aligned}$$

$$-5 \leq 2x \leq 7$$

$$\boxed{-\frac{5}{2} \leq x \leq \frac{7}{2}} \quad (1)$$

$$\begin{aligned} |2x-1| &\geq 2 \\ \downarrow \end{aligned}$$

$$\boxed{C-2 \cdot 1} : (2x-1) \geq 2$$

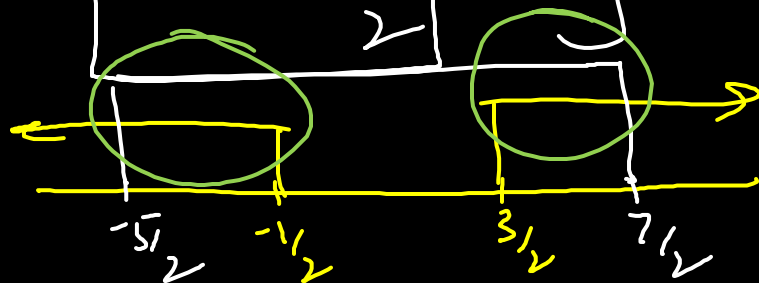
$$\boxed{x \geq \frac{3}{2}}$$

$$\boxed{\left(-\infty, -\frac{1}{2}\right] \cup \left[\frac{3}{2}, \infty\right)}$$

$\Rightarrow \boxed{\emptyset \mathbb{R}}$

$$\boxed{C-2 \cdot 2} : (2x-1) \leq -2$$

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









# Practice Problems



The product of all the solutions of the equation  
 $(x-2)^2 - 3|x-2| + 2 = 0$

A. 2

B.  $1/2$

C. -1

D. 0

5

$$|x-2|^2 - 3|x-2| + 2 = 0$$

Let:  $|x-2| = t$

$$t^2 - 3t + 2 = 0$$

$$(t-2)(t-1) = 0$$

$$t = 1, 2$$

$$\left\{ \begin{array}{l} \Rightarrow |x-2| = 1 \\ x-2 = \pm 1 \\ \boxed{x = 1, 3} \end{array} \right. \quad \left\{ \begin{array}{l} |x-2| = 2 \\ x-2 = \pm 2 \\ \boxed{x = 4, 0} \end{array} \right.$$





The equation  $||x-1| + a| = 4$ , can have real solutions for  $x$  if  $a$  belongs to the interval

- A.**  $(-\infty, 4)$       **B.**  $(-\infty, -4)$       **C.**  $(4, \infty)$       **D.** None of these

5

Handwritten solution:

Case 1:  $|x-1| + a = 4$   
 $\Rightarrow |x-1| = 4 - a$   
For  $|x-1| \geq 0$ , we need  $4 - a \geq 0 \Rightarrow a \leq 4$ .

Case 2:  $|x-1| + a = -4$   
 $|x-1| = -4 - a$   
For  $|x-1| \geq 0$ , we need  $-4 - a \geq 0 \Rightarrow a \leq -4$ .

Combining both cases, the condition for real solutions is  $a \leq 4$ .

Number line diagram showing the interval  $a \leq 4$ :

Ex:  $|x| = -1 \rightarrow \text{No soln.}$

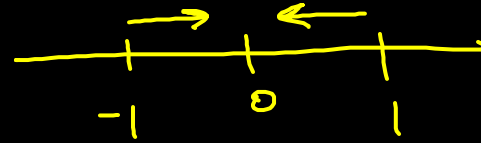


5

$$\left| \frac{x^2 - 5x + 4}{x^2 - 4} \right| \leq 1$$

**A.**  $[0, 8/5] \cup [5/2, +\infty)$

**C.**  $(0, 1) \cup (2, +\infty)$



**B.**  $(0, 2) \cup [5/2, +\infty)$

**D.**  $[0, 8/5] \cup [5, +\infty)$

$|C-1|$  :

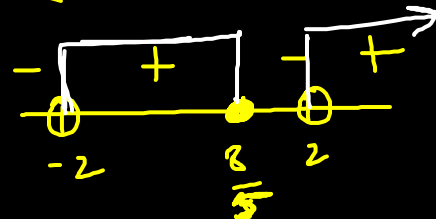
$$\frac{x^2 - 5x + 4}{x^2 - 4} \leq 1$$

$$\frac{x^2 - 5x + 4 - x^2 + 4}{x^2 - 4} \leq 0$$

$$\frac{-5x + 8}{x^2 - 4} \leq 0$$

$$\frac{5x - 8}{x^2 - 4} \geq 0$$

$$\frac{5x - 8}{(x-2)(x+2)} \geq 0$$

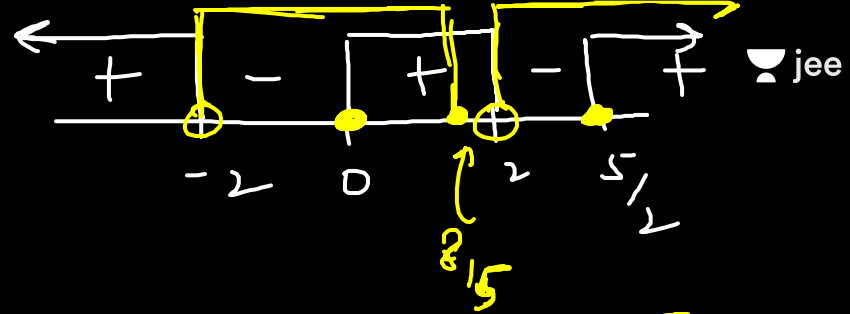


$$\boxed{C-2} : \frac{x^2 - 5x + 4}{x^2 - 4} \geq -1$$

$$\frac{x^2 - 5x + 4 + x^2 - 4}{x^2 - 4} \geq 0$$

$$\frac{2x^2 - 5x}{x^2 - 4} \geq 0$$

$$\frac{x(2x - 5)}{(x - 2)(x + 2)} \geq 0$$



$$\boxed{\left[0, \frac{5}{2}\right] \cup \left(-\infty, -2\right)}$$





If  $\frac{|x+3|+x}{x+2} > 1$

, then least integral value of  $x$  is

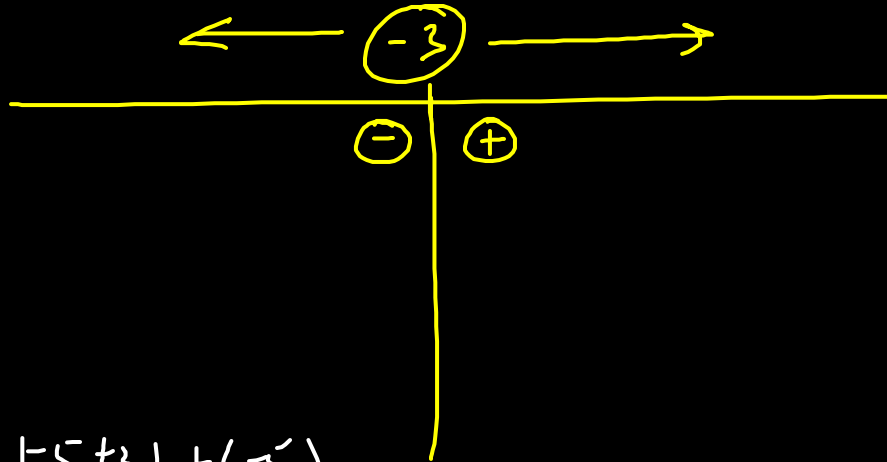
A. ~~-5~~

B. ~~-2~~

C. ~~-1~~

✓ D. -4

5



$$f(-5) = \frac{|-5+3|+(-5)}{(-5)+2}$$

$$= \frac{-3}{-3} = \textcircled{1} \leftarrow \text{X}$$

$$\left\{ \frac{1-4}{-2} \right.$$

$$\textcircled{\frac{3}{2}} > 1$$





What percent of the domain of the function  $f(x) = \frac{\sqrt{9-x^2}}{\sqrt[4]{9-|2x+5|}}$  consists of positive numbers?

A. 30%

B. 40%

C. 45%

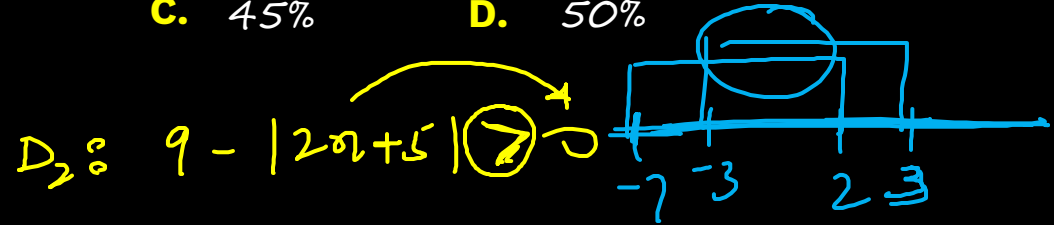
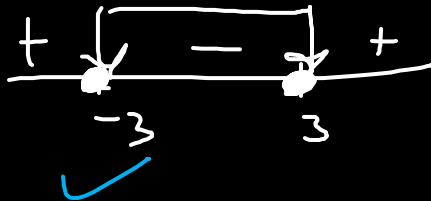
D. 50%

5

$$\underline{D_1}: 9 - x^2 \geq 0$$

$$x^2 - 9 \leq 0$$

$$(x-3)(x+3) \leq 0$$



$$D_2: 9 - |2x+5| > 0$$

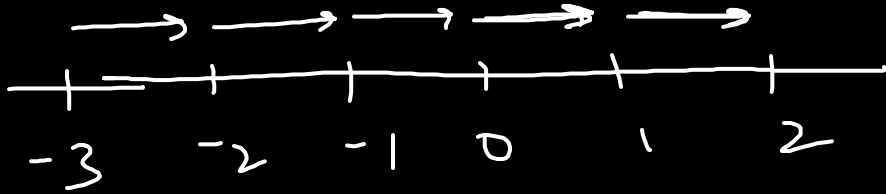
$$|2x+5| < 9$$

$$-9 < (2x+5) < 9$$

$$-14 < 2x < 4$$

$$\boxed{-7 < x < 2}$$

$\Rightarrow$  Domain:  $[-3, 2)$



$$\frac{2}{5} \times 100 = 40\% \checkmark$$

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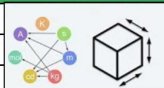
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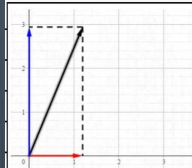
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### Vectors

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|   | L4 | ▶ <a href="#">PLAY</a> | <a href="#">Notes PDF</a> |
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Maths



**5 PM**

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**Jayant Sir**  
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The screenshot shows a test results page. At the top, there are buttons for "View solutions" and "Share your results". Below these, a progress bar indicates "68 correct" and "2 incorrect". The page is divided into sections for "Physics", "Chemistry", and "Mathematics". The "Physics" section is currently selected, showing a score of "88/120" and an accuracy of "73%". At the bottom, there is a section for "NEGATIVE MARKING" and a note that says "YOU MISSED OUT".





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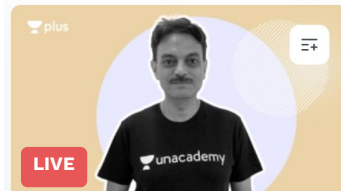
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Question

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

16. In the following reaction, the structure of the major product 'X' is

c1ccccc1[N+](=O)[O-] + c1ccccc1 → c1ccccc1[N+](=O)[O-] + c1ccccc1 (Reaction scheme showing nitrobenzene reacting with benzene to form nitrobenzene and benzene)

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

$\text{HNO}_3/\text{H}_2\text{SO}_4$

$\text{e}^-$  deficient

50-60

Sachan Sir B aa  
mera

Chaudhuri  
nitration

Sachan Sir B aa  
mera

Chaudhuri  
nitration

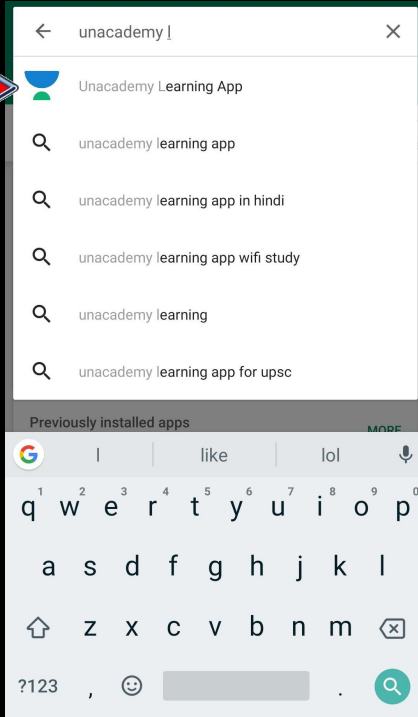
Sharma Left

Vvsagg Right

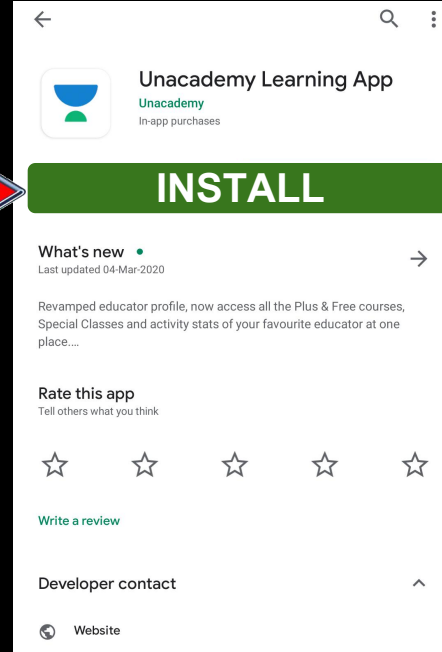
Prashant Singh joined

Rohit Sachan Left

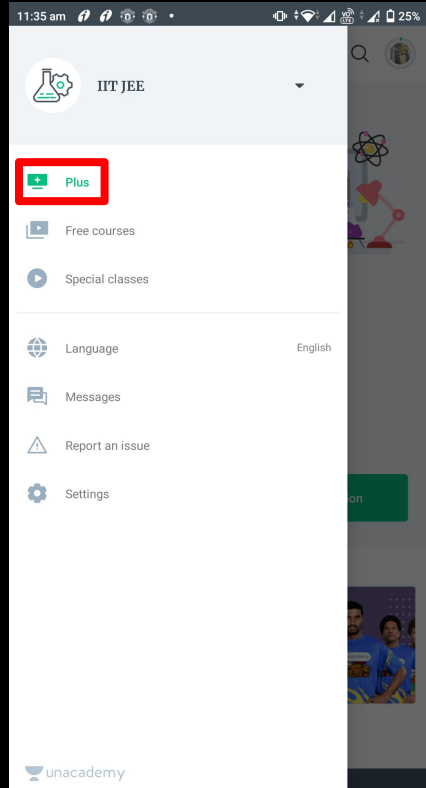
# Step 1



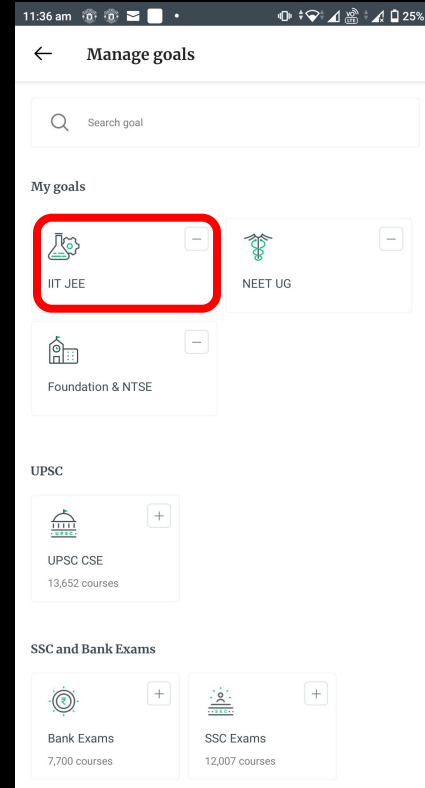
# Step 2



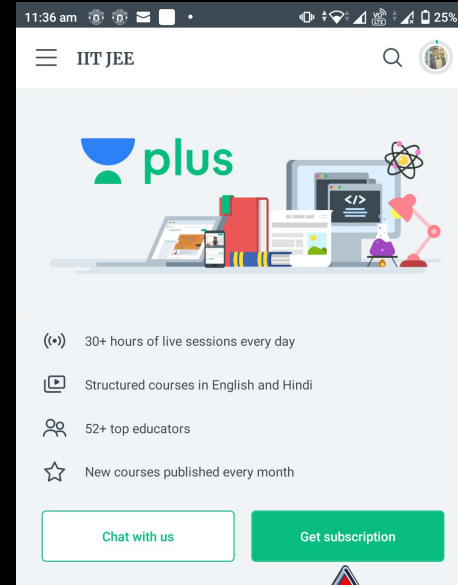
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## Step 4



## Step 5



# Step 6

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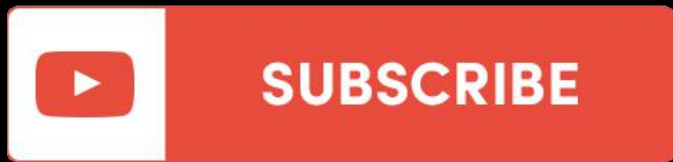
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