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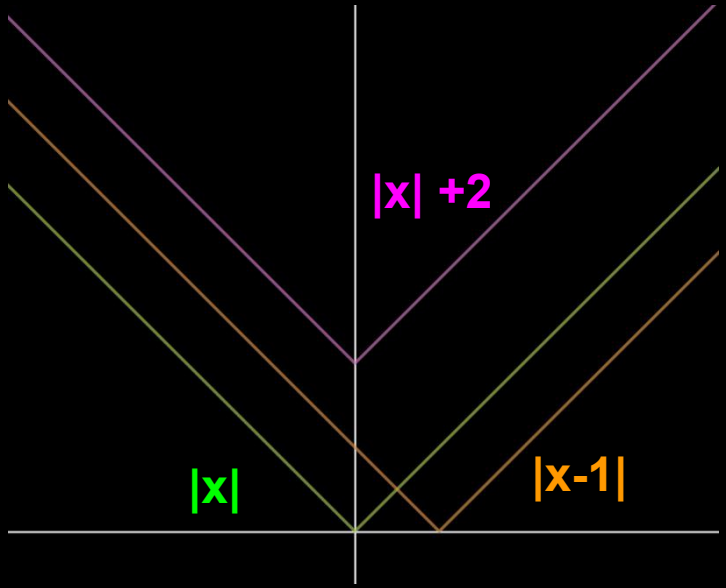
Functions

DPP 4

Modulus Function



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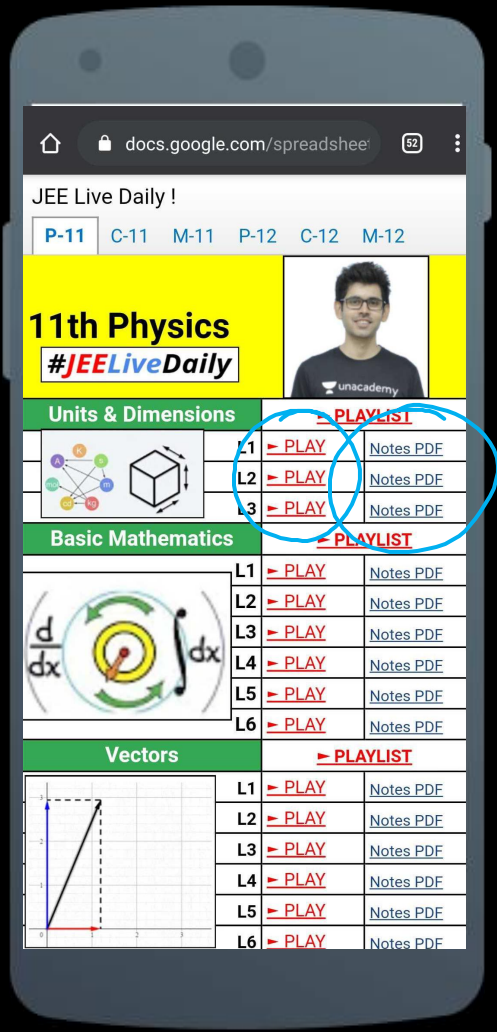

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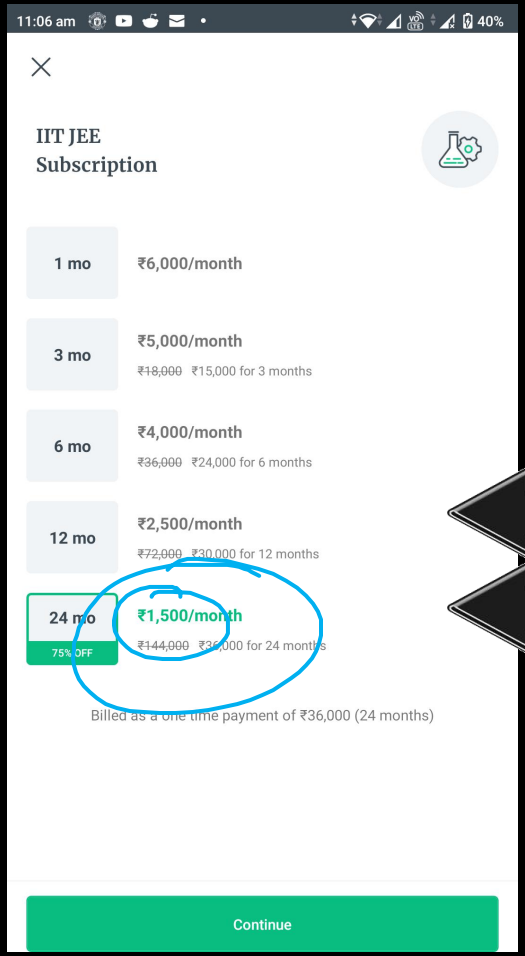

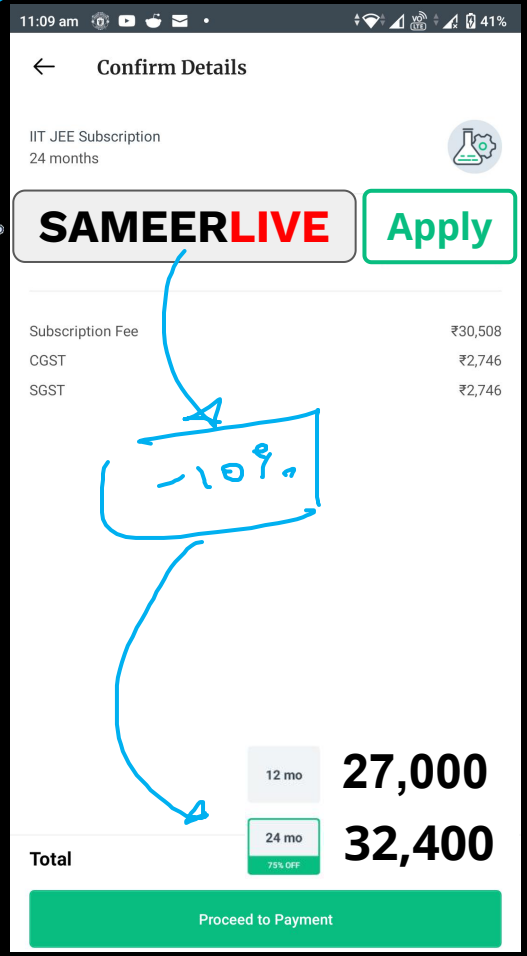

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Functions

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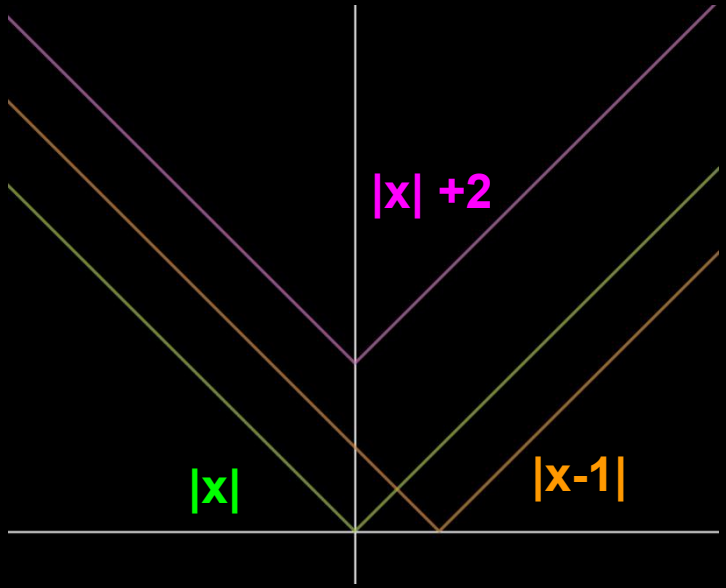
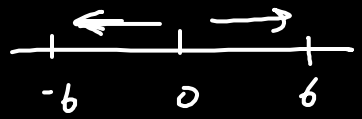
Modulus Function



Homework Discussion

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

f(x)



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C-1: $|2x-1|-4 \leq 2$ ① & C-2: $|2x-1| - 4 \geq -2$

$|2x-1| \leq 6$

$-6 \leq (2x-1) \leq 6$

$-5 \leq 2x \leq 7$

$\boxed{\frac{-5}{2} \leq x \leq \frac{7}{2}}$ — ①

$|2x-1| \geq 2$

C-2.1 : $(2x-1) \geq 2$

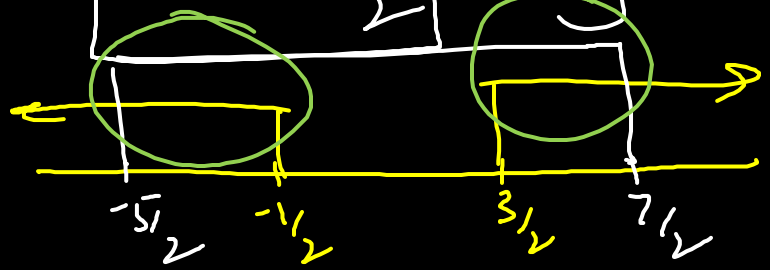
$x \geq 3/2$

$\Rightarrow$ OR

C-2.2 : $(2x-1) \leq -2$

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

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



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: $|x-2| = t$

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

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

$t = 1, 2$

$\Rightarrow |x-2| = 1$

$x - 2 = \pm 1$

$x = 1, 3$

$|x-2| = 2$

$x - 2 = \pm 2$

$x = 4, 0$

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

$|x-1|+a=4$ OR $|x-1|+a=-4$

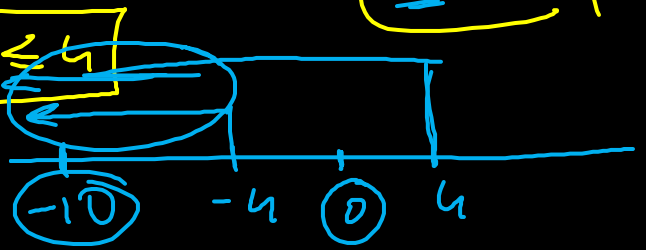
$|x-1| = 4-a$ $\quad$ $|x-1| = -4-a$

$|x-1|$ = +ve

$4-a \geq 0 \Rightarrow a \leq 4$

$-4-a \geq 0$

$a \leq -4$



Eg: $|x| = -1$ → No soln.

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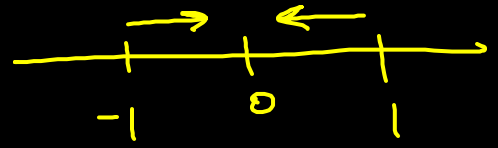
$$\left|\frac{x^2-5x+4}{x^2-4}\right| \leq 1$$



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

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

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

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

C-1 :

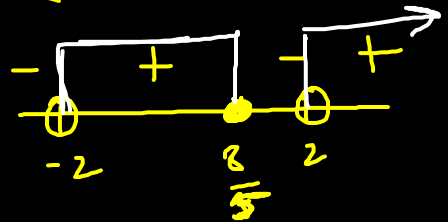
$$\frac{x^2-5x+4}{x^2-4} \leq 1$$

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

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

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

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



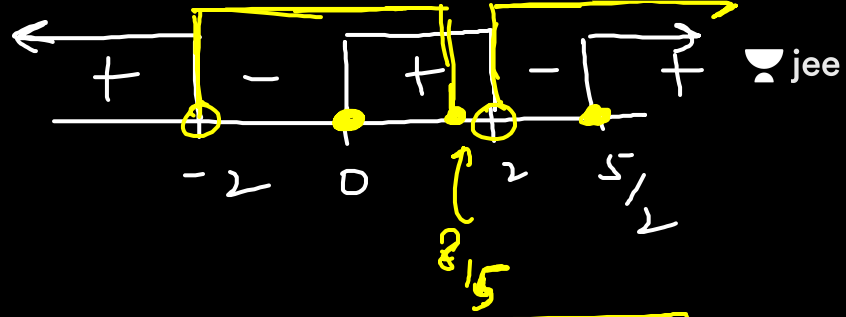
C-2 :

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

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

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

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

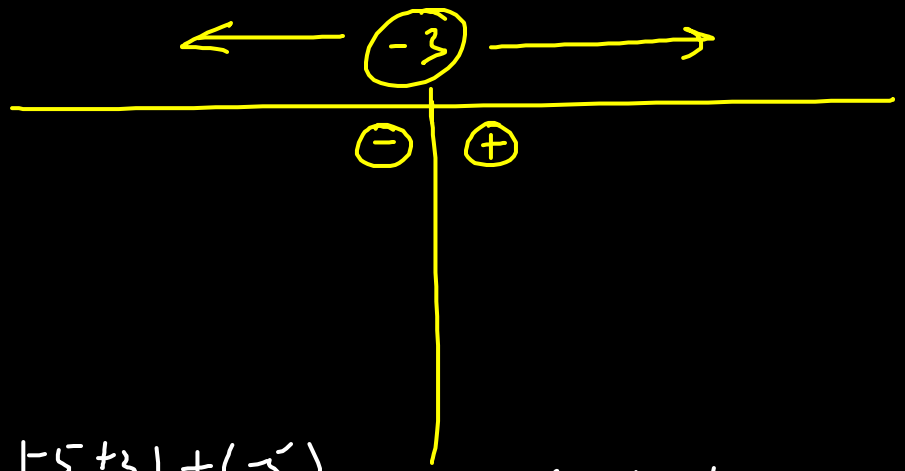


$$\left[0, \frac{8}{5}\right] \cup \left(\frac{5}{2}, \infty\right)$$

If $\frac{|x+3|+x}{x+2} > 1$, then least integral value of x is

A. -5 B. -2 C. -1 D. -4

5



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

$= \frac{-3}{-3} = 1$

$\frac{1-4}{-2}$

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

5

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

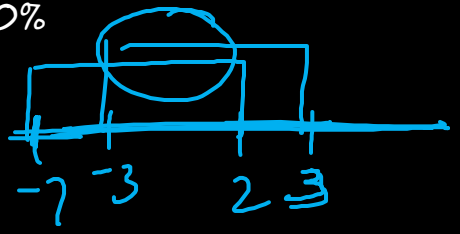
A. 30% **B.** 40% **C.** 45% **D.** 50%

D_1: $9 - x^2 \geq 0$

$x^2 - 9 \leq 0$

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

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



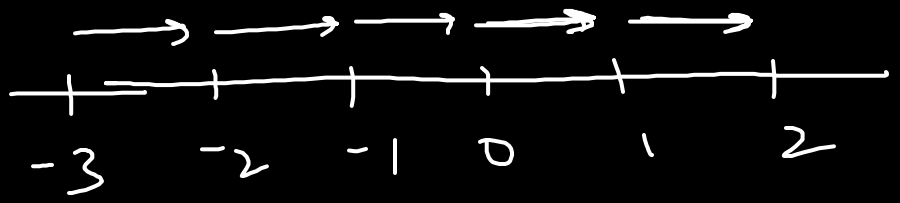
$|2x+5| < 9$

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

$-14 < 2x < 4$

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

=) Domain : $[-3, 2)$



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

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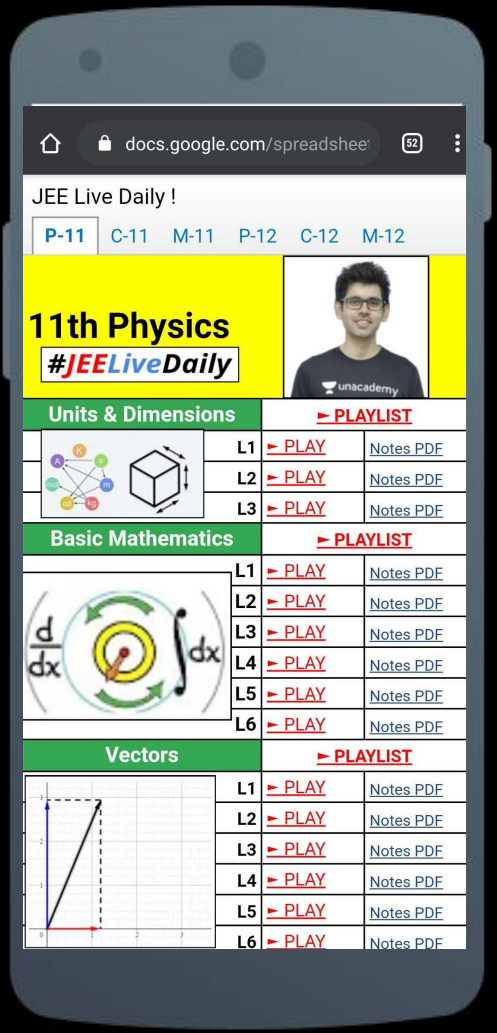

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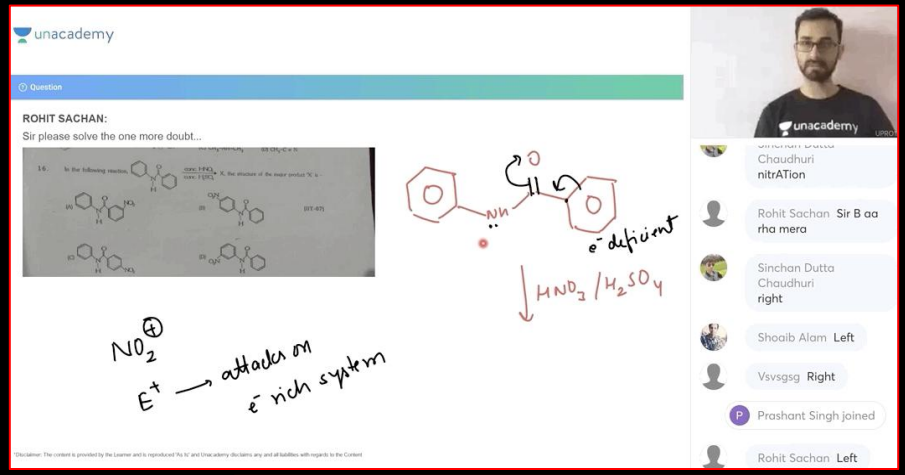

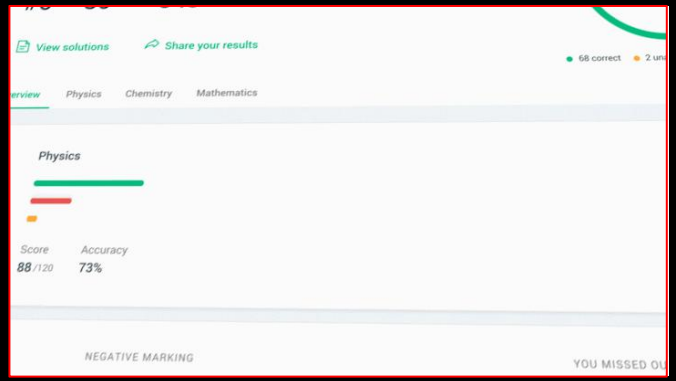

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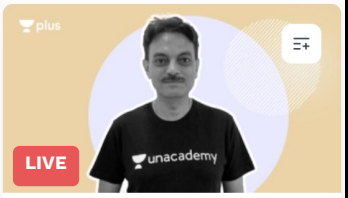

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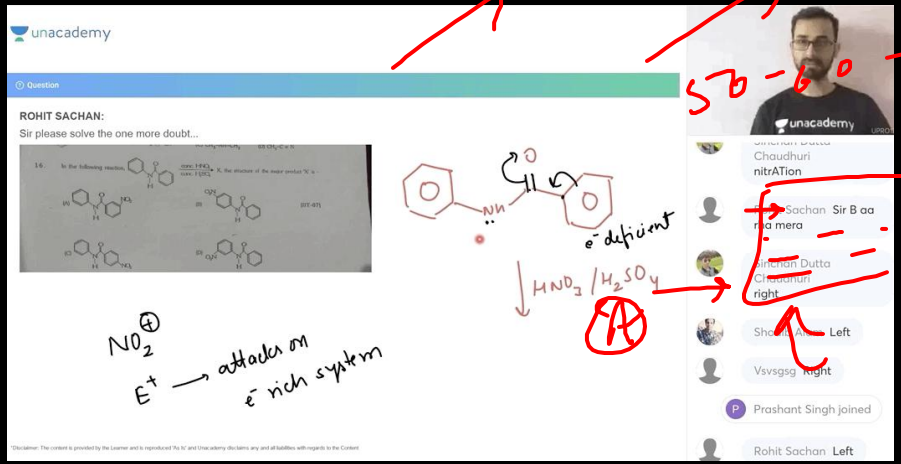

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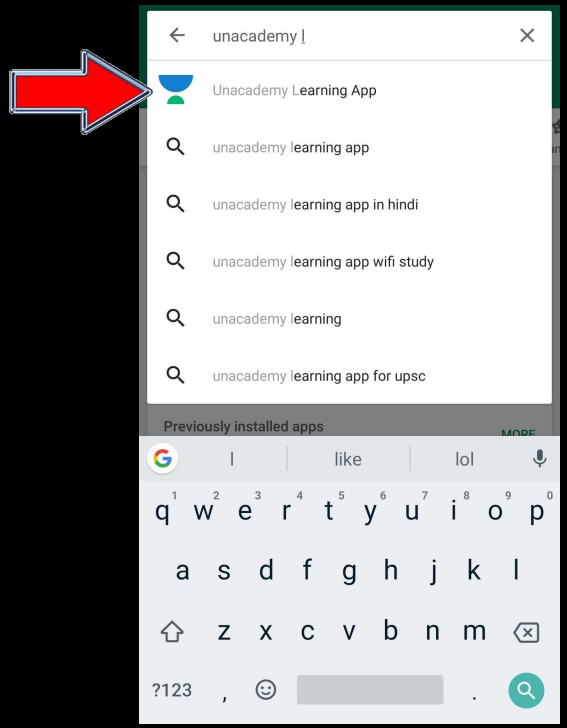
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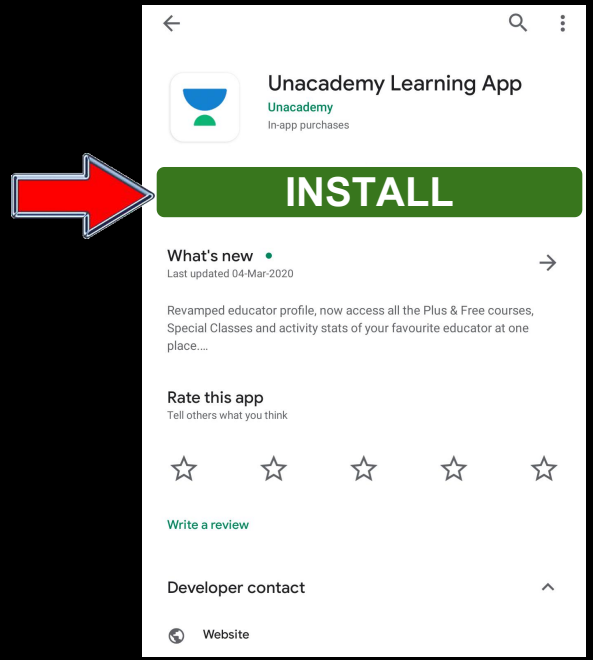
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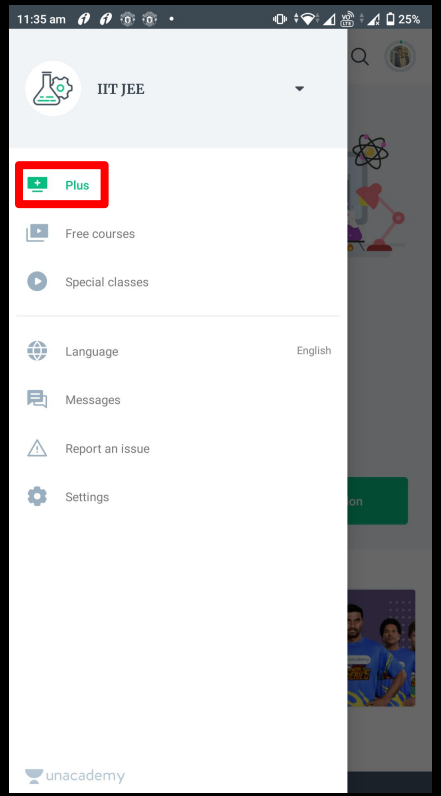

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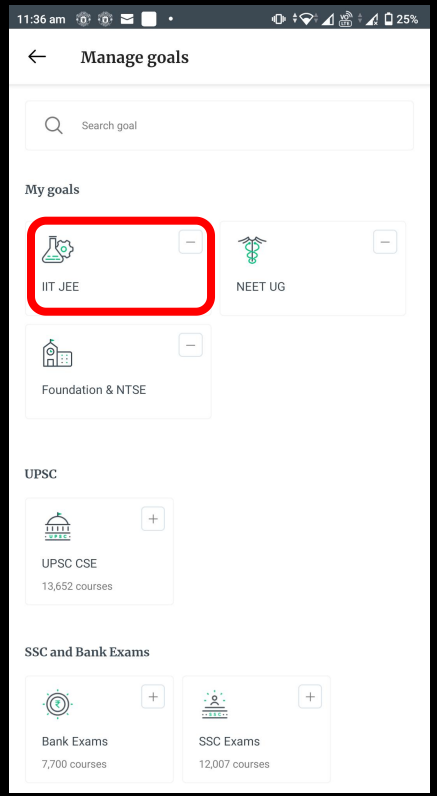

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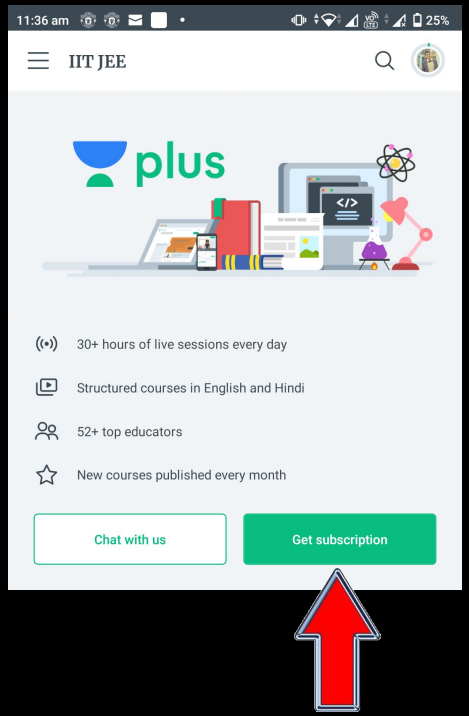

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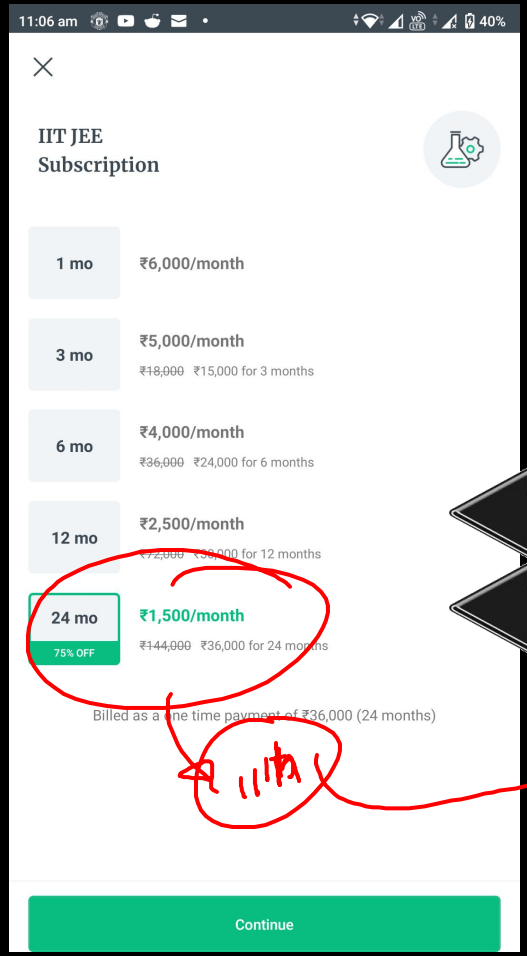
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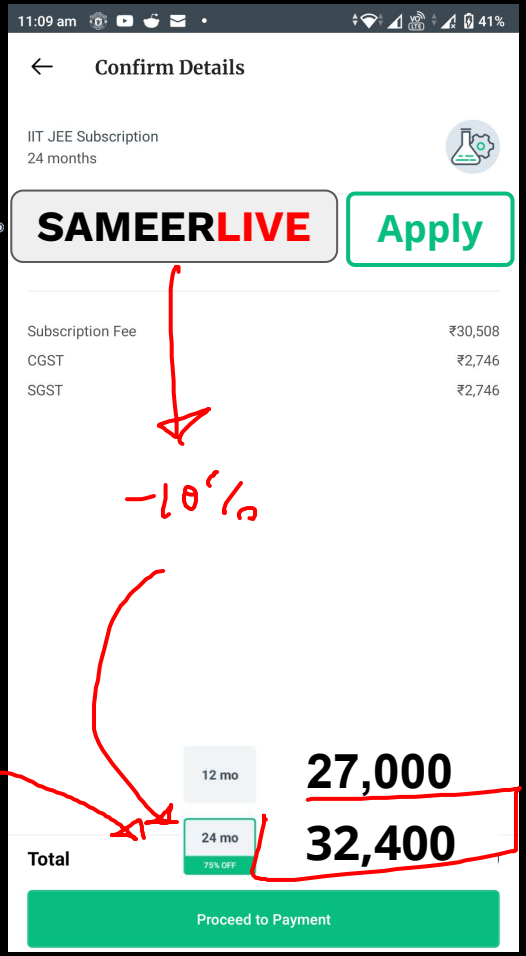
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