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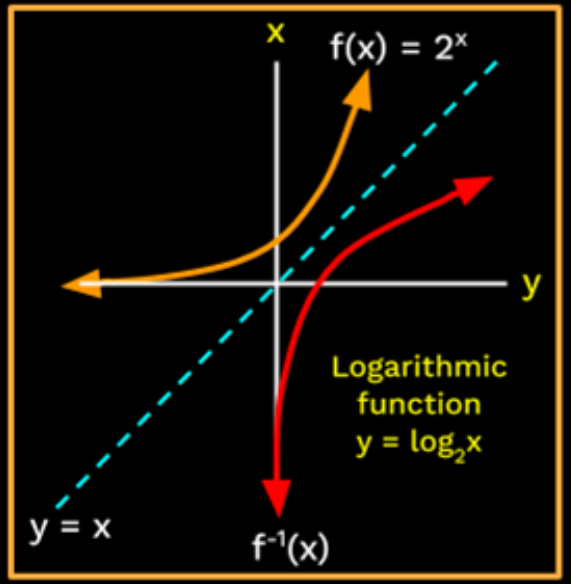

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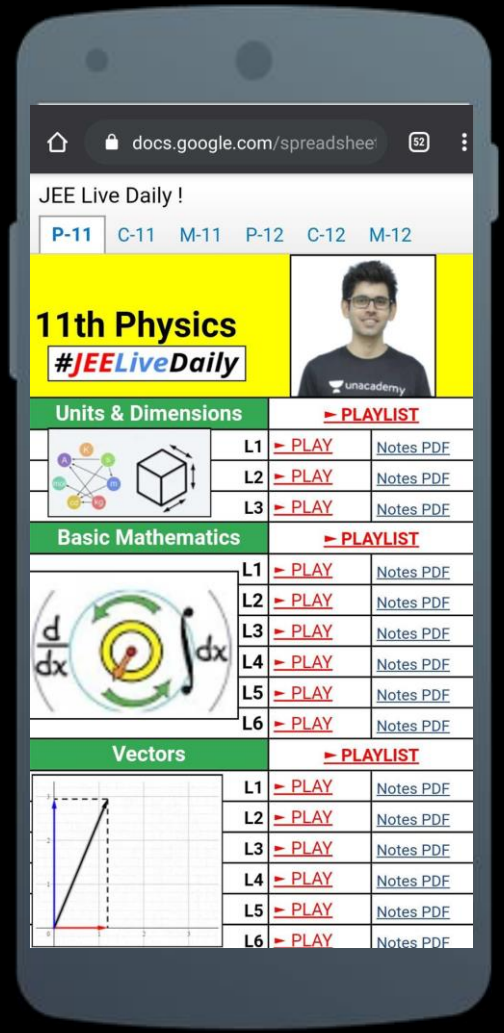

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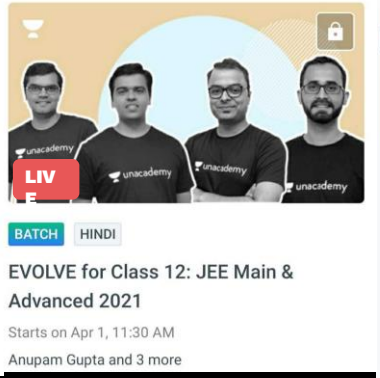

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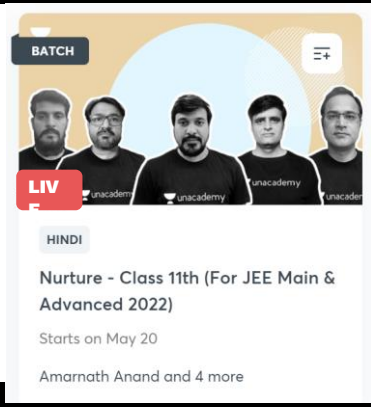

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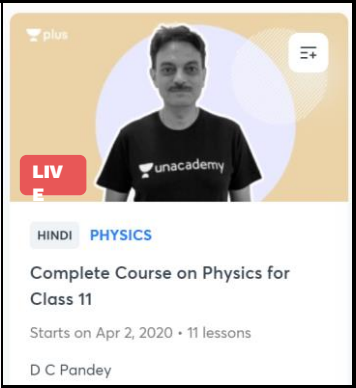

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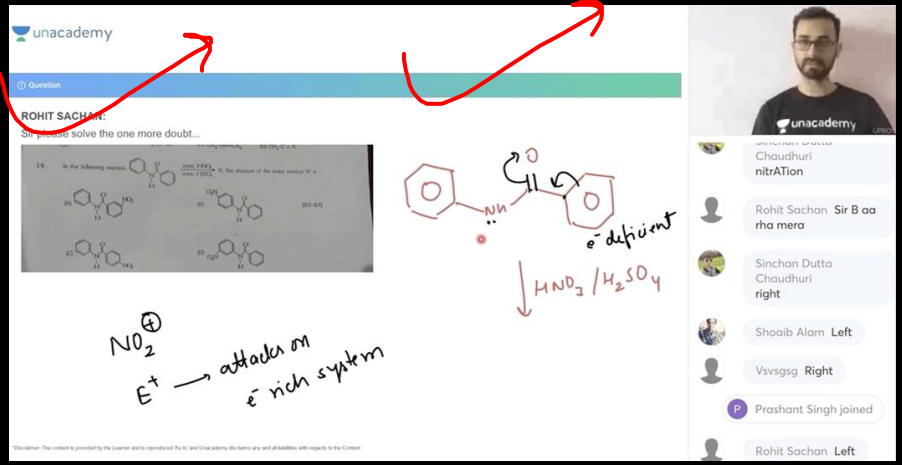

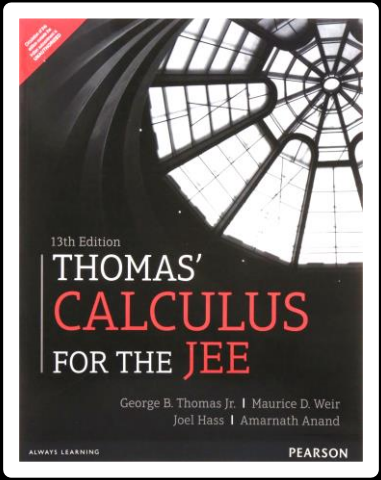
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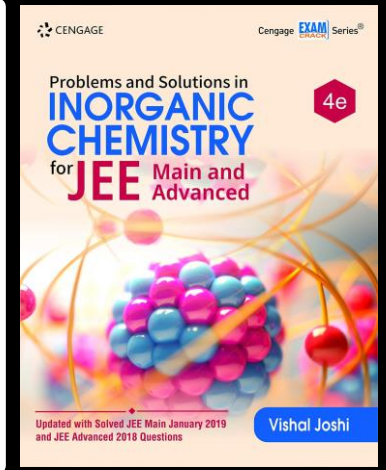
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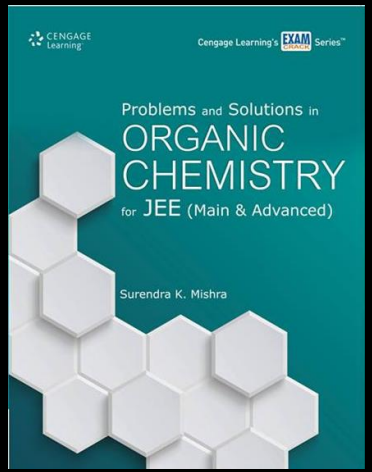
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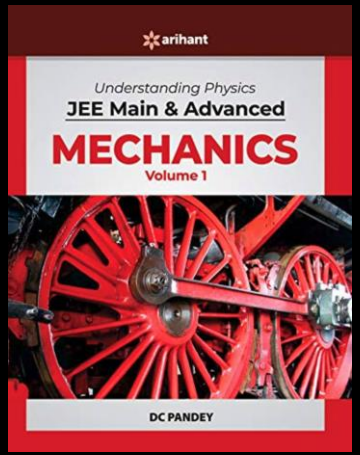
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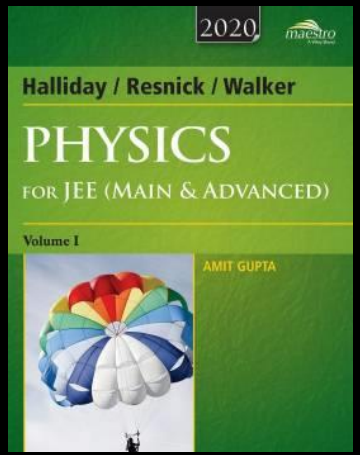
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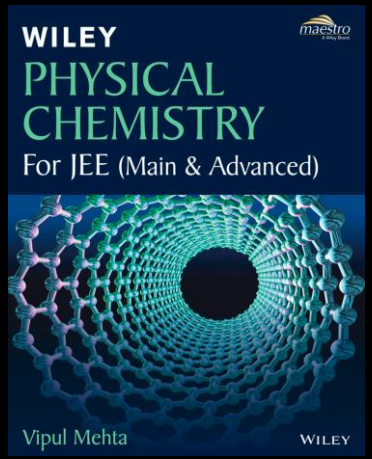
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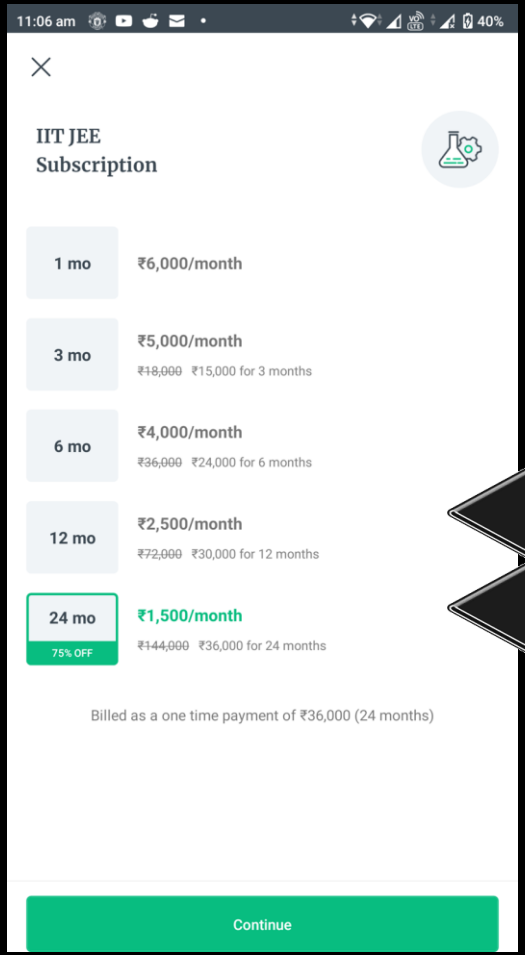

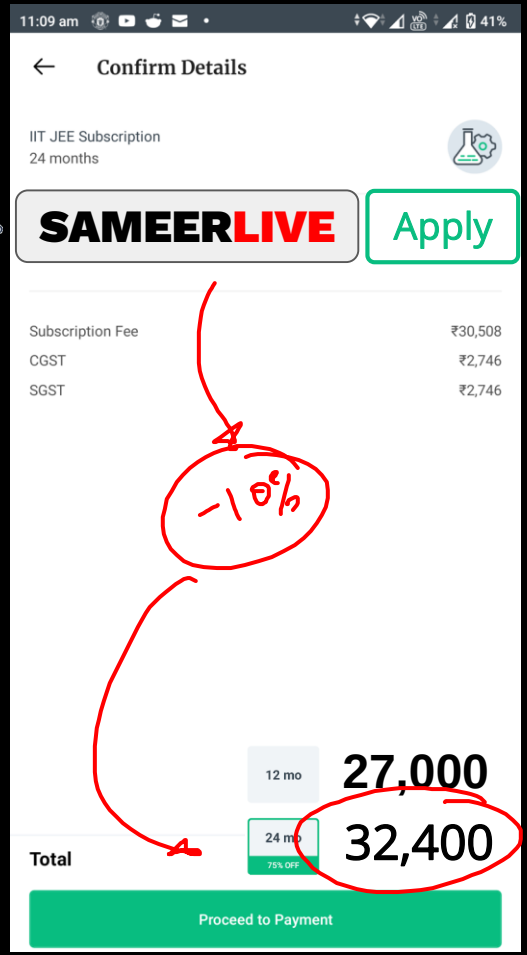

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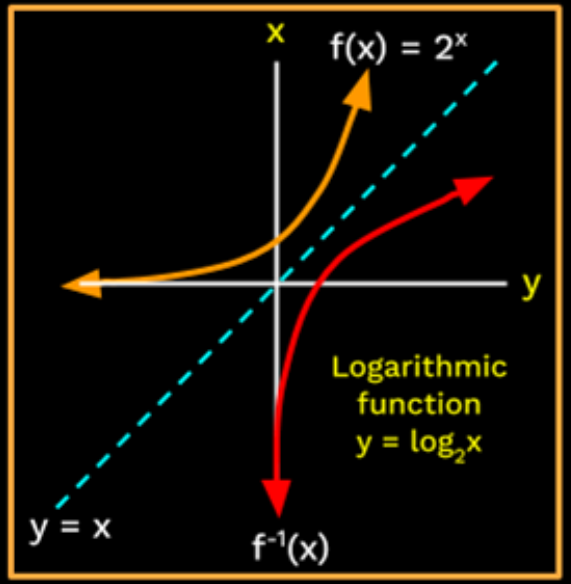
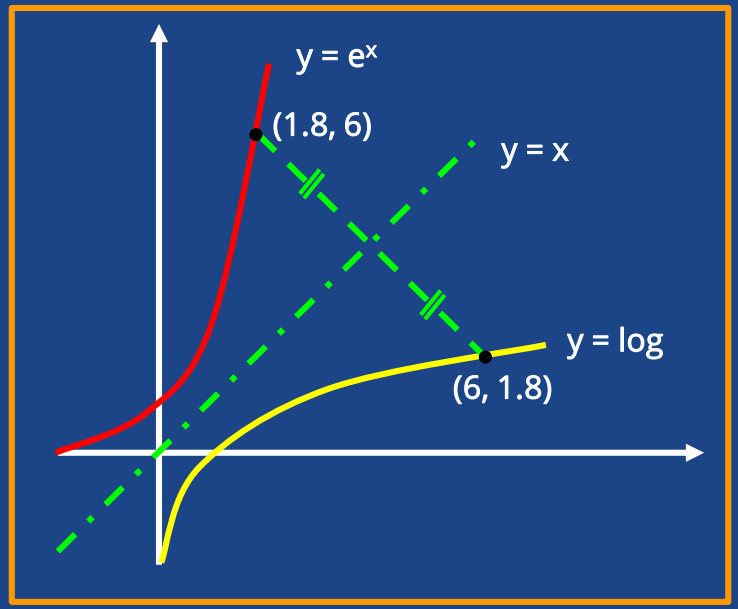


Homework Question (DPP-6)



Example

Solve for x: $\log_{(x+6)}\left(\log_2\left(\frac{x+2}{x-1}\right)\right) > 0$

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Domain:

1. $\left(\frac{x+2}{x-1}\right) > 0$
2. $\log_2\left(\frac{x+2}{x-1}\right) > 0$
3. $(x+6) > 0$

$x+6 \neq 1$

Case: 1 $\rightarrow$ $(x+6) > 1$; $\boxed{x > -5}$

$\log_2\left(\frac{x+2}{x-1}\right) > (x+6)^0$

$\log_2\left(\frac{x+2}{x-1}\right) > 1$

$\left(\frac{x+2}{x-1}\right) > 2$

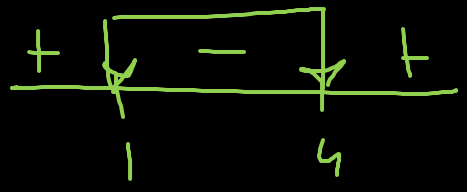
$$\frac{x+2}{x-1} > 2$$

$$\frac{x+2}{x-1} - 2 > 0$$

$$\frac{x+2-2x+2}{x-1} > 0$$

$$\frac{4-x}{x-1} > 0$$

$$\frac{x-4}{x-1} < 0$$



$$x \in (1,4)$$ ✓

↳ Case : 2 : $0 < x+6 < 1 \rightarrow$ $\boxed{-6 < x < -5}$

$0 < \log_2\left(\frac{x+2}{x-1}\right) < (x+6)^0$

$0 < \log_2\left(\frac{x+2}{x-1}\right) < 1$

$\boxed{1 < \left(\frac{x+2}{x-1}\right) < 2}$

Part-1 :

$\frac{x+2}{x-1} > 1$

$\frac{x+2}{x-1} - 1 > 0$

$\frac{x+2-x+1}{x-1} > 0$

$\frac{3}{x-1} > 0$

$\Rightarrow \boxed{x > 1}$

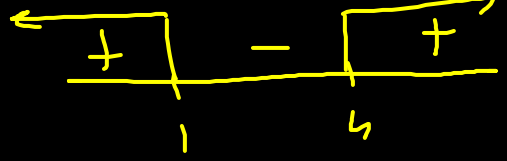
$\cap$

Part-2 :

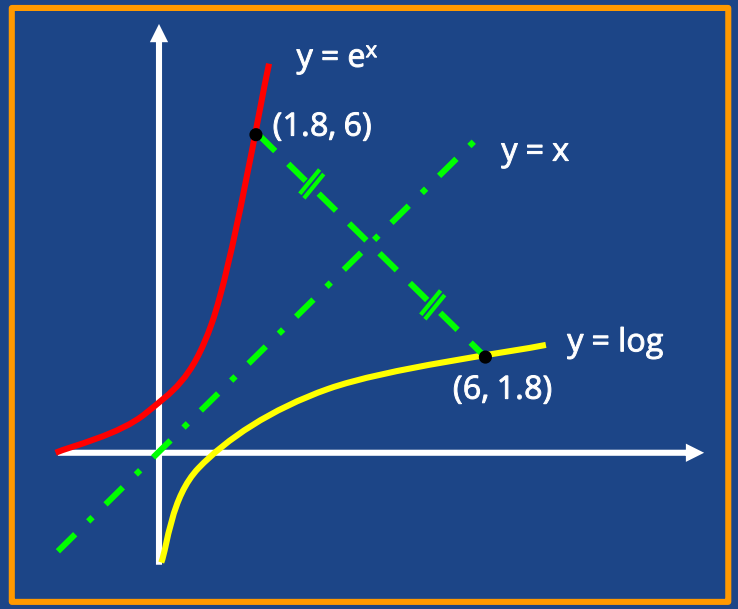
$\frac{x+2}{x-1} - 2 < 0$

$\frac{x+2-2x+2}{x-1} < 0$

$\frac{x-4}{x-1} > 0$



Homework Question (L-10)



Example

If $y = 3[x] + 2 = 2[x + 4]$. Find the value of: $[x + y]$.

A. 26 **B.** 20 **C.** 14 **D.** None

$$3[x] + 2 = 2[x+4]$$

$$3[x] + 2 = 2([x] + 4)$$

$$3[x] + 2 = 2[x] + 8$$

$$[x] = 6 \quad \text{---(1)}$$

$$\Rightarrow \boxed{x \in [6, 7)}$$

$$y = 3[x] + 2$$

$$= 3(6) + 2 = \boxed{20}$$

Now:

$$[x + y]$$

$$= [x + 20]$$

$$= [x] + 20 = 26$$

Example

y = [2x - 1] = 3[x - 6]. Find the possible values of **[3x + y]**.

A. 84 **B.** 85 **C.** 103 **D.** 104

$[2x-1] = 3[x-6]$

$[2x] - 1 = 3[x] - 18$

$x = I + f = [x] + \{x\}$

$[2(I+f)] - 1 = 3I - 18$

$2I + [2f] - 1 = 3I - 18$

$[2f] = I - 17$ — (1)

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Case-1 : $f \in [0, 0.5)$

$2f \in [0, 1)$

$[2f] = 0$

$x = I + f : x \in [17, 17.5)$

$y = 3[x-6] = 3[x] - 18$

$= 3 \times 17 - 18 = 33$

Now:

$[3x+y] = [3x] + 33$

51 + 33 = 84

52 + 33 = 85

$\because x \in [17, 17.5)$

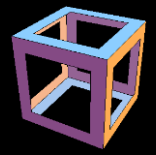
$3x \in [51, 52.5)$

$[3x] \rightarrow 51, 52$

For $y = 1$:

$0 = I - 17$

$I = 17$



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Case:2 : $f \in [0.5, 1)$

$2f \in [1, 2)$

$[2f] = 1$

In Eq^n (1):

$1 = I - 17$

$I = 18$ ✓

$x = I + f \; ; \; x \in [18.5, 19)$

$y = 3[x] - 18 = 3 \times 18 - 18 = 36$

Now:

$[3x + y] = [3x] + 36$

$\because x \in [18.5, 19)$

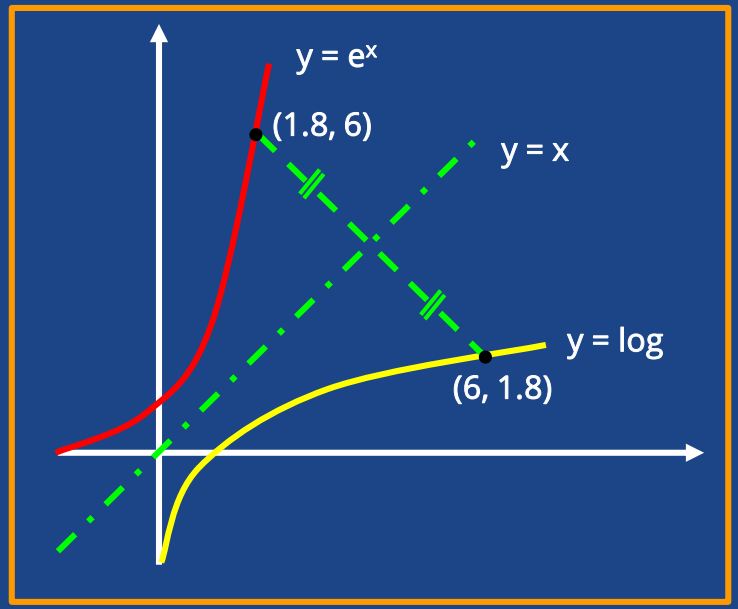
$3x \in [55.5, 57)$

$[3x] \rightarrow 55, 56$ ✓

$55 + 36 = 91$

$56 + 36 = 92$

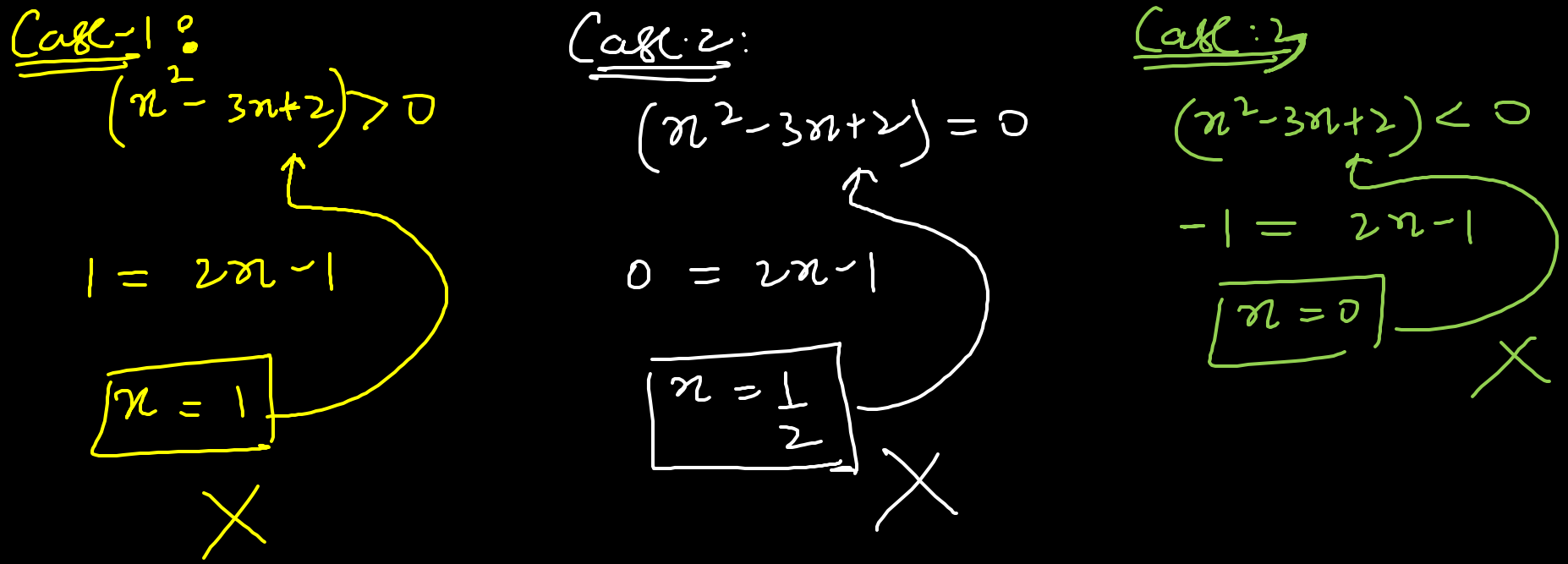
Homework Question (L-11)



Example

Find the number of solutions of the equation: $\text{sgn}(x^2 - 3x + 2) = (2x - 1)$

A. 1 **B.** 2 **C.** 3 **D.** 0



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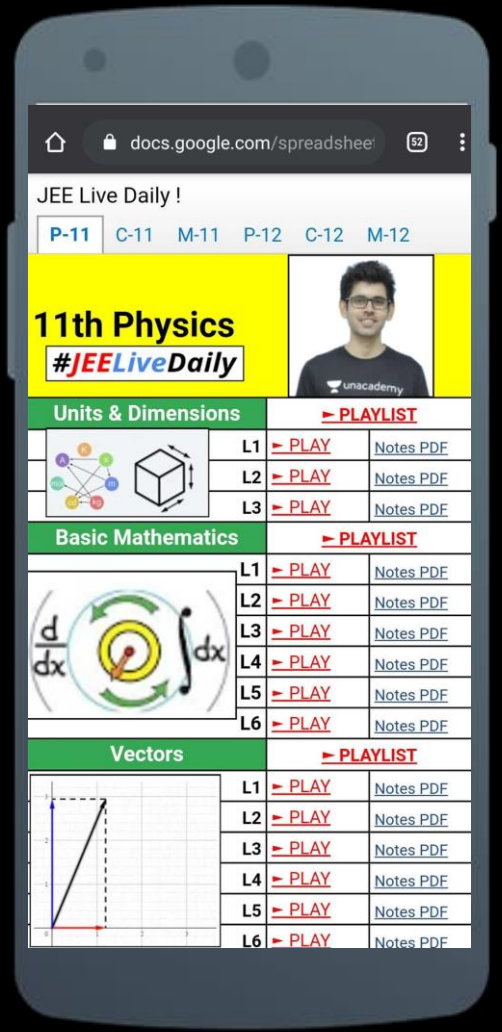

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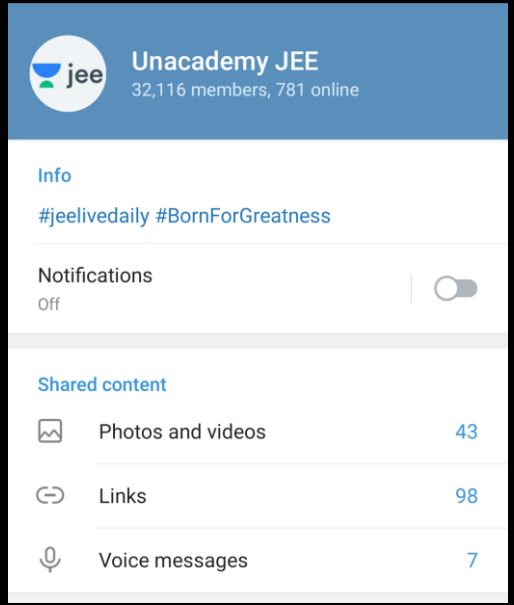

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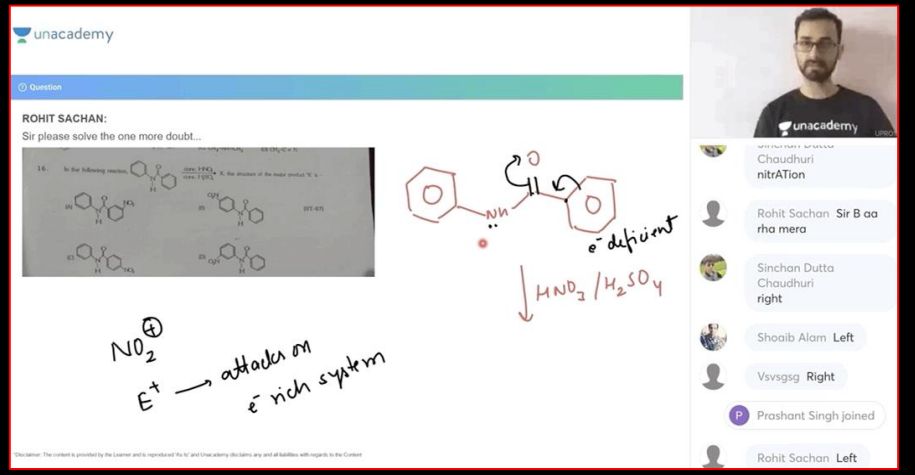

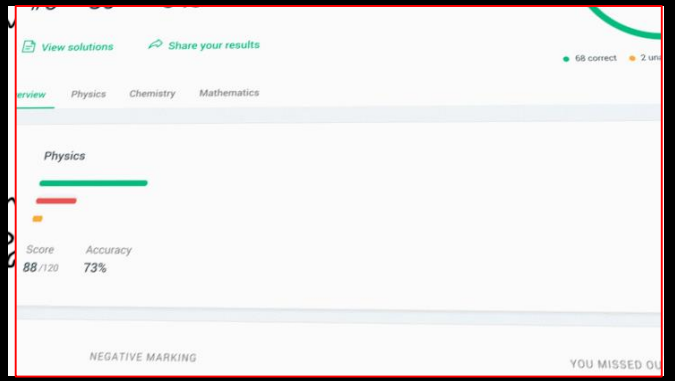

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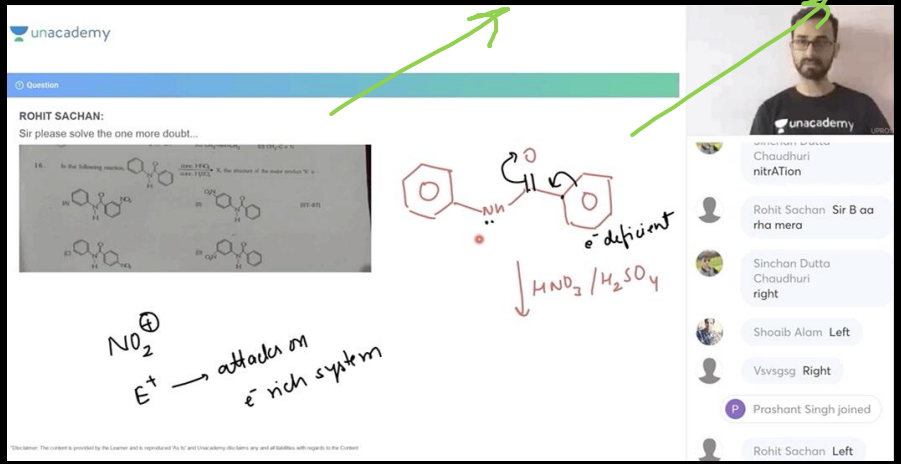

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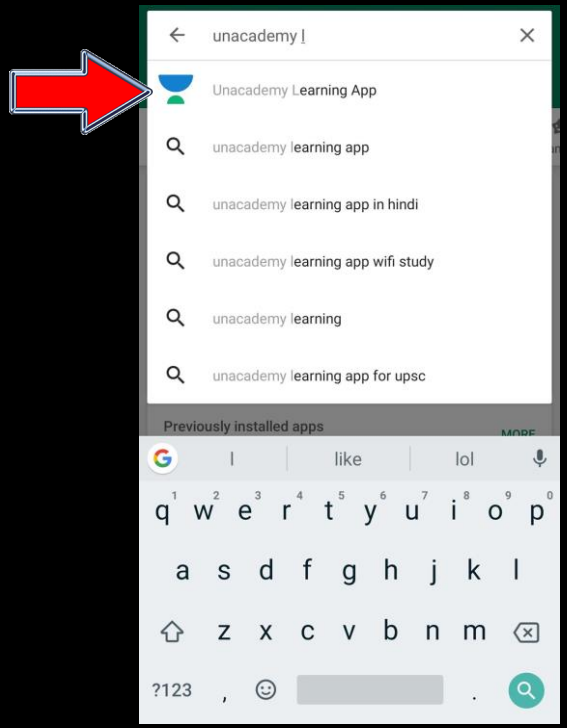
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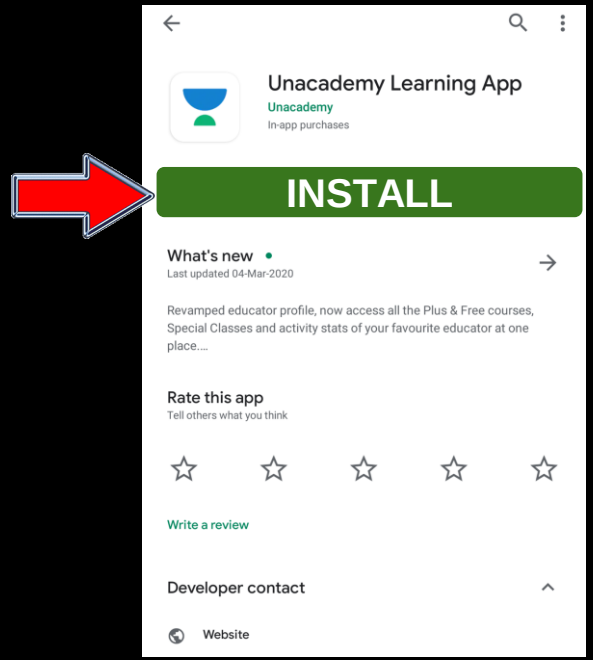
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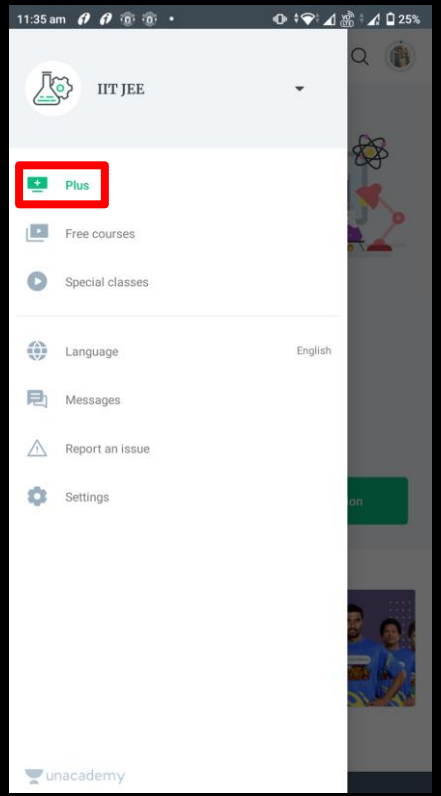

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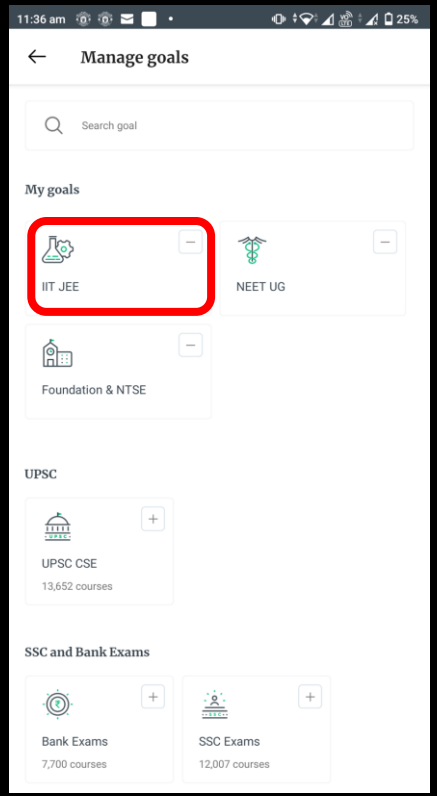

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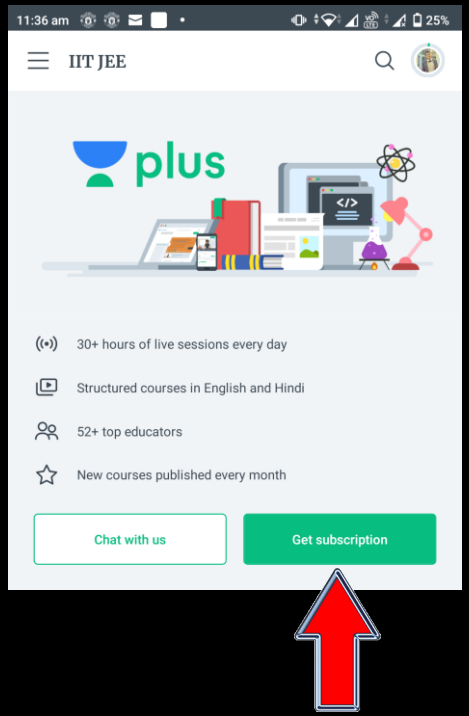

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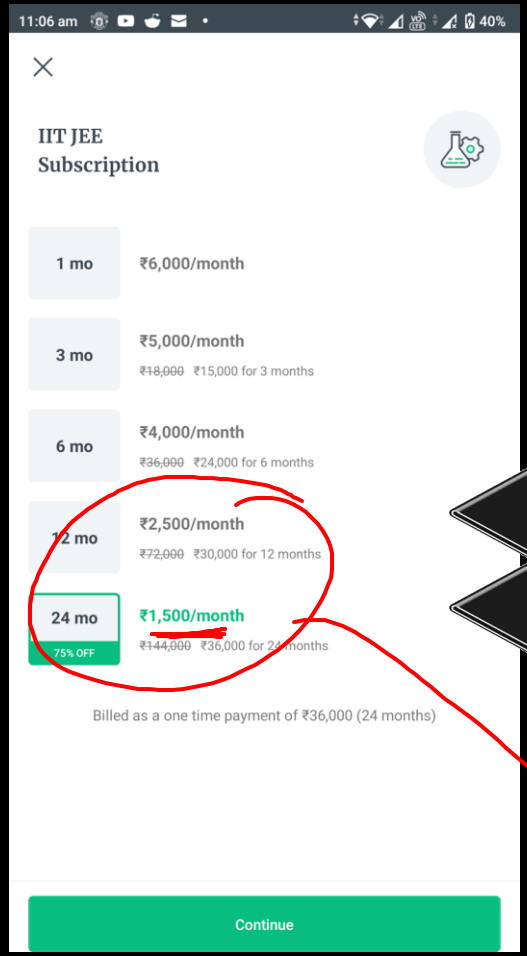

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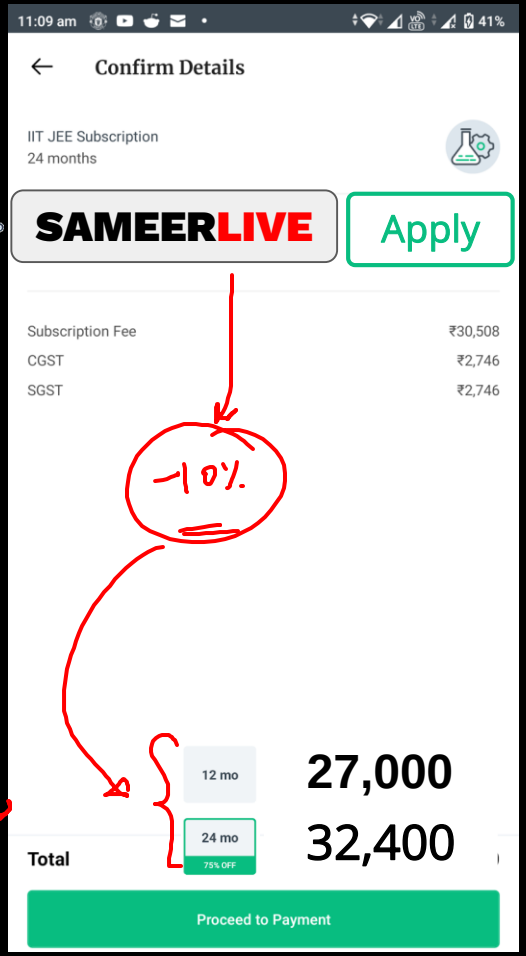

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