

Functions



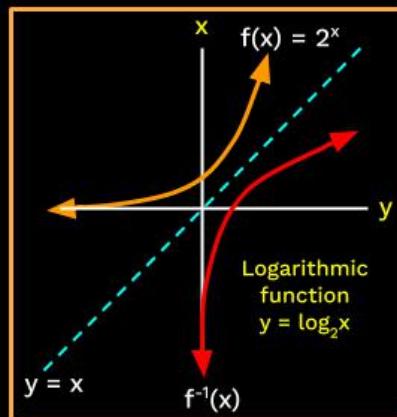
LIVE daily

2.0

LECTURE

9

Logarithmic Function - 3





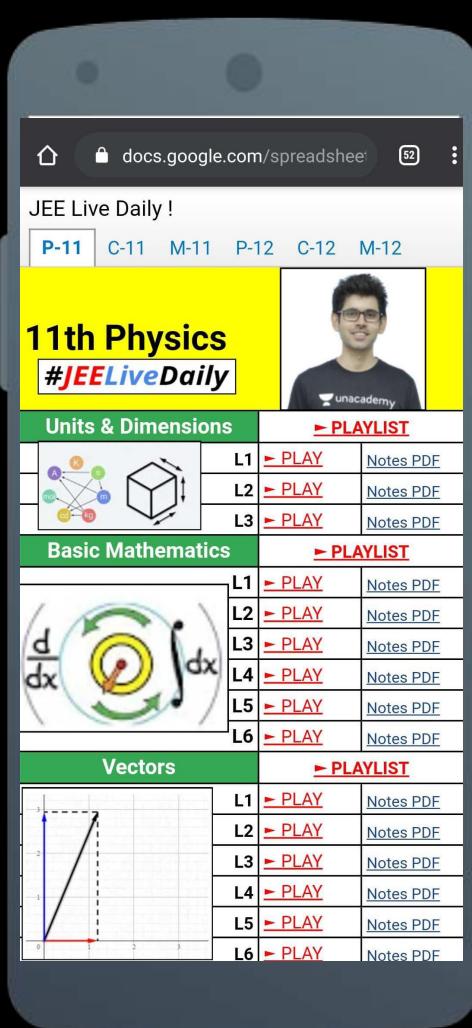
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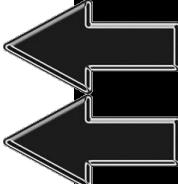
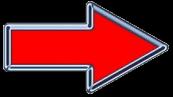
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Functions



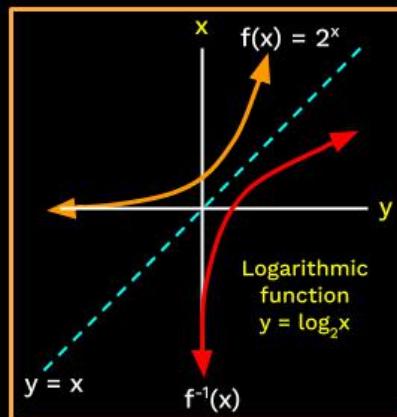
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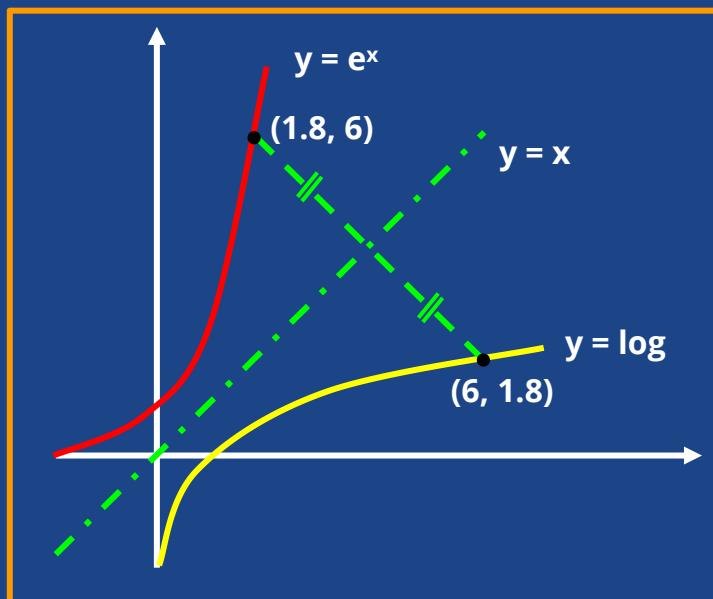
LECTURE

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Logarithmic Function - 3



Homework Question





Example

Solve for x: $1 + 6 \log_{(x+2)} 4 = \log_{(4)}(x+2)$

A. 62

B. 14

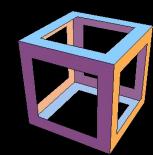
C. $\frac{-31}{16}$

D. $\frac{-127}{64}$

$$1 + 6 \left(\frac{1}{\log_4(x+2)} \right) = \log_4(x+2)$$

Let: $\log_4(x+2) = t$

$$1 + \frac{6}{t} = t \Rightarrow t+6 = t^2$$



$$t^2 - t - 6 = 0$$

$$(t-3)(t+2) = 0$$

$$\swarrow$$

$$t = 3$$

$$\searrow$$

$$t = -2$$

$$\log_4(n+2) = 3$$

$$(n+2) = 4^3$$

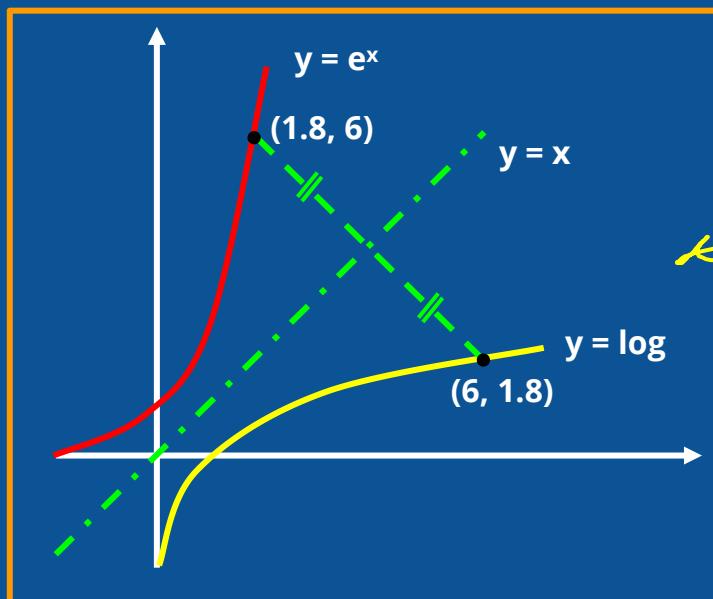
$$\boxed{n = 62}$$

$$\log_4(n+2) = -2$$

$$(n+2) = \frac{1}{16}$$

$$\boxed{n = -\frac{31}{16}}$$

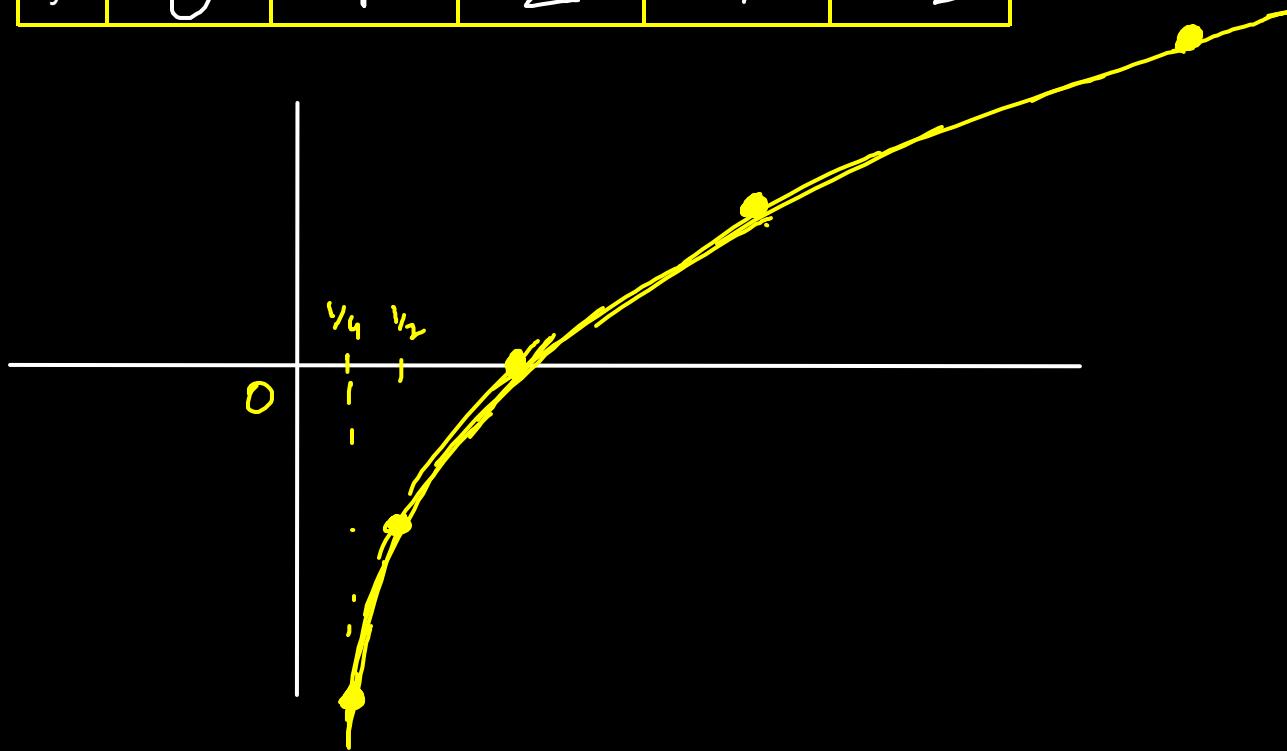
Graph of Log Function



$$f(x) = \log_a x \quad (a > 1)$$

$$\text{Ex: } f(x) = \log_2 x$$

x:	1	2	4	y_2	y_4
y:	0	1	2	-1	-2



$$f(x) = \log_a x \quad (0 < a < 1)$$

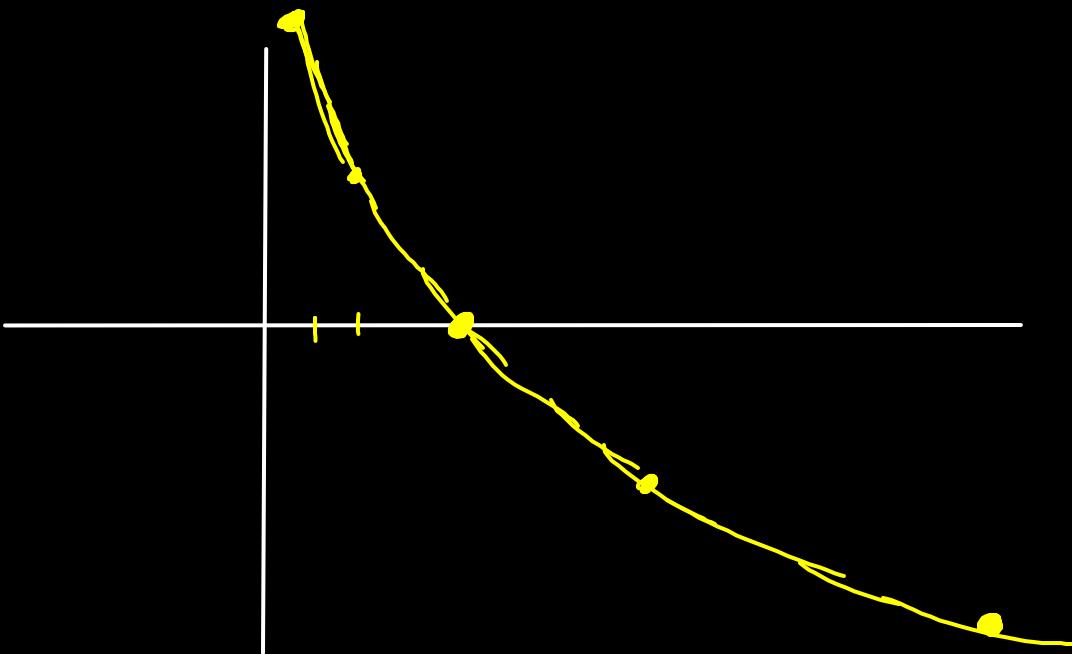
Eg: $y = f(x) = \boxed{\log_{\frac{1}{2}} x}$

x:	1	2	4	y_2	y_4
y:	0	-1	-2	1	2

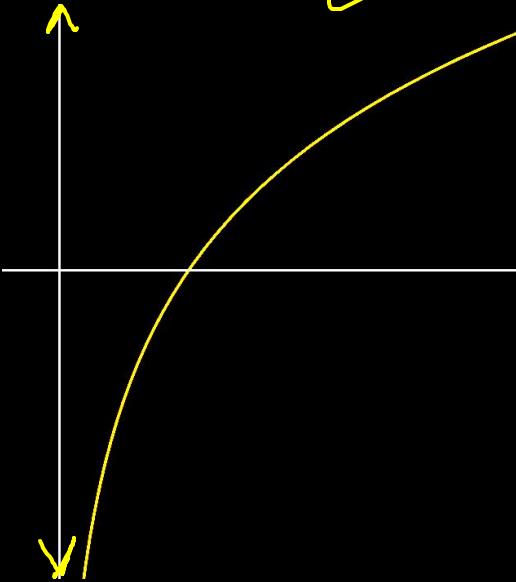
$$= \log_{(2)^{-1}} x$$

$$= \frac{1}{(-1)} \log_2 x$$

$$= -(\log_2 x)$$



$$f(x) = \log_a x \quad (a > 1)$$



Domain ; $x > 0$
 $x \in (0, \infty)$

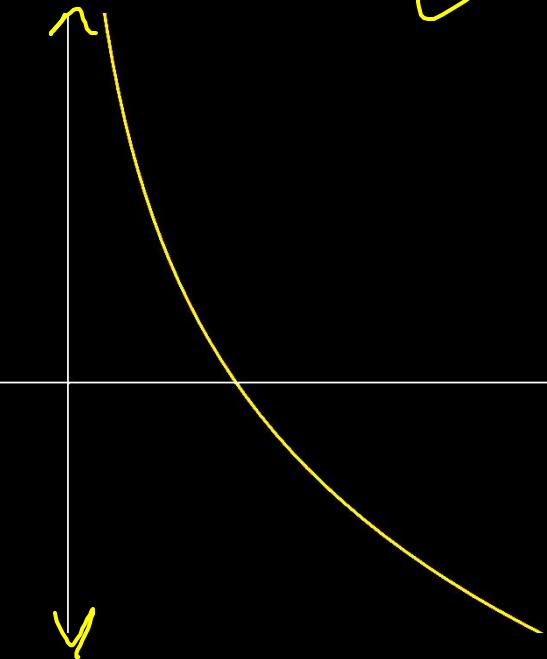
Range : \mathbb{R}

$$f(x) = \log_a(x) \quad (0 < a < 1)$$

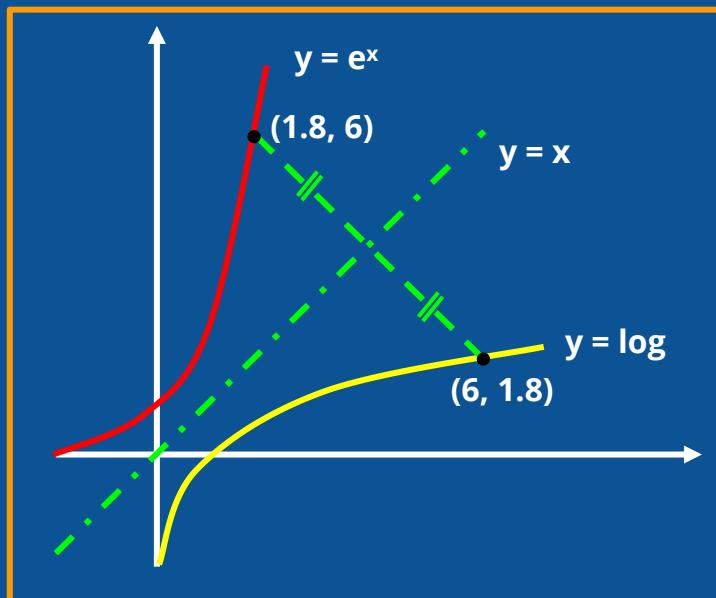
Domain : $x > 0$

$$x \in (0, \infty)$$

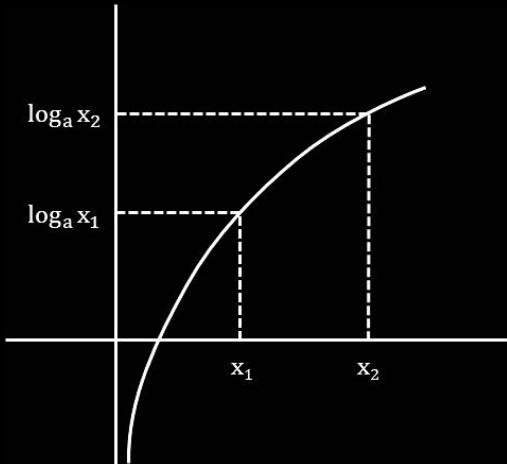
Range : \mathbb{R}



Solving Log Inequalities



Log Inequalities



$$2 \boxed{<} 4$$

$$\log_2 2 < \log_2 4$$

↓ ↓

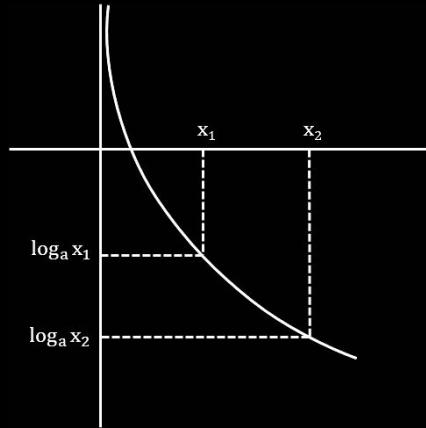
(1) (2)

$f(x) = \log_a x \quad (a > 1)$

$x_1 < x_2$

$\log_a x_1 < \log_a x_2$

Log Inequalities



$$f(x) = \log_a x \quad (0 < a < 1)$$

$$2 \boxed{<} 4$$

$$\log_{1/2} 2 > \log_{1/2} 4$$

↓ ↓

$\circled{-1}$ $\boxed{>}$ $\circled{-2}$

$x_1 < x_2$ \leftarrow

$\log_a x_1 > \log_a x_2$



Example

Solve for x: $\log_{1/5} (4x - 1) \geq 0$

A. $x \in (-\infty, \frac{1}{2})$ B. $\checkmark x \in \left(\frac{1}{4}, \frac{1}{2}\right)$

C. $x \in \left(0, \frac{1}{4}\right)$ D. $x \in \left(-\infty, -\frac{1}{4}\right)$

M-1: $\log_{1/5} (4x - 1) > (\log_{1/5} 1)$

$(4x - 1) < (1)$

$x < \frac{1}{2}$

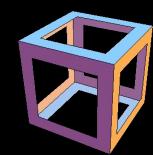
Domain:

$$(4x - 1) > 0$$

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

$$\Rightarrow \textcircled{1} \cap \textcircled{2}$$

$$x \in \left(\frac{1}{4}, \frac{1}{2}\right)$$



M-2

$$\log_{\frac{1}{5}}(4n+1) > 0$$

$$(4n+1) < \left(\frac{1}{5}\right)^0$$

Domain

$$\boxed{n > \frac{1}{4}} - \textcircled{2}$$

$$(4n+1) < 1$$

$$\boxed{n < \frac{1}{2}} - \textcircled{1}$$

$$\textcircled{1} \cap \textcircled{2}$$

$$n \in \left(\frac{1}{4}, \frac{1}{2}\right)$$



Example

Solve for x : $\log_7(x^2 - 4x - 5) \leq 1$

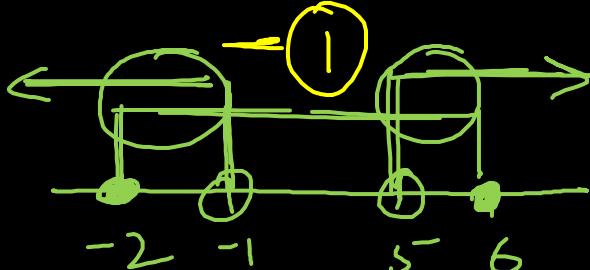
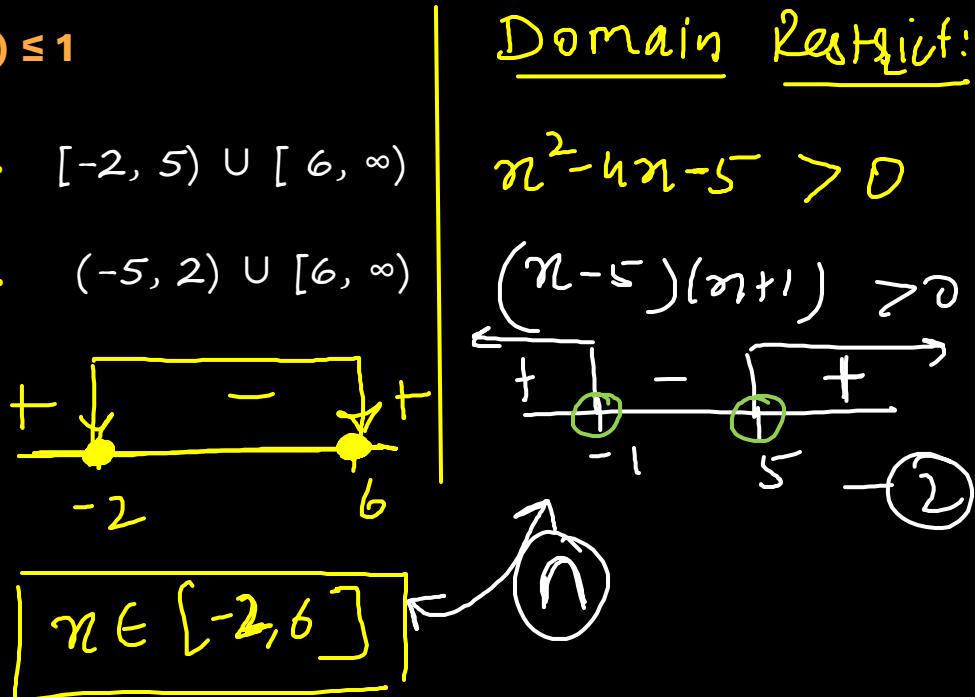
- A. $[-2, -1) \cup (5, 6]$ B. $[-2, 5) \cup [6, \infty)$
 C. $(-1, 5)$ D. $(-5, 2) \cup [6, \infty)$

$$\log_7(x^2 - 4x - 5) \leq 1$$

$$x^2 - 4x - 5 \leq 7^1$$

$$x^2 - 4x - 12 \leq 0$$

$$(x-6)(x+2) \leq 0$$





Example

Solve for x : $\log_{1/\sqrt{3}}\left(\frac{x^2+x}{x+4}\right) < 0$

$$\therefore \frac{1}{\sqrt{3}} < 1$$

A. $\mathbb{R} - (-3, 8)$

B. $(-\infty, -4) \cup (3, 8)$

C. $(-4, -3) \cup (8, \infty)$

D. None of these

$$\log_6\left(\frac{n^2+n}{n+4}\right) > \left(\frac{1}{\sqrt{3}}\right)^0$$

$$\frac{n^2+n}{n+4} > 6$$

$$\frac{n^2+n}{n+4} - 6 > 0$$

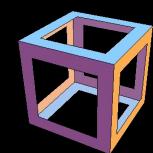
$$\frac{n^2+n-6n-24}{n+4} > 0$$

$$\log_6\left(\frac{n^2+n}{n+4}\right) > 1 =$$

Domain :

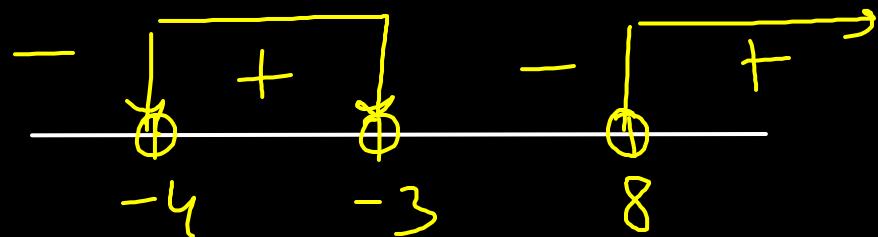
① $\log_6\left(\frac{n^2+n}{n+4}\right) > 0$

② $\left(\frac{n^2+n}{n+4}\right) > 0$



$$\frac{x^2 - 5x - 24}{x+4} > 0$$

$$\frac{(x-8)(x+3)}{(x+4)} > 0$$





Example

Solve for x : $\log_x(6-x) > 2$

- * ✓ A. $(1, 2)$ B. $(-3, 2)$ C. $(0, 6)$ D. None of these

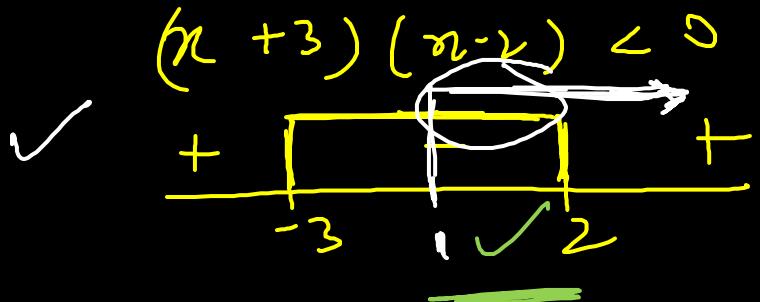
$$\left\{ \begin{array}{l} \text{Domain: } \begin{array}{l} \text{① } 6-n > 0 \Rightarrow n < 6 \\ \text{② } n > 0; n \neq 1 \end{array} \end{array} \right.$$

*

Case-1 $\therefore \boxed{n > 1}$ ✓

$$(6-n) > n^2$$

$$n^2 + n - 6 < 0$$

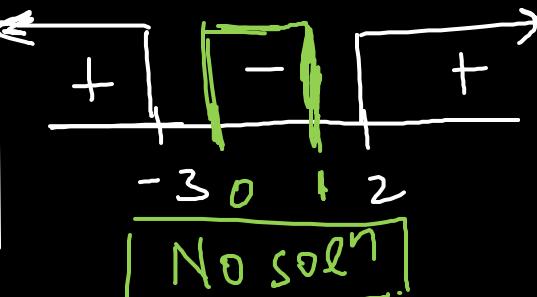


Case-2 $\boxed{0 < n < 1}$ ✓

$$(6-n) < n^2$$

$$n^2 + n - 6 > 0$$

$$(n+3)(n-2) > 0$$





Example

Find the domain of $f(x) = \sqrt{\log_{\frac{1}{4}} \log_{\frac{1}{3}} \log_{\frac{1}{2}} x}$

H.W.

Tomorrow



4 PM

MON - WED

11th



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7 PM

Namo Sir
Physics



12th



jee **LIVE** quiz 2.0

4PM

Nishant Sir
Maths



8 PM

Paaras Sir
Chemistry



5PM

Anupam Sir
Chemistry



9 PM

Sameer Sir
Maths



6 PM

Jayant Sir
Physics



THURS - SAT

12th 

7 PM Jayant Sir Physics



11th 

4 PM Sameer Sir Maths



8 PM Anupam Sir Chemistry



5 PM Paaras Sir Chemistry



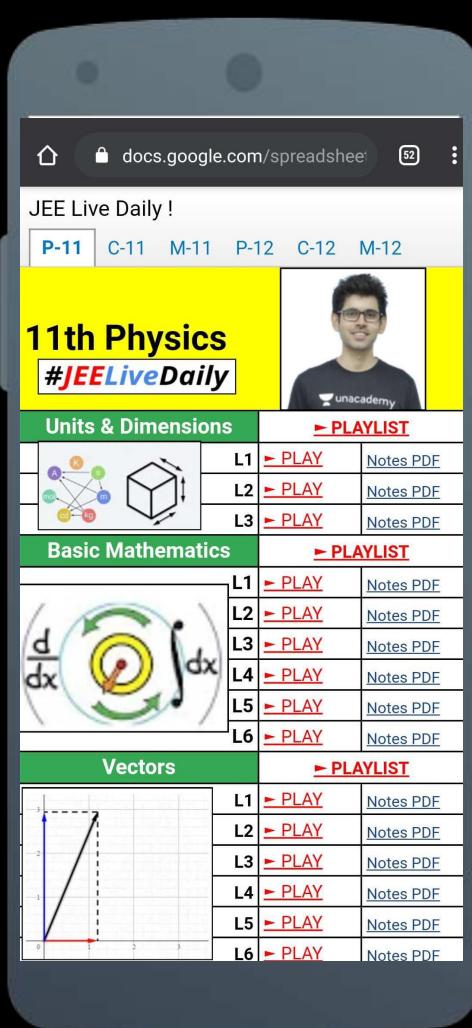
9 PM Nishant Sir Maths

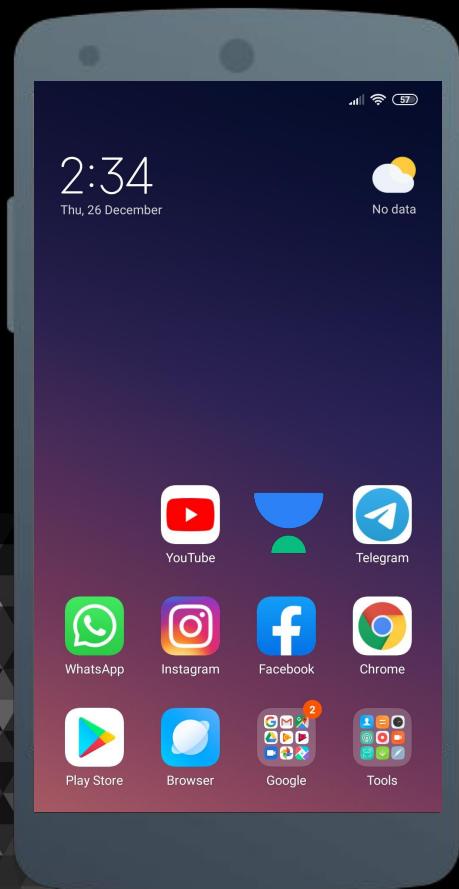


6 PM Namo Sir Physics



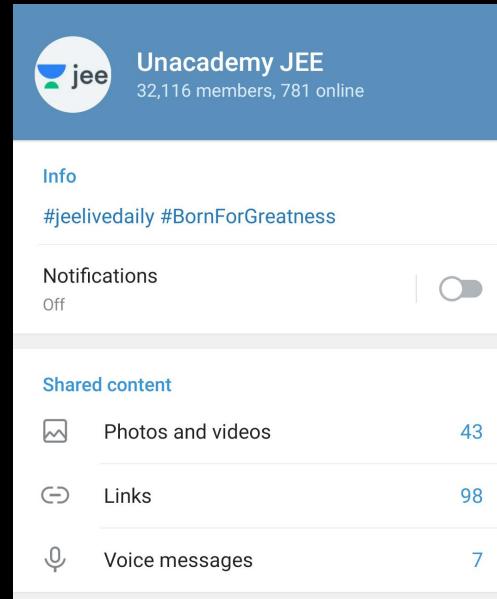
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A screenshot of a Telegram group info page. The header features the jee logo and the group name "Unacademy JEE" with a member count of "32,116 members, 781 online". Below the header, there's a "Info" section with the hashtags "#jeelivedaily #BornForGreatness". Under "Notifications", the toggle switch is set to "Off". The "Shared content" section shows three categories with counts: "Photos and videos" (43), "Links" (98), and "Voice messages" (7). Each category has a corresponding icon: a camera for photos and videos, a link for links, and a microphone for voice messages.

Category	Count
Photos and videos	43
Links	98
Voice messages	7

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A screenshot of a Unacademy live session. At the top right is a video feed of a male educator named Rohit Sachan. To his left is a sidebar showing user activity: 'Srinchana Dutta Chaudhuri nitration' (right), 'Rohit Sachan Sir Baa rha mera' (left), 'Sinchana Dutta Chaudhuri right' (right), 'Shoaib Alam Left' (left), 'Vsvsgsg Right' (right), and 'Prashant Singh joined' (right). Below the sidebar is a list of users: 'Rohit Sachan Left' (left) and 'Rohit Sachan Left' (right). The main area shows a chemistry question from IIT-JEE. The question asks for the structure of the major product X in the reaction of 4-nitrophenyl isocyanide with concentrated HNO₃. Three structures are shown: (A) 4-nitrophenyl isocyanide, (B) 4-nitrophenyl carbonyl isocyanide, and (C) 4-nitrophenyl isocyanic acid. A handwritten note next to the question indicates that structure (B) is the correct answer. Below the question is a handwritten diagram of the mechanism: NO_2^+ attacks an electron-rich system (indicated by arrows pointing to the phenyl ring and the carbonyl group). The products are labeled $\text{HNO}_3 / \text{H}_2\text{SO}_4$ and 'e⁻ deficient'. At the bottom of the slide is a disclaimer: 'Disclaimer: The content is provided by the Learner and is reproduced by Unacademy. Unacademy does not own any and all liability with regards to the Content.'

A screenshot of a test series analysis dashboard. At the top, there are buttons for 'View solutions' and 'Share your results'. Below that, tabs for 'Overview', 'Physics', 'Chemistry', and 'Mathematics' are visible. The 'Physics' tab is selected, showing a progress bar with a green segment and a red segment. Below the bar, the text 'Score 88/120' and 'Accuracy 73%' is displayed. At the bottom of the dashboard, the text 'NEGATIVE MARKING' and 'YOU MISSED 0' is shown.



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Question

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

16. In the following reaction, NO_2 acts as an oxidising agent. X is the structure of the major product 'X' is -

NO_2 → attacks on e^- rich system

e^- deficient

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

Sirchana Dutta Chaudhuri Right

Rohit Sachan Sir Baa rha mera

Sirchana Dutta Chaudhuri right

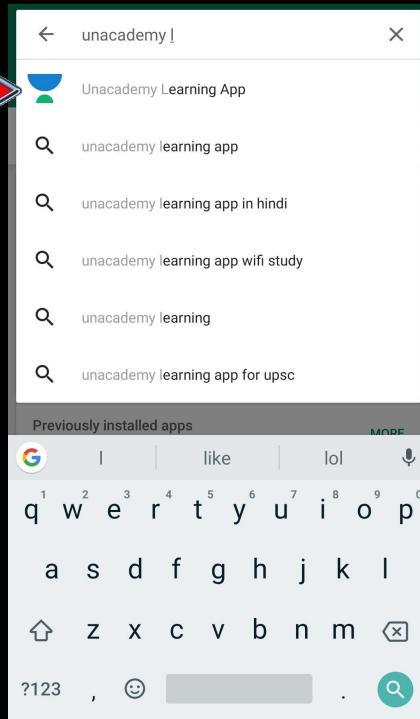
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Vsvsgsg Right

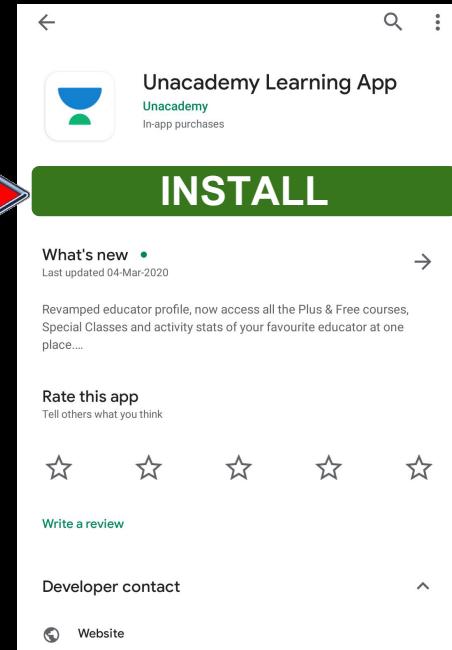
Prashant Singh joined

Rohit Sachan Left

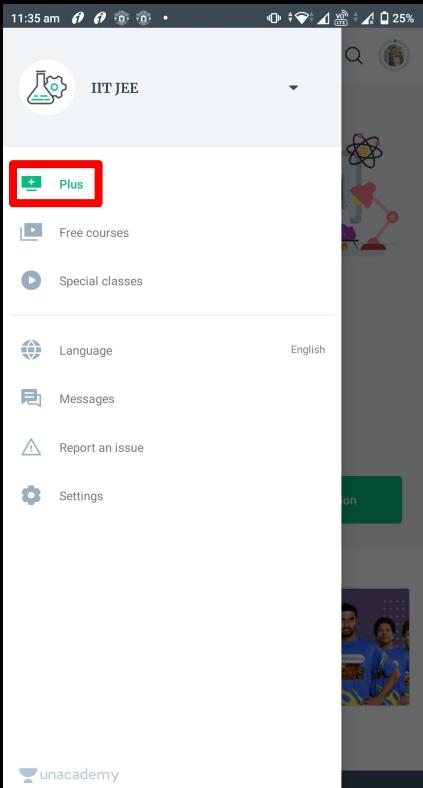
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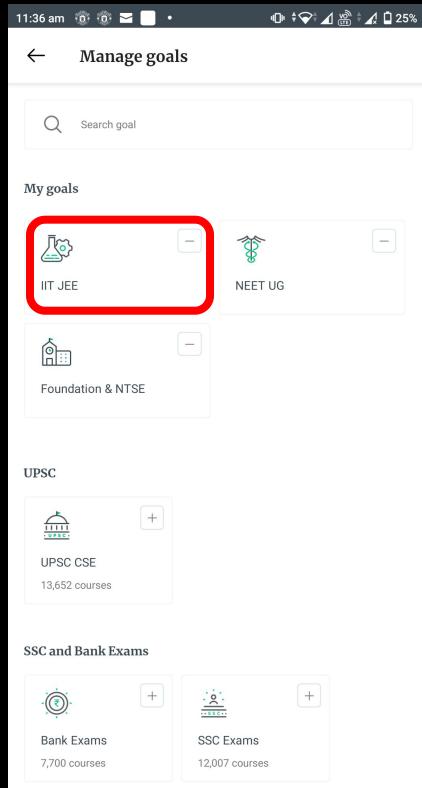
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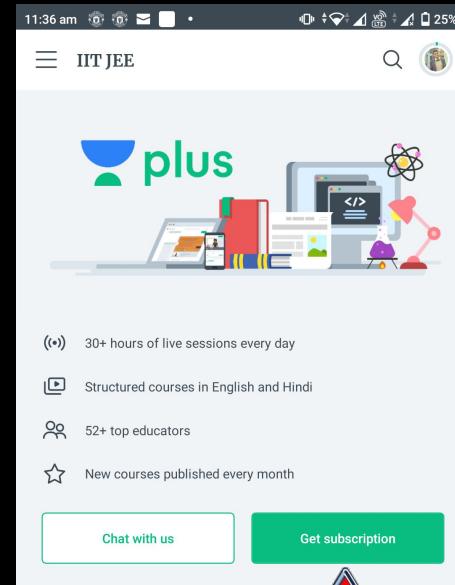
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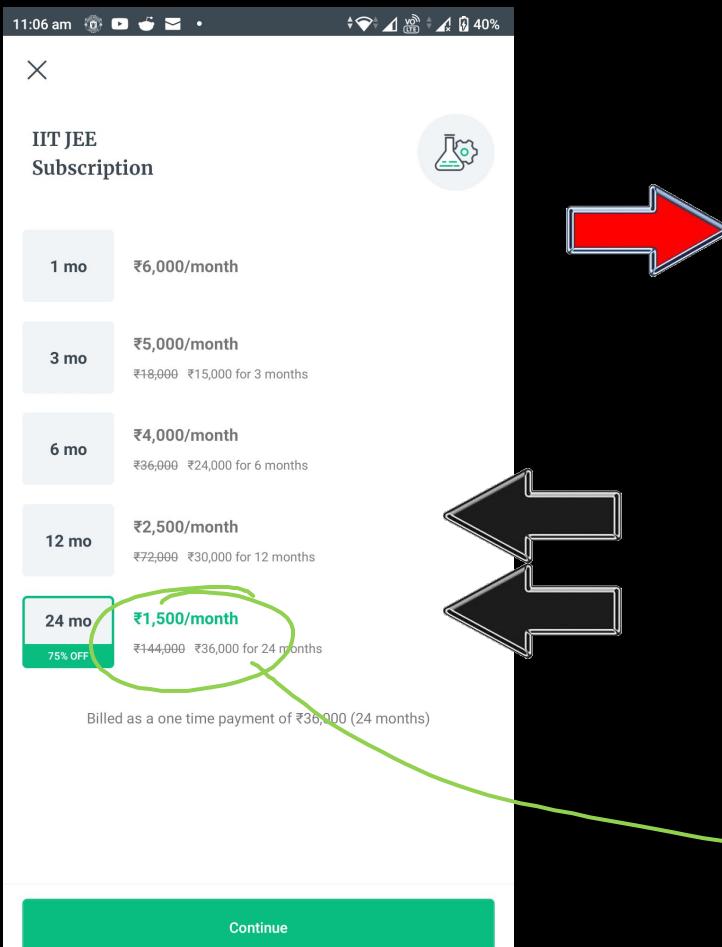
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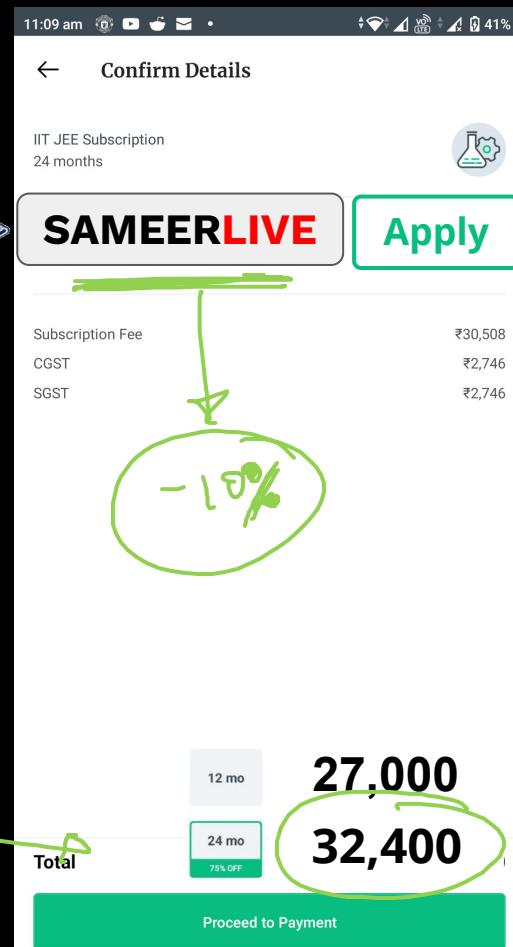
Step 5



Step 6



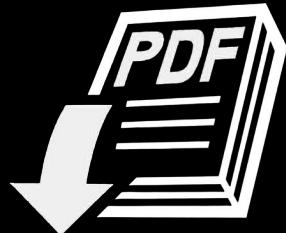
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1350 / month



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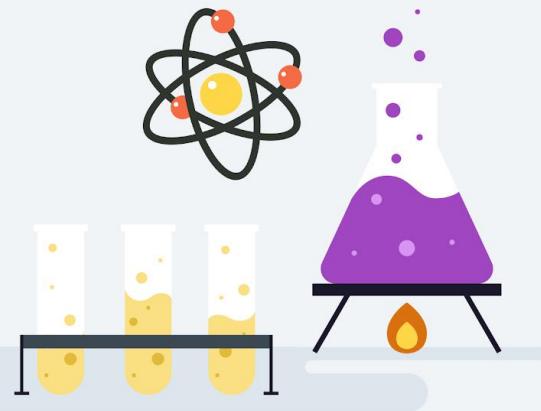




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