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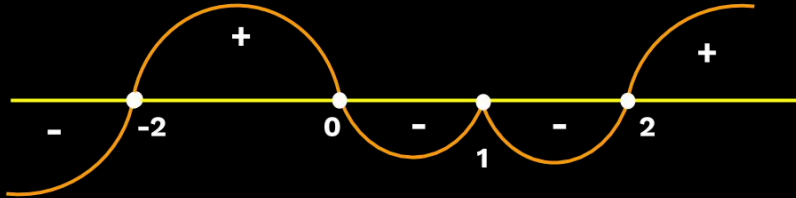
2.0

Functions

LECTURE

2

Wavy Curve Method





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Sameer Chincholikar
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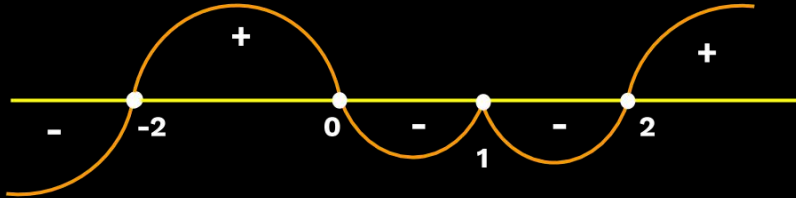
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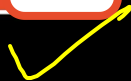
Wavy Curve Method



Types of Inequalities

Greater than:

$>$



$$8 > 2$$

Greater than
or equal to:

\geq

$$8 \geq 2 \quad \checkmark$$

$$2 \geq 2 \quad \checkmark$$

Types of Inequalities

Less than:

$<$

**Less than or
equal to:**

\leq

Solving Linear Inequalities

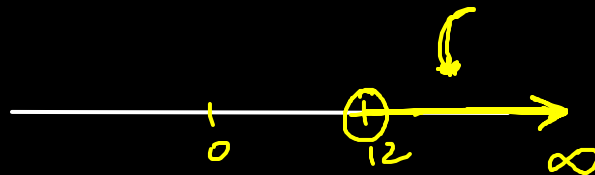
✓ **Example:**

$$3x - 14 > 22$$

$$3x > 22 + 14$$

$$3x > 36$$

$$x > 12$$



(a, b)

Intervals
 $(12, \infty)$ ✓
 open

A curly brace groups the word 'Intervals' and the expression $(12, \infty)$. Below $(12, \infty)$ is a double-headed horizontal arrow. An arrow points from the word 'open' in a circle up to the open circle in the interval notation.

$$\begin{cases} 2 > 1 \\ -2 < -1 \end{cases}$$

Solving Linear Inequalities

Example:

$$16 - 5x \geq 21$$

$$-5x \geq 21 - 16$$

$$-5x \geq 5$$

$$x \leq \frac{5}{(-5)}$$

$$\Rightarrow x \leq -1$$

Eg: $x = -2$

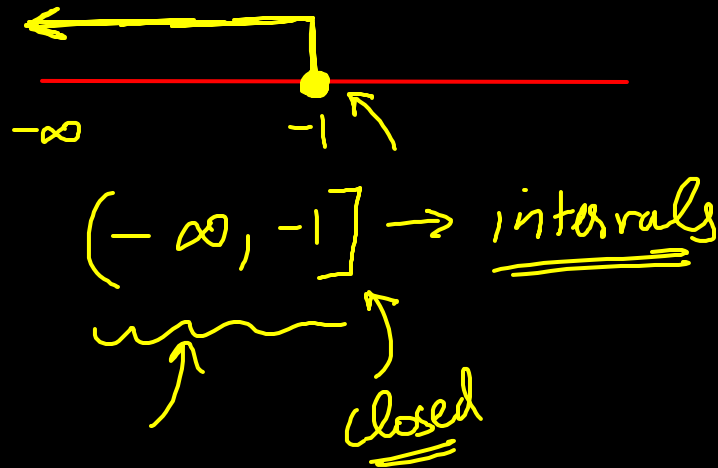
$$16 - 5(-2)$$

$$16 + 10$$

$$26 \checkmark$$

Eg: $x = 0$

$$16 \times$$

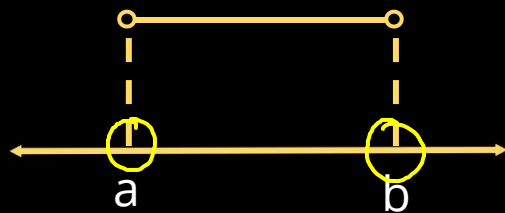


* Intervals

1

Open Intervals

$$\underline{a} < x < \underline{b}$$



$x \in (a, b)$
Open brackets

Intervals

2

Closed Intervals

$$\underline{a} \leq x \leq \underline{b}$$



$$x \in [a, b]$$

Closed brackets or
square brackets

Ex: $x^2 - 5x + 6 = 0$

$$x = 2, 3$$

$$\text{Soln set} = \{ 2, 3 \}$$

Intervals

() []



3

Semi Open Semi
Closed Intervals

$$a < x \leq b$$



$$x \in (a, b]$$

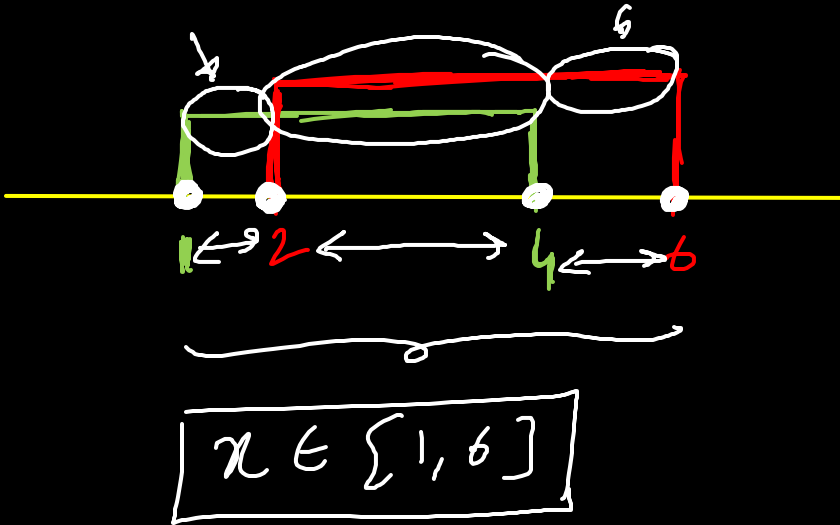
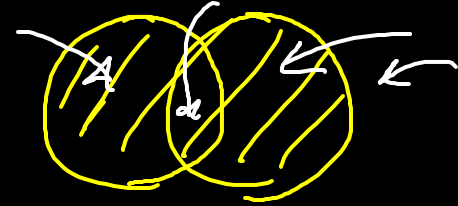
One side open one
side closed

(] [)

Operations on Intervals ✱

Union

Example: $x \in [1, 4] \cup [2, 6]$

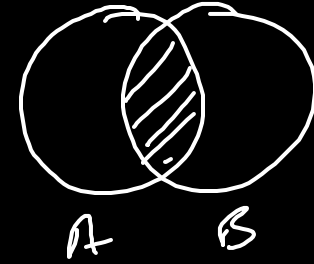
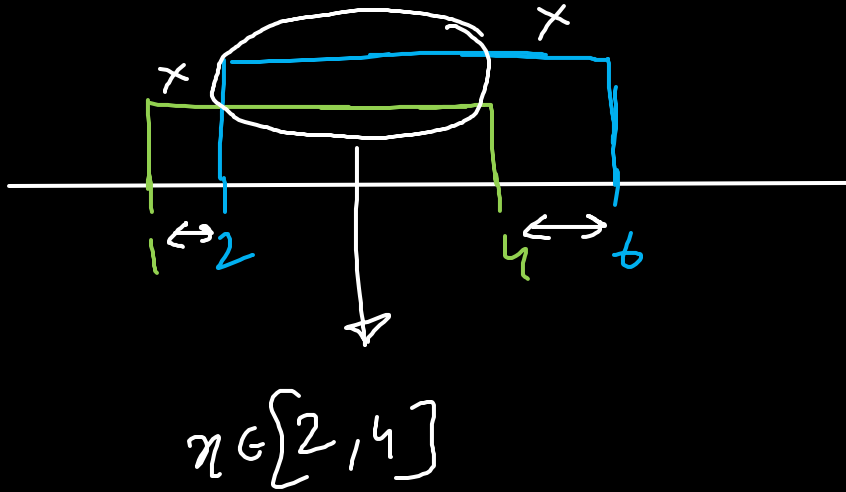


Operations on Intervals

Intersection

Example:

$$x \in [1, 4] \cap [2, 6]$$



Polynomial Inequalities



Example

Solve for 'x':

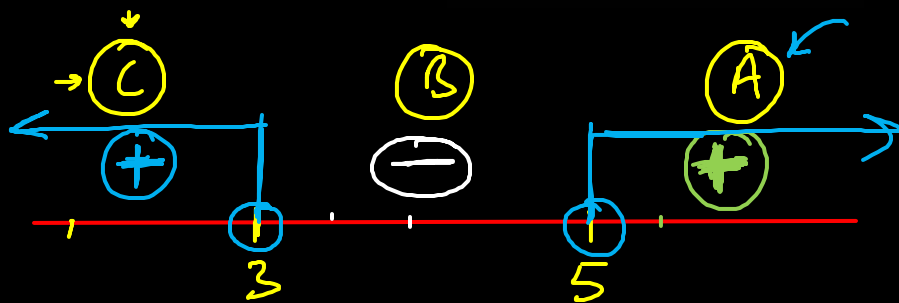
$$(x-3)(x-5) > 0$$

A. $x \in (-\infty, 3) \cup (5, \infty)$

B. $x \in (-\infty, -3] \cup [-5, \infty)$

C. $x \in (-\infty, 3] \cup [5, \infty)$

D. $x \in [3, 5]$



$x=4 : (4-3)(4-5) \rightarrow (-)$

$= 3 \cdot 5 : (0.5)(-1.5) \rightarrow (-)$

$x=0 : (-3)(-5) \rightarrow (+) \checkmark$

$x=6 : (6-3)(6-5) \rightarrow 3 \times 1 \rightarrow (+)$
 $x=7 : \rightarrow (+)$
 $x=10 : \rightarrow (+)$
 $x=100 : \rightarrow (+)$



Example

Solve for 'x':

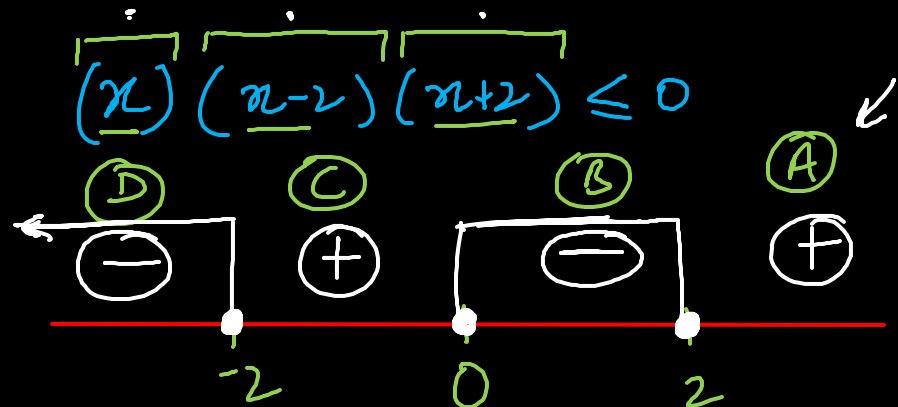
$$x(x^2 - 4) \leq 0$$

A. $(-\infty, -2] \cup [2, \infty)$

B. $(-\infty, -2] \cup [0, 2]$

C. $[-2, 0] \cup [2, \infty)$

D. None of these



$$x \in (-\infty, -2] \cup [0, 2]$$

Example

Solve for 'x':

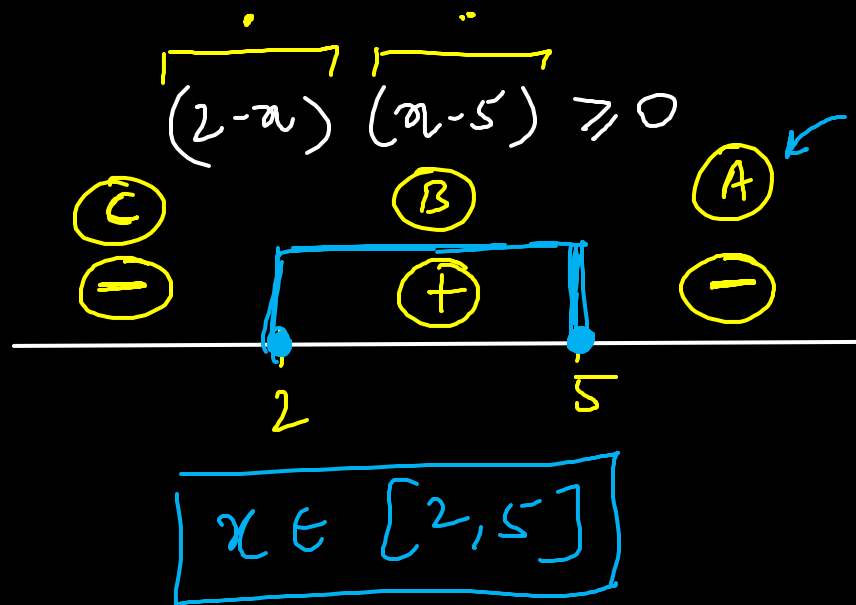
$$(2 - x)(x - 5) \geq 0$$

A. $x \in (2, 5)$

☒ B. $x \in [2, 5]$

C. $x \in (-\infty, 2] \cup [5, \infty)$

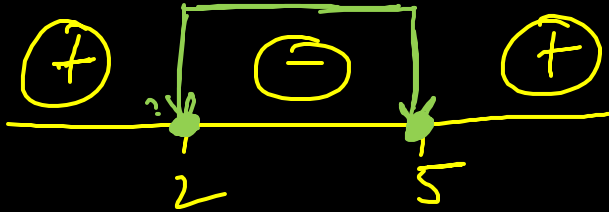
D. $x \in (-\infty, 2) \cup (5, \infty)$



$$(2-x)(x-5) \geq 0$$

multiply -1 both sides.

$$(x-2)(x-5) \leq 0$$



Example

Solve for 'x':

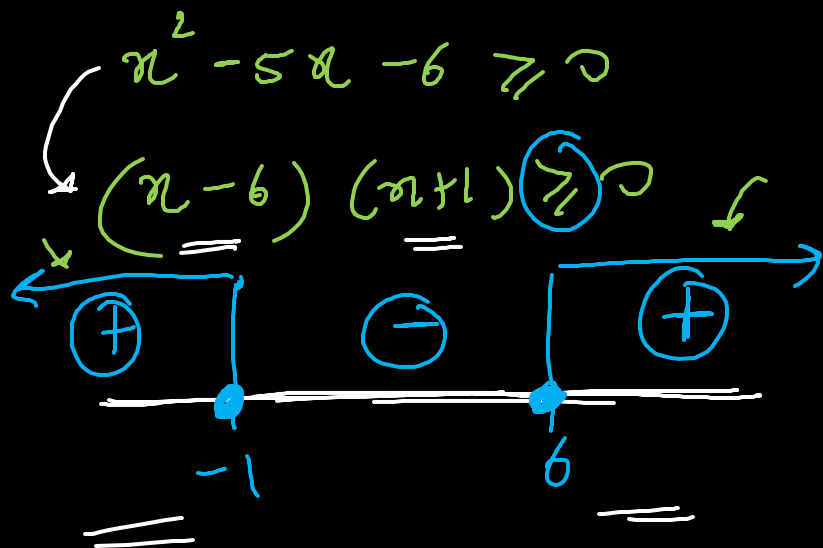
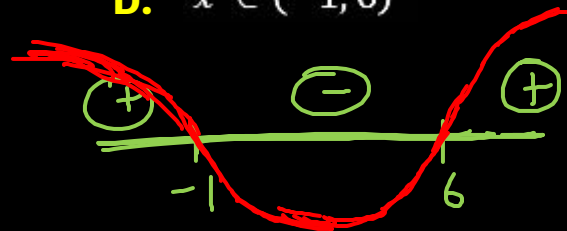
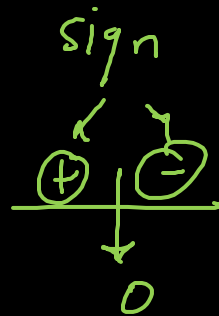
$$x(x-5) \geq 6$$

A. $x \in (-\infty, 0) \cup (5, \infty)$

B. $x \in (-\infty, 0) \cup (5, 6)$

C. $x \in (-\infty, -1] \cup [6, \infty)$

D. $x \in (-1, 6)$



Example

Solve for 'x':

$$\underline{(x+2)} \underline{(x-1)^2} \underline{(x-5)} \geq 0$$

power even

power one \Rightarrow odd

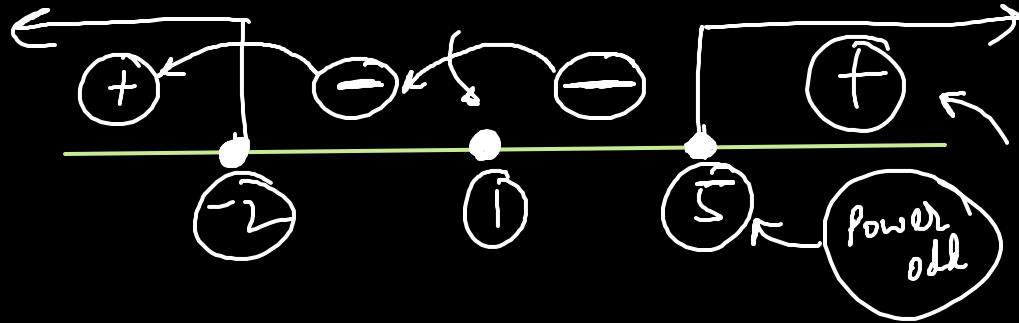
A. $x \in (-\infty, -2] \cup (5, \infty)$

B. $x \in (-\infty, -2] \cup (5, \infty) \cup \{2\}$

C. $x \in [-2, -5]$

D. None of these

$$\underline{(x+2)} \underline{(x-1)^2} \underline{(x-5)} \geq 0$$



$$x \in (-\infty, -2] \cup [5, \infty) \cup \{1\}$$

* Steps of 'Wavy Curve Method'

Standard form:

- ❖ Factorize
- ❖ 'x' positive sign
- ❖ right of inequality is zero

Number Line

- ❖ Mark critical points
- ❖ open circles
- ❖ closed circles

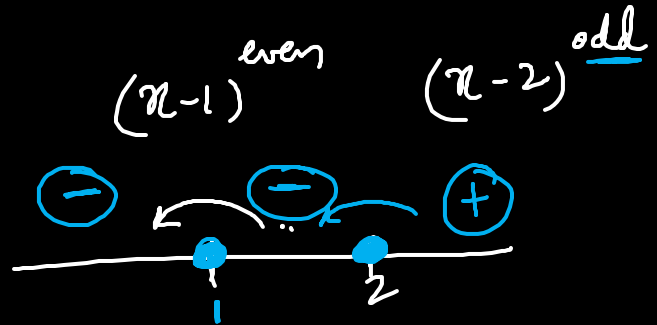
Mark Signs:

- ❖ Mark each portion
- ❖ Positive OR
- ❖ negative

Get Answer

- ❖ Select the required portion
- ❖ Include closed circles

Ex: $(x-1)^2(x-2)^3 \geq 0$
 $x \in [2, \infty) \cup \{1\}$



Rational Inequalities



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Physics



8 PM

Paaras Sir
Chemistry



9 PM

Sameer Sir
Maths



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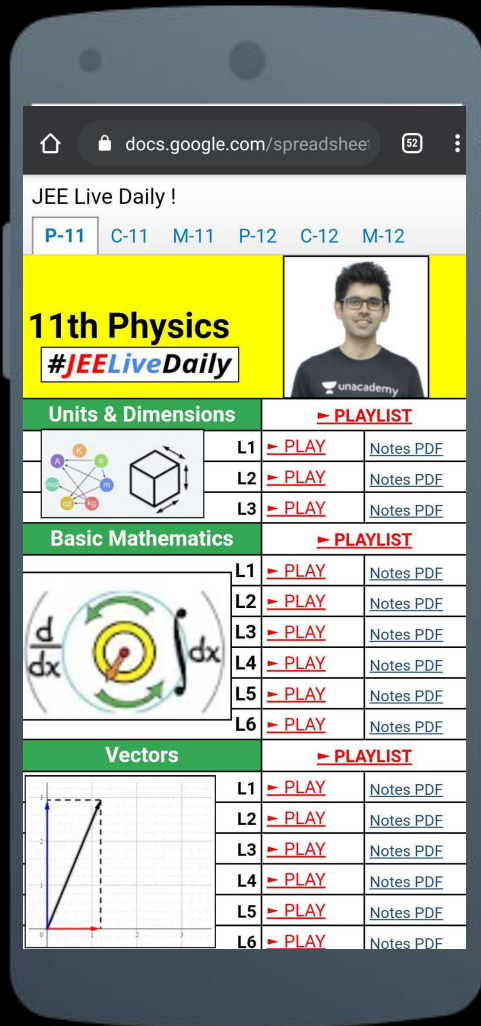
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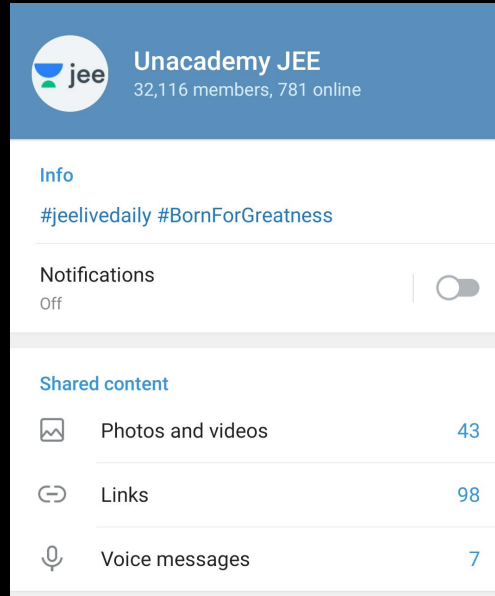
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Question

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

14. In the following reaction, the product is:

Reaction scheme showing the nitration of N,N-dimethylaniline with $\text{HNO}_3/\text{H}_2\text{SO}_4$ to form N,N-dimethylaniline-4-nitrobenzene.

Handwritten notes:

- NO_2^+ attacks on e^- rich system
- e^- deficient
- $\text{HNO}_3/\text{H}_2\text{SO}_4$

Participants:

- Chaudhuri nitrATion
- Rohit Sachan Sir B aa rha mera
- Sinchan Dutta Chaudhuri right
- Shoaib Alam Left
- Vsvsgs Right
- Prashant Singh joined
- Rohit Sachan Left

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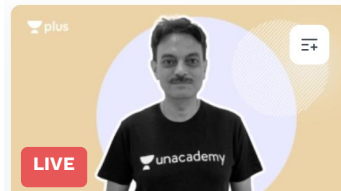


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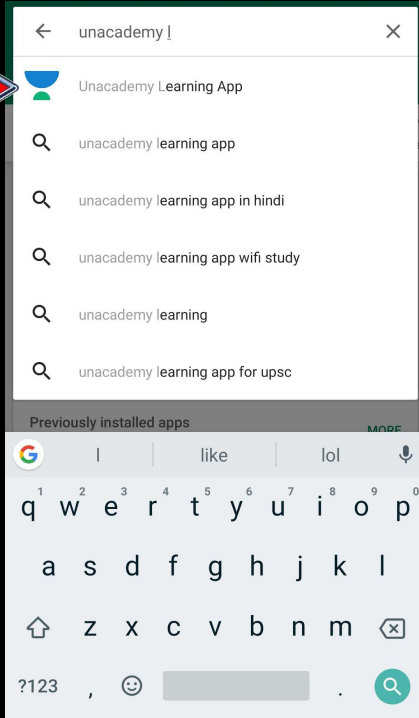
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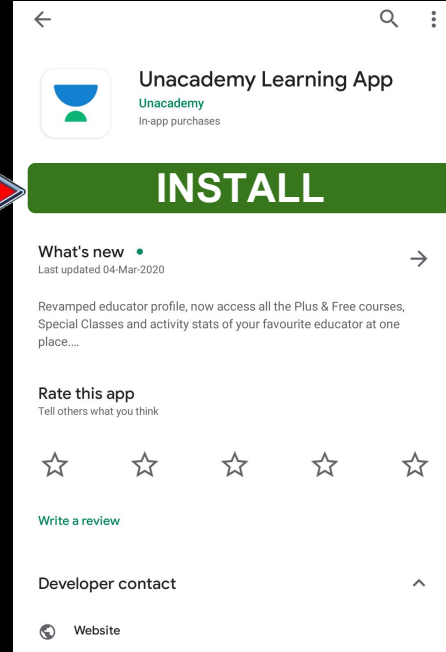
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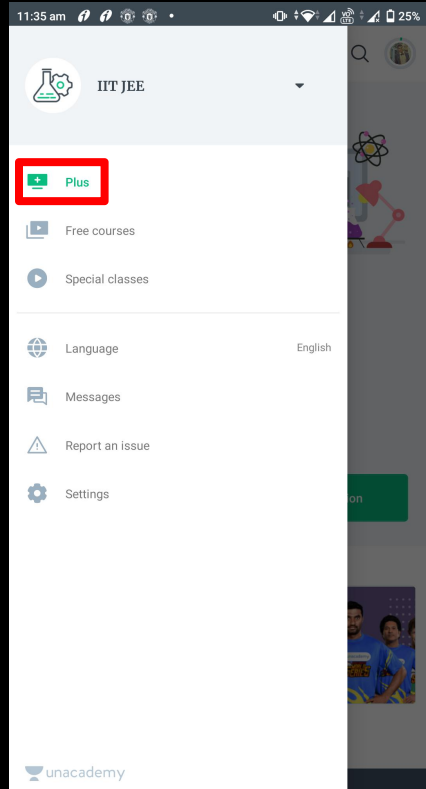
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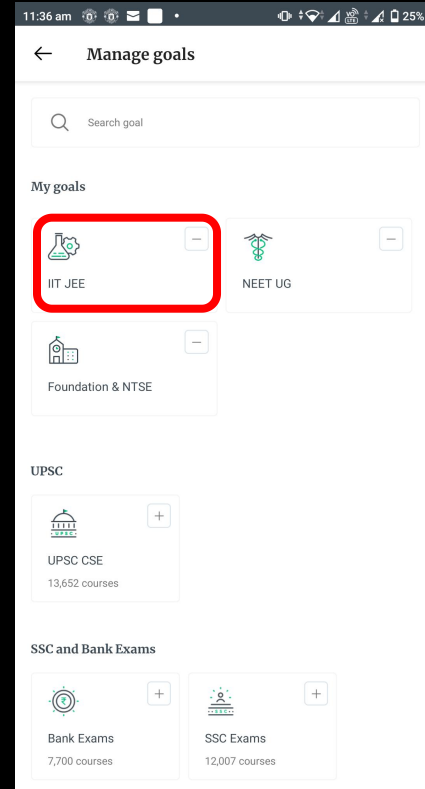
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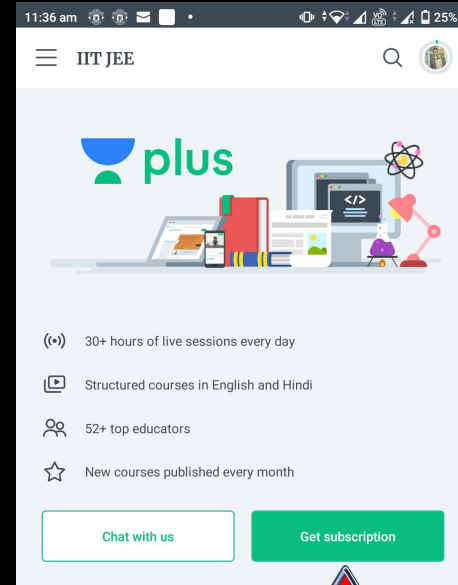
Step 3



Step 4



Step 5



Step 6

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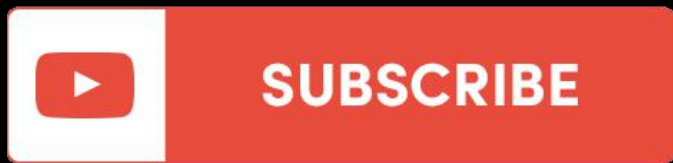
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