

Location of Roots -1

Quadratic Equations

7



$$\alpha + \beta = \frac{-b}{a}$$



$$\alpha\beta = \frac{c}{a}$$



$$|\alpha - \beta| = \frac{\sqrt{D}}{|a|}$$



Sameer Chincholikar

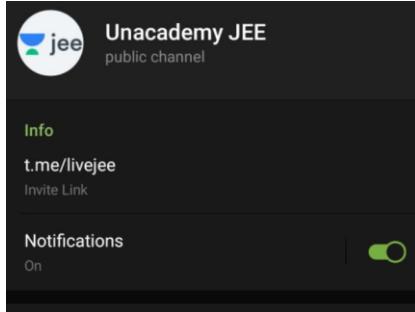
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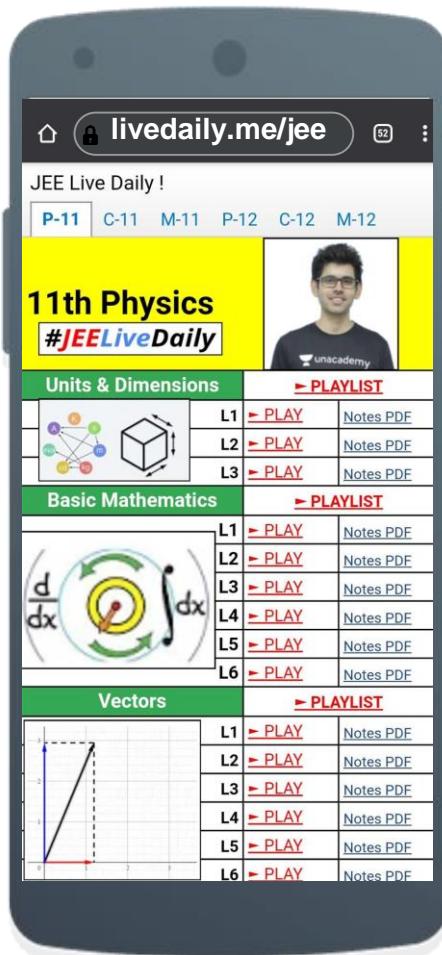
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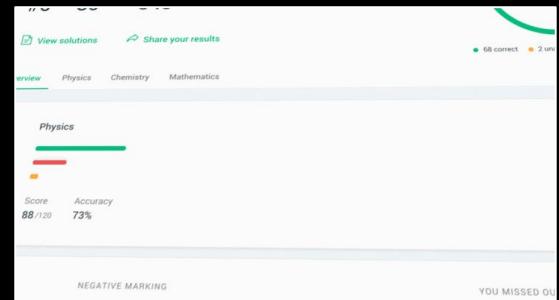


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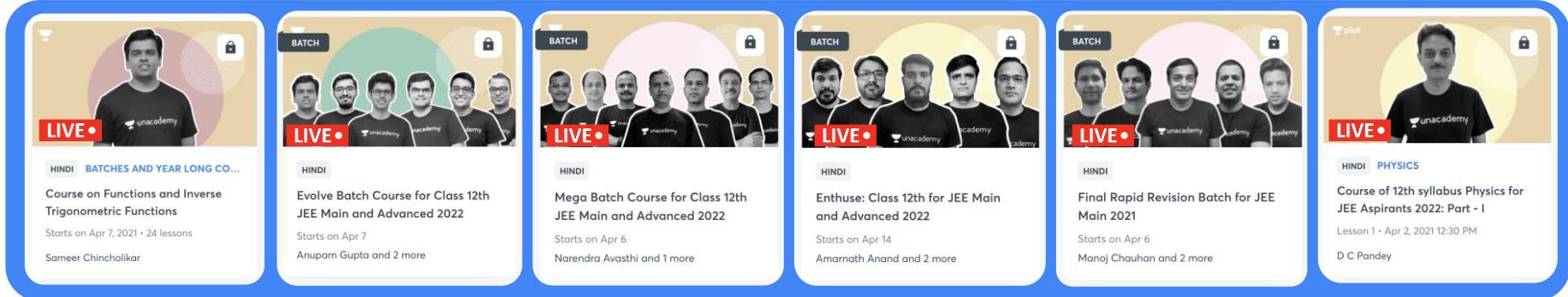
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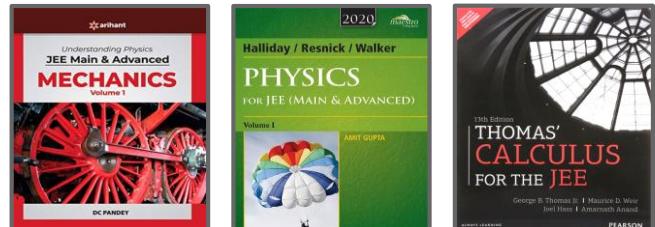
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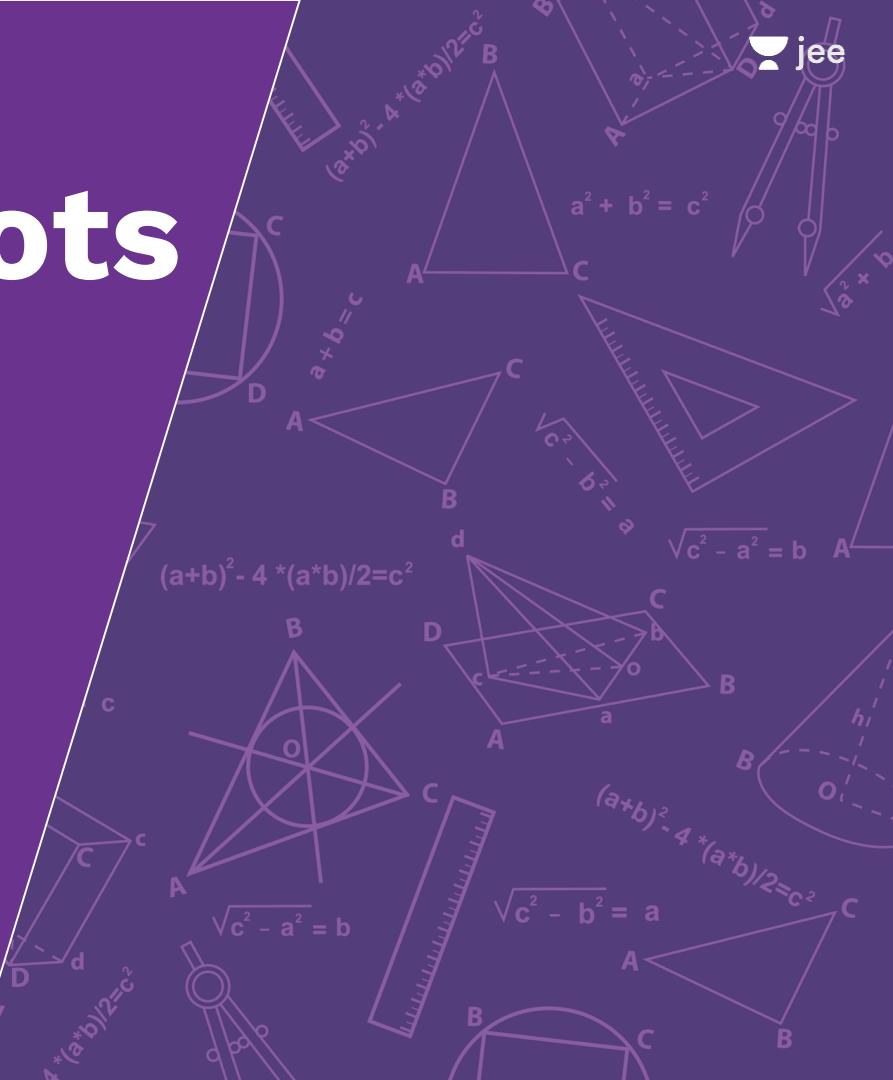
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LET'S BEGIN!!



Location of Roots

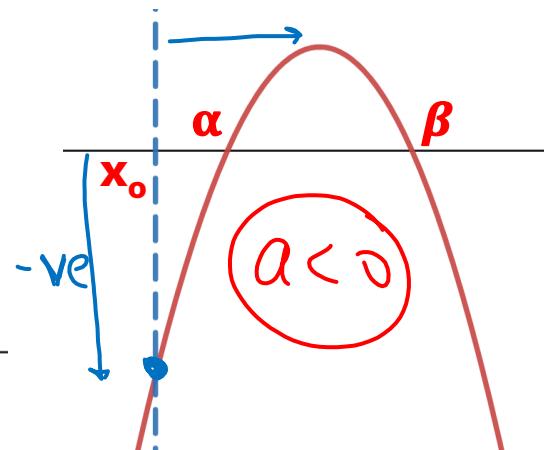
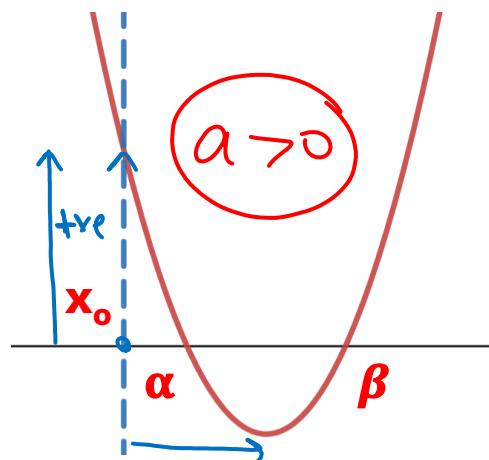


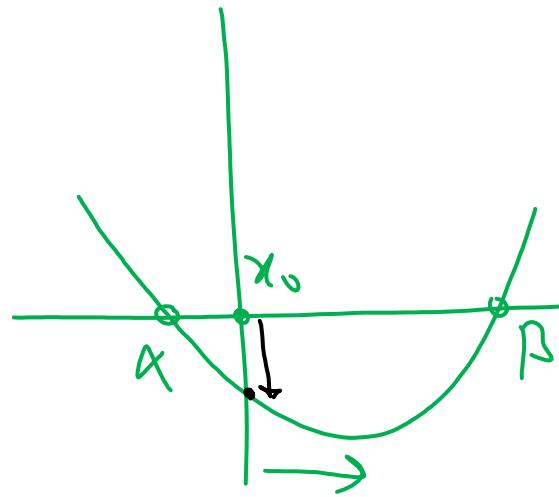
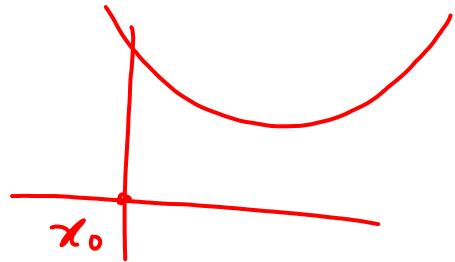
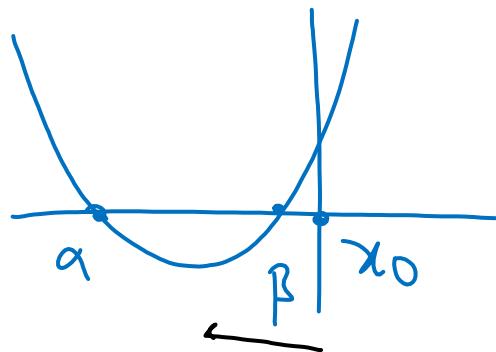
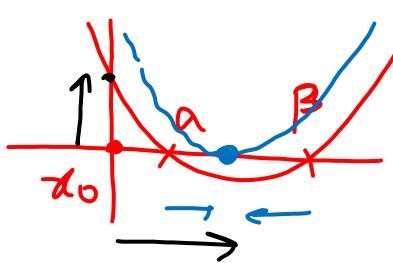


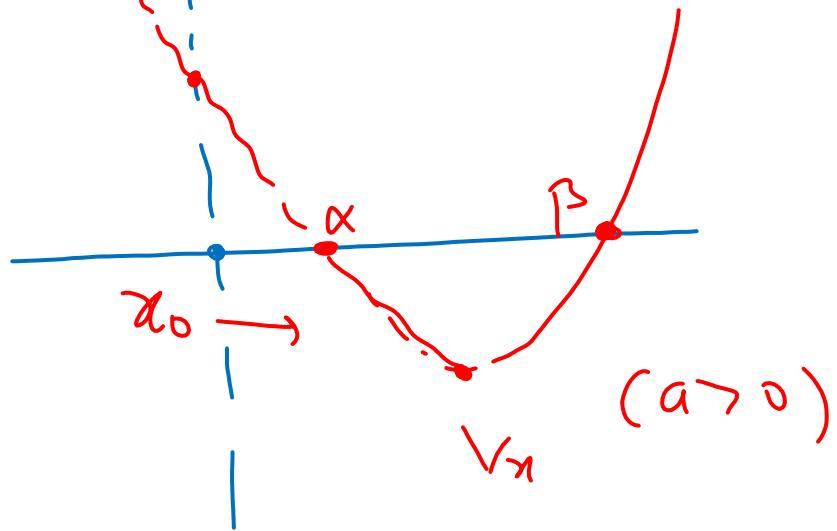
1. Both the roots are greater than x_0 :

$$f(x) = ax^2 + bx + c$$

- ① $D \geq 0$
- ② $\sqrt{\Delta} > x_0$
- ③ $a \cdot f(x_0) > 0$





$D > 0$ 

The smallest integral value of k , for which both the roots of the equation $x^2 - 8kx + 16(k^2 - k + 1) = 0$ are real, distinct and have values **at least 4**, is

$$\boxed{D > 0}$$

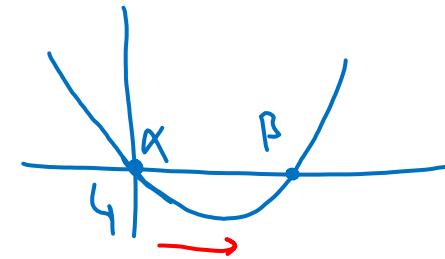
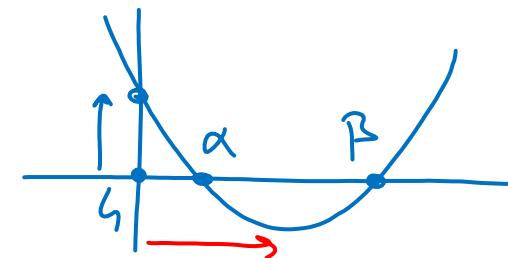
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① $\boxed{D > 0}$

$$\cancel{64k^2 - \cancel{4}(16)(k^2 - k + 1) > 0}$$

$$\cancel{k^2 - k^2} + k - 1 > 0$$

$$\boxed{k > 1} - ①$$



$$\textcircled{2} \quad \boxed{V_x > 4}$$

$$\frac{-(-8K)}{2(1)} > 4$$

$$\boxed{K > 1} - \textcircled{2}$$

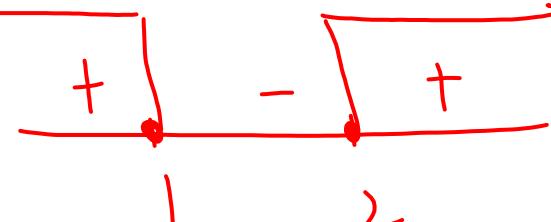
$$\textcircled{3} \quad \boxed{a \cdot f(4) \geq 0}$$

$$1 \left(\cancel{1} - \cancel{3}^2 K + \cancel{1}^6 (K^2 - K + 1) \right) \geq 0$$

$$1 - 2K + K^2 - K + 1 \geq 0$$

$$K^2 - 3K + 2 \geq 0$$

$$(K-1)(K-2) \geq 0$$



$$\textcircled{1} \cap \textcircled{2} \cap \textcircled{3}$$

$$\Rightarrow K \in [2, \infty)$$

smallest integral

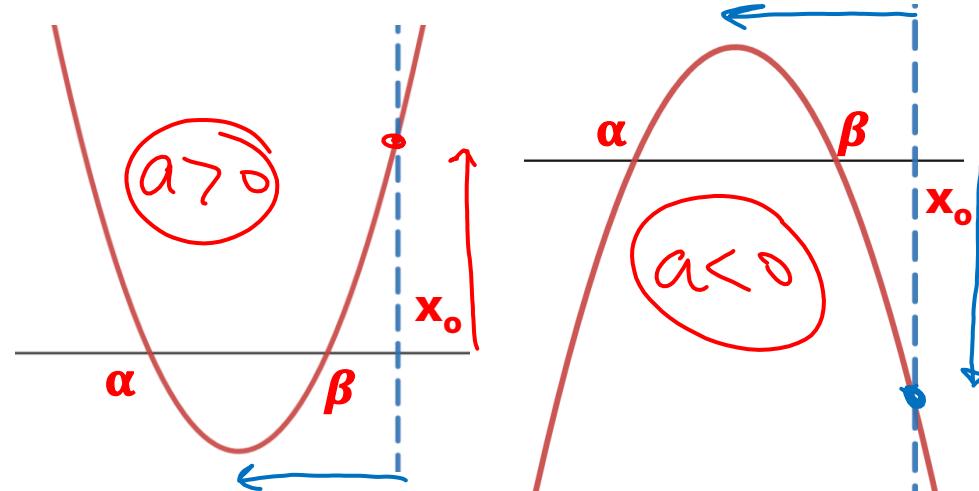
value is $\textcircled{2}$

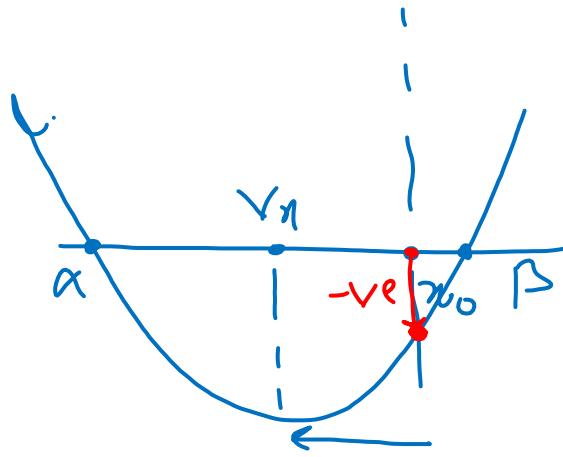


2. Both the roots are less than x_0 :

$$f(x) = ax^2 + bx + c$$

- ① $D \geq 0$
- ② $\sqrt{\Delta} < x_0$
- ③ $a \cdot f(x_0) > 0$







If the roots of the equation $x^2 - 2ax + a^2 + a - 3 = 0$ are real and less than 3, then :

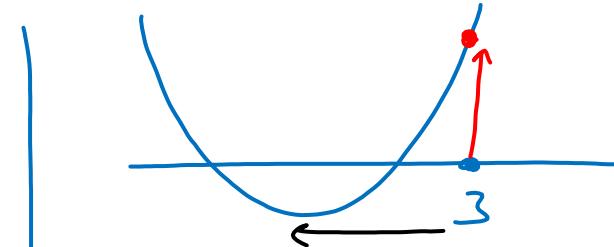
- A. $a < 2$
- B. $2 < a < 3$
- C. $3 \leq a \leq 4$ \times
- D. $a > 4$ \times

① $D \geq 0$

$$4a^2 - 4(1)(a^2 + a - 3) \geq 0$$

$$4a^2 - 4a^2 - 4a + 12 \geq 0$$

$a \leq 3$



② $V_x < 3$

$$-\frac{(-2a)}{x(1)} < 3$$

$a < 3$

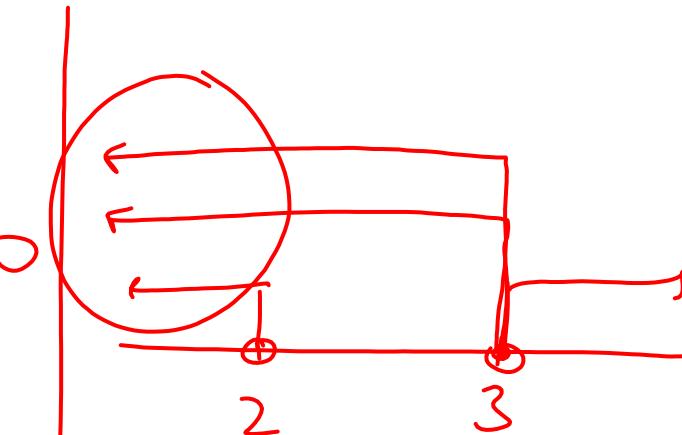
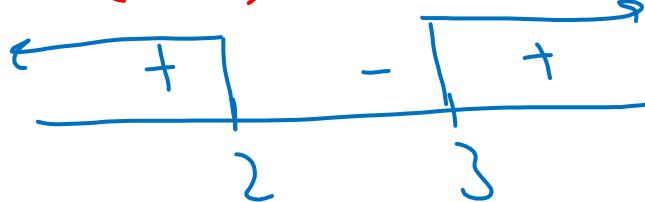
(3)

$$(1) f(3) > 0$$

$$9 - 6a + a^2 + a - 3 > 0$$

$$a^2 - 5a + 6 > 0$$

$$(a-2)(a-3) > 0$$



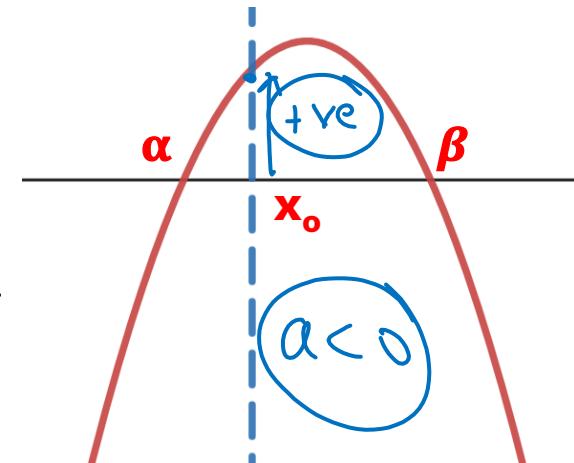
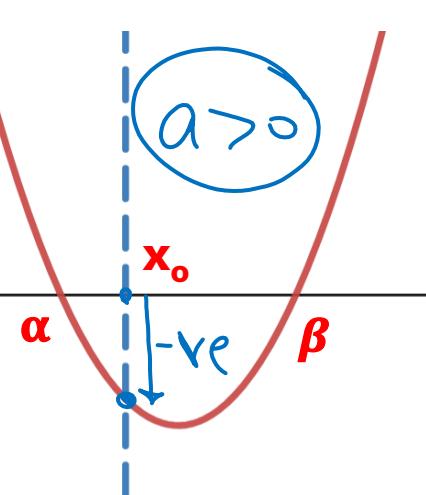
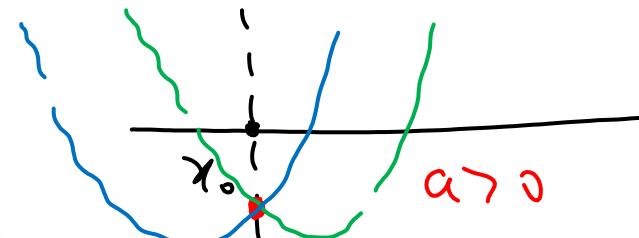
$$\boxed{a < 2}$$



3. One root less than and other greater than x_0 :

$$f(x) = ax^2 + bx + c$$

$$a \cdot f(x_0) < 0$$



The values of a , for which the quadratic equation

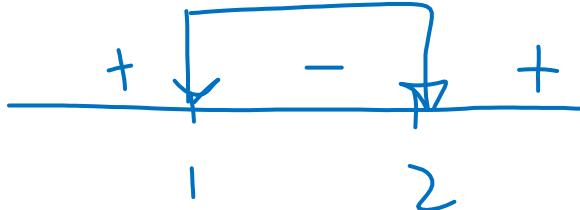
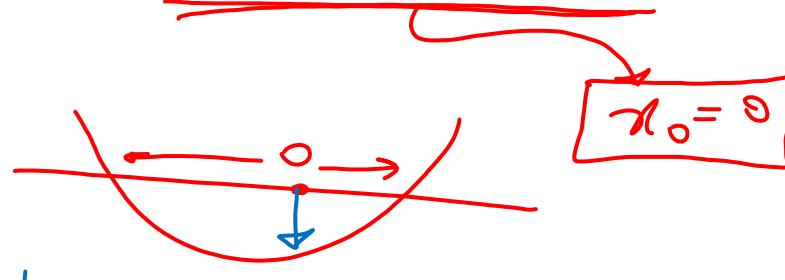
$3x^2 + 2(a^2 + 1)x + (a^2 - 3a + 2) = 0$ possesses roots of opposite signs are:

- A. $1 < a < 2$
- B. $a \in (2, \infty)$
- C. $1 < a < 3$
- D. None of these

$$3(f^{\circ}) < 0$$

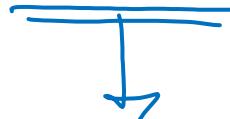
$$a^2 - 3a + 2 < 0$$

$$(a-1)(a-2) < 0$$



The values of a for which the equation $2x^2 - 2(2a+1)x + a(a-1) = 0$ has roots α and β satisfying the condition $\alpha < a < \beta$, are :

- A. $(-3, 0)$
- B. $(0, \infty)$
- C. $(-\infty, -3) \cup (0, \infty)$
- D. None of these



$$\boxed{\alpha < a < \beta}$$



$$\boxed{\alpha_0 = a}$$

$$\boxed{(2) f(a) < 0}$$

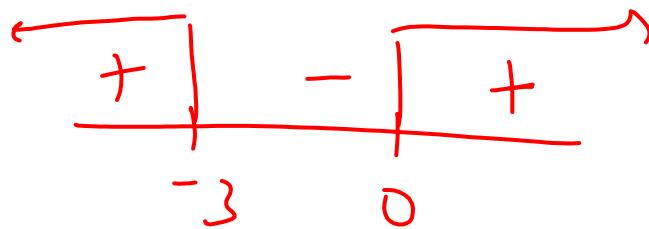
$$2a^2 - 2(2a+1)a + a(a-1) < 0$$

$$2a^2 - 4a^2 - 2a + a^2 - a < 0$$

$$-a^2 - 3a < 0$$

$$a^2 + 3a > 0$$

$$a(a+3) > 0$$



$$(-\infty, -3) \cup (0, \infty)$$



4. Both root between x_1 and x_2 :

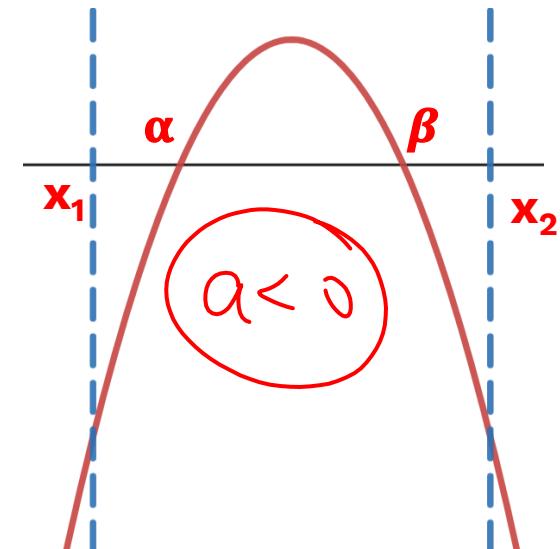
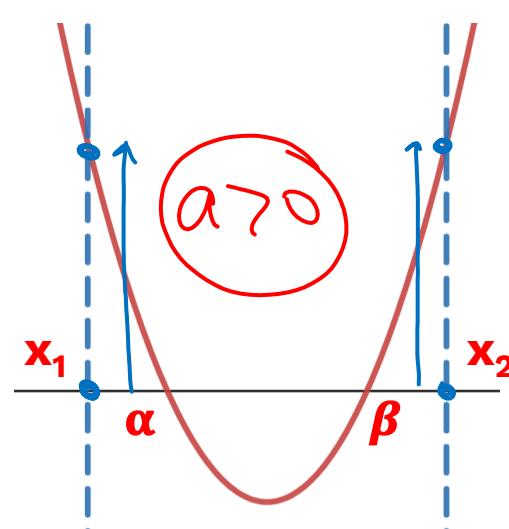
$$f(x) = ax^2 + bx + c$$

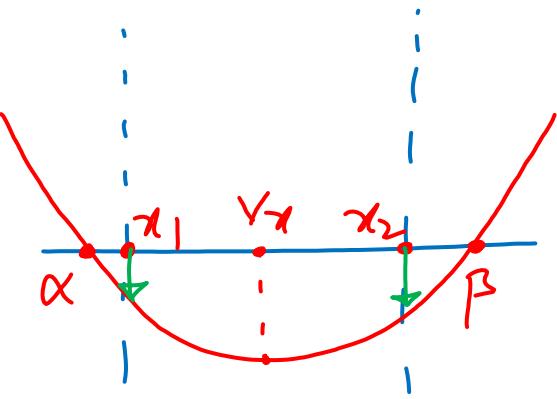
① $D > 0$

② $x_1 < \sqrt{x} < x_2$

③ $a \cdot f(x_1) > 0$

④ $a \cdot f(x_2) > 0$





$$f(x_1) f(x_2) > 0$$

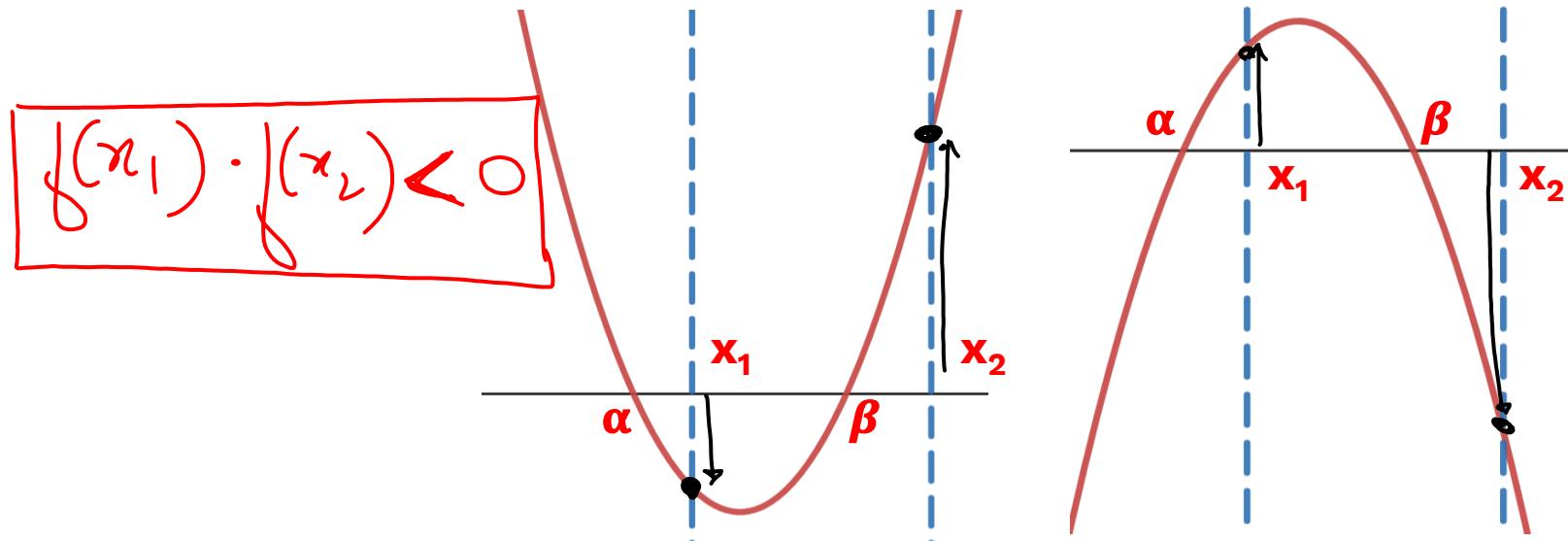
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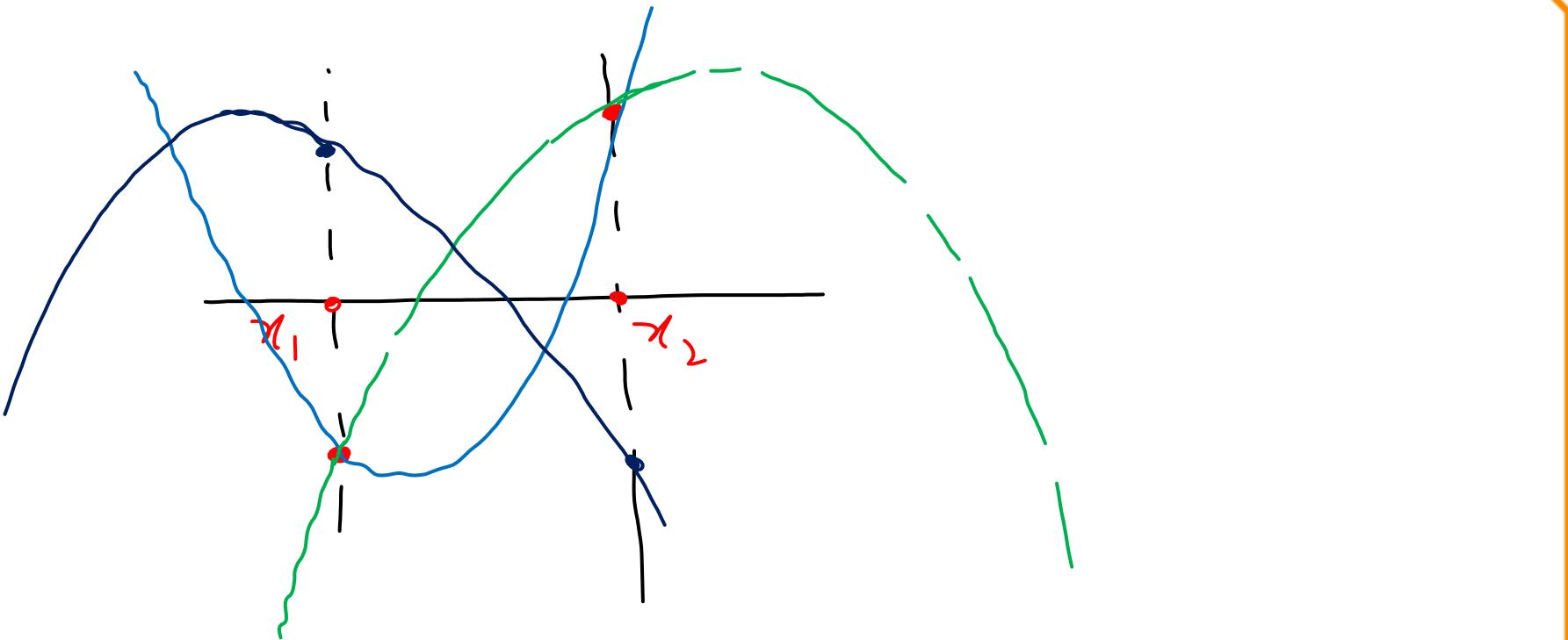




5. Exactly one root between x_1 and x_2 :

$$f(x) = ax^2 + bx + c$$





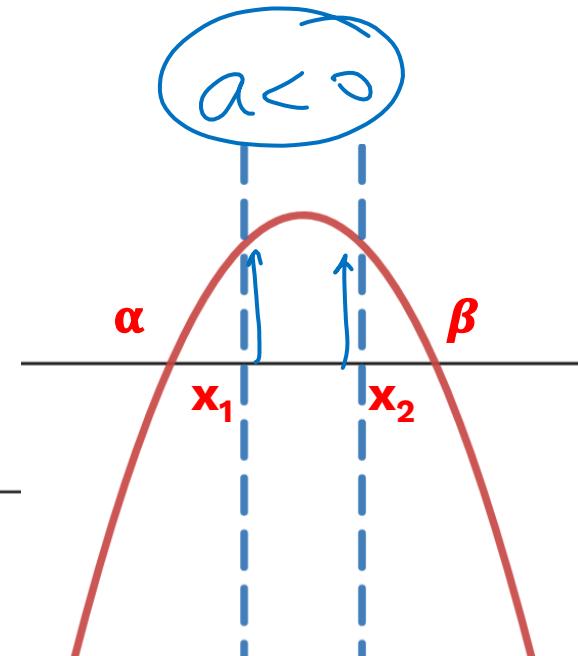
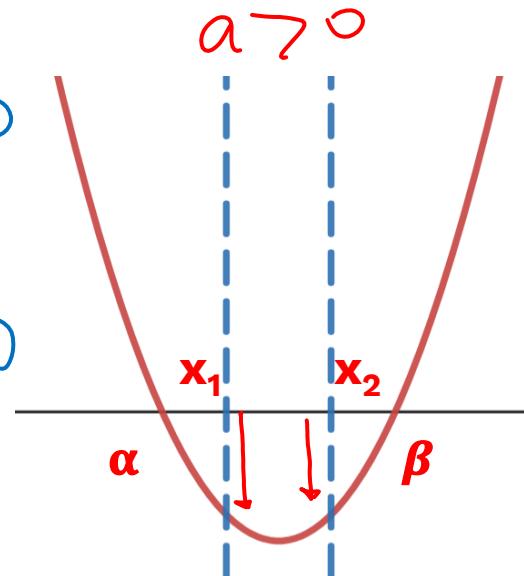


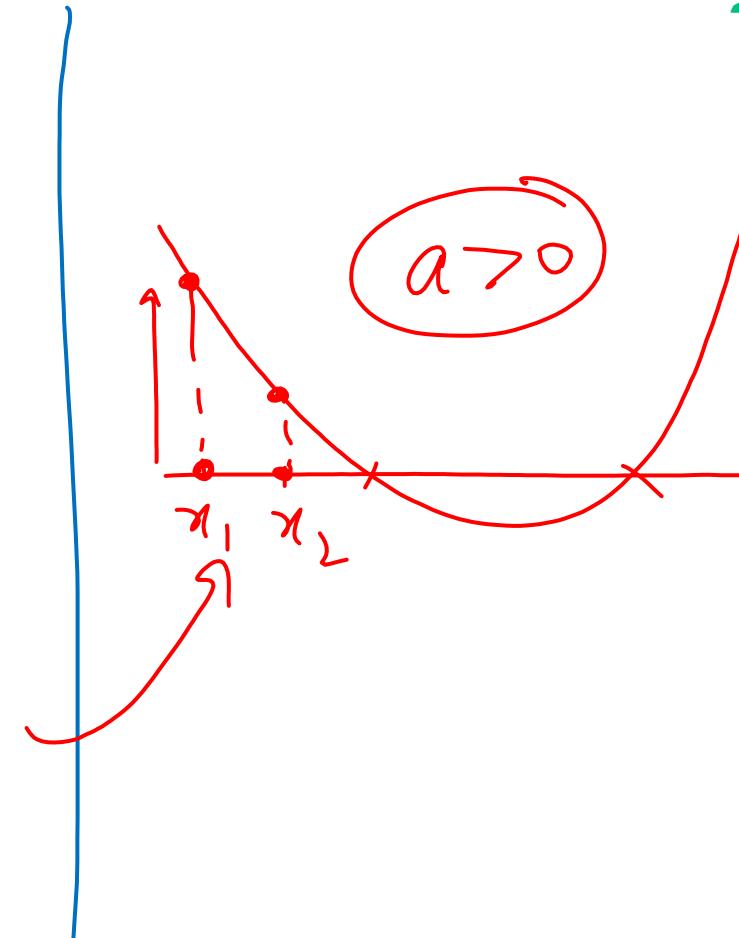
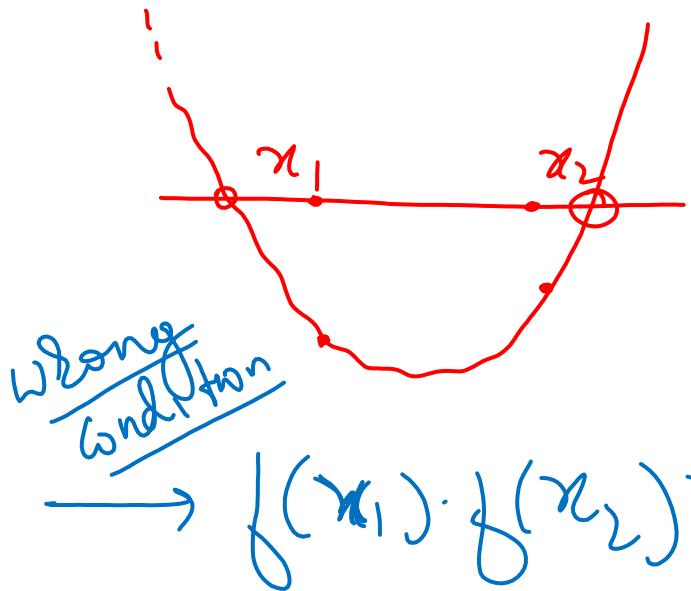
6. Both roots outside x_1 and x_2 :

$$f(x) = ax^2 + bx + c$$

$$\textcircled{1} \quad a \cdot f(x_1) < 0$$

$$\textcircled{2} \quad a \cdot f(x_2) < 0$$







All the values of m for which both roots of the equation $x^2 - 2mx + m^2 - 1 = 0$ are greater than -2 but less than 4 , lie in the interval

- A. $-2 < m < 0$
- B. $m > 3$
- C. $-1 < m < 3$
- D. $1 < m < 4$

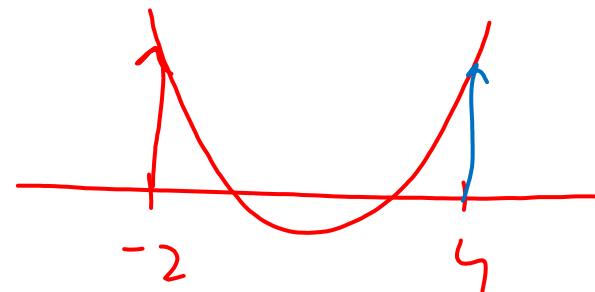
① $D \geq 0$

$$4m^2 - 4(m^2 - 1) \geq 0$$

$$m^2 - m^2 + 1 \geq 0$$

$$1 \geq 0$$

$$\Rightarrow m \in \mathbb{R}$$



② $-2 < \frac{-(-2m)}{2(1)} < 4$

$$-2 < m < 4$$

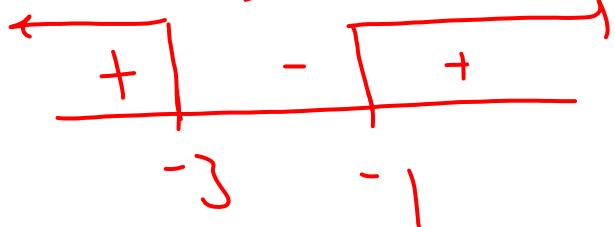
(3)

$$(1) f(-2) > 0$$

$$4 + 4m + m^2 - 1 > 0$$

$$m^2 + 4m + 3 > 0$$

$$(m+3)(m+1) > 0$$



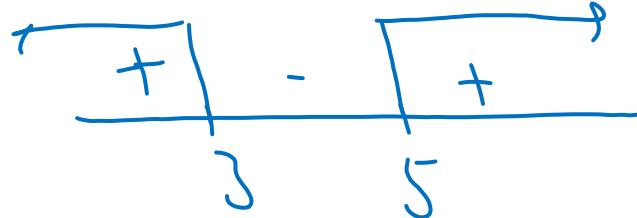
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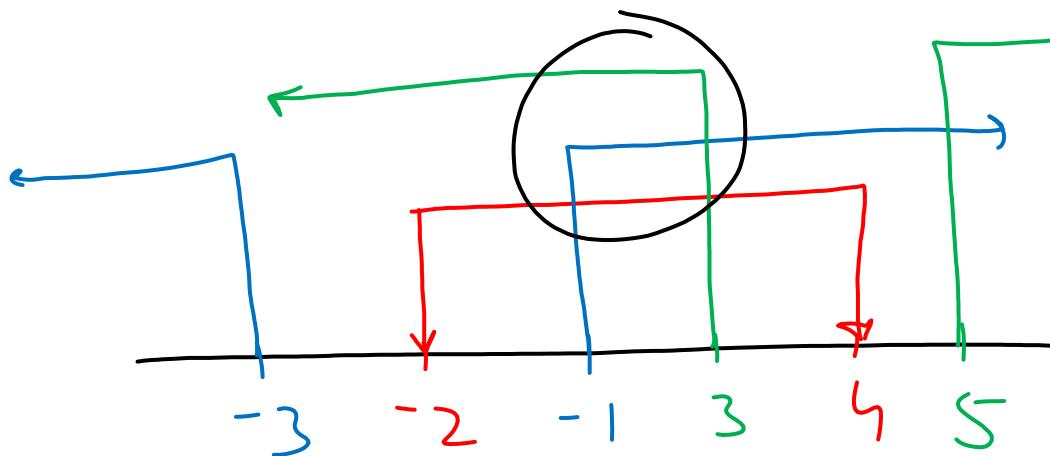
$$(1) f(4) > 0$$

$$16 - 8m + m^2 - 1 > 0$$

$$m^2 - 8m + 15 > 0$$

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





$$M-2=0$$

$$(x-m)^2 - 1^2 = 0$$

$$(x-m+1)$$

$$(x-m-1) = 0$$

$$\begin{cases} x = m-1 \\ x = m+1 \end{cases}$$

$$-1 < M < 3$$

$$-2 \quad M-1 \quad M+1 \quad 5$$

Homework

Question L-6





Show that the expression $\frac{mx^2 + 3x - 4}{m + 3x - 4x^2}$ will be capable of all values

when x is real, provided that m has any value between 1 and 7.

$y \in \mathbb{R}$

$$y = \frac{mx^2 + 3x - 4}{m + 3x - 4x^2}$$

$$my + 3yx - 4y x^2$$

$$= mx^2 + 3x - 4$$

$$(m+4y)x^2 + (3-3y)x - (4+my) = 0$$

$x \in \mathbb{R}, D \geq 0$

$$(3-3y)^2 + 4(m+4y)(4+my) \geq 0$$

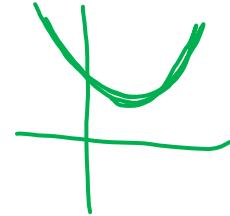
$$(9 + 9j^2 - 18j) + 4(4m + m^2j + 16j + 4mj^2) \geq 0$$

$$\Rightarrow (9 + 16m)j^2 + (-18 + 4m^2 + 64)j + (9 + 16m) \geq 0$$

Now; $j \in \mathbb{R} \Rightarrow D \leq 0 \quad \& \quad (9 + 16m) > 0$

$$(4m^2 + 46)^2 - 4(9 + 16m)(9 + 16m) \leq 0$$

$$\Rightarrow (2m^2 + 23)^2 - (9 + 16m)^2 \leq 0$$

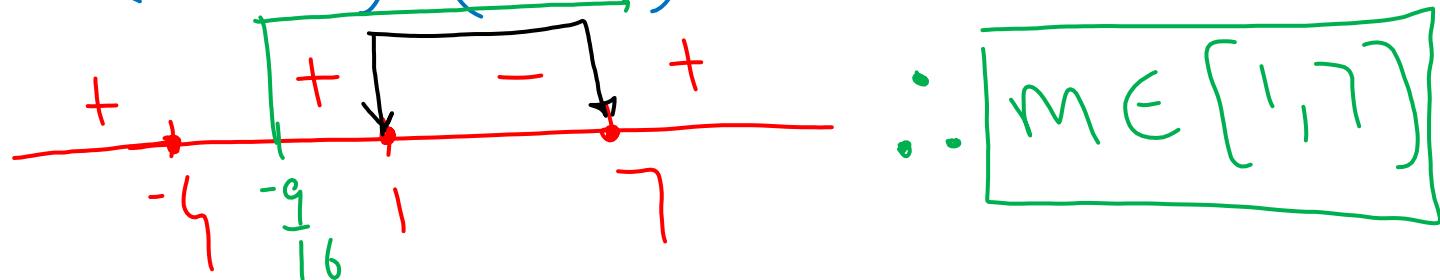


$$\Rightarrow (2m^2 + 23 + 9 + 16m)(2m^2 + 23 - 9 - 16m) \leq 0$$

$$\Rightarrow (2m^2 + 16m + 32)(2m^2 - 16m + 14) \leq 0$$

$$\Rightarrow 4(m^2 + 8m + 16)(m^2 - 8m + 7) \leq 0$$

$$\Rightarrow 4(m+4)^2(m-1)(m-7) \leq 0$$





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Namo Sir | Physics

6:00 - 7:30 PM



Ashwani Sir | Chemistry

7:30 - 9:00 PM



Sameer Sir | Maths

9:00 - 10:30 PM

12th



Jayant Sir | Physics

1:30 - 3:00 PM



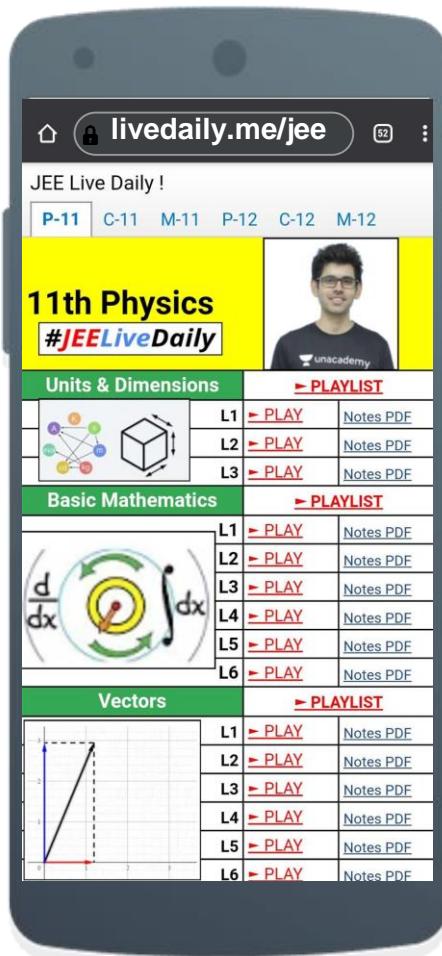
Anupam Sir | Chemistry

3:00 - 4:30 PM



Nishant Sir | Maths

4:30 - 6:00 PM

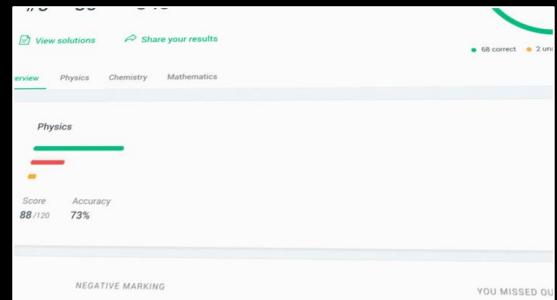


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The screenshot shows a physics class interface. At the top left is a question about a shell being fired from point O at 60 degrees with a speed of 40 m/s. At the top right is a video feed of a teacher explaining self-inductance. Below the video is a poll with options: 'Self-induced emf' (selected), 'Mutual induced emf', and 'None'. A handwritten note on the right shows a rectangular loop with a current arrow and the formula $P_{\text{ext}} = 4$.

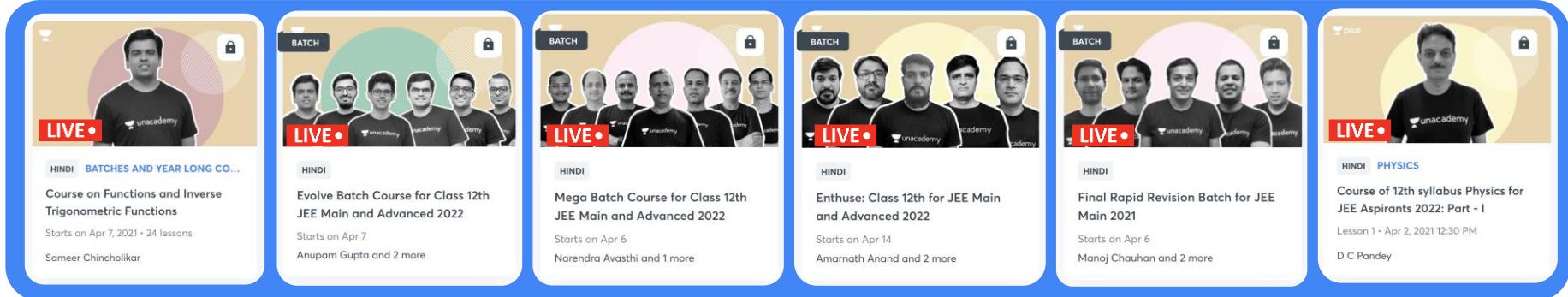
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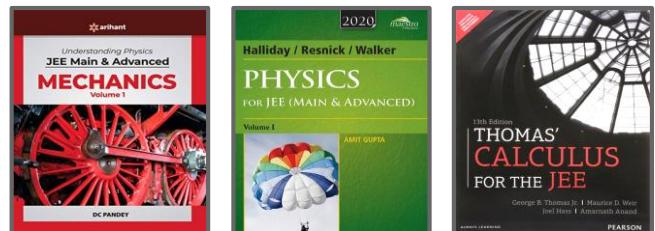
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Course	Language	Start Date	Instructor(s)
Course on Functions and Inverse Trigonometric Functions	HINDI	Apr 7, 2021	Sameer Chinchalkar
Evolve Batch Course for Class 12th JEE Main and Advanced 2022	HINDI	Apr 7	Anupam Gupta and 2 more
Mega Batch Course for Class 12th JEE Main and Advanced 2022	HINDI	Apr 6	Narendra Avasthi and 1 more
Enthuse: Class 12th for JEE Main and Advanced 2022	HINDI	Apr 14	Amarnath Anand and 2 more
Final Rapid Revision Batch for JEE Main 2021	HINDI	Apr 6	Manoj Chauhan and 2 more
Course of 12th syllabus Physics for JEE Aspirants 2022: Part - I	HINDI PHYSICS	Apr 2, 2021	D C Pandey

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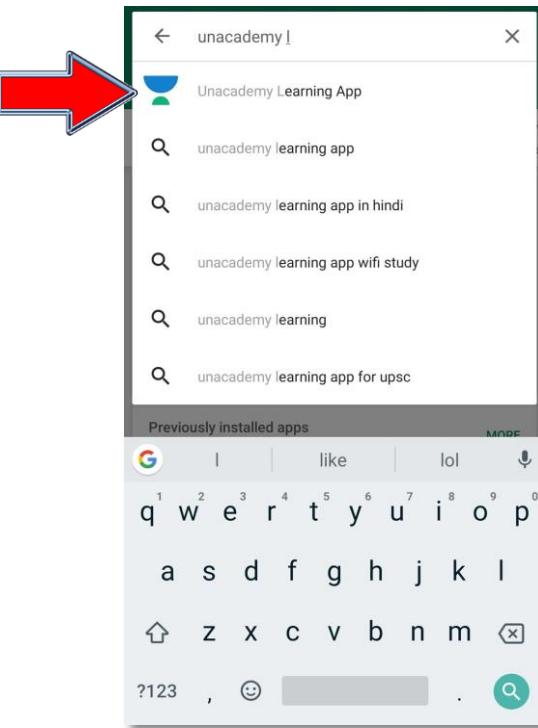


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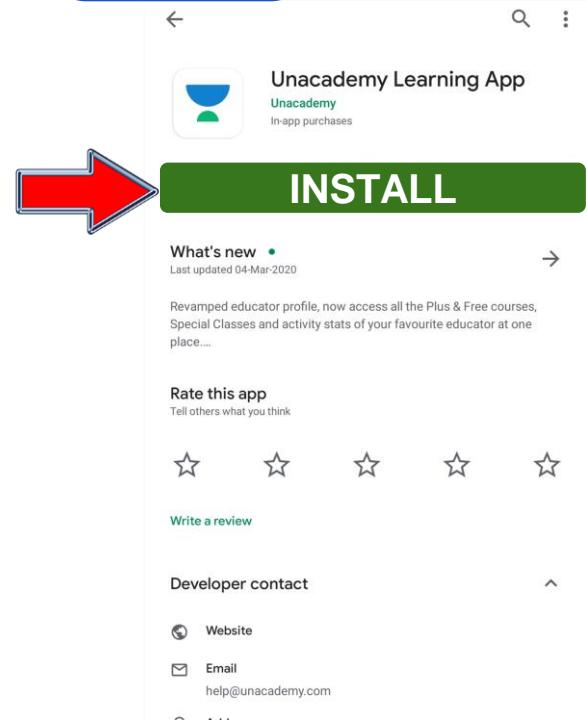


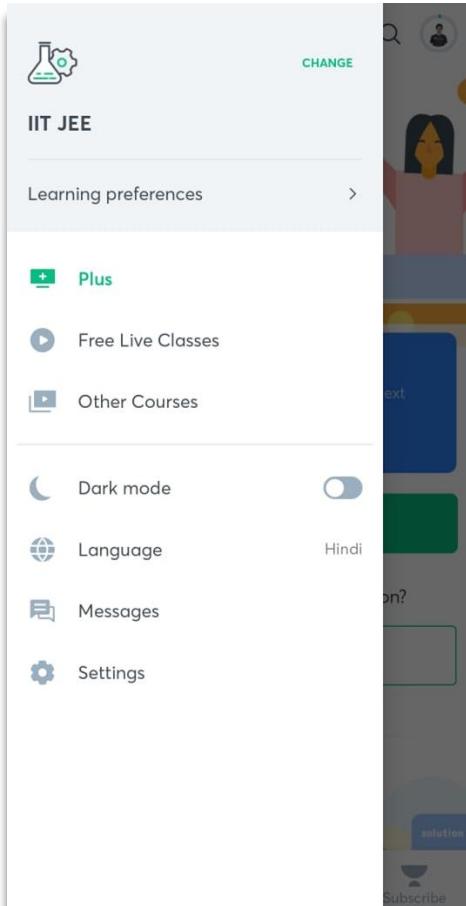
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