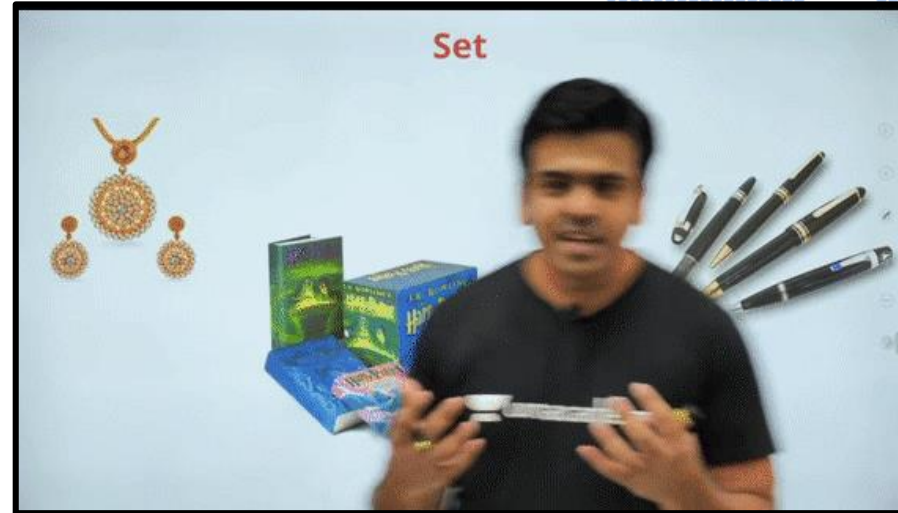
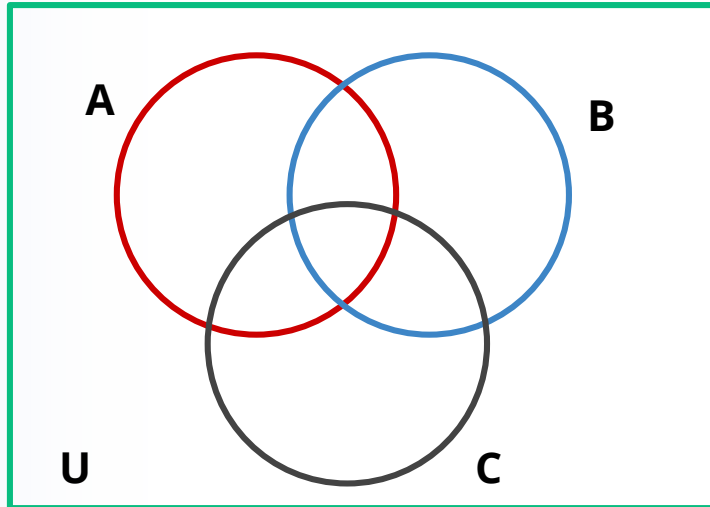


Laws of Sets

Sets

3



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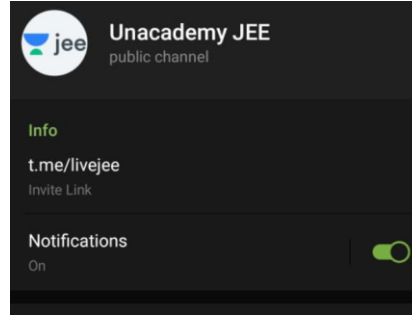
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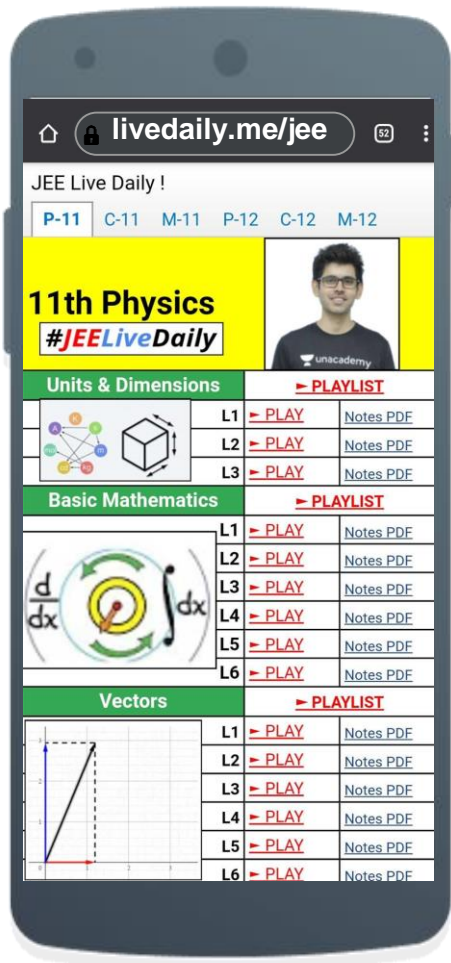
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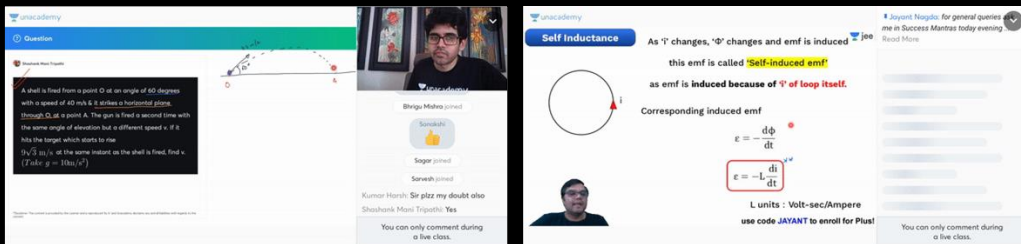
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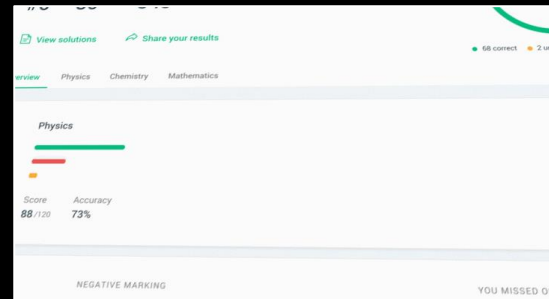
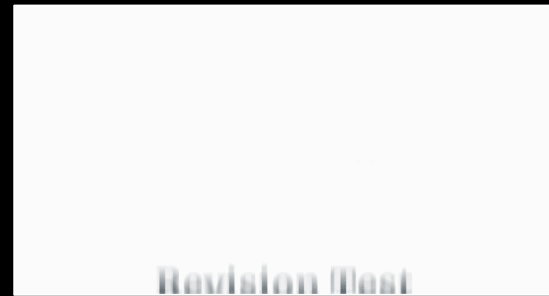


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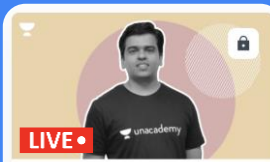


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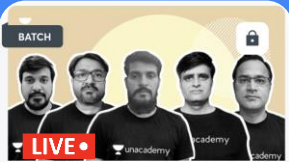
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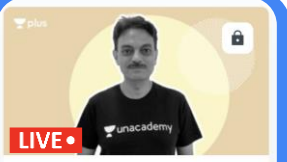
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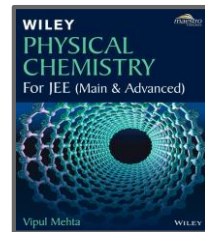
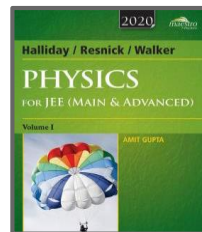
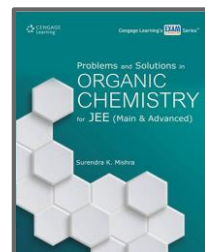
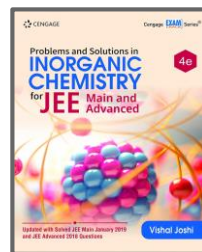
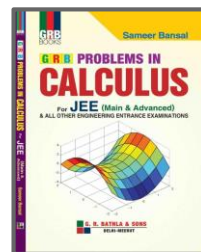
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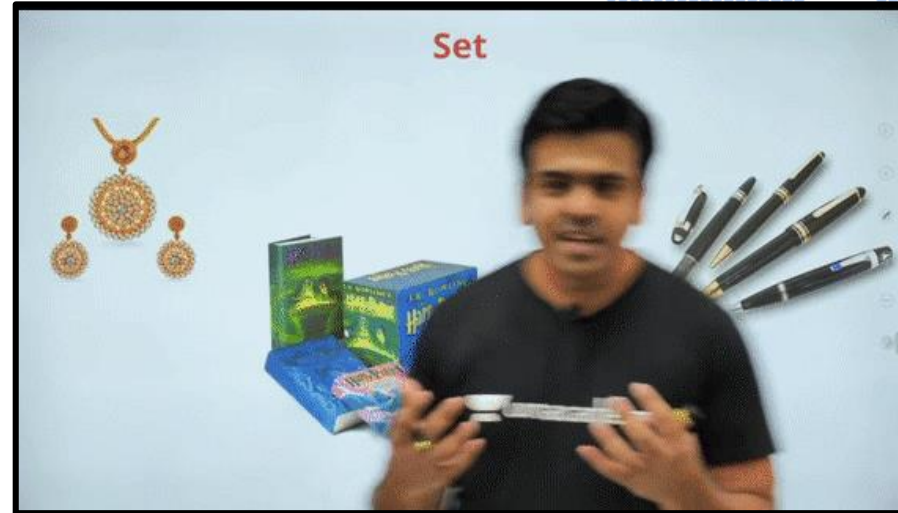
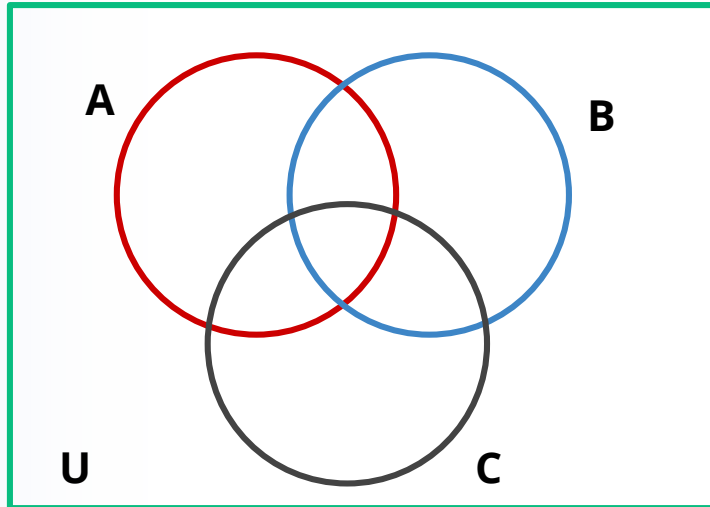
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Laws of Sets

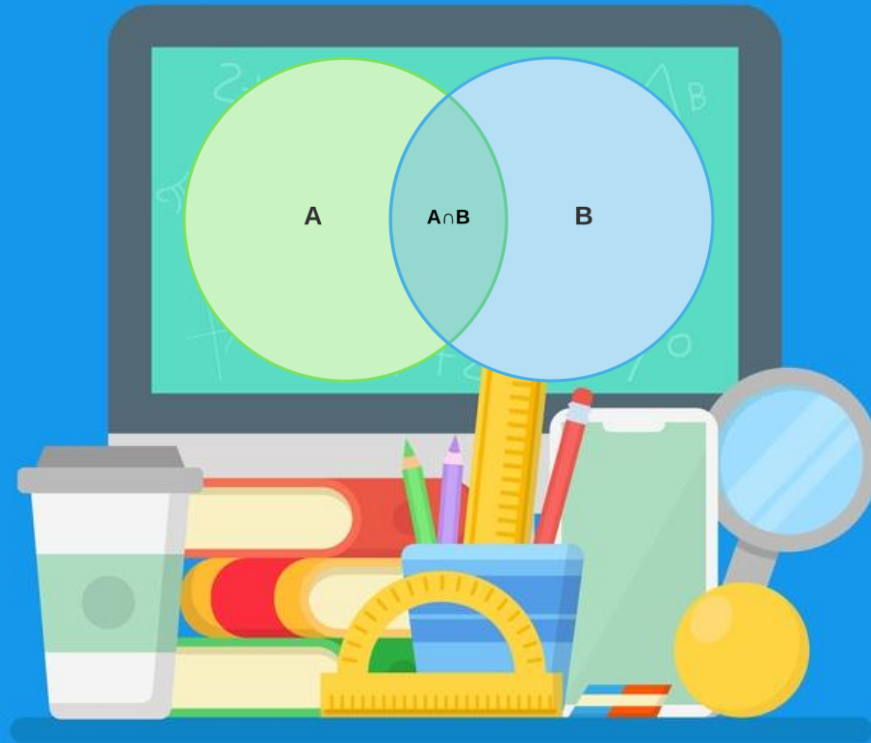
Sets

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LET'S BEGIN!!

Laws of Algebra of Sets (Properties of Sets)

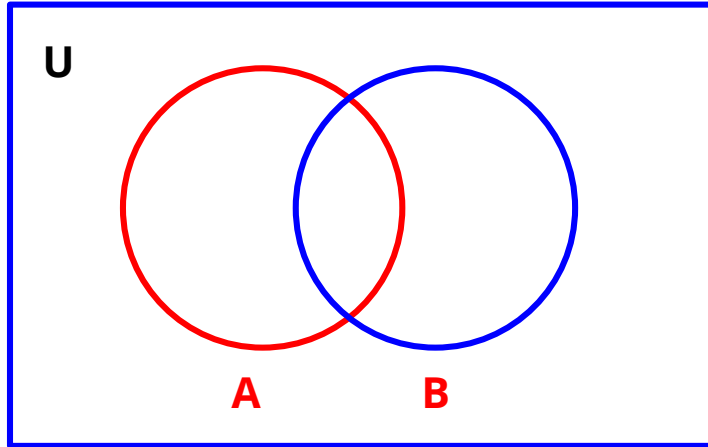




Laws of Algebra of Sets (Properties of Sets)

1

Commutative law : $A \cup B = B \cup A$;
 $A \cap B = B \cap A$

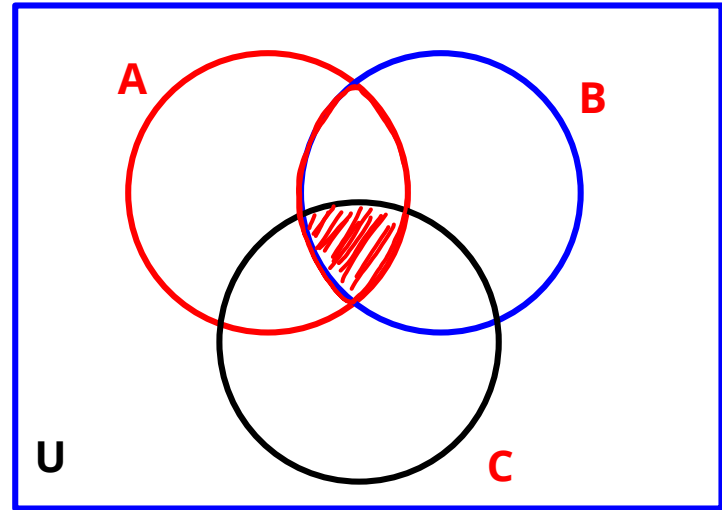
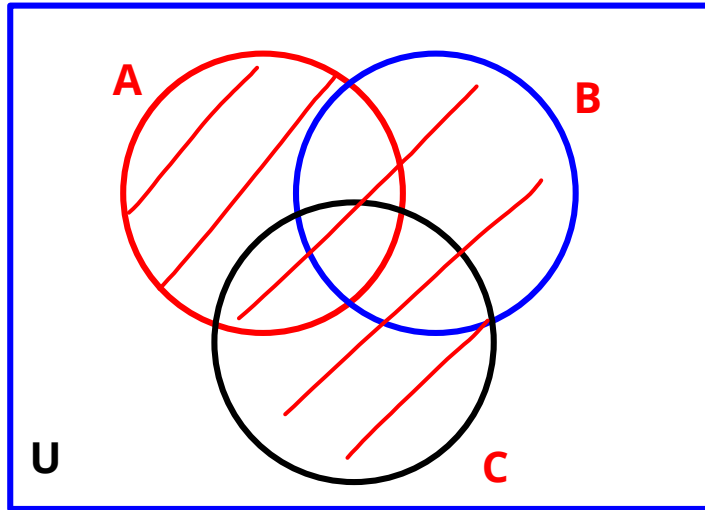




Laws of Algebra of Sets (Properties of Sets)

2

Associative law : $(A \cup B) \cup C = A \cup (B \cup C)$;
 $(A \cap B) \cap C = A \cap (B \cap C)$





$$2 \times (3 + 5) = 2 \times 3 + 2 \times 5$$

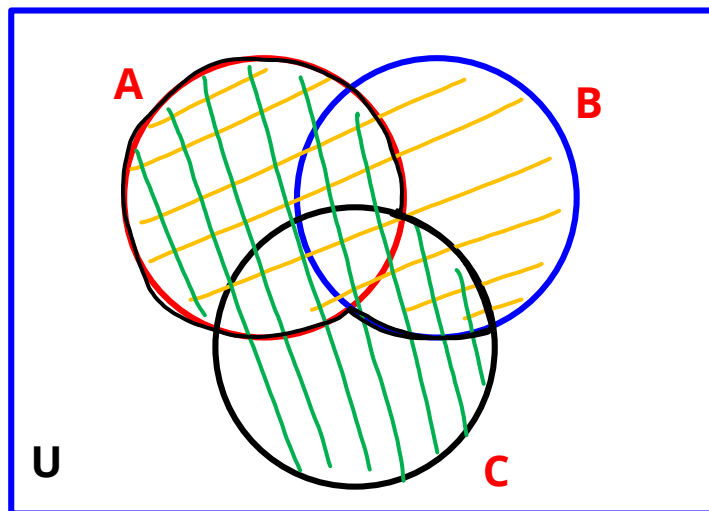
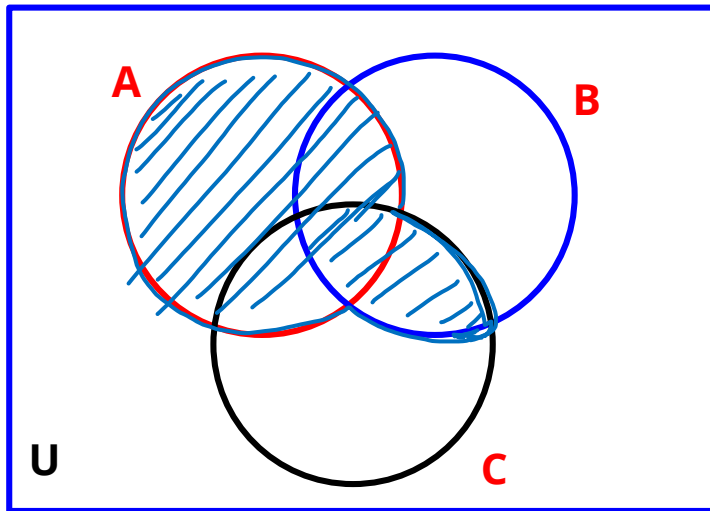
Laws of Algebra of Sets (Properties of Sets)

3

Distributive law : $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$;



$$A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$$

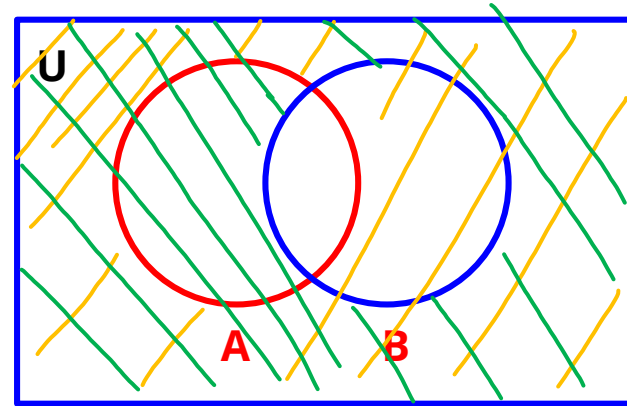
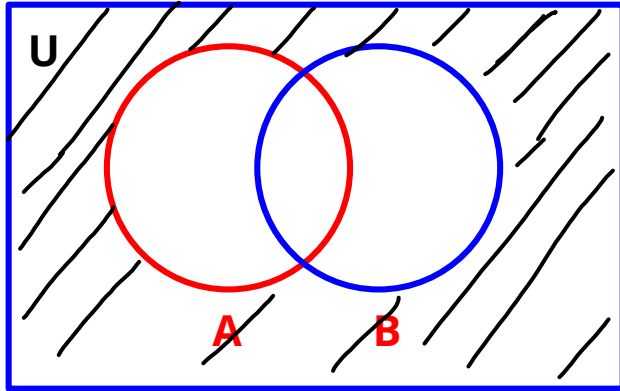




Laws of Algebra of Sets (Properties of Sets)

4

De-morgan law : $(A \cup B)' = A' \cap B'$
* $(A \cap B)' = A' \cup B'$





Laws of Algebra of Sets (Properties of Sets)

5

Identity law : $A \cap U = A$;
 $A \cup \phi = A$



Laws of Algebra of Sets (Properties of Sets)

6

Complement law: $A \cup A' = U$, ✓

$$A \cap A' = \phi,$$

$$(A')' = A$$



Laws of Algebra of Sets (Properties of Sets)

7

Idempotent law: $A \cap A = A$,
 $A \cup A = A$



Example

If X and Y are two sets and X' denotes the complement of X , then

$X \cap (X \cup Y)'$ equals

A. X

B. Y

☒ C. Φ

D. None of these

$$X \cap (X \cup Y)'$$

$$X \cap (X' \cap Y')$$

$$(X \cap X') \cap Y'$$

$$\Phi \cap Y'$$

$$\rightarrow \Phi$$

Example

If $A = \{1, 3, 5, 7, 9, 11, 13, 15, 17\}$, $B = \{2, 4, \dots, 18\}$ and N the set of natural numbers is the universal set, then $A' \cup ((A \cup B) \cap B')$ is

A. ϕ

B. N

C. A

D. B

$$A' \cup ((A \cup B) \cap B')$$

$$A' \cup ((A \cap B') \cup (B \cap B'))$$

\downarrow
 \emptyset

$$A' \cup (A \cap B')$$

$$\underline{(A' \cup A) \cap (A' \cup B')}$$



$$U \cap (A' \cup B')$$

$$A' \cup B'$$

$$(A \cap B)' \longrightarrow (\phi)' \longrightarrow U$$



Example

The set $(A \cap B')' \cup (B \cap C')$ is equal to

A. $A' \cup B \cup C$

☒ B. $A' \cup B$

C. $A' \cap C'$

C. $A' \cap B$

$$(A \cap B')' \cup (B \cap C')$$

$$(A' \cup B) \cup (B \cap C')$$

$$A' \cup B$$



Example

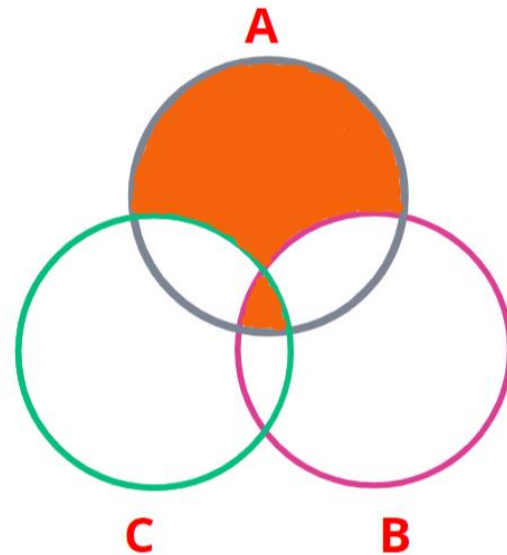
The shaded region in the given figure is

A. $A \cap (B \cup C)$ ✗

B. $A \cup (B \cap C)$

✓ C. $A - (B \Delta C)$

D. $A - (B \cup C)$



Example

Identify the incorrect statement :

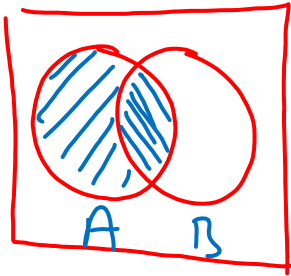
A. For all sets A and B, $(A - B) \cup (A \cap B) = A$ ✓

B. For all sets A, B and C, if $A \subset B$, then $A \cap C \subset B \cap C$ ✓

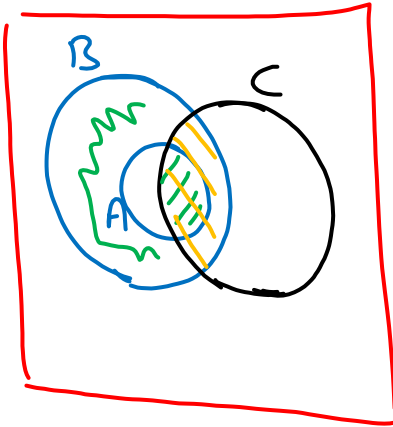
C. For all sets A, B and C, if $A \subset B$, then $A \cup C \subset B \cup C$ ✓

✓ **D.** For all sets A, B and C, $A - (B - C) = (A - B) - C$

(A)



(B)

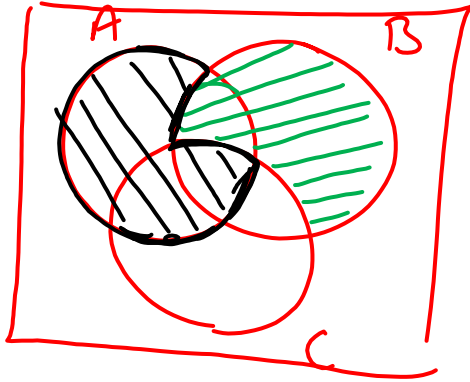


(C)

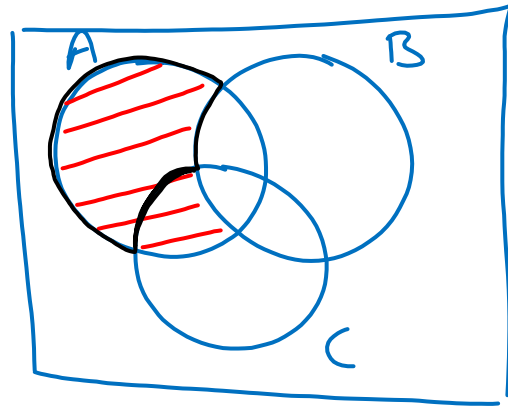


(D)

$$A - (B - C)$$



$$(A - B) - C$$





Example

The set $(A \cup B \cup C) \cap (A \cap B' \cap C')' \cap C'$ is equal to

A. $A \cap B$

B. $A \cap C'$

☒ C. $B \cap C'$

D. $B' \cap C'$

$$(A \cup B \cup C) \cap (A \cap B' \cap C')' \cap C'$$

$$(A \cup B \cup C) \cap (A' \cup B \cup C) \cap C'$$

$$(A \cap A') \cup (B \cup C) \cap C'$$

$$\underbrace{(A \cap A')}_{\rightarrow \emptyset} \cup (B \cup C) \cap C'$$

$$(B \cup C) \cap C'$$

$$(B \cap C') \cup \underbrace{(C \cap C')}$$

\downarrow
 \emptyset

$$\underbrace{\hspace{10em}} \downarrow$$

$$(B \cap C')$$

Example

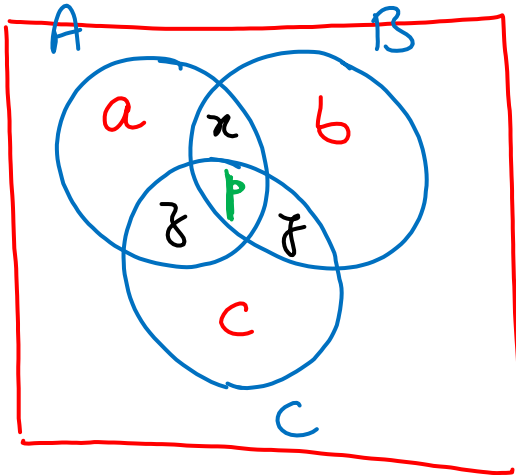
Let A, B and C be three sets and X be the set of all elements which belong to exactly two of the sets A, B and C, Then X is equal to

~~A.~~ $(A \cap B) \cup (B \cap C) \cup (C \cap A)$

B. $A \Delta (B \Delta C)$

C. $(A \cup B) \cap (B \cup C) \cap (C \cup A)$

✓ D. $(A \cup B \cup C) - [A \Delta (B \Delta C)]$



$$X = \{x, y, z\}$$

$$[A] = \{\underbrace{x, p}, \underbrace{y, p}, \underbrace{z, p}\}$$

$$\{x, y, z, p\}$$

$$\begin{aligned}
 [C] &= \left\{ \begin{aligned} &\{a, b, \underline{x, y, z, p}\} \\ &\{b, c, \underline{x, y, z, p}\} \\ &\{a, c, \underline{x, y, z, p}\} \end{aligned} \right\} \\
 &\quad \textcircled{1} \rightarrow \{x, y, z, p\}
 \end{aligned}$$

$$[B] = A \Delta (B \Delta C)$$

$$(B \Delta C) = \{ \textcircled{x, z}, b, c \}$$

$$(A) = \{ a, \textcircled{x, z}, p \}$$

$$A \Delta (B \Delta C) = \{ a, b, c, p \}$$

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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

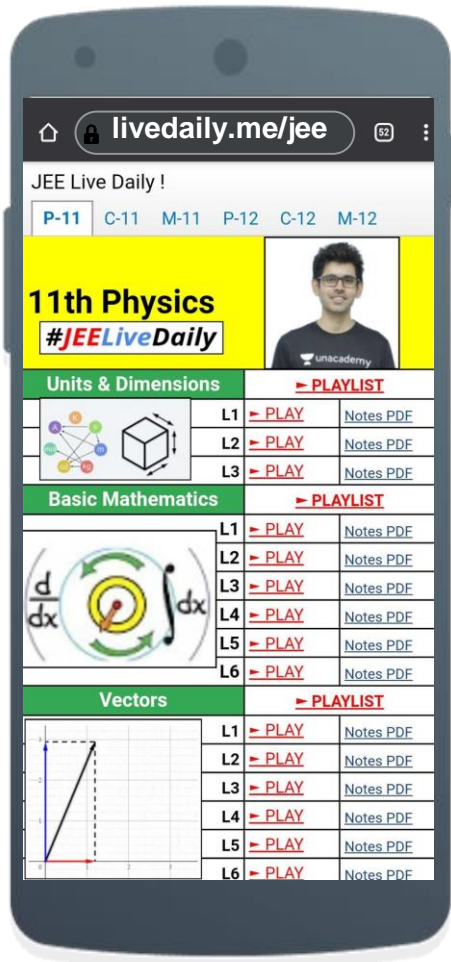
3:00 - 4:30 PM



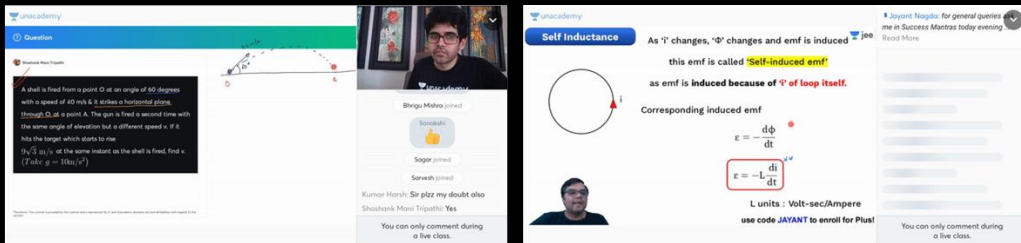
Nishant Sir | Maths

4:30 - 6:00 PM

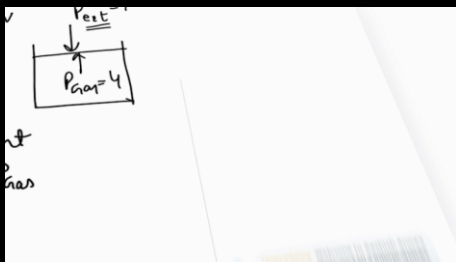
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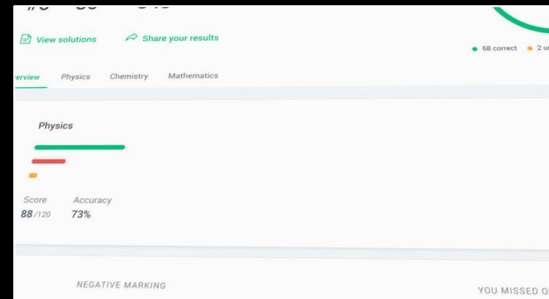
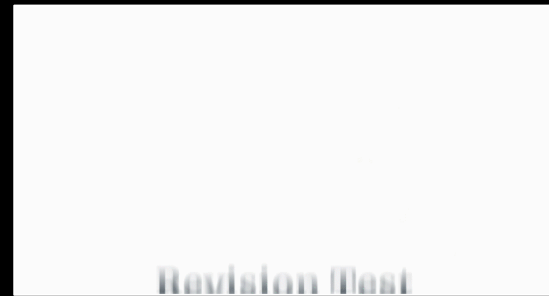


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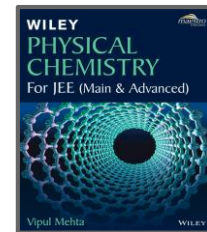
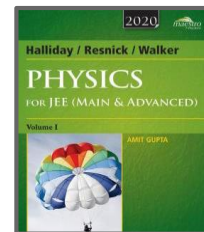
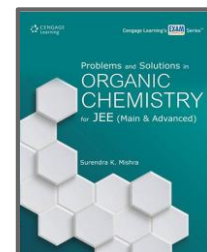
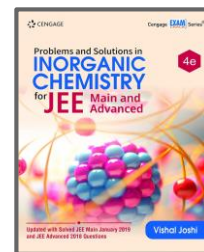
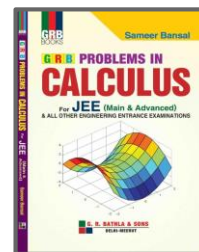
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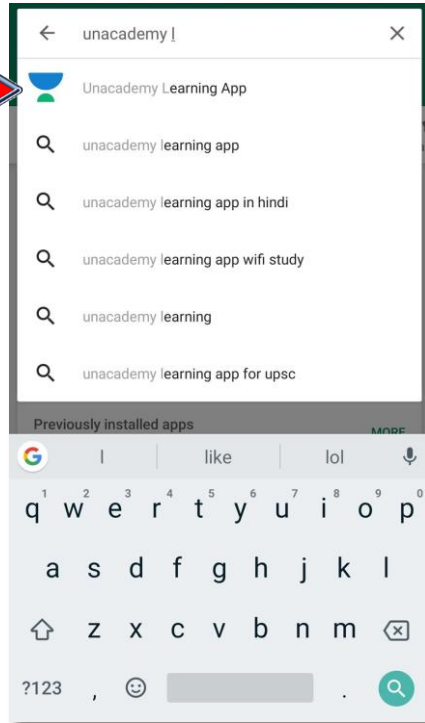
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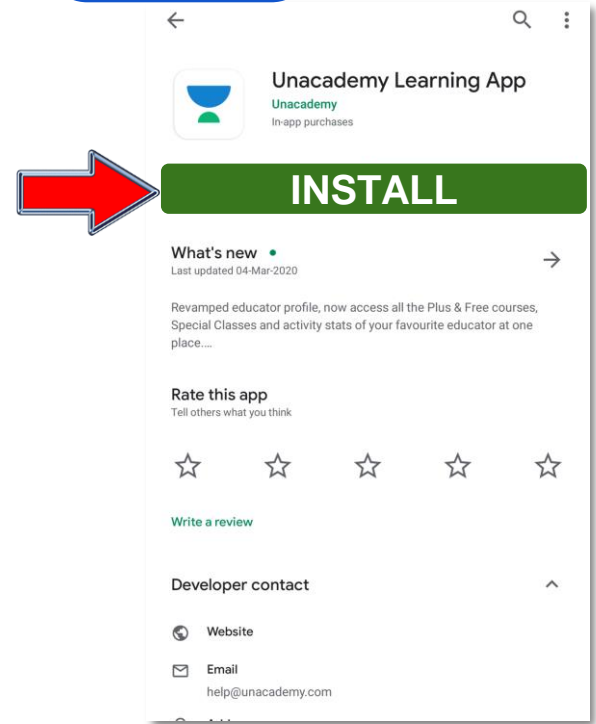
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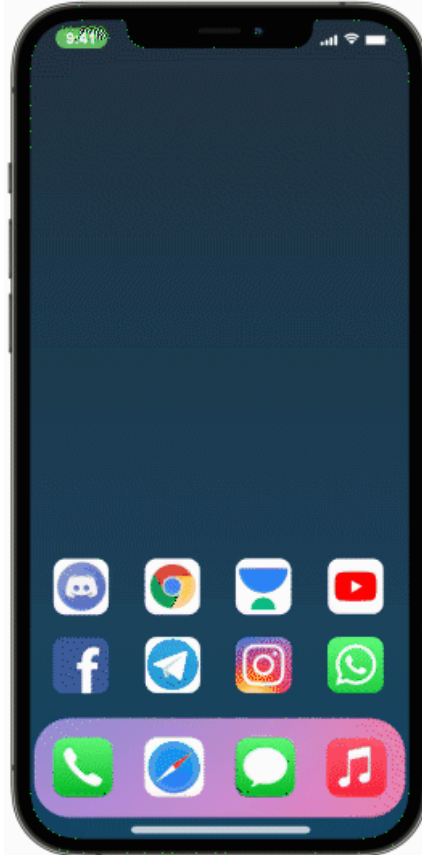
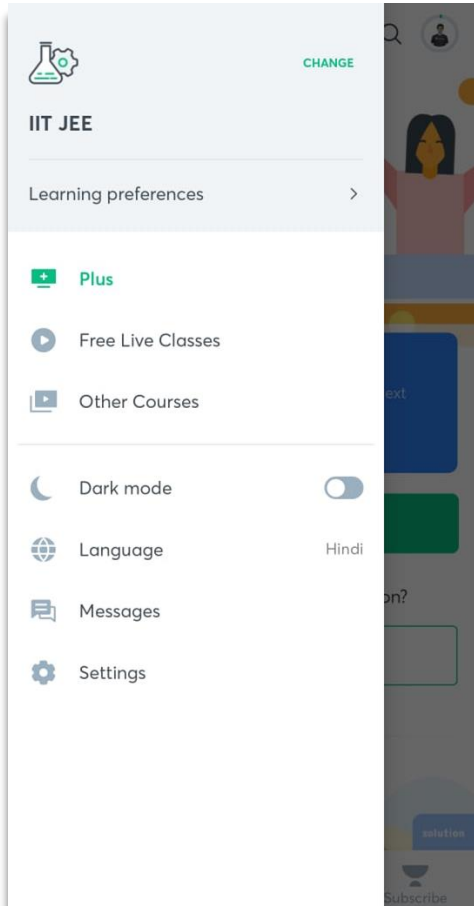


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