

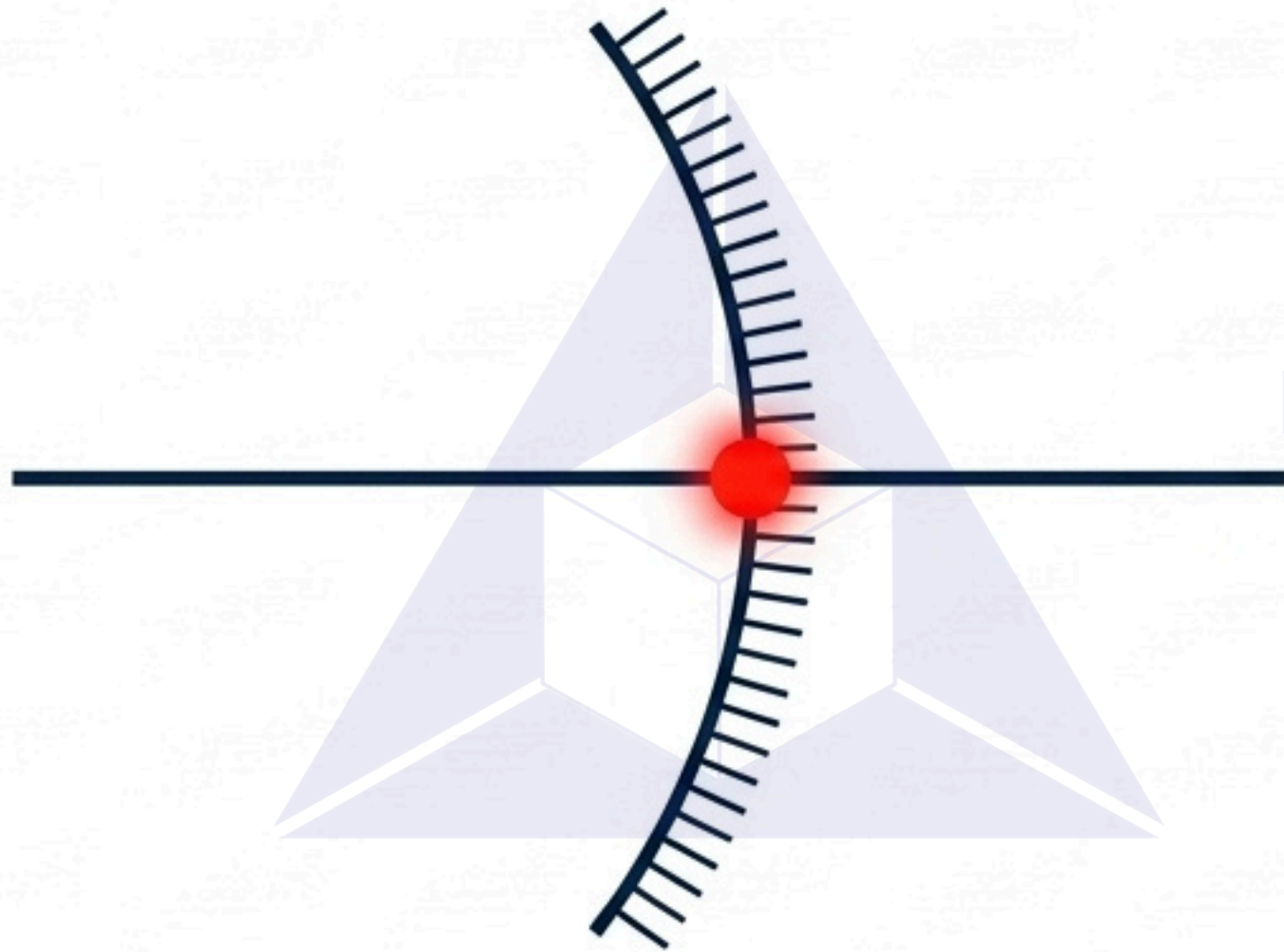
Cartesian Sign Convention in Ray Optics

The foolproof framework for JEE optical mechanics.

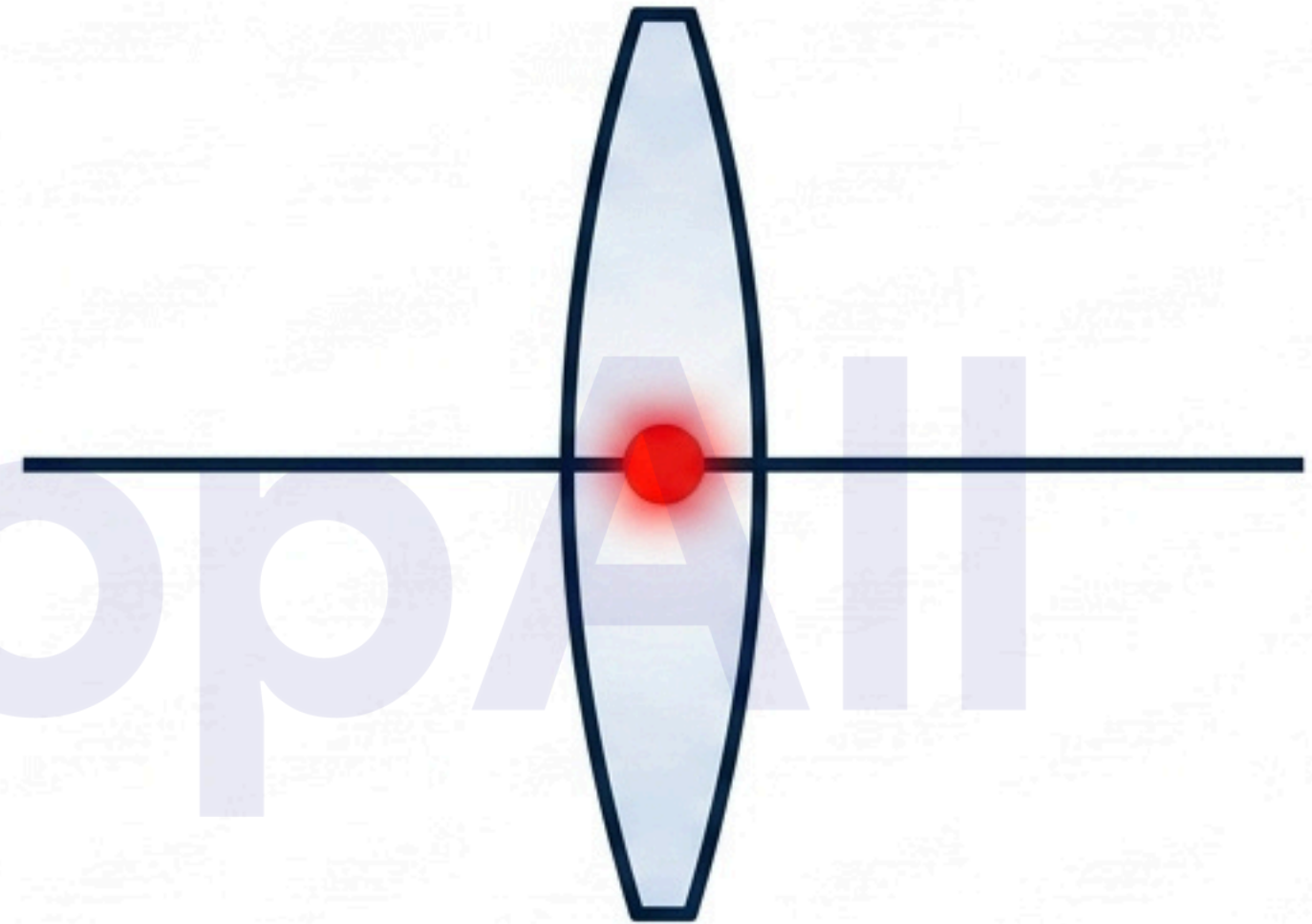
Concept 9.2.1



Step 1: Define the Origin (0,0)



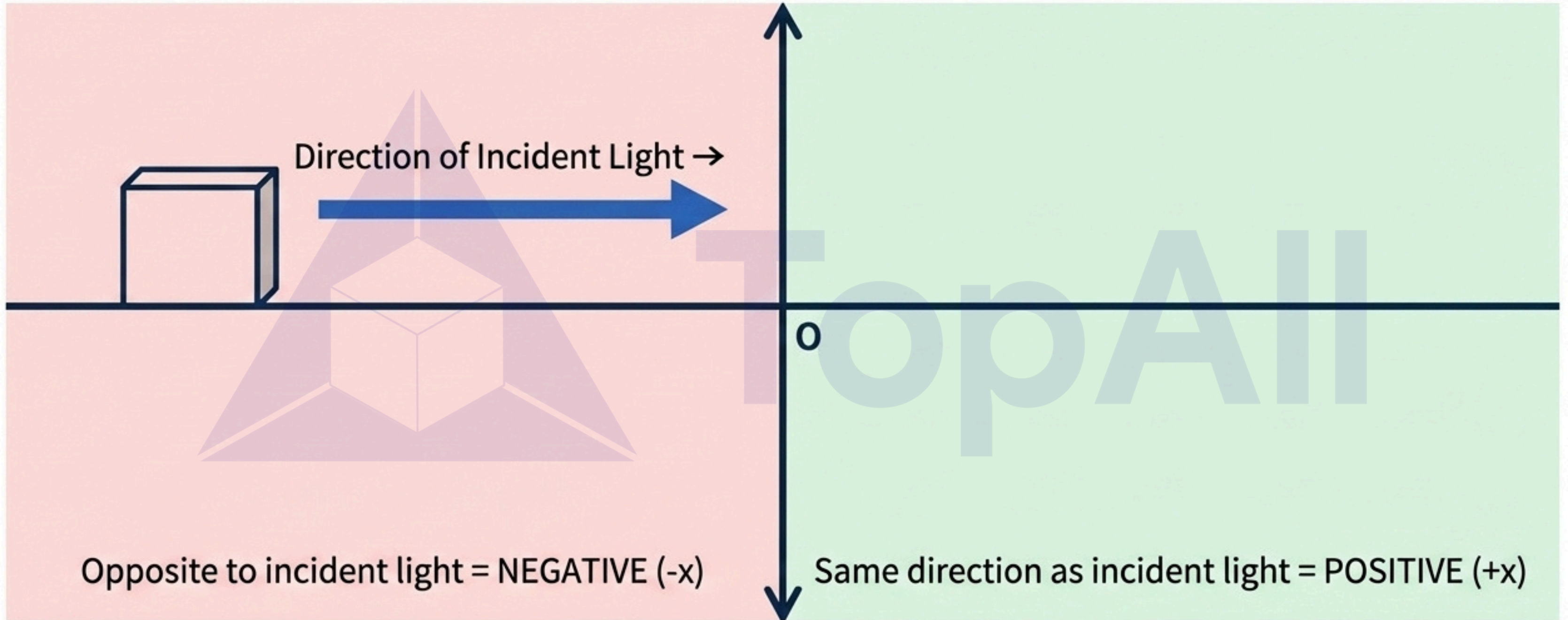
POLE (P) for Spherical Mirrors



OPTICAL CENTRE (O) for Spherical Lenses

Crucial Rule: All distances are measured *from* this origin point along the principal axis.

The Horizontal Rule (Distances)



The **incident light** vector acts as your **positive x-axis**. Always trace from the Origin.



You've Learned the Theory. Let's Test Them Now.

$$E=mc^2$$



Turn theory into marks with **unlimited MCQs, smart analysis, and focused revision.**

Practice Now



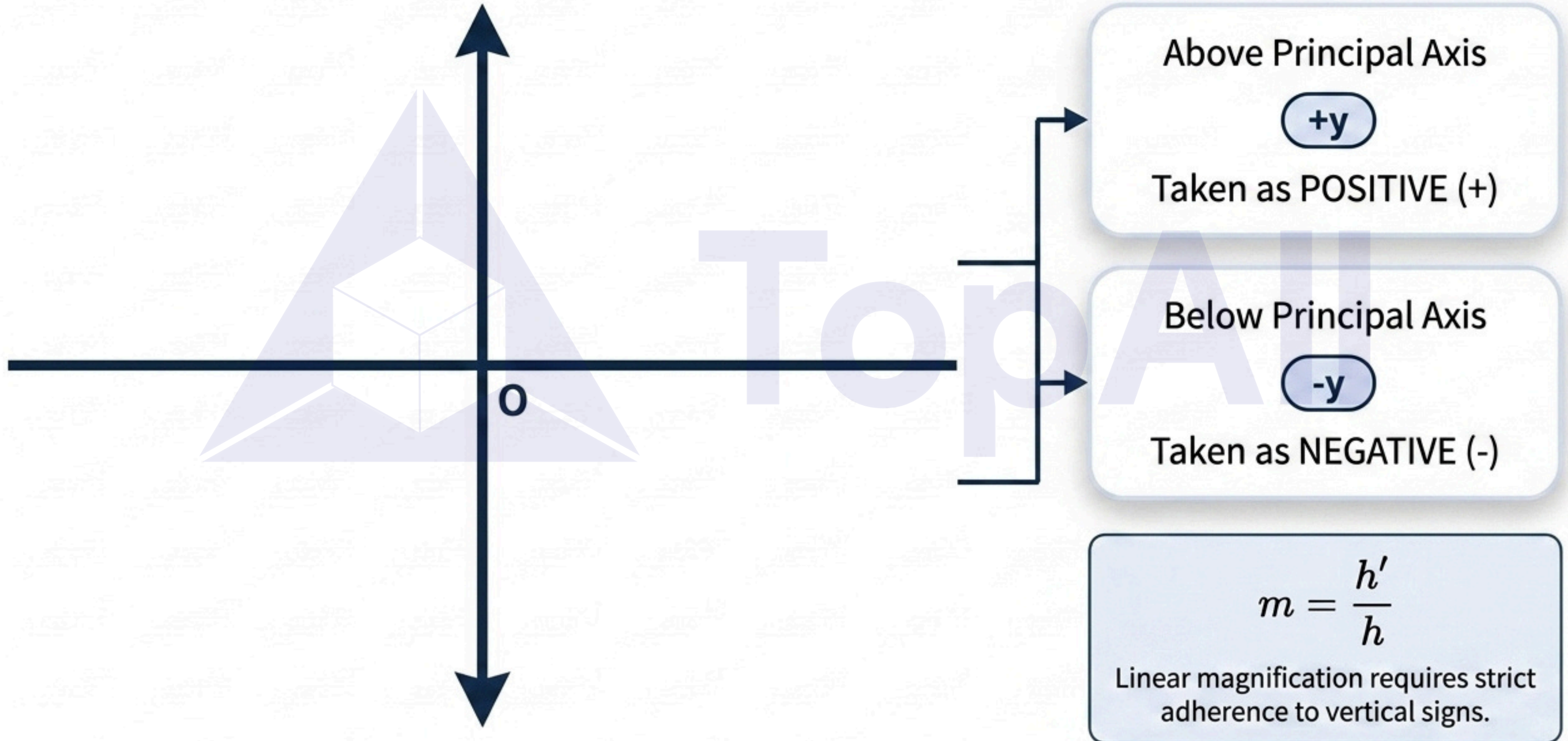
At prep.topall.app

Key Highlights

- » Free Study Material, Videos & Infographics
- » Push Your Limits with Level-Based Challenges
- » Climb the Leaderboard Among Fellow Aspirants
- » Practice Unlimited MCQs for NEET & JEE
- » Get Clear Explanations, Not Just Marks
- » Track Your Performance Smarter



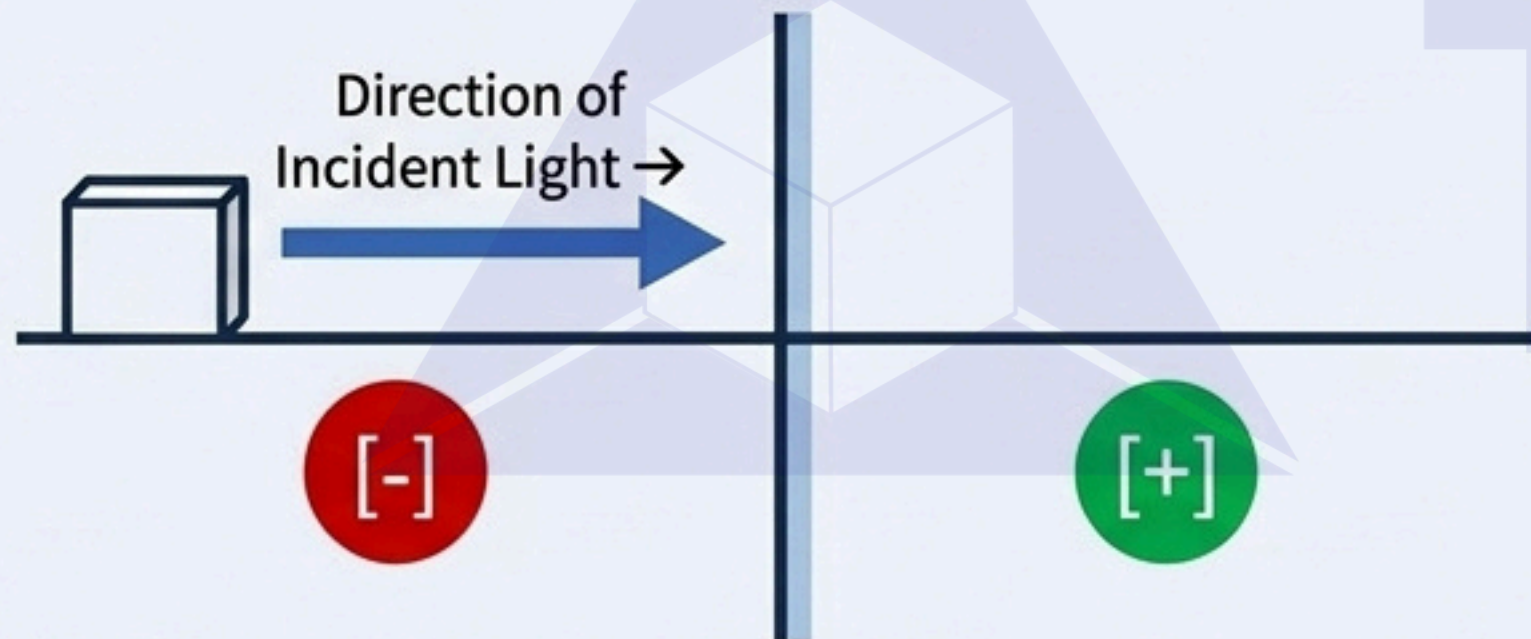
The Vertical Rule (Heights)



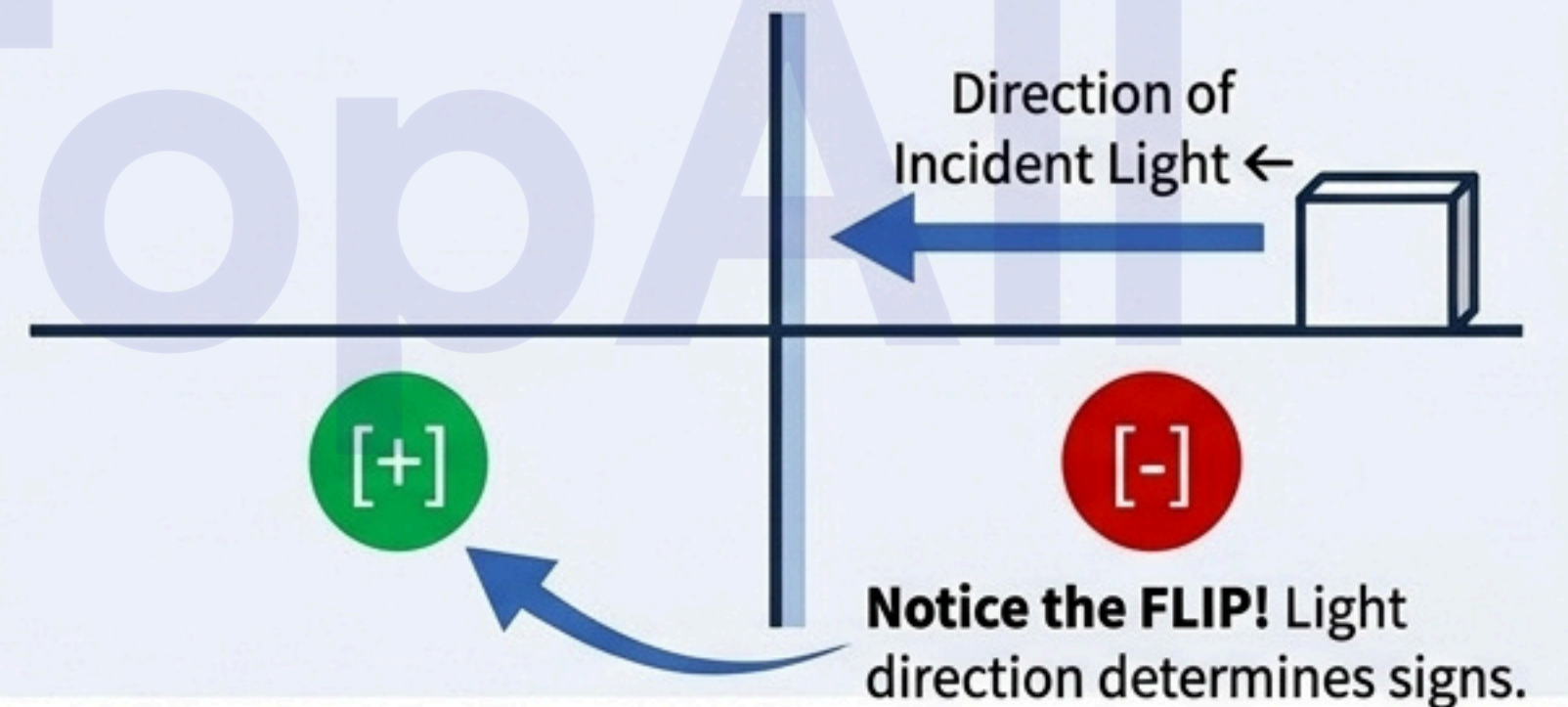
Beware the Rote-Memorization Trap

JEE Trap Alert: Do NOT blindly memorize 'Left = Negative, Right = Positive'.

The Standard Setup



The Trap Setup



Examiners can, and **will**, place the object **on the right** or use multi-lens setups to test your conceptual clarity. **Always let the light dictate the signs.**

Apply the Convention: Concave Mirror

Diagram Section

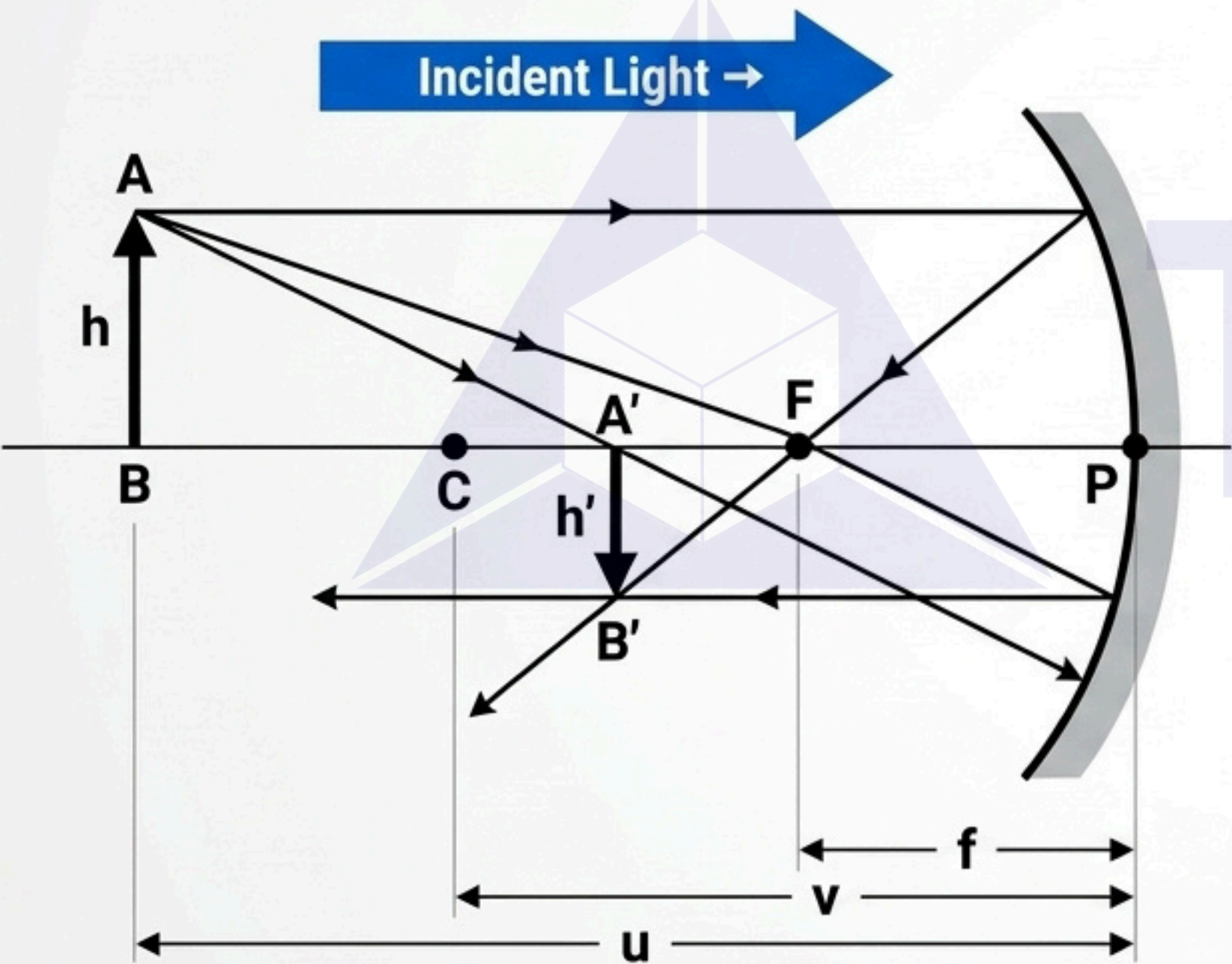


Table Section

Variable	Measurement Path	Direction	Sign
Object Dist. (u)	P to Object	Opposite Light	NEGATIVE (-)
Image Dist. (v)	P to Image	Opposite Light	NEGATIVE (-)
Focal Length (f)	P to F	Opposite Light	NEGATIVE (-)
Image Height (h')	Below Axis	Downward	NEGATIVE (-)

The Foolproof Execution Checklist

1. Draw the Incident Light Arrow.

Do this before anything else.

2. Mark the Origin.

Identify the Pole or Optical Centre.

3. Place your Pen on the Origin.

Force yourself to start all measurements here.

4. Trace to the Target.

Moving with light? **[+]** | Moving against light? **[-]**

Mirror Equation: $\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$

Thin Lens Formula: $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$

The formulas never change; only your input signs do.



You've Learned the Theory.

Now Let's Test It.

Reading notes gets you knowledge.

Practicing MCQs gets you marks.

That's exactly what TopAll Pro is built for.

Try TopAll Pro Now

What TopAll Pro Does Differently

-  **Stuck? Snap it. Solve it. — Doubts AI**
Photo → step-by-step solution in seconds, 24/7
-  **Your AI Coach finds your blind spots**
Concept-level weakness detection — not just chapter-level
-  **4.5 Lakh+ questions. Never run out.**
13× more content than any other prep app in India
-  **Build your own test in 60 seconds**
Pick a chapter, set difficulty — AI does the rest instantly.
-  **AI Recommendation that helps you improve**
AI Recommendation Analysis your Tests and tell you where you need to improve.



Practice the moment you finish studying
Jump in while the concept is still fresh in your head

4.5L+
MCQs

1.5L+
Students

AI Powered
In-Depth Analysis