

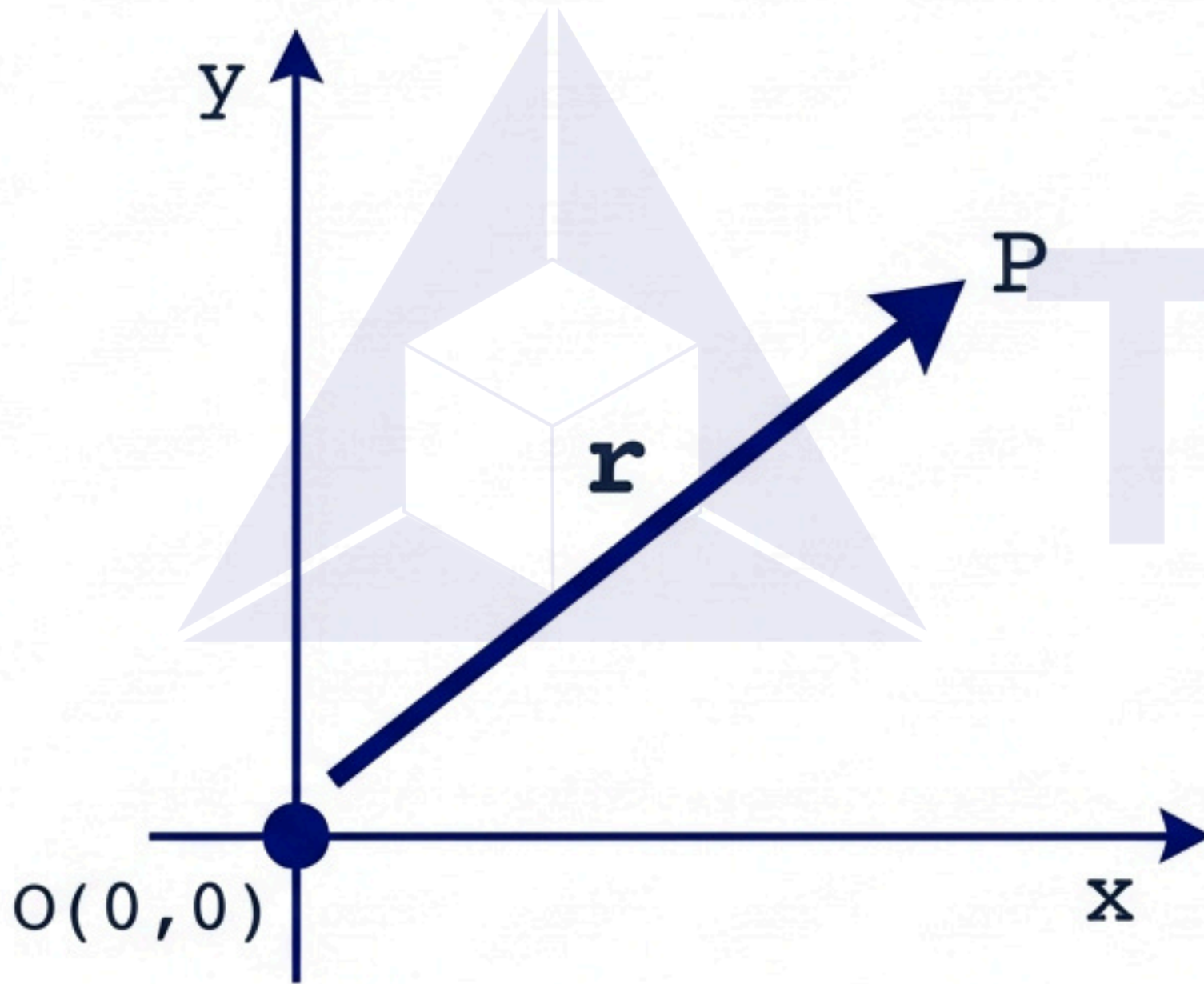
CLASS 11 PHYSICS • CHAPTER 3

Position and Displacement Vectors

Transitioning from 1D motion to 2D spatial kinematics



Defining the Position Vector

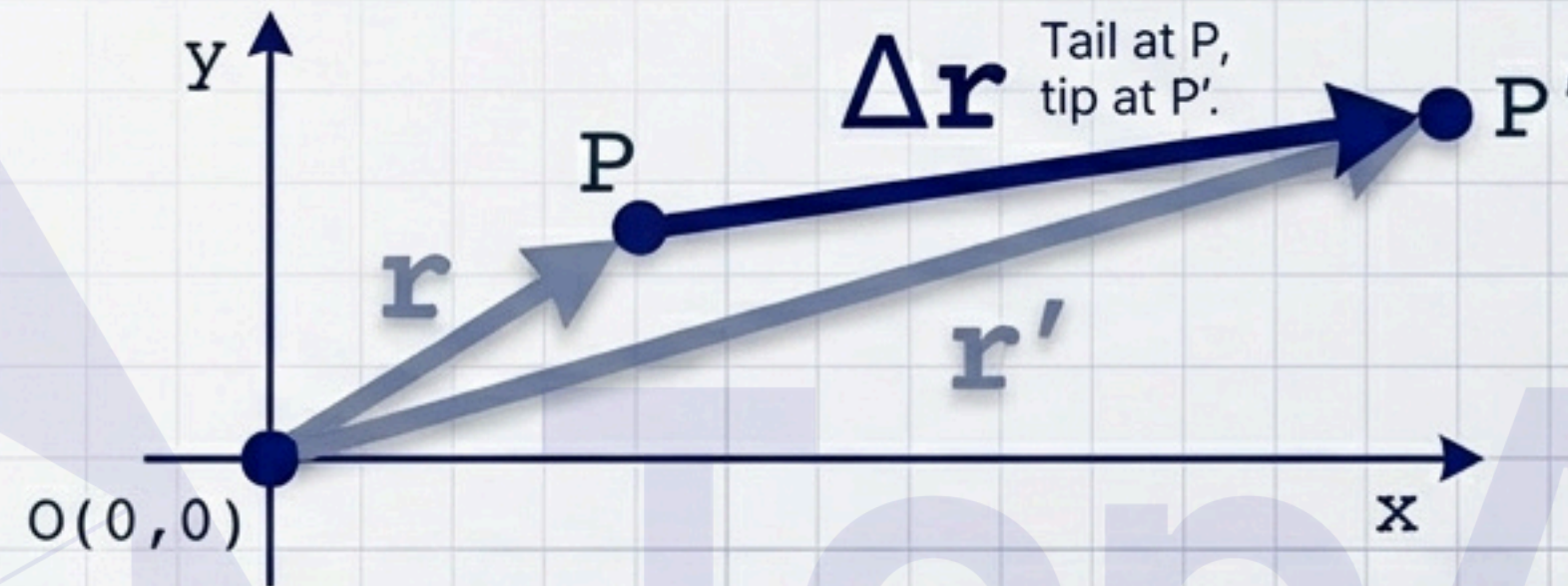


To describe an object's location in a plane, we anchor it to a convenient origin point.

The vector $\mathbf{r}$ points exactly where the object lies as seen from the origin.

$$\mathbf{r} = \overline{OP}$$

The Displacement Vector



Initial & Final

Object moves from point P to point P' .

Displacement

The vector bridging the start and end points is the displacement vector.

$$\Delta \mathbf{r} = \mathbf{r}' - \mathbf{r}$$



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



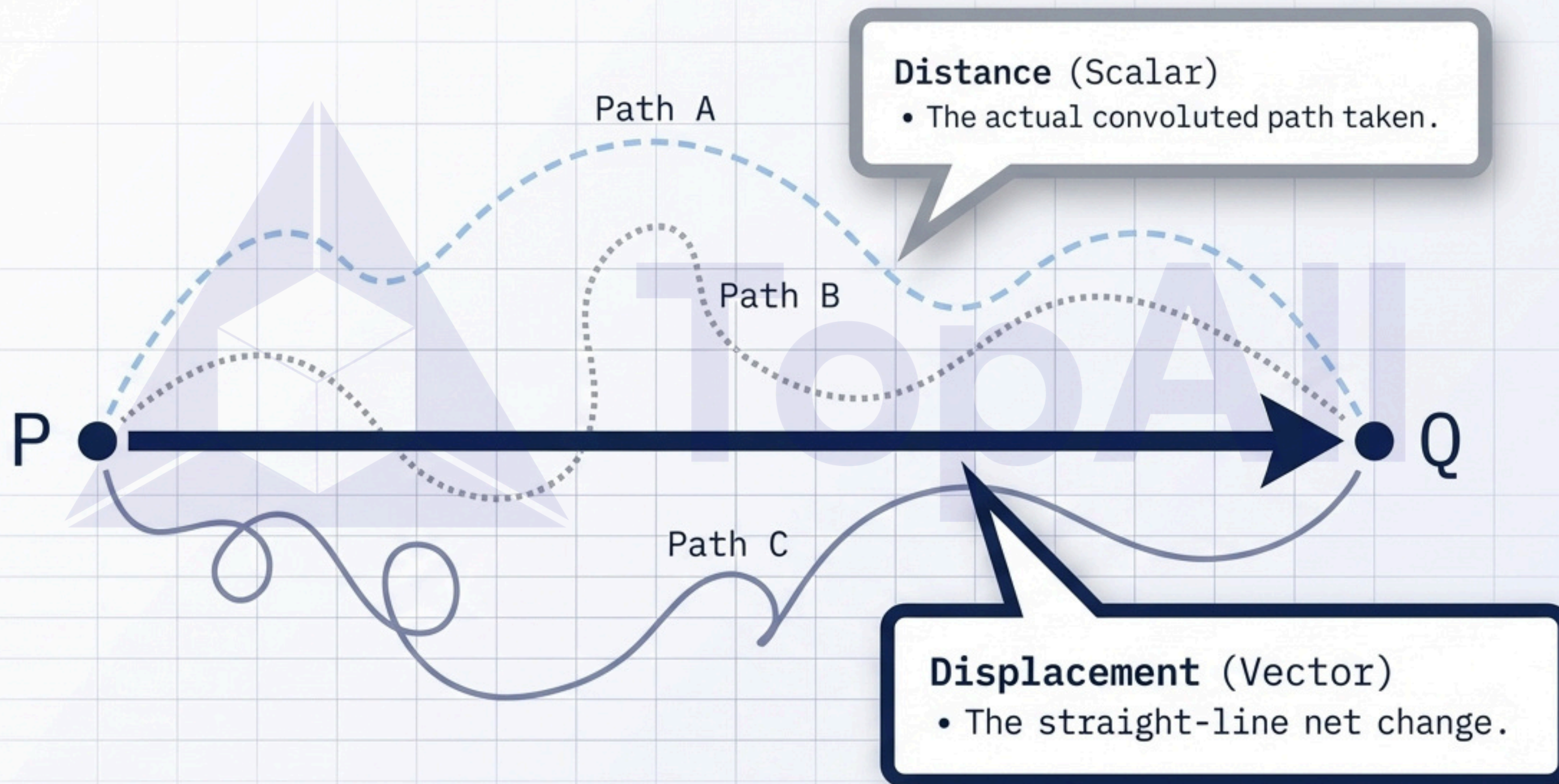
At prep.topall.app

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



Path Length is Not Displacement



Laws of Displacement



Displacement depends **ONLY** on initial and final positions. It is entirely path-independent.

Scenario



Because displacement is the shortest possible straight line between two points...

Mathematical Result

$$|\text{Displacement}| \leq \text{Path Length}$$



Pro-Tip: Exam Smart: The magnitude of displacement only equals path length if the object moves in a perfectly straight line without turning back!

Revision Summary

Position Vector

Locates an object relative to the origin.

$$\mathbf{r} = \text{OP}$$

Displacement Vector

The net change in position.

$$\Delta \mathbf{r} = \mathbf{r}' - \mathbf{r}$$

Path-Independent

Cares only about the start and end points,
never the journey.

$|\text{Displacement}| \leq \text{Path Length}$

The straight line is always the shortest
route.



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