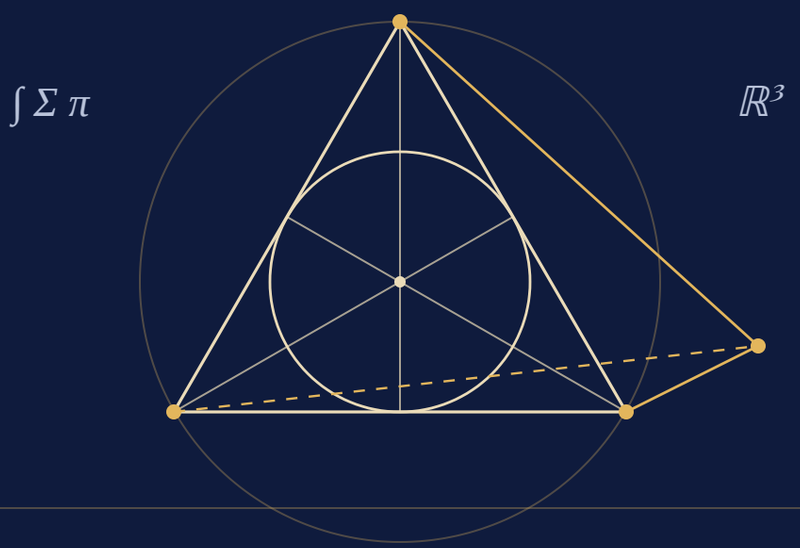
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Preface

Why another problem book, when the internet has a billion problems?

Let us get the obvious objection out of the way. Problems are everywhere. Your coaching module has them, your friend's WhatsApp group has them, and a quick search will give you more problems than you can solve before your grandchildren sit for JEE. So why should anyone, least of all you, open *another* problem book?

Because a pile of problems is not a plan. A thousand random questions are like a thousand random gym exercises: you will certainly get tired, but you may not get stronger. What helps is a set of good problems, arranged in a sensible order, checked carefully, and pitched at the level you actually need. That is all this book tries to be. It is not a textbook and it does not reteach theory. It is the place where theory you already know meets problems that refuse to be solved by memory alone.

How this book was put together

Every question here has been selected from multiple sources: test papers, practice sheets and problems that students have brought to me over the years. Selecting turned out to be the easy part. The hard part was everything after it: rejecting questions whose answer keys disagreed with their own solutions, catching misprints that had survived several generations of photocopying, rewriting statements that could be read in two ways, and making sure no question turns up twice. Many promising problems were dropped because they were wrong, ambiguous or simply dull. The ones that remain earned their place.

Each Part follows one area of the syllabus, and each assignment inside a Part mixes the main topic with ideas from the rest of that Part, because that is how JEE Advanced asks its questions. A problem on the parabola has every right to turn into a quadratic equation halfway through, and it usually does.

A word about AI

Yes, AI tools were used in making this book, and you deserve to know how. They were used to speed up the slow, mechanical work: typesetting in LaTeX, checking that each answer key matches its solution, re-doing calculations, and hunting down formatting slips. They were *not* used to invent questions. Every problem in this book comes from a real source and was chosen by a human (me), usually with a cup of tea and occasionally with a sigh. Think of the AI as a very fast assistant who never gets tired of checking $\binom{10}{4}$ for the fifth time.

Found a mistake? Please tell me

AI makes mistakes. Humans make mistakes too, and this particular human has made his share. Despite several rounds of checking, an error or two may still be hiding somewhere: a sign that flipped, a key that slipped, a comma that wandered. If you find one, I would genuinely like to hear about it. Write to

mathactiveonly@gmail.com

with **RAMM** in the subject line, along with the assignment and question number. Every confirmed correction will be fixed in the next update, and you will have the quiet satisfaction of having out-thought the book.

Finally, a request. Do not treat this book as a race to the answer key. The minutes you spend stuck on a problem, trying one idea and then another, are not wasted minutes; they are the whole point. Struggle a little, then a little more, and only then turn the page.

All the best. Stay Mathactive!

Ashutosh Kumar
Mathemission • mathemission.in
November 2026

How to Use This Book

(Reading the manual: the one thing nobody does, and everybody should)

What is inside

Eight Parts. Sets, Relations & Functions; Trigonometry; Algebra One; Algebra Two; Coordinate Geometry; Differential Calculus; Integral Calculus; Vectors & 3D Geometry. Parts 1–7 have five assignments each and Part 8 has two.

Every assignment looks the same. Five sections in JEE Advanced style, usually nineteen questions in all:

- Section A: 4 single-correct questions,
- Section B: 5 questions where one or more options may be correct,
- Section C: 6 numerical-answer questions,
- Section D: passages with 2 linked questions each,
- Section E: 2 matrix-match questions.

A *Focus Topics* box at the top tells you what the assignment is really about. Titles marked *Mixed Review* roam across the whole Part, exactly like the real exam.

Answer Key, then Hints & Solutions. Each assignment is followed by its answer key on a fresh page, and then by full hints and solutions on another fresh page. The page break is deliberate. It is there to protect you from "accidentally" seeing the answer.

Test Yourself. Six closing tests (one per area, and one full-syllabus test) with an answer key only. No hints, no solutions. By then, you will not need them. (Mostly.)

For students

1. **Learn the theory first.** This is a problem book, not a first course. Finish the chapter from your textbook or class notes, then come here.
2. **Sit it like a test.** One assignment, one sitting, a clock on the table and the phone in another room (yes, really). The time benchmarks are on the next pages.
3. **Mark, do not peek.** If a question refuses to open, mark it and move on. Return to it at the end with fresh eyes.
4. **Check with the key, then think again.** For every wrong or skipped question, try once more *before* reading the solution. A second attempt teaches you more than a first reading.
5. **Read the solution actively.** Close the book after reading, and write the solution yourself. If you cannot, you have not understood it yet; read it again.

6. **Keep an error log.** Note the question number, the idea you missed, and the date. Revisit the log before every test. Your mistakes are the most personalised study material you will ever own.

7. **Score honestly.** Use JEE Advanced marking: $+3/-1$ for single-correct, partial marking for multi-correct, $+4$ for numericals. Being strict with yourself now is cheaper than being surprised in May.

For teachers

Teachers may find this book even more useful than students do, and here is why. Every assignment is a ready-made, checked, exam-pattern paper on a well-defined set of topics, with a clean answer key and complete solutions. That means:

- **Weekly tests with no preparation time.** Pick the assignment that matches the week's topic and hand it out. Assignment 1 of each Part is the gentlest entry point; the Mixed Review assignments make excellent cumulative tests.
- **Homework that actually means something.** Set Sections A–C as homework and use Sections D–E in class for discussion; the passages and matrix-match questions start excellent arguments.
- **Ready-made revision.** The Test Yourself papers work well as end-of-unit or pre-board revision tests.
- **Solutions you can teach from.** The solutions are written to be explained on a board, step by step, not just to be checked.

(And if a student finds a mistake before you do, please ask them to write to

`mathactiveonly@gmail.com`

with **RAMM** in the subject line. Then buy them a chocolate.)

Suggested Study Paths & Time Benchmarks

Pick a route. Any route. Just do not stand at the junction for a month.

Time benchmarks

These are targets for a well-prepared student. If you are slower in the beginning, good: that is what practice is for. If you are much faster, check whether you are actually reading the questions.

Section	Questions	Target time
A: Single correct	4	10–12 min
B: One or more correct	5	18–20 min
C: Numerical answer	6	20–24 min
D: Linked comprehension	2 passages (4 parts)	12–15 min
E: Matrix match	2	10–12 min
Whole assignment	**19**	**75–90 min**
Test Yourself paper	19	60–75 min

After the attempt, allow about as much time again for checking, re-attempting and reading solutions. An assignment is not "done" when the clock stops; it is done when you understand every question in it.

Path 1: The Class XI route

Parts 1, 2, 3 and 5, plus the counting and binomial assignment of Part 4 (P4.1), in that order. Take one assignment a week alongside school; that is roughly a term and a half of steady work. Finish with Test Yourself 1 and 3.

Path 2: The Class XII route

Parts 6, 7 and 8, then matrices, probability and the Mixed Reviews of Part 4 (P4.2–P4.5). One or two assignments a week. Finish with Test Yourself 4 and 5.

Path 3: The twelve-week full course

For students who have finished the syllabus once and want one serious, complete round.

Column I	Column II
Weeks	**Work**
1–2	Parts 1 and 2 (10 assignments)
3–4	Part 3, then Test Yourself 1
5–6	Part 4, then Test Yourself 2

Continued on next page

Column I	Column II
7	Part 5, then Test Yourself 3
8–9	Parts 6 and 7
10	Part 8, then Test Yourself 4 and 5
11	Re-attempt every question in your error log
12	Test Yourself 6 (full test), then rest. Seriously.

Path 4: The last-month sprint

Short on time? Do Assignment 1 and Assignment 5 of every Part (Part 8: both), then all six Test Yourself papers. That is about twenty papers in four weeks: demanding, but very doable. Skip nothing in your error log.

Path 5: For teachers

Follow your teaching order. After each chapter, set the matching assignment as a timed class test; after each Part, set the Mixed Review assignment and the matching Test Yourself paper as a unit test. Over a two-year programme this gives you about forty-three ready-made, exam-pattern tests.

Mathematics is not a spectator sport. You have to get on the field, and occasionally fall over.