

APPLIED MATHEMATICS · CHAPTER 3

Calculus – Differentiation, Applications & Integration

A 1-page guide for parents · 90-second read.

EXPECTED MARKS**15 marks****TIME TO MASTER****Strong hrs****HELPLINE****70330 05444****WHAT THIS CHAPTER IS, IN PLAIN ENGLISH**

This is the most important chapter in your child's Class 12 Applied Mathematics book — it carries about 15 of the 80 theory marks, more than any other unit. Calculus is the mathematics of CHANGE. The first half (differentiation) answers questions like 'how fast is cost rising as we make more units?' and 'what production level gives the maximum profit?' — exactly the decisions a business makes. The second half (integration) reverses the process and is used to add up areas, such as the 'consumer surplus' (the bargain shoppers get) and 'producer surplus' (the bonus sellers receive) in a market. The mathematics is more abstract than earlier chapters, but it is highly rule-based: once your child knows a handful of formulas and the steps for finding a maximum, most questions become routine.

5 QUESTIONS TO ASK YOUR CHILD

- What does 'marginal cost' mean, and how is it different from 'average cost'?
- How do you find the production level that gives the maximum profit?
- Why do we use the SECOND derivative to decide whether a point is a maximum or a minimum?
- What does the '+ C' mean in an indefinite integral, and why does it disappear in a definite integral?
- What is 'consumer surplus' and which area on a graph does it represent?

WEAK-SPOT INDICATORS

- If your child cannot differentiate a simple cost function like $C(x) = 500 + 20x + 0.1x^2$ without help, the foundation (the power rule) is missing — fix this first.
- If they treat every point where the slope is zero as a 'maximum' without checking the second derivative, they will lose 1-2 marks on every optimisation question.
- If they confuse marginal cost (cost of one more unit) with average cost (total cost ÷ units), the entire marginal-analysis section will go wrong.

WHEN TO WORRY — AND WHAT TO DO

If, after attempting one problem from each of marginal analysis, maxima-minima, integration, and consumer surplus, your child gets fewer than two correct, schedule two focused 60-90 minute sessions. Because this unit is worth ~15 marks, weakness here has the biggest impact on the final score of any single chapter — it deserves priority revision time.

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