

Algebra 12 — Nature of Cubic Roots

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ON THE LCHL PAST PAPERS · 2025 P1 Q1(c) (main sitting, 10 marks) · 2017 P1 Q5(c) (main sitting, 8 marks)

How to use this sheet: these are the exact questions worked in this tutorial, in order. Try each one yourself first — the time it is posed in the video is shown, so you can pause before Paul solves it. Final answers are at the back; the full method is in the video.

Worked examples (in the video)

Example 1. Prove $x^3 - 5x^2 + 17x - 13 = 0$ has only one real root (*worked 03:46-10:21*).

Questions

Q1. Prove $x^3 - 8x^2 + 22x - 20 = 0$ has only one real root

Posed at 10:35 in the tutorial.

Q2. Prove $x^3 - 15x^2 + 67x - 53 = 0$ has only one real root

Posed at 10:35 in the tutorial.

Answers

Final answers only — pause the video and check yourself; the worked method is in the tutorial.

Example 1. Full proof — watch the tutorial for the complete write-up.

Q1. Full proof — watch the tutorial for the complete write-up.

Q2. Full proof — watch the tutorial for the complete write-up.

Overlaps with these tutorials

Algebra 9 — Nature of Quadratic Graphs. The four-scenario discriminant rubric this video reuses. Do it first.

Algebra 11 — Solving Cubic Equations. The same trial-and-error + long-division pipeline, run one step further.

Complex Numbers — quadratic equations. Scenario 3's 'two imaginary roots' are actually computed there; this video only proves they exist.