

Algebra 19 — Simultaneous Equations by Substitution

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ON THE LCHL PAST PAPERS · 2025 P1 Q5(c) (main sitting, 10 marks) · 2025 P1 Q4(a) (deferred, 10 marks) · 2024 P1 Q1(c) (deferred, 10 marks) · 2022 P1 Q4(a) (deferred, 10 marks) · 2022 P2 Q1(c) (main sitting, 7 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. $x + y = 7$ and $x^2 + y^2 = 25$ (worked 00:22–04:25).

Questions

Solve each pair of simultaneous equations

Q1. $x - y = -3$ and $x^2 + y^2 + 2x - 4y + 3 = 0$

Posed at 05:36 in the tutorial.

Q2. $a + 2b + 1 = 0$ and $a^2 - ab + b^2 = 3$

Posed at 05:36 in the tutorial.

Q3. $2x + 5y = 1$ and $x^2 + 5xy - 4y^2 = -10$

Posed at 05:36 in the tutorial.

Answers

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

Example 1. (3, 4) or (4, 3)

Q1. (0, 3) or (−2, 1)

Q2. $(a, b) = (-\frac{11}{7}, \frac{2}{7})$ or (1, −1)

Q3. (−2, 1) or (3, −1)

Overlaps with these tutorials

Algebra 18 — Simultaneous Equations in Three Variables. The elimination counterpart; together they cover the LCHL simultaneous-equations syllabus.

Algebra 2 — Factorising Quadratics. Every substitution ends in a quadratic to factorise.

Algebra 14 — Manipulation of Formula. The isolate-one-variable step is that skill, applied to a system.