Simultaneous squares

Teacher notes

Why use this resource?

This problem provides an opportunity for students to draw together several different mathematical concepts that they have met previously, including the manipulation of linear equations, simultaneous equations, properties of straight-line graphs (including parallel and perpendicular lines), Pythagoras' Theorem, and the use of quadratic equations to solve geometrical problems.

Preparation

Students might find grid paper or boards useful.

Possible approaches

Display the first four equations on the board and discuss the questions briefly as a class before working in pairs.

Class divided into groups of 4 or 6 look at the equations and questions. When they have verified as a group that these do define a square give each group one of the scenarios to investigate. After 10 minutes rotate which scenario each group is working on until all groups have looked at each one, or after first period of time groups feedback to the class what they have discovered so far.

Key questions

The resource itself is based on three key questions. Students might first consider

- How can we know that the equations define a square?
- If we have two adjacent vertices of a square (Scenario 2) what else do we know about the square? Is there more than one solution?
- How many solutions are there to Scenario 3?