IDEA 59

ENLARGEMENTS ON A COORDINATE GRID

On a coordinate grid draw a quadrilateral in the first quadrant ensuring the four vertices lie on grid points.

Calculate the area of the quadrilateral; to do this students might dissect their shape into more easily 'work-out-able' pieces. Alternatively, they could be shown a method of framing the shape in a rectangle, working out the areas of the shapes outside the quadrilateral and within the rectangle, then subtracting the total from the area of the rectangle.

Now ask students to double each ordinate and plot the new shape. This will, of course, be an enlargement of the original quadrilateral with the origin as the centre of enlargement.

Calculate the area of the enlarged shape and compare with the area of the original. Try the same procedure again with other quadrilaterals.

What happens if the original shape is drawn across two, three or all four quadrants?

What happens to the area of the enlarged shape if the ordinates of the original are multiplied by 3 or by ½ or by 2½?

What happens to the shape if the original ordinates are multiplied by –2?

IDEA 60

MORE COORDINATE PROBLEMS

The three problems below are intended for students to 'play around' with coordinates in order to familiarize themselves with coordinate geometry.

In setting up each task there are, potentially, two important issues involved. The first is teacher expectation, that students are able to generate examples for themselves and each other. The second is ownership, of students developing a task without the teacher needing to prepare a worksheet.

PROBLEM 1

- Find the mid-point of a straight line segment between two points, for example (2, 5) and (6, 3).
- Do lots of examples choosing different pairs of starting points.
- Generalize for the mid-point between any two points P_1 and P_2.
- Check the generality holds when negative ordinates are used.

PROBLEM 2

- Draw some squares and write the coordinates of the corners of the square.
- Give your partner information about two points for each square; this might be a) a pair of adjacent points (in which case there will be two solutions), or b) a pair of diagonally opposite points (in which case there will be a unique solution).
- Partners then have to try to draw the squares from the information provided.

PROBLEM 3

In pairs, each student draws a pentagon with three right angles and one line of symmetry.

Students give their partner some information about their shape; the area of the pentagon and the coordinates of three of the corners. Partners then have to try to reproduce each other's pentagons.