Plotting the position of shapes in all four quadrants

National Curriculum attainment target

- Describe positions on the full coordinate grid (all four quadrants)

Lesson objective

- Plot and label shapes in the four quadrants; use the properties of shapes to predict missing coordinates

Previous related lessons

Unit 2, Week 3, Lesson 1; Unit 2, Week 3, Lesson 2; Unit 11, Week 3, Lesson 1

Prerequisites for learning

Pupils need to:

- be able to plot specified points and draw sides to complete a given polygon

Vocabulary

coordinates, quadrant, negative, positive, x-axis, y-axis, x-coordinate, y-coordinate

Future related lessons

None

Success criteria

Pupils can:

- plot and label rectangles, squares, parallelograms and rhombuses in the four quadrants
- use the properties of shapes to predict missing coordinates

Getting Started

- Choose an activity from Geometry – Position and direction.

Collins Connect
Year 6, Unit 11, Week 3

Teach

Resources

Resource 12: 4-quadrant coordinate grids (per child); ruler (per child)

- Display: the Coordinates tool showing a 4-quadrant coordinate grid.
- Plot these points on the grid: A (3, 5), B (3, 3), C (–4, 3), D (–4, –3), E (3, –1) and F (3, –3).
- Ask: **Who can tell me the coordinates of the point C?** (–4, 3) **… of the point D?** (–4, –3)
- Elicit that the points A, B, E and F have the same *x*-coordinate.
- Ask: **Who can tell me which of these six points I can join to form a rectangle?** (C, B, F and D) Use the Coordinates tool to join the points and display the rectangle.
- Ask: **If we join the points C, A, E and D in order what shape will we make?** (parallelogram) Show the parallelogram.
- Distribute the rulers and 4-quadrant coordinate grids.
- Write on the board the points: A (–2, 3), B (3, 3) and C (3, –4).
- Ask the children to plot the points A, B and C on their first grid.
- Say: **The points A, B and C are three of the four vertices of a rectangle. Tell your partner how to find the coordinates of the missing vertex D.** (–2, –4)
- Say: **Using your ruler, join the points in order, A to B, B to C, C to D, and D to A to complete the rectangle.**
- Write on the board the points: E (–3, 2), F (5, 2) and G (3, –3).
- Ask the children to plot the points E, F and G on their second grid.
- Say: **The points E, F and G are three vertices of a parallelogram.**
- Ask: **Who can predict the coordinates of the missing vertex H?** (–5, –3) **How did you find your answer?**
- Ask the children to plot the point H (–5, –3) on their grid and to join them in order to complete the parallelogram.
- Write on the board the points J (4, –2), K (0, –4) and L (–4, –2).

- Ask the children to plot the points J, K and L on their third grid.
- Say: **The points J, K and L are three vertices of a rhombus.**
- Repeat, as above, to locate the missing vertex M (0, 0) and to complete the drawing of the rhombus.
- Write on the board the points: P (–3, –1) and R (5, –1).
- Say: **The line joining the points P (–3, –1) and R (5, –1) is a diagonal of square PQRS. Plot these points on your fourth grid.**
- Ask pairs to discuss how to locate the coordinates of the points Q and S.
- Take feedback. Elicit that the diagonals of a square are equal in length and intersect at 90°, that the diagonals intersect at the point (1, –1) and that by counting squares on the grid we find the coordinates for Q (1, 3) and for S are (1, –5).

Individualised Learning

Refer to Activity 2 from the Learning activities on page 446.

Pupil Book 6C – Page 70: Plotting shapes in the four quadrants (2)
Resources: Resource 12: 4-quadrant coordinate grids (per child); ruler (per child)

Progress Guide 6 – Support, Year 6, Unit 11, Week 3, Lesson 2: Points on the run
Resources: ruler (per child)

Plenary

- Ask the children to review what they have learned in the lesson and to share this with the class.
- Display: Slide 1 showing the data from Question 1 of Challenge 2.
- Select three of the four points for the vertices of the rectangle ABCD, the square EFGH, the parallelogram JKLM, and the rhombus PQRS. Taking each shape in turn, plot the points for the vertices on a four quadrant coordinate grid using the Coordinates tool.
- For each shape, ask the children to find the coordinates of the missing vertex.
- Using the Coordinates tool, plot the points Q (–3, 3) and R (3, 2).
- Say: **The line joining the points Q (–3, 3) and R (3, 2) is a side of square QRST**.
- Ask: **Who can predict the missing coordinates for the vertices S and T if both points have negative y-coordinates?** [S (2, –4) and T (–4, –3)] **Can you explain to the class how you found your answer?**
- Complete the drawing of the square.

Homework Guide 6
Year 6, Unit 11, Week 3, Lesson 1: Missing coordinates
Resources: ruler (per child), red pencil (per child)

Overcoming Barriers

- Ask the children to use what they know about the properties of the shape to help them to predict the coordinates of the missing vertex.