Reflecting shapes into all four quadrants

National Curriculum attainment target

- Draw simple shapes on the coordinate plane, and reflect them in the axes

Lesson objective

- Use coordinates to reflect shapes into all four quadrants

Previous related lessons

Unit 2, Week 3, Lesson 3; Unit 2, Week 3, Lesson 4; Unit 11, Week 3, Lesson 3

Prerequisites for learning

Pupils need to:

- be able to reflect a 2-D shape using coordinates in the first quadrant and lines that are parallel to the axes

Vocabulary

- image, reflect, quadrant, negative, x-axis, y-axis

Future related lessons

None

Success criteria

Pupils can:

- use coordinates to reflect shapes in the axes into all four quadrants

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 the points A (1, 5), B (5, 4) and C (2, 2).
- Say**: If the y-axis is a mirror line, then I can reflect the point A (1, 5) in the y-axis to a position in the second quadrant.**
- Recall that when we reflect the point A then we call its image A′ which we read as A dash.
- Ask: **What are the coordinates of the point A′?** (–1, 5)
- Say: **Tell your partner the coordinates of the vertices B′ and C′.** [(–5, 4) and (–2, 2)]
  Take feedback, then display the images of the vertices under a reflection in the y-axis.
- Say**: The x-axis is a mirror line. I can reflect the point A (1, 5) in the x-axis to a position in the fourth quadrant.**
- Ask: **Who can tell me the quadrant into which the image A dash will be reflected?** (third quadrant)
- Say: **As we have already reflected the point A in the y-axis and used A′ for its image, we use A″ for the second image of A in the third quadrant. We read it this as A dash dash. Finally, we use A‴ for the third image of A in the fourth quadrant, which we read as A dash dash dash.**
- Ask: **What are the coordinates of the point A″?** (-1, –5) **… of the point A‴?** (1, –5) **Can you explain to the class how you found them?**
- Repeat for the points B and C.
- Display: Slide 1 showing the table for the corresponding vertices of the four triangles.
- Ask: **What patterns do you notice in the table?** Elicit that for all three vertices the x-coordinate is negative in the second quadrant, the y-coordinate is negative in the fourth quadrant and both the x-coordinate and the y-coordinate are negative in the third quadrant.
- Distribute a ruler and two 4-quadrant coordinate grids from Resource 12 to each child.
- Ask the children to plot the points for triangle ABC in the first quadrant, draw the reflection of the triangle in the y-axis, and the reflection of both triangles in the x-axis.
- Display: Slide 2 showing triangle ABC reflected into all four quadrants.
- Display: Slide 3 showing a shape.

- Say: **We will find it easier to reflect this shape into all four quadrants if we focus on the coordinates of some of its vertices. These vertices are labelled as A, B, C and D.**
- Ask: **Who can tell me the coordinates for the vertex C when it is reflected into all four quadrants?** [(1, 1), (–1, 1), (–1, –1) and (1, –1)]
- Ask the children to draw the shape in the first quadrant, draw its reflected image in the y-axis, and the reflection of both shapes in the x-axis.
- Allow time for this and then ask pairs to compare their diagrams.
- Display: Slide 4 showing the shape reflected into all four quadrants.

Individualised Learning

Refer to Activity 4 from the Learning activities on page 447.

Pupil Book 6C – Page 74: Four quadrants reflection
Resources: Resource 12: 4-quadrant coordinate grids (per child); ruler (per child)

Progress Guide 6 – Support, Year 6, Unit 11, Week 3, Lesson 4: On reflection
Resources: ruler (per child)
– Extension, Year 6, Unit 11, Week 3, Lesson 4: Four quadrant pattern
Resources: ruler (per child)

Plenary

- Ask the children to review what they have learned about reflecting shapes in the axes and to share this with the class.
- Ask: **How can we check the corresponding vertices of a shape and its image have been reflected correctly?** Elicit that corresponding vertices are the same distance from the mirror line.
- Say: **The coordinates of a point are T (3, 5).** Ask: **In which quadrant of the grid will I plot the coordinates for point T?** (first quadrant)
- Display: the Coordinates tool and plot the point T (3, 5) on a 4-quadrant coordinate grid.
- Ask: **What are the coordinates of the point T when it is reflected in the y-axis?** (–3, 5) **… when the points T and T' are reflected in the x-axis?** (–3, –5) (3, –5)
- If appropriate, repeat as above for other points.

Homework Guide 6
Year 6, Unit 11, Week 3, Lesson 4: 4-quadrant reflection