

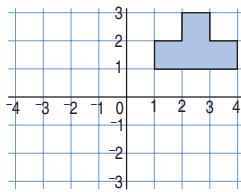
**As outcomes, Year 8 pupils should, for example:**

Use vocabulary from previous year.

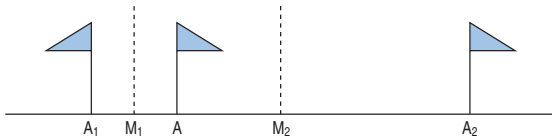
**Combinations of two transformations**

Transform 2-D shapes by repeated reflections, rotations or translations. Explore the effect of repeated reflections in parallel or perpendicular lines. For example:

- Reflect a shape in one coordinate axis and then the other. For example, reflect the shape below first in the x-axis and then in the y-axis. What happens? What is the equivalent transformation? Now reflect it first in the y-axis and then in the x-axis. What happens? What is the equivalent transformation?



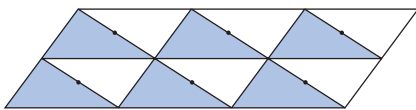
- Investigate reflection in two parallel lines. For example, find and explain the relationship between the lengths  $AA_2$  and  $M_1M_2$ .



- Investigate how repeated reflections can be used to generate a tessellation of rectangles.

Explore the effect of repeated rotations, such as half turns about different points. For example:

- Generate a tessellation of scalene triangles (or quadrilaterals) using half-turn rotations about the mid-points of sides.



Explain how the angle properties of a triangle (or quadrilateral) relate to the angles at any vertex of the tessellation.

**As outcomes, Year 9 pupils should, for example:**

Use vocabulary from previous years and extend to: plane symmetry, plane of symmetry... axis of rotation symmetry...

**Combinations of transformations**

Transform 2-D shapes by combining translations, rotations and reflections, on paper and using ICT.

Know that reflections, rotations and translations preserve length and angle, and map objects on to congruent images.

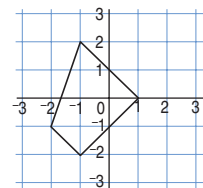
**Link to congruence (pages 190–1).**

Use mental imagery to consider a combination of transformations and relate the results to symmetry and other properties of the shapes. For example:

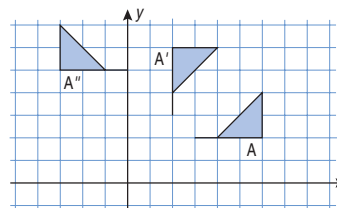
- Say what shape the combined object and image(s) form when:
  - a right-angled triangle is reflected along its hypotenuse;
  - a square is rotated three times through a quarter turn about a corner;
  - a scalene triangle is rotated through  $180^\circ$  about the mid-point of one of its sides.

Working practically when appropriate, solve problems such as:

- Reflect this quadrilateral in the y-axis. Then reflect both shapes in the x-axis. In the resulting pattern, which lines and which angles are equal in size?



- Flag A is reflected in the line  $y = x$  to give  $A'$ .  $A'$  is then rotated through  $90^\circ$  centre  $(0, 3)$  to give  $A''$ .



Show that A could also be transformed to  $A''$  by a combination of a reflection and a translation. Describe other ways of transforming A to  $A''$ .