

4.4.2 Transformations

Name: _____ Class: _____ Date: _____

KEY WORDS centre of enlargement

<!-- Session 2 native-skill companion -->

Objective

Practise transformations within the labelled native lessons. Public original tasks; locally authored answer guidance.

1 Key knowledge and worked examples

■ Reflections, rotations and enlargements · Foundation

A translation adds a vector. A reflection reverses signed perpendicular distance from a mirror line. A rotation needs a centre, angle and direction. For enlargement from C, use new $P = C + k(P - C)$.

$$P_{\text{image}} = c + k(p - c)$$

For centre $C = (1,1)$, point $P = (3,2)$ and factor 2, the image is $(5,3)$. At factor $1/2$ the image is $C + (1/2)(P - C) = (2, 1.5)$, halfway from C to P. Reflecting $(3,2)$ in the y-axis gives $(-3,2)$. Rotating it 90° anticlockwise about the origin gives $(-2,3)$. Translation by $(2,-1)$ gives $(5,1)$. State the centre, line or vector as appropriate.

Specify a reflection line, rotation centre/angle/direction or enlargement centre/factor. Fractional positive enlargement factors reduce a shape without reversing its position about the centre.

AQA G7 Foundation includes single reflections, rotations, translations and enlargements with positive integer/fractional factors. Negative factors and combinations of isometries belong to separate Higher teaching.

■ Reflections, rotations and enlargements · Higher

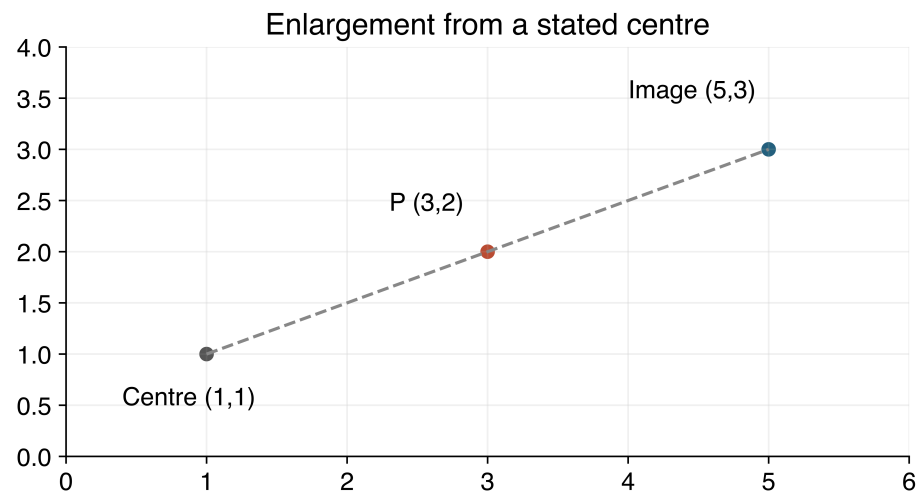
A translation adds a vector. A reflection reverses signed perpendicular distance from a mirror line. A rotation needs a centre, angle and direction. For enlargement from C, use new $P = C + k(P - C)$.

$$P_{\text{image}} = c + k(p - c)$$

For $C = (1,1)$, $P = (3,2)$, $k = 2$, the image is $C + 2(P - C) = (5,3)$. With $k = 1/2$ it is $(2, 1.5)$; with $k = -2$ it is $(-3, -1)$, on the opposite side of the centre. Reflecting $(3,2)$ in the y-axis gives $(-3,2)$, and a 90° anticlockwise rotation about the origin gives $(-2,3)$. Identify centre, factor, line, angle and direction as applicable.

A rotation needs its centre and direction, not just an angle. A negative enlargement factor places the image on the opposite side of the centre. A translation does not change orientation or size.

Describe a transformation completely before constructing the image. Check corresponding distances and angles. For combined transformations, apply them in the stated order; they usually do not commute.



Original native-lesson illustration; labels belong to its worked example.

2 Practice

2.1 (Foundation) For $C = (1,1)$, $P = (3,2)$, $k = 2$, find the image x-coordinate.

2.2 (Foundation) For that enlargement, find the image y-coordinate.

2.3 (Foundation) Reflect (3,2) in the y-axis. Find the new x-coordinate.

3 Exam-style questions

3.1 Decide whether this claim is true. Justify with a concrete calculation or counterexample: Every enlargement is centred at the origin unless its scale factor is negative.
