

# Vectors and transformation geometry – supported focus

Pearson Edexcel · International GCSE · Mathematics A

## Supported teaching and tier boundary

4MA1: Vectors and transformation geometry. Version: Issue 2, November 2017; first assessment June 2018; linear Mathematics A.

Foundation teaching and Higher additions are labelled below. This reference packages the existing native-lesson crosswalk. It does not certify unreviewed specification rows or a whole qualification. Original diagnostics are separate and are not reproduced.

### ■ Vectors and transformation geometry · Foundation

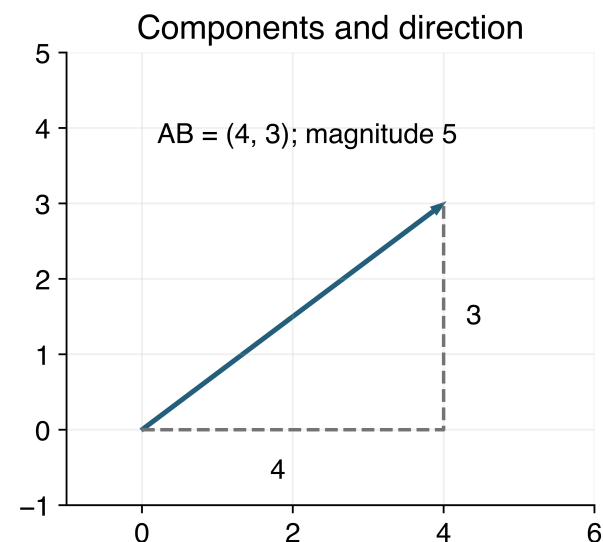
Add corresponding vector components and subtract position vectors to find a displacement. A translation moves every point by the same vector; a scalar multiple changes length and possibly direction.

$$\overrightarrow{AB} = \mathbf{b} - \mathbf{a}, \quad |\mathbf{v}| = \sqrt{v_x^2 + v_y^2}$$

With  $\mathbf{a}=(4,1)$  and  $\mathbf{b}=(1,3)$ ,  $\mathbf{a}+\mathbf{b}=(5,4)$ . From  $A=(1,2)$  to  $B=(5,5)$ , displacement  $\overrightarrow{AB}=(4,3)$ . Its magnitude is  $\sqrt{4^2+3^2}=5$ .

The order of subtraction matters:  $\overrightarrow{BA}=-\overrightarrow{AB}$ . Proving parallelism needs a scalar-multiple relation; a sketch alone is insufficient. Negative enlargement reverses position about its centre.

Draw arrows with direction and identify the starting and ending points. Scalar products, spatial line equations and advanced angle calculations are excluded from this Foundation/Core lesson.



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

### ■ Reflections, rotations and enlargements · Foundation

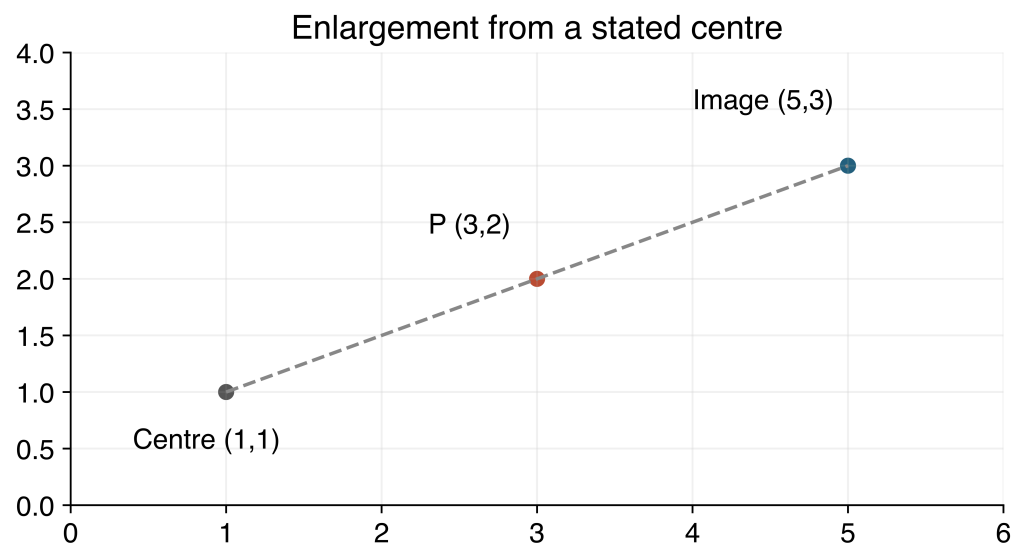
A translation adds a vector. A reflection reverses signed perpendicular distance from a mirror line. A rotation needs a centre, angle and direction. For enlargement from C, use new  $P=C+k(P-C)$ .

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

For  $C=(1,1), P=(3,2), k=2$ ,  $P-C=(2,1)$ , so new  $P=(1,1)+2(2,1)=(5,3)$ . Reflection of (3,2) in the y-axis gives (-3,2). A  $90^\circ$  anticlockwise rotation about the origin gives (-2,3).

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.*

## Remaining qualification limits

Official question-bank boundaries, scheme alignment and all objective-level teaching coverage require the recorded review; no practice registry promotion.

The authored diagnostic assessments are not full-length qualification mocks.

Only the mapped native skills are supplied here. Objective rows marked formula-review-required are not promoted to complete coverage by these print companions.

## Terms

**resultant** .

**centre of enlargement** .