

7.3) Enlargements and stretches

Worked example

Describe the effect of the following matrices:

$$\begin{pmatrix} 2 & 0 \\ 0 & 2 \end{pmatrix}$$

$$\begin{pmatrix} 3 & 0 \\ 0 & 3 \end{pmatrix}$$

$$\begin{pmatrix} 3 & 0 \\ 0 & 2 \end{pmatrix}$$

Your turn

Describe the effect of the following matrices:

$$\begin{pmatrix} 2 & 0 \\ 0 & 3 \end{pmatrix}$$

Stretch parallel to x -axis, scale factor 2
and

Stretch parallel to y -axis, scale factor 3
(not an enlargement)

Worked example

A triangle T has vertices $(1, 1)$, $(1, 2)$ and $(2, 2)$.

- Find the vertices of the image of T under the transformation given by the matrix $\mathbf{M} = \begin{pmatrix} 2 & 0 \\ 0 & 3 \end{pmatrix}$.
- Sketch T and its image, T' on a coordinate grid.
- Describe the geometric transformation.

Your turn

A triangle T has vertices $(1, 1)$, $(1, 2)$ and $(2, 2)$.

- Find the vertices of the image of T under the transformation given by the matrix $\mathbf{M} = \begin{pmatrix} 3 & 0 \\ 0 & 2 \end{pmatrix}$.
- Sketch T and its image, T' on a coordinate grid.
- Describe the geometric transformation.

a) $(3, 2)$, $(3, 4)$ and $(6, 4)$

b) Sketch

c) The triangle has been stretched by a scale factor of 3 parallel to the x -axis and by a scale factor of 2 parallel to the y -axis

Worked example

Shape B is transformed to shape C by the matrix

$$A = \begin{pmatrix} 2 & -3 \\ -4 & 9 \end{pmatrix}.$$

Given that the area of C is 72 square units, find the area of B

Your turn

Shape R is transformed to shape S by the matrix

$$A = \begin{pmatrix} 2 & -2 \\ -1 & 3 \end{pmatrix}.$$

Given that the area of S is 72 square units, find the area of R

18