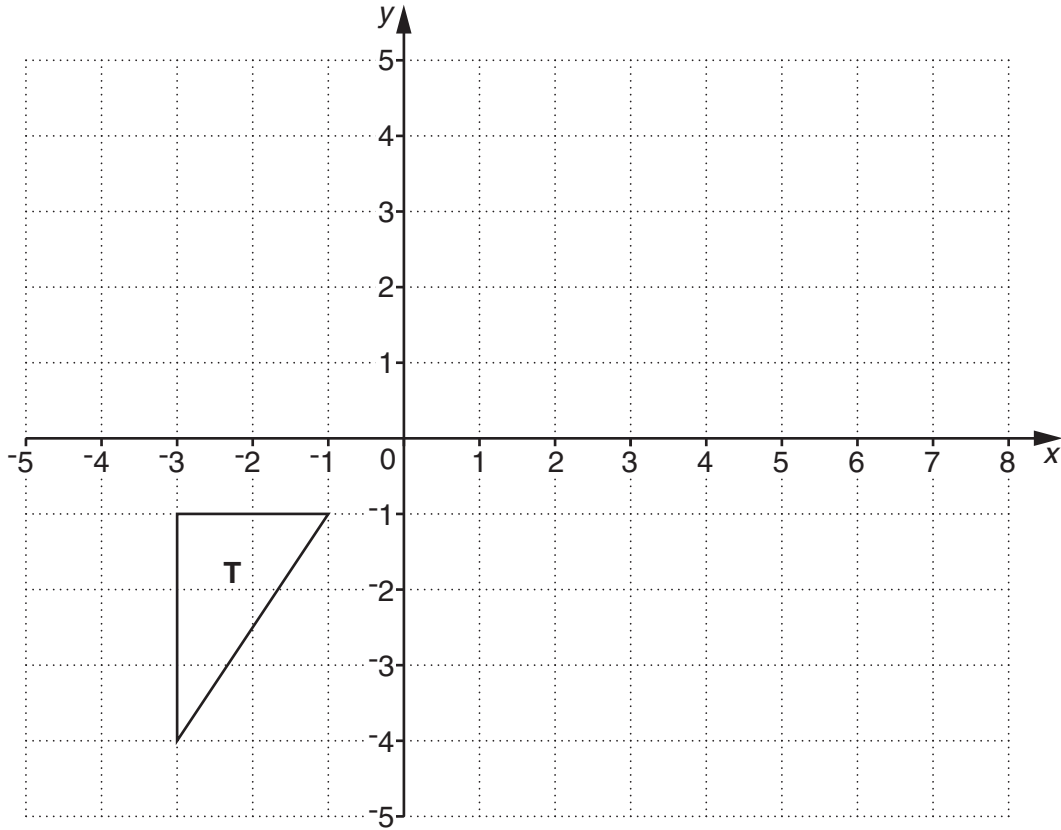**1** The grid shows triangle **T**.

(a) Reflect triangle **T** in the line $y = {}^-1$.
Label the image **A**. **[2]**

(b) Rotate triangle **T** 180° about the point (0, 0).
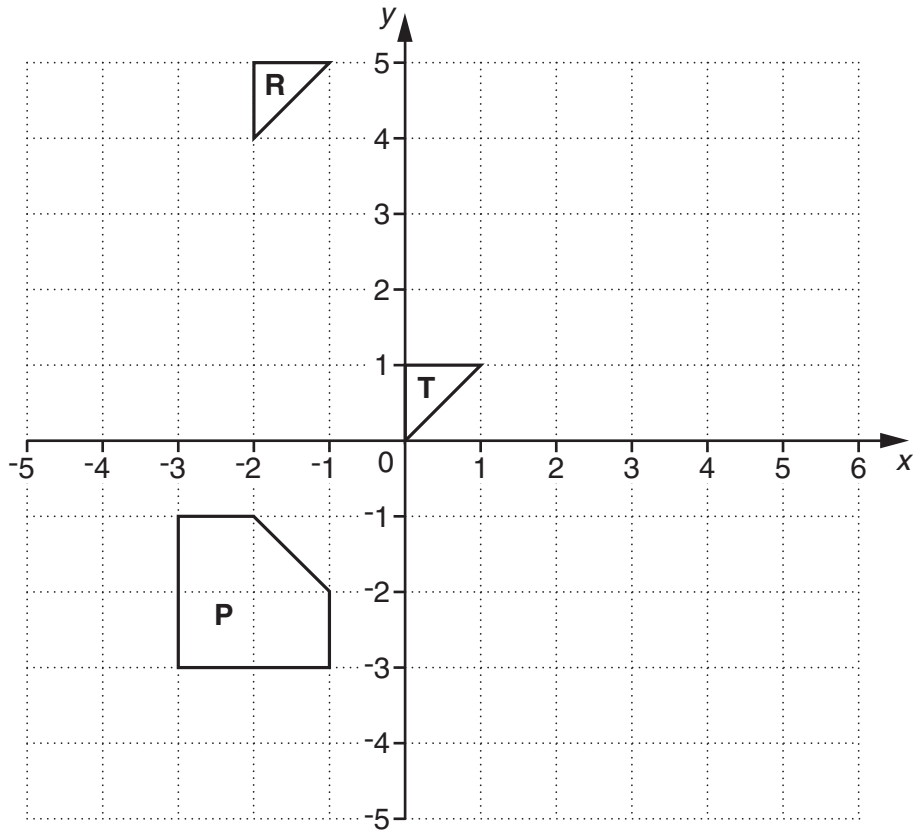Label the image **B**. **[2]**

(c) Triangle **T** is transformed by four translations given by the following vectors.

$$\begin{pmatrix} 15 \\ -6 \end{pmatrix} \text{ then } \begin{pmatrix} 22 \\ 9 \end{pmatrix} \text{ then } \begin{pmatrix} {}^-15 \\ 6 \end{pmatrix} \text{ then } \begin{pmatrix} {}^-17 \\ -9 \end{pmatrix}$$

Draw the image of triangle **T** after these four translations.
Label the image **C**. **[3]**

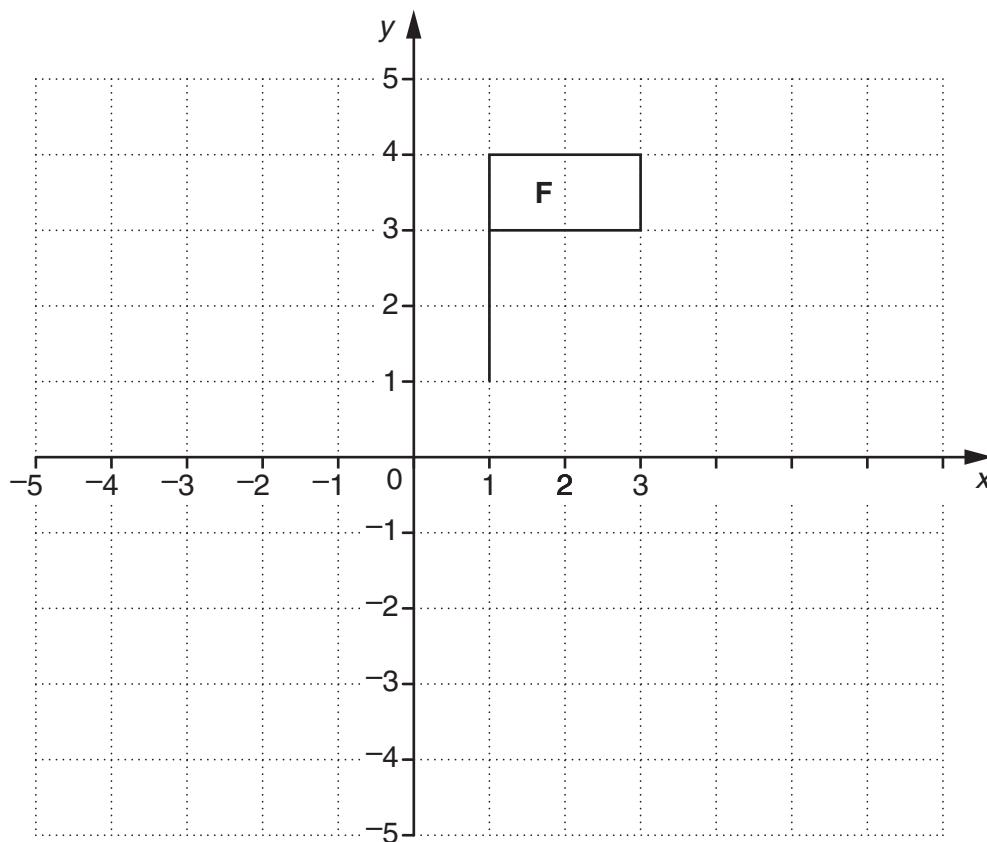**2**　　Shapes **P**, **R** and **T** are drawn on this grid.

(a)　Describe fully the **single** transformation that maps triangle **T** onto triangle **R**.

　　...

　　.. **[3]**

(b)　Reflect shape **P** in the line $x = 1$.
　　Label your image **B**.　　　　　　　　　　　　　　　　　　　　　　　　　　　　　**[2]**

(c)　Enlarge triangle **T** with scale factor 3, centre (0, 0).
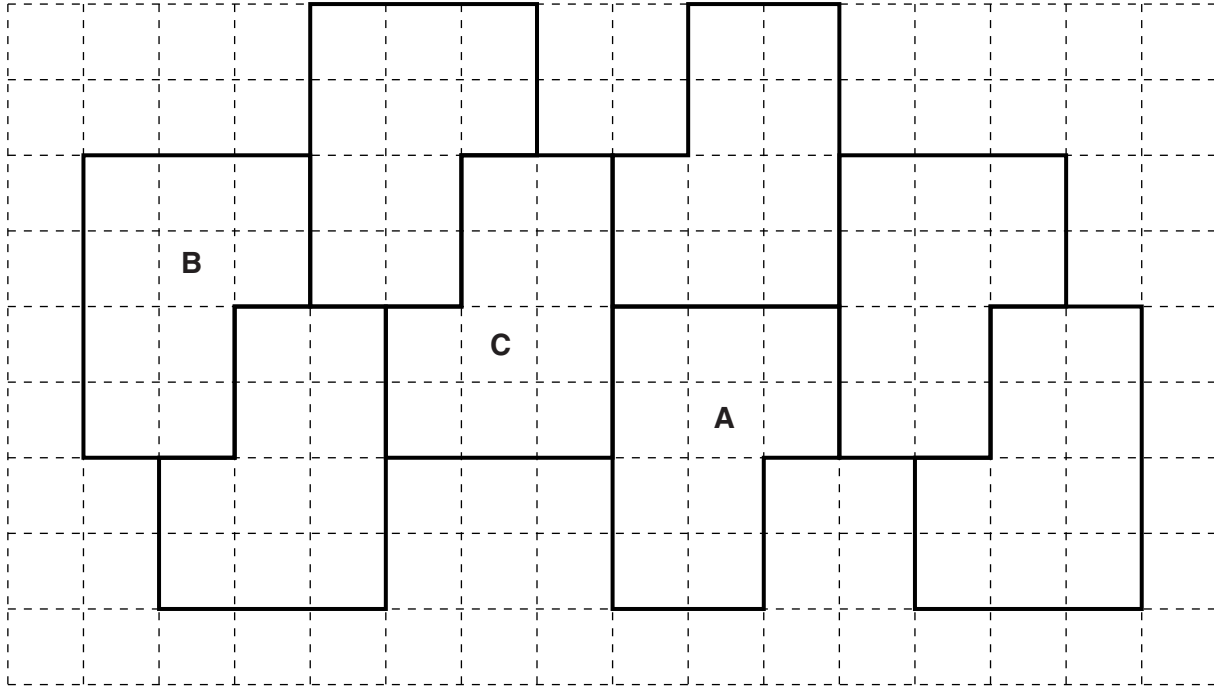　　Label your image **C**.　　　　　　　　　　　　　　　　　　　　　　　　　　　　　**[3]**

3

(a) Rotate shape **F** 90° anticlockwise about the point (1, 1).
Label the image **G**.   **[3]**

(b) Translate shape **F** using the vector $\begin{pmatrix} 1 \\ -3 \end{pmatrix}$.
Label the image **H**.   **[2]**

4 Part of a wallpaper design is shown below.

(a) Describe fully the single transformation that maps shape **A** onto shape **B**.

_____

_____ **[3]**

(b) Shape **C** is a rotation of shape **B**.

(i) Through what angle has the shape been rotated?

(b)(i) _____ ° **[1]**

(ii) Mark the centre of rotation with a cross (X). **[1]**

(c) Describe a single transformation that would **decrease** the **area** of shape **A**.

_____

_____ **[2]**