Transformations

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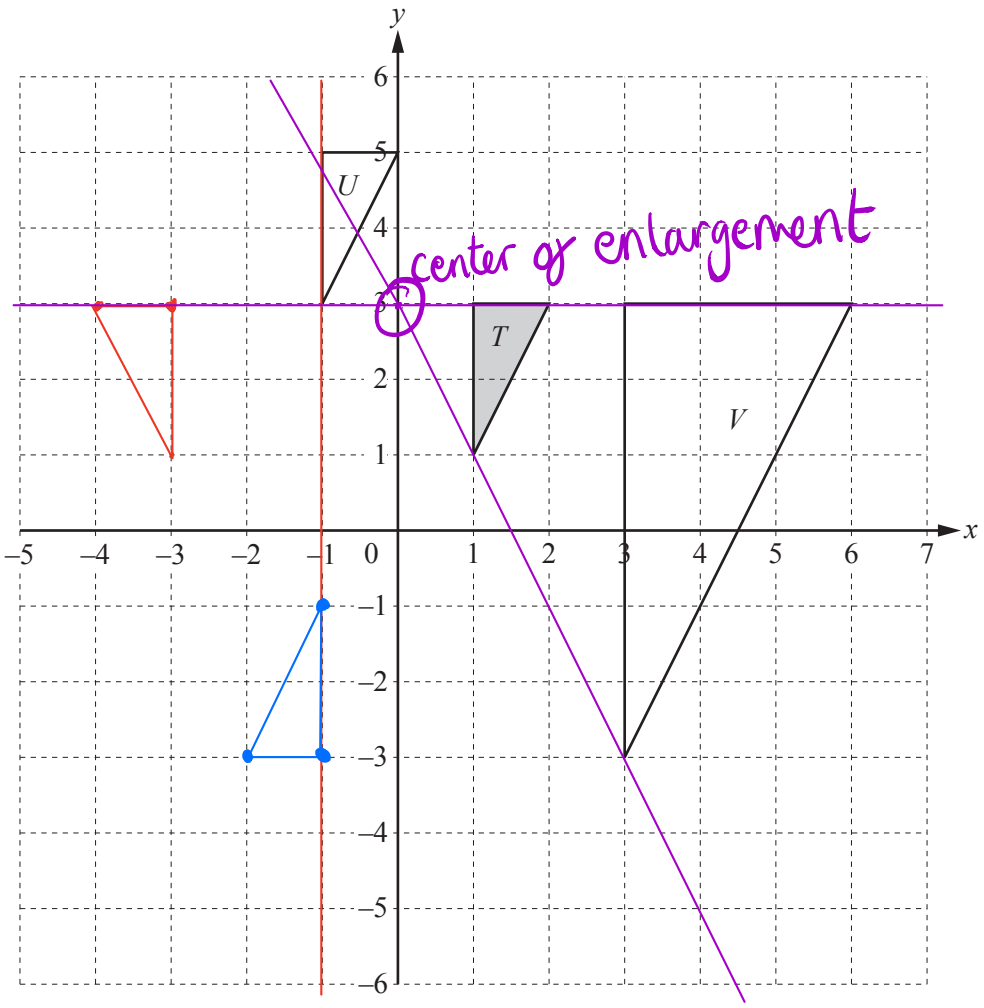
1



(a) On the grid, draw the image of

(i) triangle T after a reflection in the line $x = -1$, [2]

(ii) triangle T after a rotation through 180° about (0, 0). [2]

(b) Describe fully the **single** transformation that maps

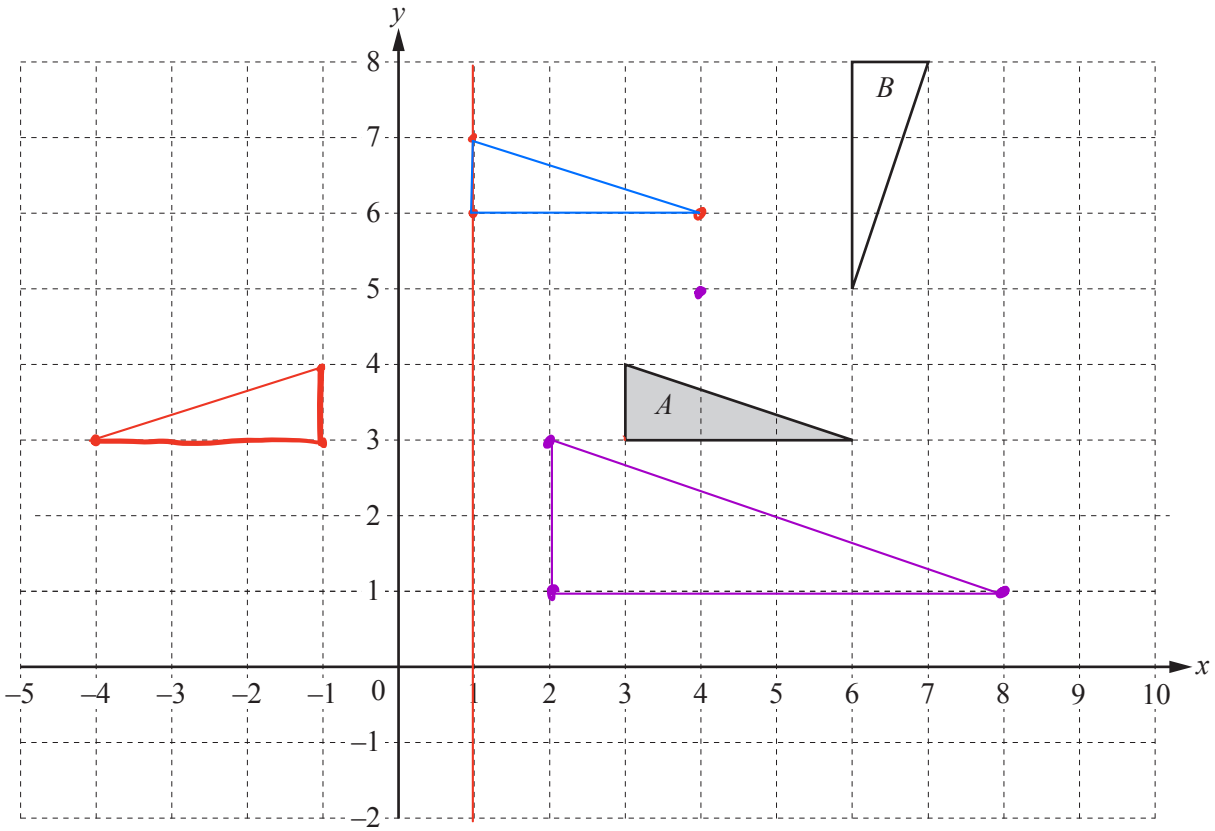
(i) triangle T onto triangle U,

Answer(b)(i) Translation by column vector $\begin{pmatrix} -2 \\ 2 \end{pmatrix}$ [2]

(ii) triangle T onto triangle V.

Answer(b)(ii) Enlargement, center (0,3) by Scale factor 3 [3]

4



(a) Draw the image when triangle A is reflected in the line $x = 1$. [2]

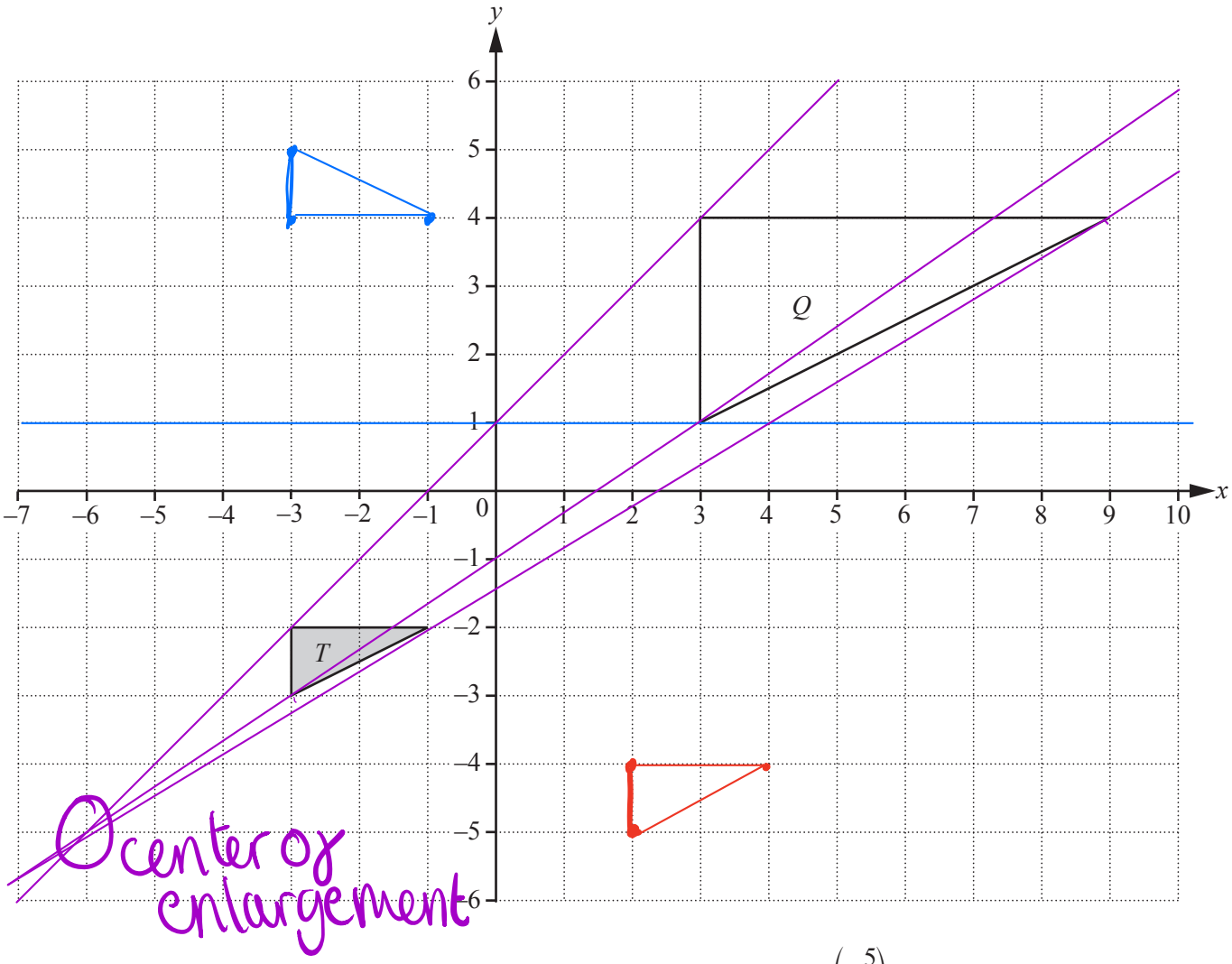
(b) Draw the image when triangle A is translated by the vector $\begin{pmatrix} -2 \\ 3 \end{pmatrix}$. [2]

(c) Draw the image when triangle A is enlarged by scale factor 2 with centre (4, 5). [2]

(d) Describe fully the **single** transformation that maps triangle A onto triangle B.

Rotation, 90° clockwise with the center of rotation at (7,4) [3]

2 (a)



(i) Draw the image of triangle T after a translation by the vector $\begin{pmatrix} 5 \\ -2 \end{pmatrix}$. [2]

(ii) Draw the image of triangle T after a reflection in the line $y = 1$. [2]

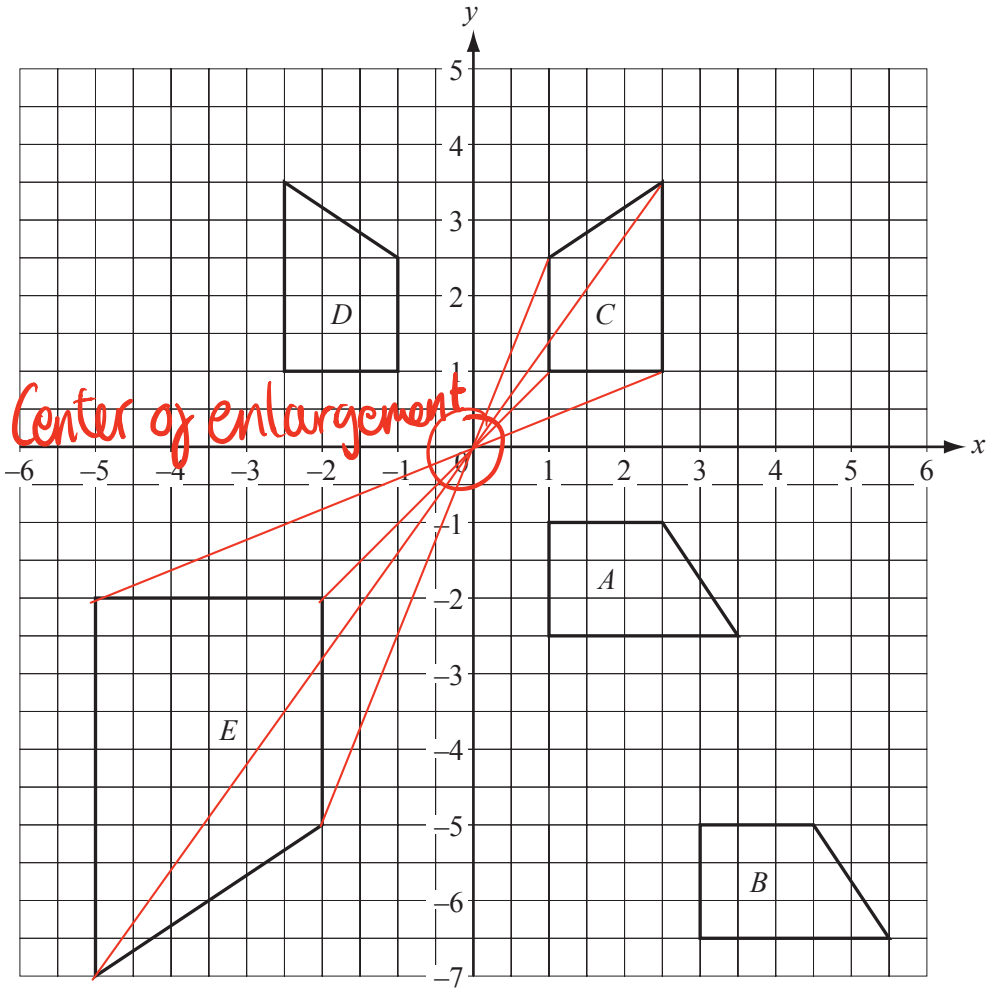
(iii) Describe fully the **single** transformation that maps triangle T onto triangle Q.

Enlargement, scale Fator 3, center of enlargement at (-6, -5)

[3]

2

For Examiner's Use



Describe fully the **single** transformation which maps

(a) *A* onto *B*,

Answer(a) Translation by column vector $\begin{pmatrix} 2 \\ -4 \end{pmatrix}$ [3]

(b) *C* onto *D*,

Answer(b) Reflection in the line $x = 0$ [2]

(c) *A* onto *C*,

Answer(c) Rotation 90° anti-clockwise about the origin [3]

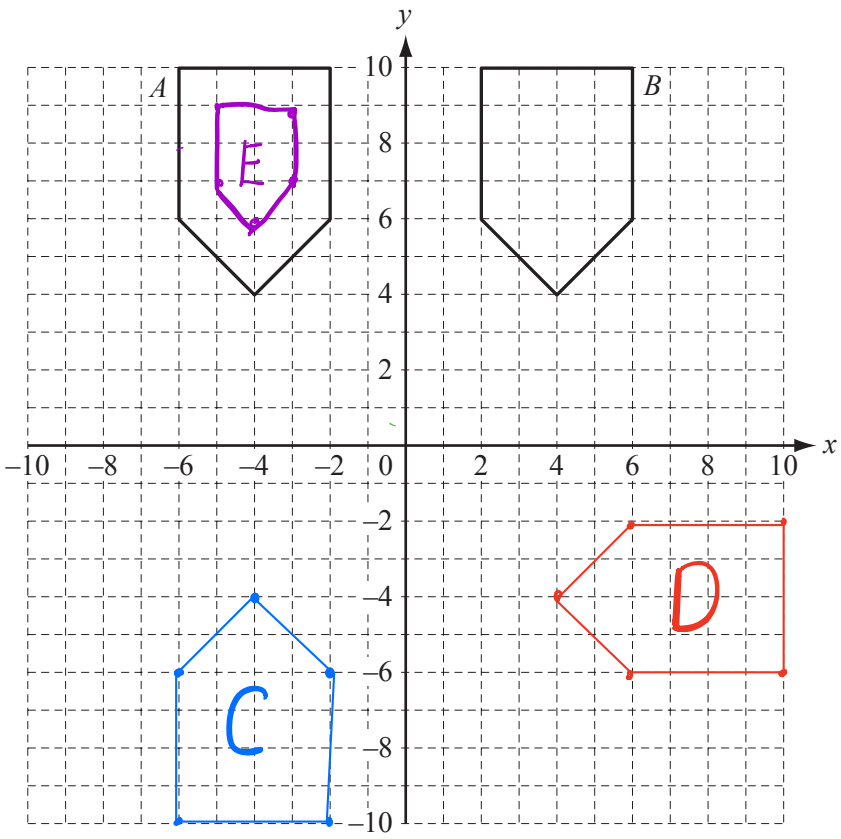
(d) *C* onto *E*.

Answer(d) Enlargement, Scale Factor −2 [3]

Center of enlargement = Origin

5

For Examiner's Use



(a) Two different **single** transformations can map shape *A* onto shape *B*.

Describe each transformation fully.

Answer(a) Reflection in the y-axis

or Translation by column vector $\begin{pmatrix} 8 \\ 0 \end{pmatrix}$ [4]

(b) Reflect shape *A* in the *x* axis. Draw the image and label it *C*. [2]

(c) Rotate shape *B* through 90° clockwise about the origin. Draw the image and label it *D*. [2]

(d) Describe fully the **single** transformation which maps shape *C* onto shape *B*.

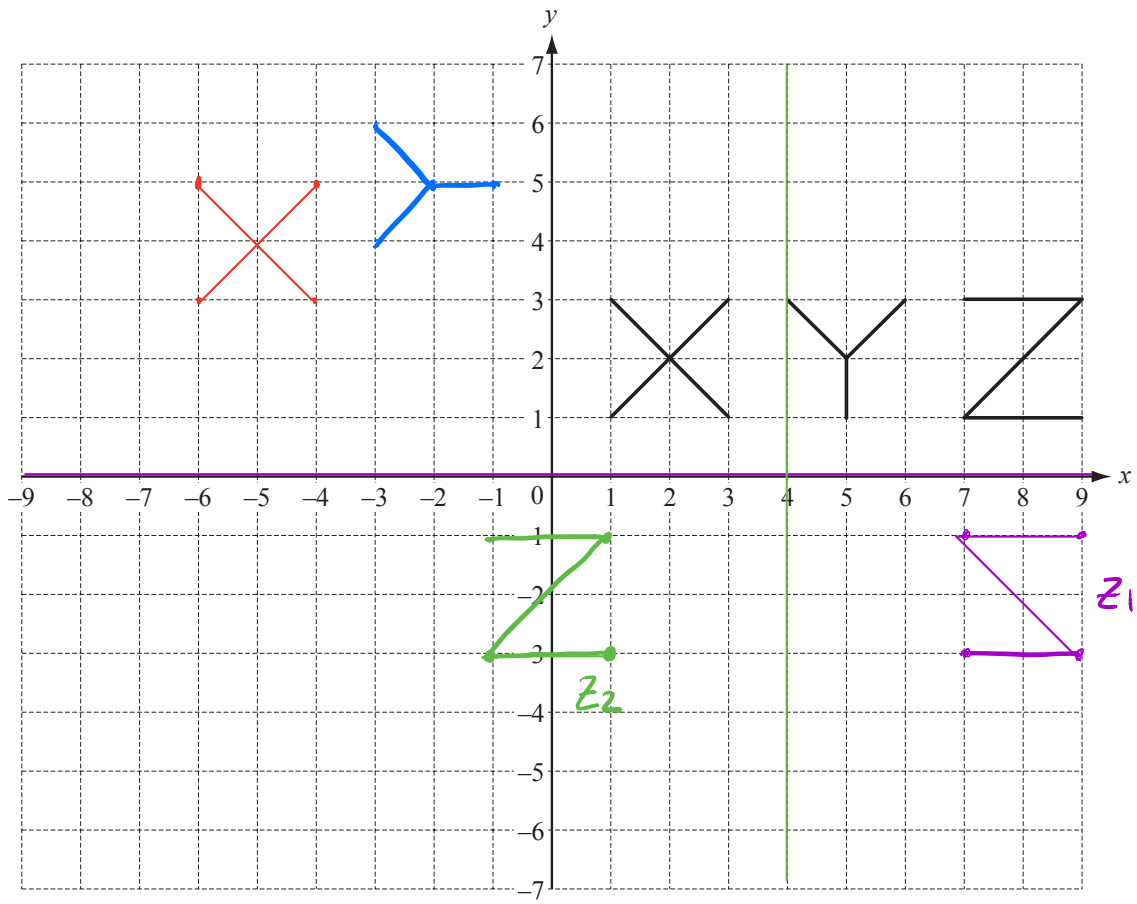
Answer(d) Rotation 180° about the origin [3]

(e) Draw the enlargement of shape *A*, centre (–4, 8), with scale factor $\frac{1}{2}$.

Label the image *E*. [2]

8

For Examiner's Use



(a) On the grid,

(i) translate X by the vector $\begin{pmatrix} -7 \\ 2 \end{pmatrix}$, [2]

(ii) rotate Y through 90° anticlockwise about the origin. [2]

(b) (i) On the grid, reflect Z in the x-axis. This is the image Z_1. [2]

(ii) On the grid, reflect the image Z_1 in the line $x = 4$. This is the image Z_2. [2]

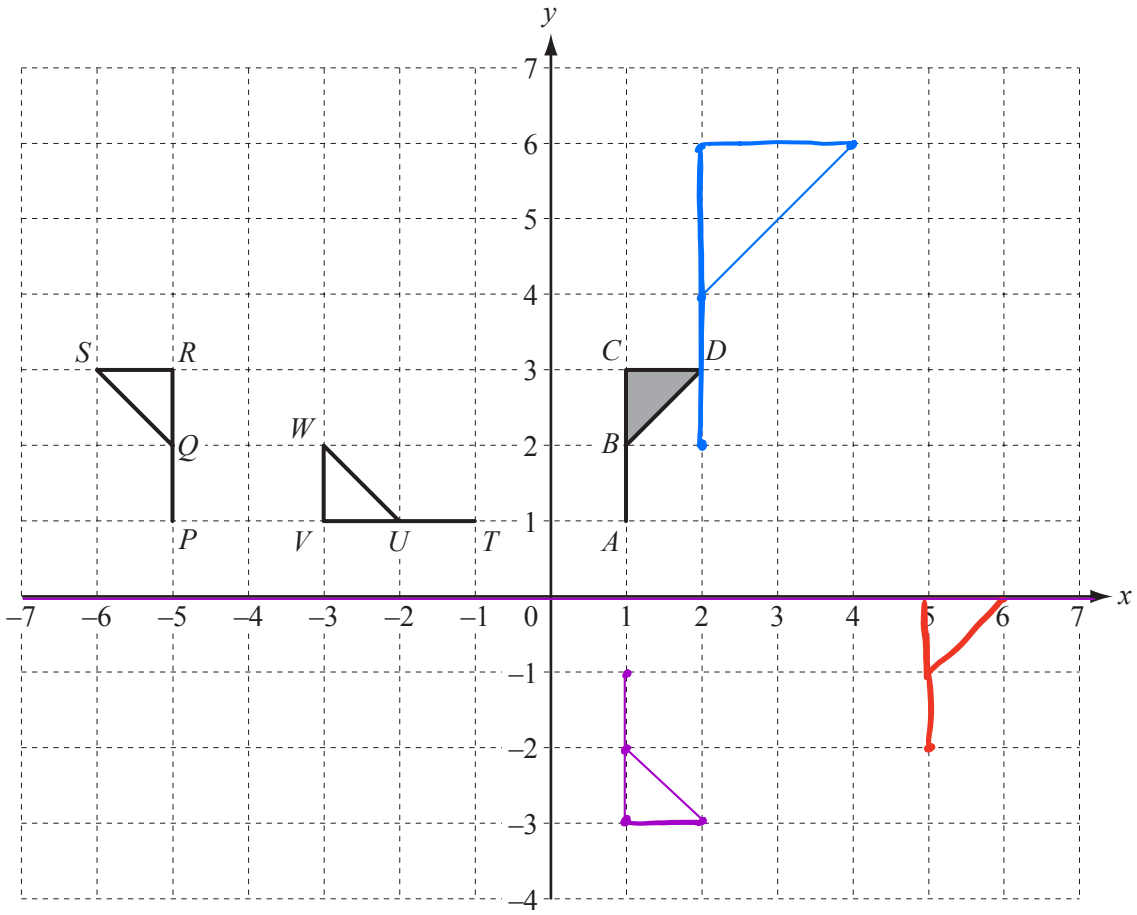
(iii) Describe a **single** transformation which maps the image Z_2 onto the original Z.

Answer(b)(iii) Translation by column vector $\begin{pmatrix} 8 \\ 4 \end{pmatrix}$ [2]

Question 9 is printed on the next page.

For Examiner's Use

5



(a) On the grid, draw the image of

(i) the flag *ABCD* after translation by $\begin{pmatrix} 4 \\ -3 \end{pmatrix}$, [2]

(ii) the flag *ABCD* after enlargement, scale factor 2, centre the origin, [2]

(iii) the flag *ABCD* after reflection in the *x*-axis. [2]

(b) Describe fully the **single** transformation which maps *ABCD* onto *PQRS*.

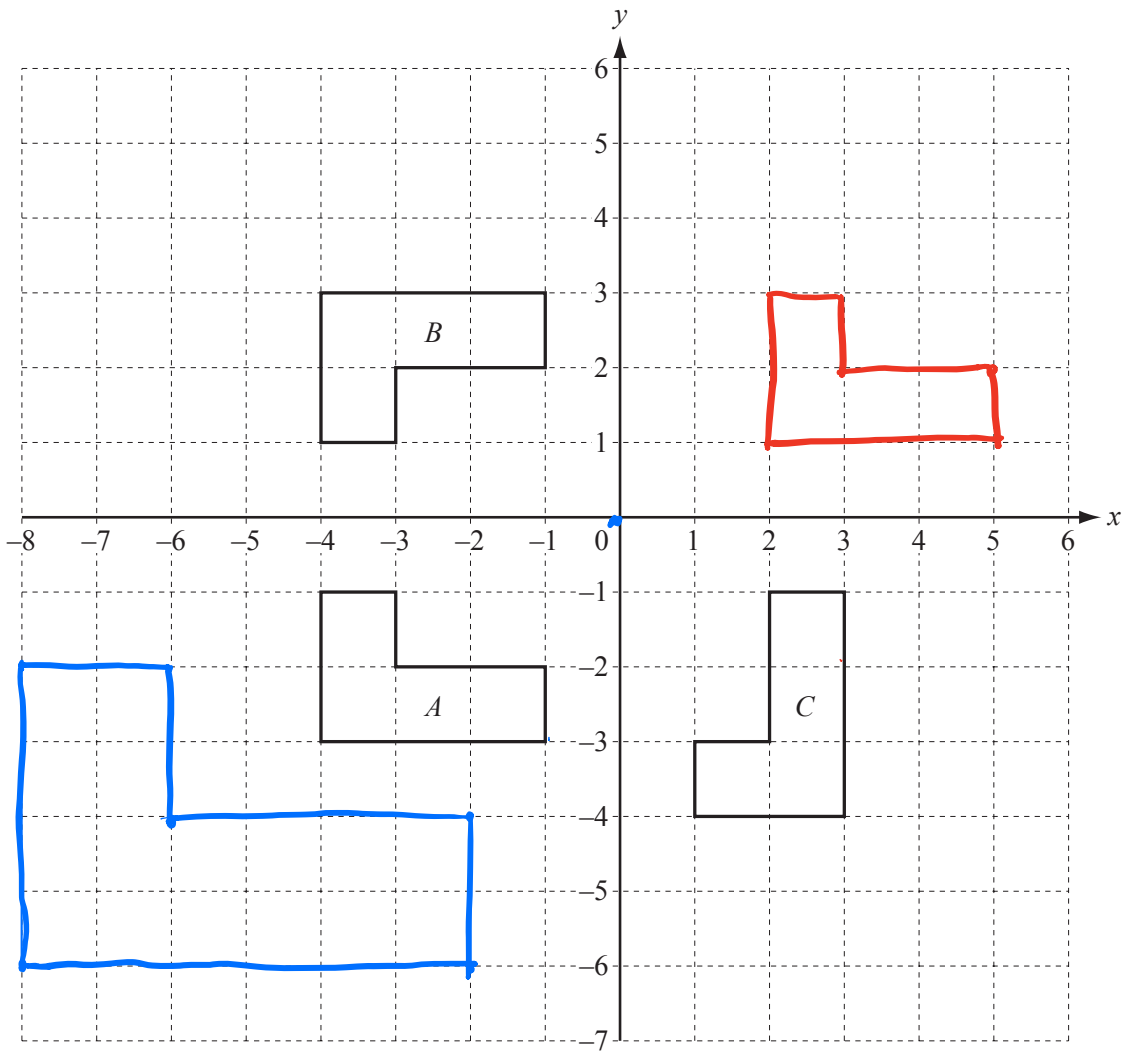
Reflection in the line $x = -2$ [2]

(c) Describe fully the **single** transformation which maps *ABCD* onto *TUVW*.

Rotation, 90 degrees clockwise around the origin. [3]

For Examiner's Use

11



Shapes A, B and C are shown on the grid.

(a) Describe fully the **single** transformation which maps

(i) shape A onto shape B,

Answer(a)(i) Reflection in the x axis. [2]

(ii) shape A onto shape C.

Answer(a)(ii) Rotation 90° Anti-clockwise around the origin. [3]

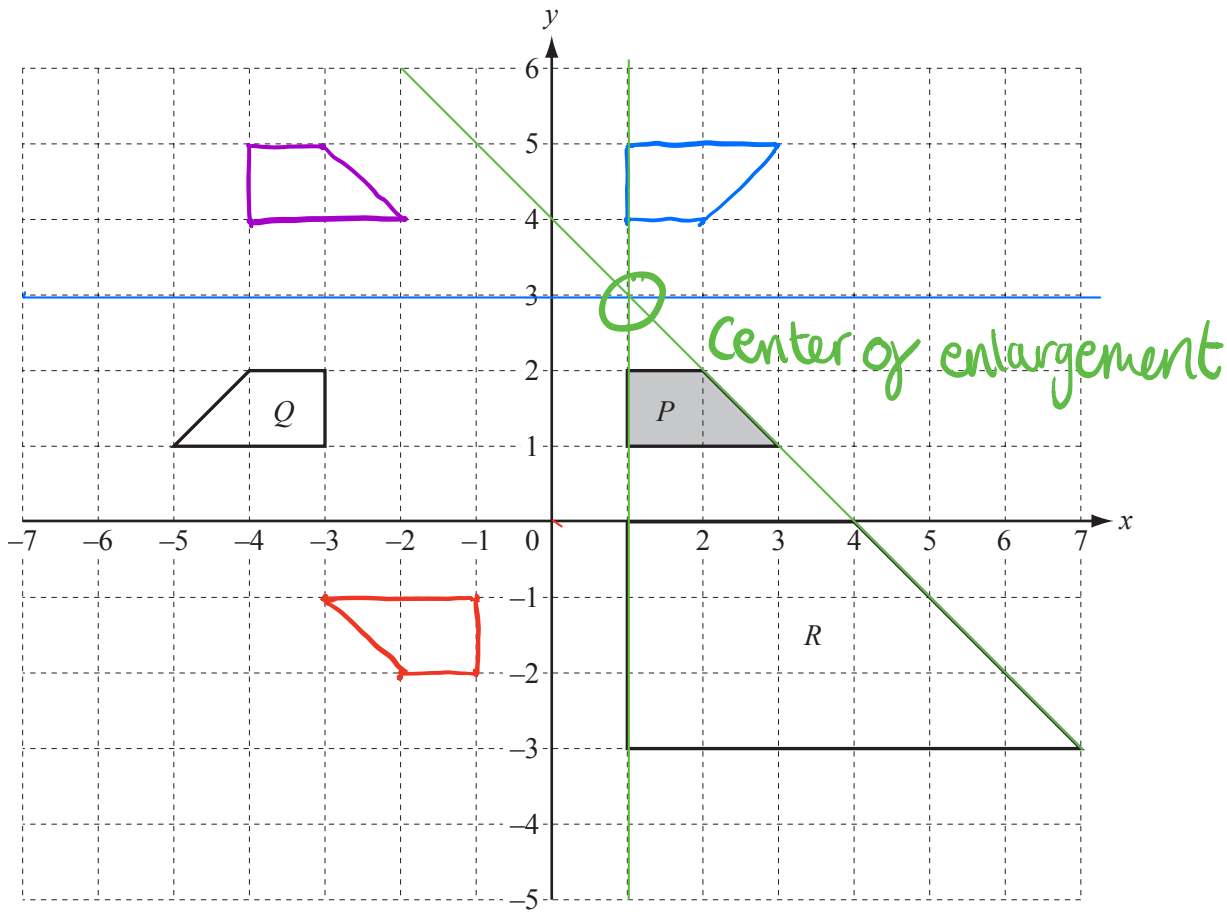
(b) On the grid draw the image of **shape *A*** after

(i) a translation by the vector $\begin{pmatrix} 6 \\ 4 \end{pmatrix}$, [2]

(ii) an enlargement, scale factor 2, centre the origin. [2]

8

For Examiner's Use



Shapes P, Q, and R are shown on the grid.

(a) On the grid, draw the image of **shape *P*** after

(i) a rotation through 180° about the origin, [2]

(ii) a reflection in the line $y = 3$, [2]

(iii) a translation by the vector $\begin{pmatrix} -5 \\ 3 \end{pmatrix}$. [2]

(b) Describe fully the **single** transformation which maps

(i) shape P onto shape Q,

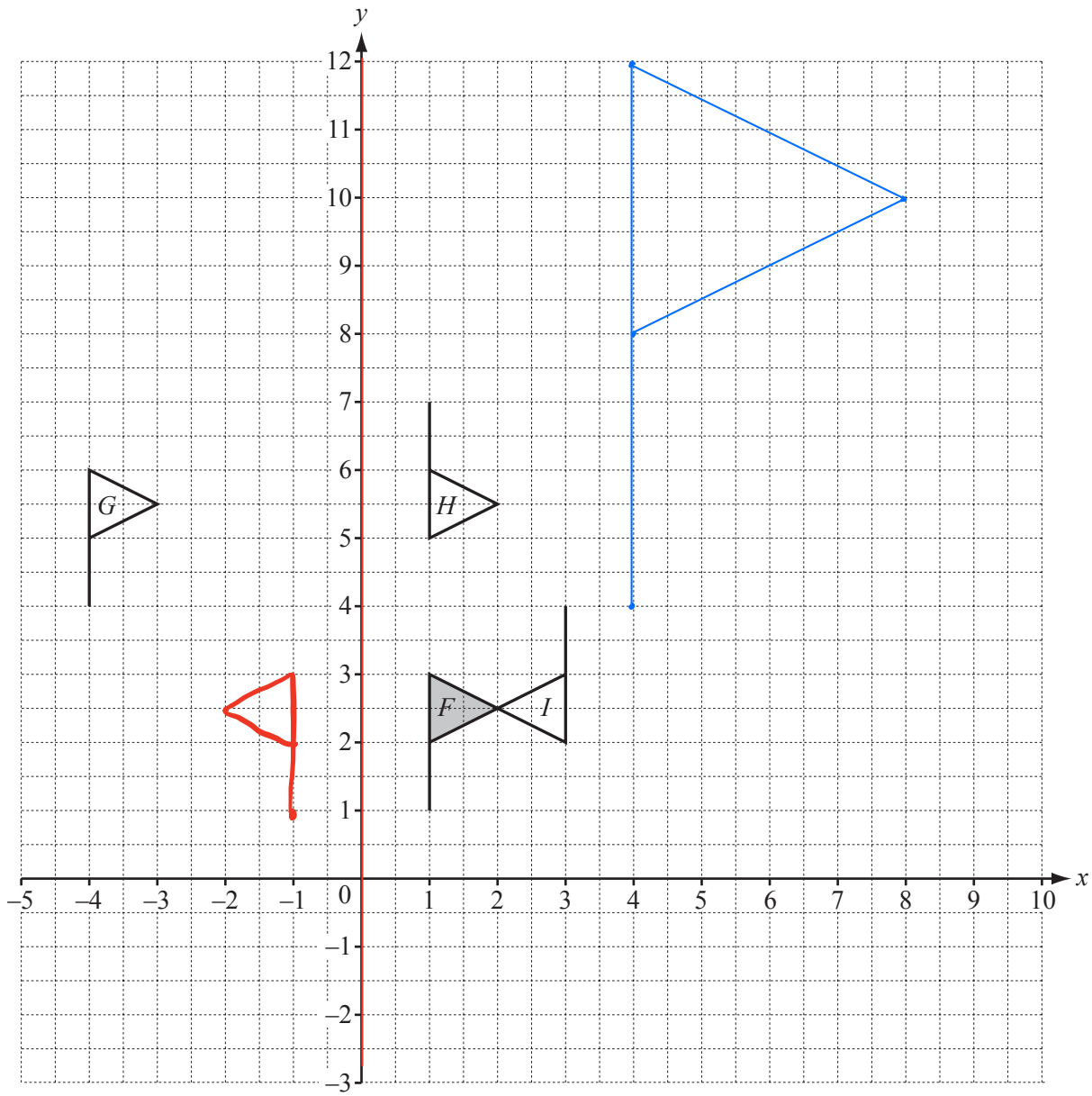
Answer(b)(i) Reflection in the line $x = -1$ [2]

(ii) shape P onto shape R.

Answer(b)(ii) Enlargement at center (1,3) with scale Factor 3 [3]

3

For Examiner's Use



(a) Describe fully the **single** transformation that maps

(i) flag *F* onto flag *G*,

Answer(a)(i) Translation by column vector $\begin{pmatrix} -5 \\ 3 \end{pmatrix}$ [2]

(ii) flag *F* onto flag *H*,

Answer(a)(ii) Reflection in the line $y = 4$ [2]

(iii) flag *F* onto flag *I*.

Answer(a)(iii) Rotation at center (2, 2.5) by 180°. [3]

(b) On the grid, draw

(i) the reflection of flag *F* in the *y*-axis, [2]

(ii) the enlargement of flag *F*, centre (0, 0) and scale factor 4. [2]

[Turn over