Write your name, centre number and candidate number in the boxes below.

Surname	Other names

Centre number | | | | | |

Candidate number | | | | |

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Transformations

Time allowed: 1 hour 15 minutes

Subject code **0580**

Mathematics

Questions from Paper 1, Paper 3 and Paper 4

You must have: a ruler marked in centimetres and millimetres, a protractor, compasses, a pen, an HB pencil and an eraser.
You may use a calculator.

Total marks

/ 61

Instructions

- Answer every question in the space provided on this paper.
- Write in black or dark blue ink. Pencil may be used for diagrams and graphs.
- Fill in your name, centre number and candidate number above.
- Show your working: a correct method can earn marks even if the answer is wrong.
- Unless a question says otherwise, give answers that are not exact to 3 significant figures, and angles in degrees to 1 decimal place.

Information

- This paper has 10 questions worth 61 marks in total.
- The marks for each question or part are shown in brackets, for example [3].

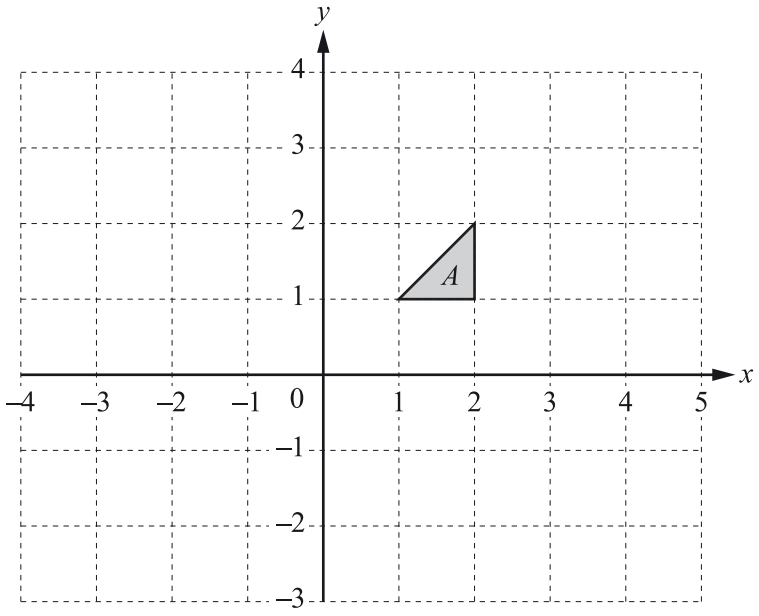
Advice

- Read every question through once before you write anything.
- Use the marks in brackets to judge how long to spend on each part.
- If you finish early, go back and check your working.

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Print at 100% (Actual size) so diagrams keep their real measurements.

1

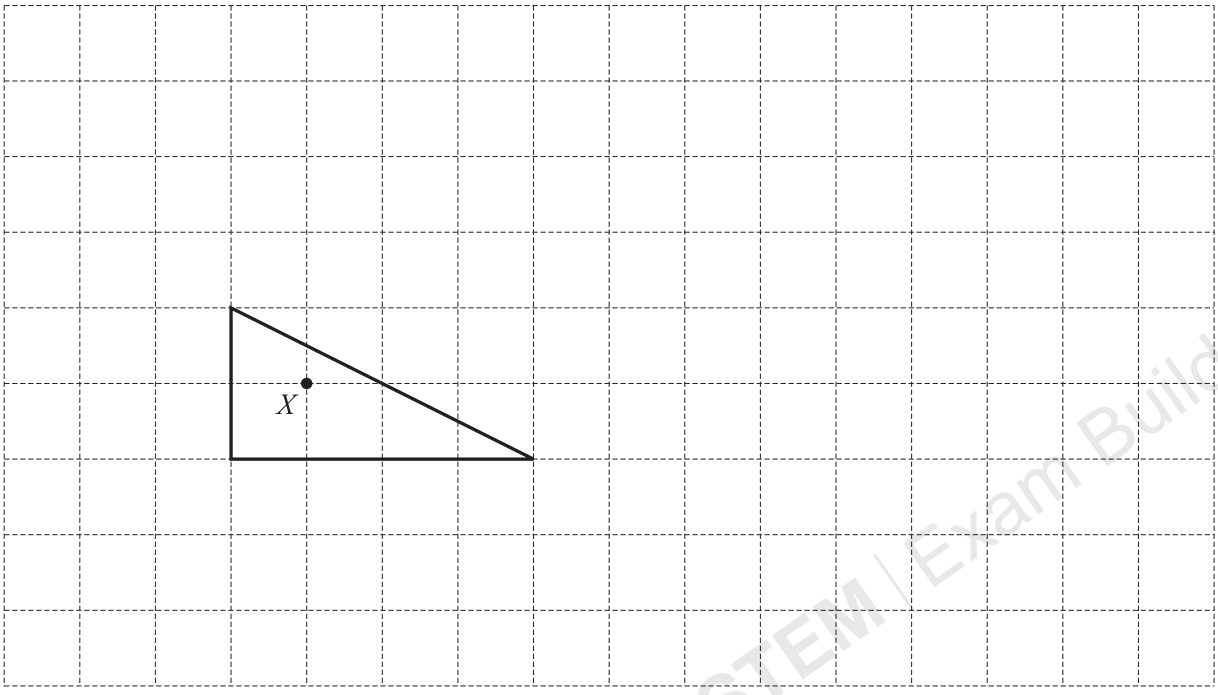


Draw the image of shape A after a translation by the vector $\begin{pmatrix} 2 \\ -3 \end{pmatrix}$. [2]

Transformations Click for more variations

1	Triangle (3, –2), (4, –2), (4, –1)	**2**	**B1** for movement 2 right or 3 down

2



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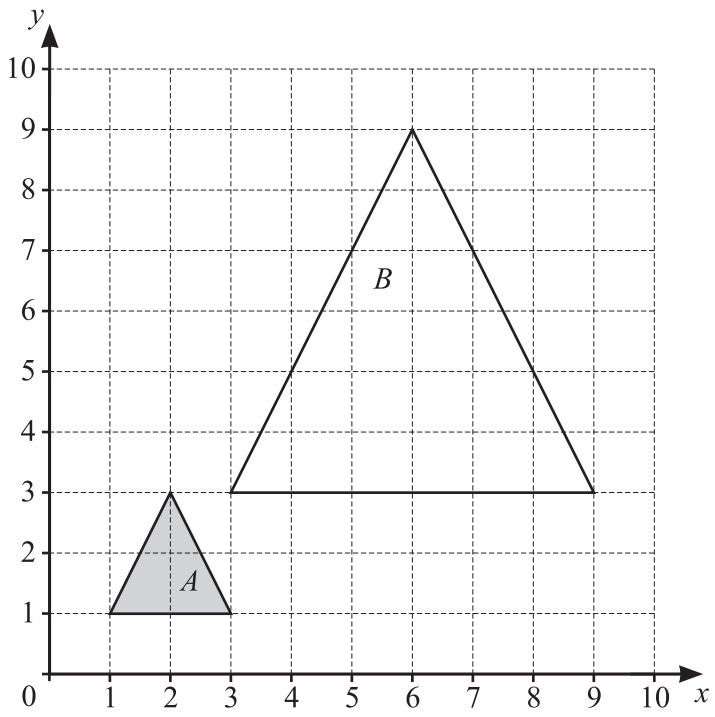
Draw the enlargement of the triangle by scale factor 3, centre X.

[2]

Transformations Click for more variations

2	correctly enlarged triangle	**2**	**M1** for an enlargement scale factor 3 but incorrect position

3 The diagram shows triangles *A* and *B*.



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

.....

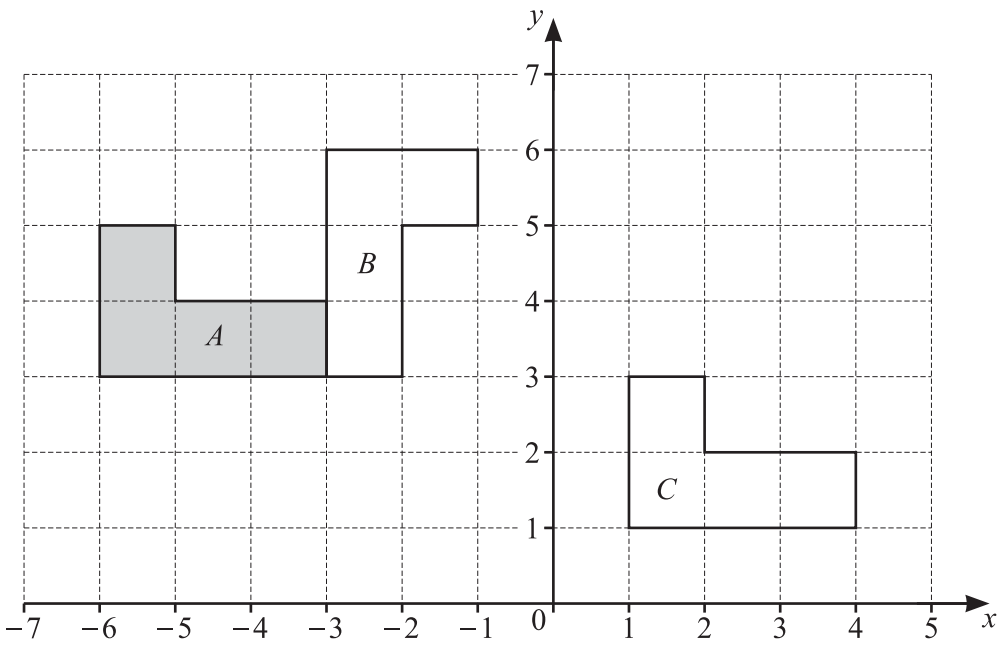
..... [3]

Transformations Click for more variations

3	Enlargement Centre (0,0) [Scale factor] 3	**3**	**B1** for each

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4 The diagram shows three shapes, A, B and C, on a 1 cm^2 grid.



Describe fully the **single** transformation that maps

(a) shape A onto shape B

.....

..... [3]

(b) shape A onto shape C.

.....

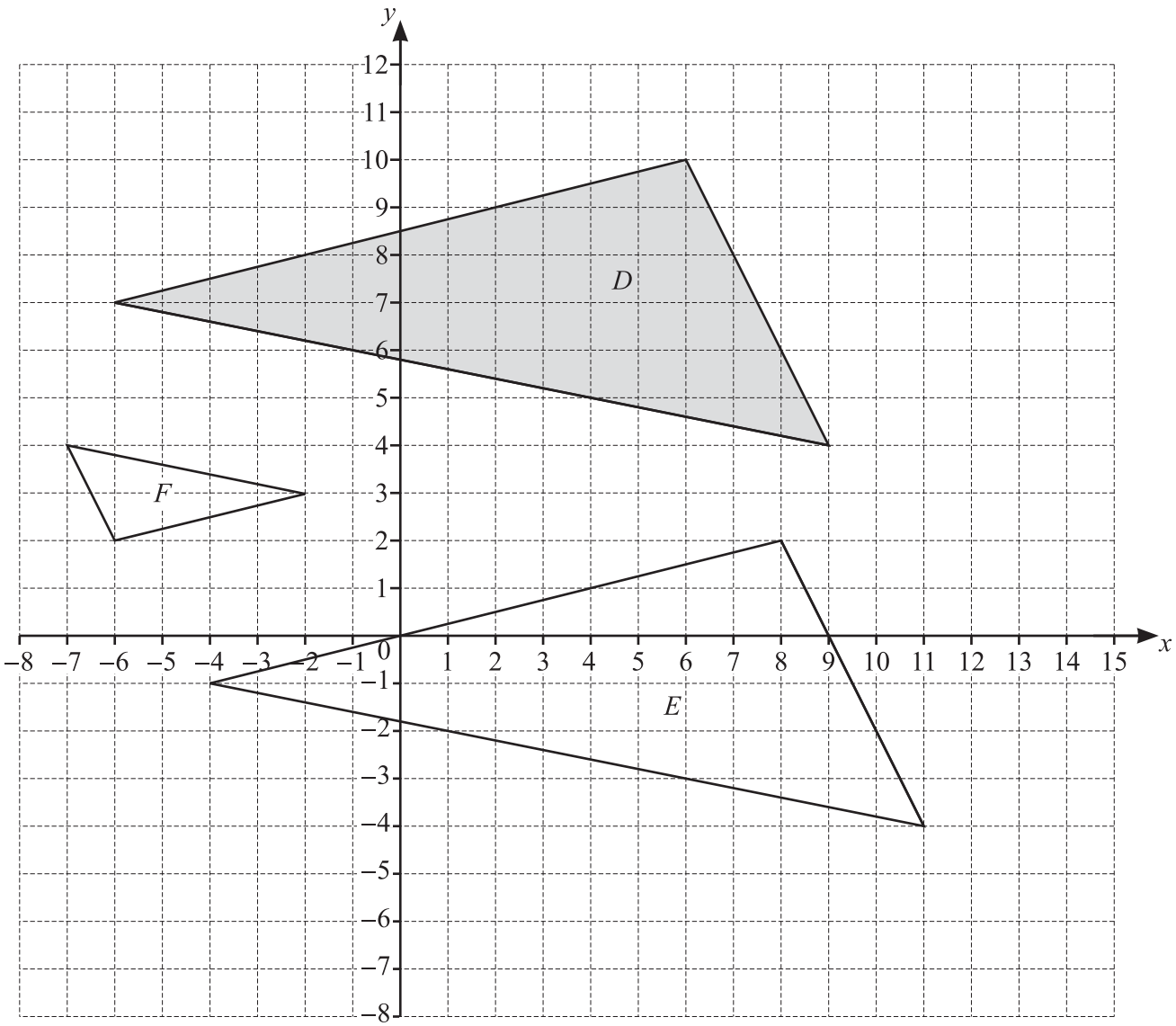
..... [2]

(a) Transformations (b) Transformations Click for more variations

4(a)	Rotation [centre] (–3, 3) 90° clockwise	**3**	**B1** for each
4(b)	Translation $\begin{pmatrix} 7 \\ -2 \end{pmatrix}$	**2**	**B1** for each

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5



(a) Describe fully the **single** transformation that maps triangle *D* onto triangle *E*.

.....

..... [2]

(b) Describe fully the **single** transformation that maps triangle *D* onto triangle *F*.

.....

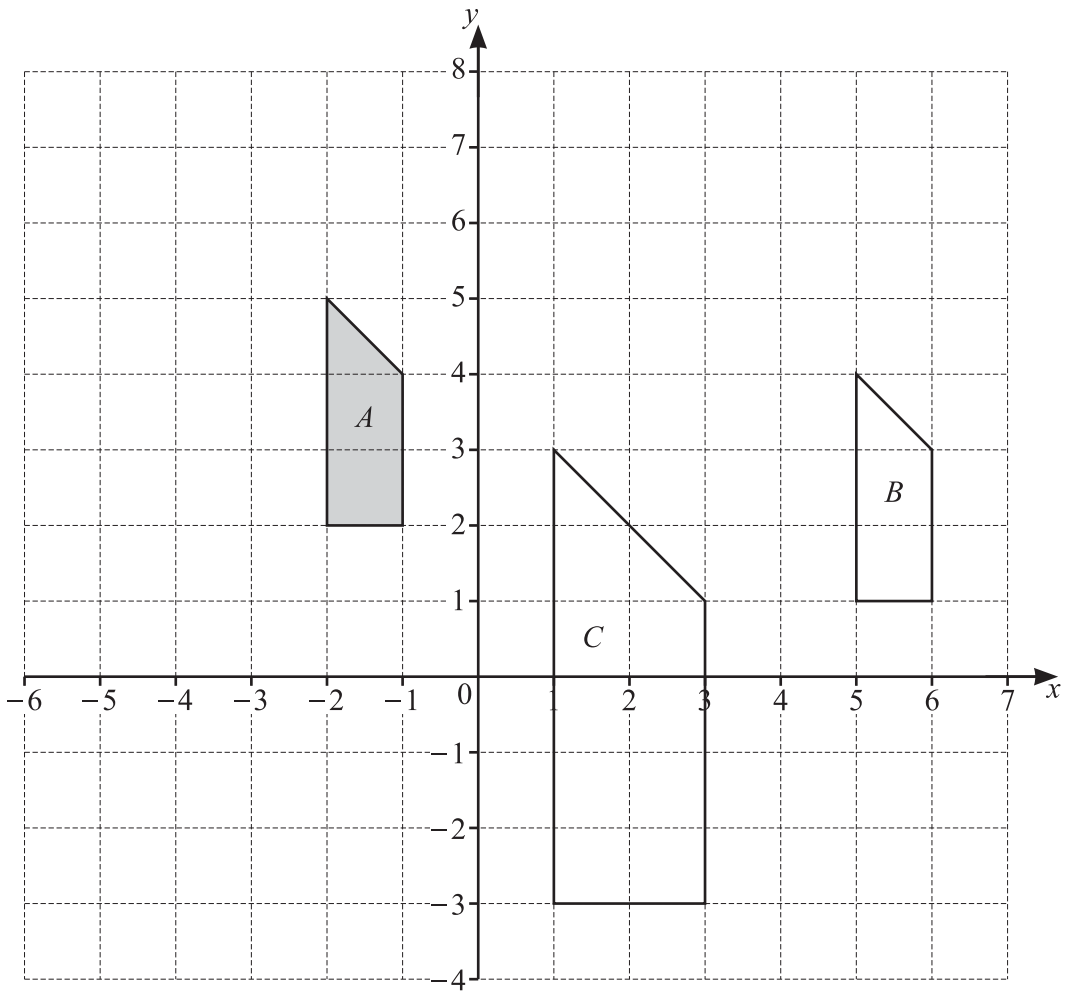
..... [3]

(a) Transformations (b) Transformations Click for more variations

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5(a)	Translation $\begin{pmatrix} 2 \\ -8 \end{pmatrix}$	**2**	**B1** for translation **B1** for $\begin{pmatrix} 2 \\ -8 \end{pmatrix}$
5(b)	Enlargement [scale factor] $-\frac{1}{3}$ [centre] (–3, 4)	**3**	**B1** for each

6



(a) Sue describes the **single** transformation that maps shape A onto shape B as a translation by the vector $\begin{pmatrix}7\\1\end{pmatrix}$.

Explain why Sue is incorrect.

.....

..... [1]

(b) On the grid, draw the image of shape A after a rotation of 90° anticlockwise about (0, 0). [2]

(c) Describe fully the **single** transformation that maps shape A onto shape C.

.....

..... [3]

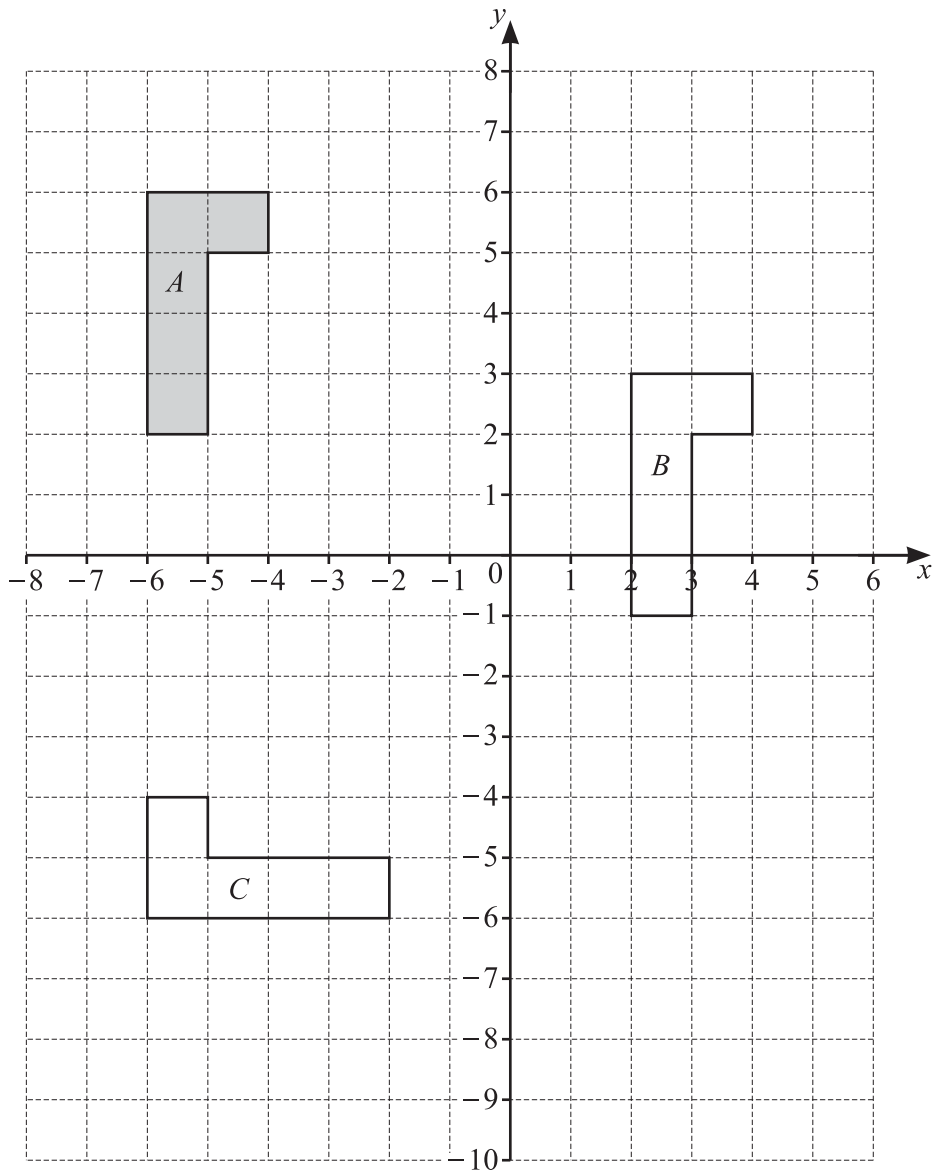
(a) Transformations (b) Transformations (c) Transformations Click for more variations

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6(a)	She counted 1 up instead of 1 down oe	**1**	
6(b)	Correct shape drawn at (–4,–1), (–2,–1), (–5,–2), (–2,–2)	**2**	**B1** for correct shape drawn 90 clockwise about the origin or for correct orientation, wrong centre
6(c)	Enlargement [scale factor] 2 [centre] (–5, 7)	**3**	**B1** for each

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7



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

(i) shape A onto shape B

.....

..... [2]

(ii) shape A onto shape C.

.....

..... [3]

(b) On the grid, draw the image of shape A after a reflection in the line $x = -2$. [2]

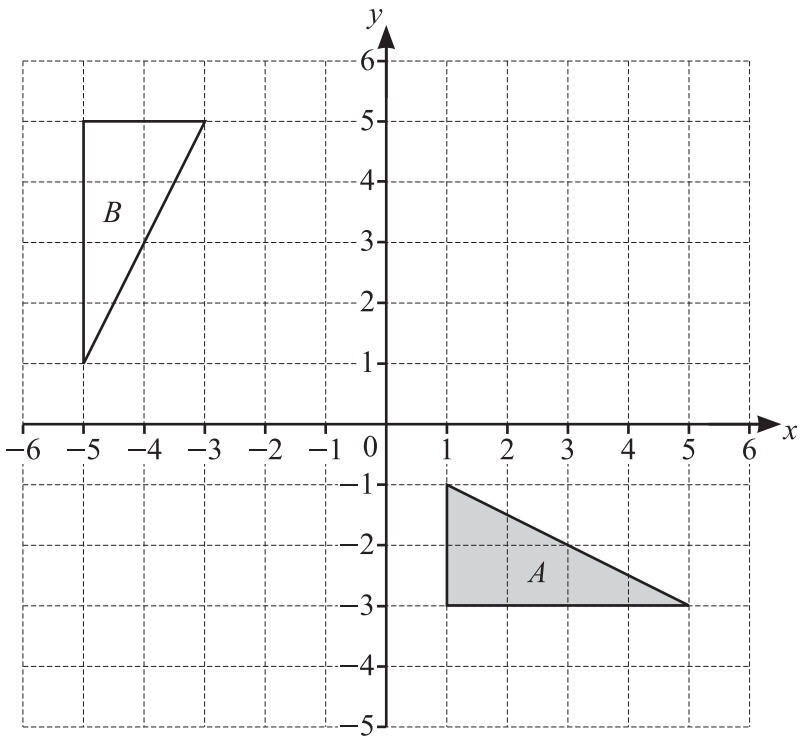
(a)(i) Transformations (a)(ii) Transformations (b) Transformations Click for more variations

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7(a)(i)	Translation $\begin{pmatrix} 8 \\ -3 \end{pmatrix}$	**2**	**B1** for translation or for correct vector oe
7(a)(ii)	Rotation 90° [anticlockwise] [centre] (0, 0)	**3**	**B1** for each
7(b)	Image drawn at (0, 5) (0, 6) (2, 6) (2, 2) (1, 2) (1, 5)	**2**	**B1** for reflection in $x = k$ If 0 scored, **SC1** for reflection in $y = -2$

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8



(a) On the grid, draw

(i) the image of triangle A after a reflection in the line $x = 1$ [2]

(ii) the image of triangle A after an enlargement by scale factor $\frac{1}{2}$ with centre (5, 1). [2]

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

.....

..... [3]

(c) The point (a, b) is reflected in the line $y = k$ where k is an integer and $b < k$.

Write the coordinates of the image of point (a, b) in terms of a, b and k.

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(..... , ...) [2]

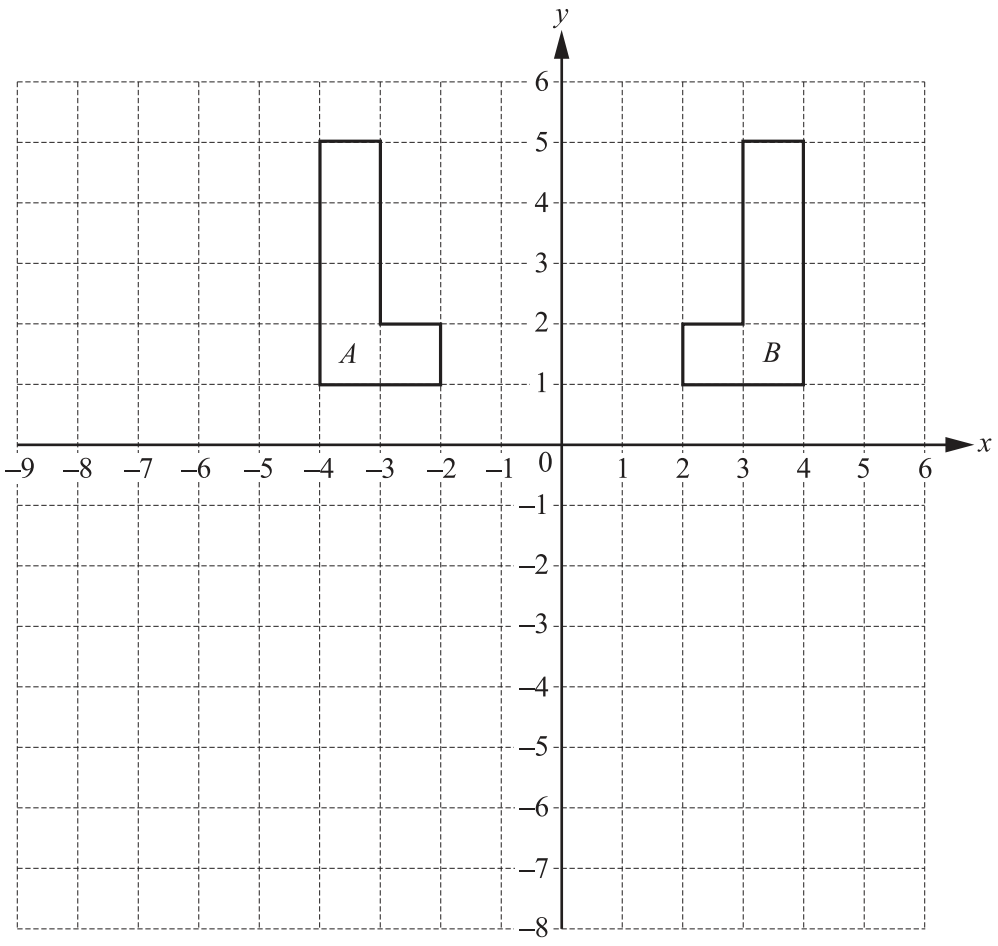
(a)(i) Transformations (a)(ii) Transformations (b) Transformations (c) Transformations

Click for more variations

8(a)(i)	Triangle at (1, –1) (1, –3) (–3, –3)	**2**	**B1** for reflection in $x = k$ or for reflection in $y = 1$
8(a)(ii)	Triangle at (3, –1) (5, –1) (3, 0)	**2**	**B1** for correct size and orientation but wrong position
8(b)	Rotation 90 clockwise oe [centre] (2, 4) oe	**3**	**B1** for each
8(c)	(a, $2k - b$) oe isw	**2**	**B1** for each coordinate

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9



The diagram shows two shapes A and B.

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

.....

..... [2]

(b) **(i)** Reflect **shape *B*** in the line $y = 0$ and label this shape C. [2]

(ii) Describe fully the **single** transformation that maps **shape *A*** onto shape C.

.....

..... [3]

(c) **(i)** Enlarge **shape *A*** by scale factor 3, centre (–2, 5). Label this shape D. [2]

(ii) How many times bigger is the area of shape D than the area of shape A?

..... [2]

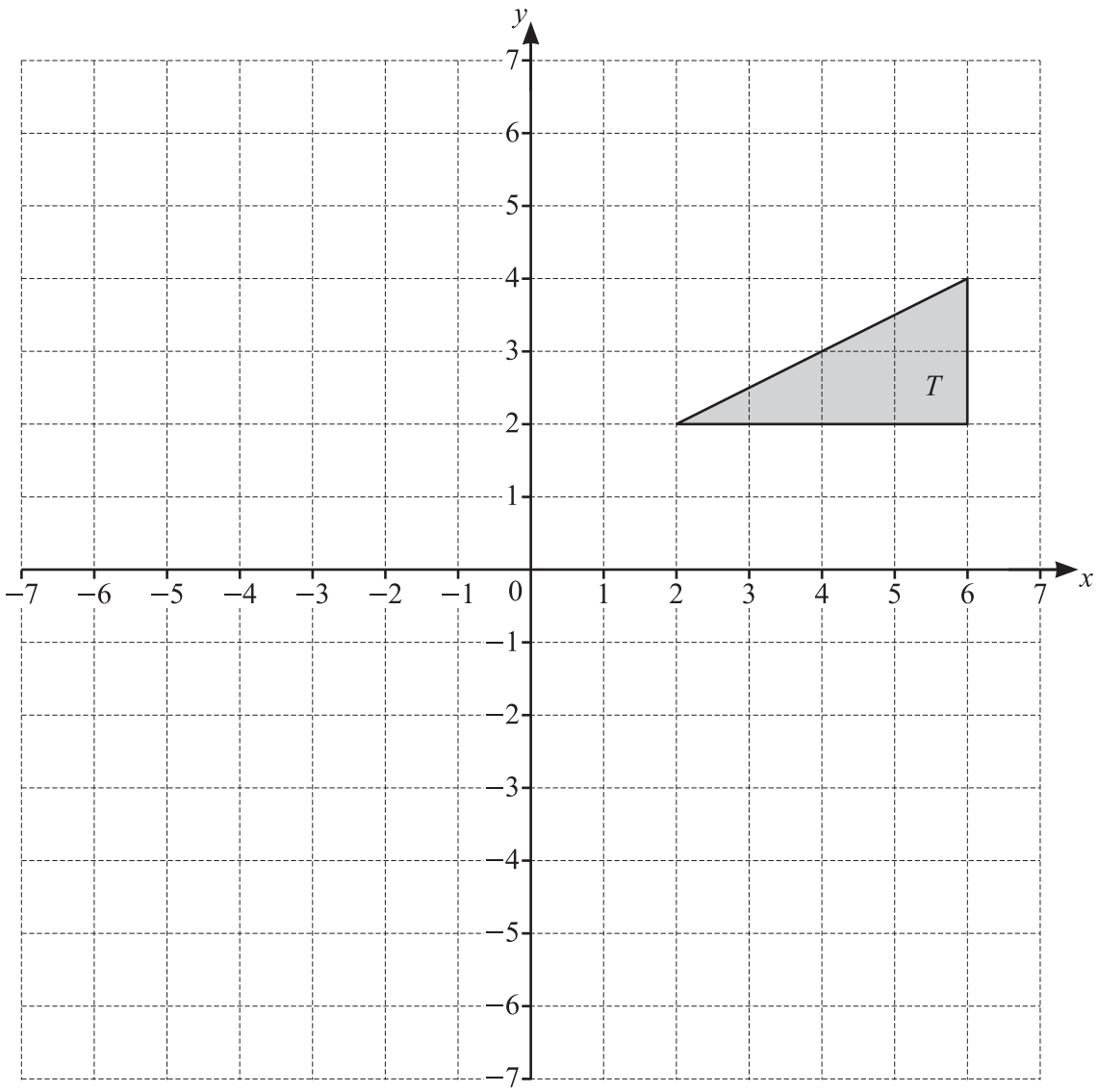
(a) Transformations (b)(i) Transformations (b)(ii) Transformations (c)(i) Transformations (c)(ii) Similar areas and volumes Click for more variations

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9	**(a)**	reflection	**1**	
		y-axis oe	**1**	
	(b) (i)	correct reflection at (2, −1), (4, −1), (4, −5), (3, −5), (3, −2), (2, −2)	**2**	**SC1** reflection in $y = k$
	(ii)	rotation	**1**	
		[centre] (0, 0) oe	**1**	
		180°	**1**	
	(c) (i)	correct enlargement at (−8, 5), (−5, 5), (−5, −4), (−2, −4), (−2, −7), (−8, −7)	**2**	**SC1** for enlargement sf 3 in wrong position or for enlargement sf k using correct centre
	(ii)	9	**2**	**M1** for 3×3 or 3^2 or 45 seen If zero scored **SC1** for (correct area of their enlargement) ÷ 5

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10



(a) **(i)** Translate triangle T by the vector $\begin{pmatrix} -7 \\ 1 \end{pmatrix}$. Label the image K. [2]

(ii) Describe fully the **single** transformation that maps triangle K onto triangle T.

.....

..... [1]

(b) Reflect triangle T in the line $y = 4$. [2]

(c) Rotate triangle T through 90° clockwise about (0, 0). [2]

(d) **(i)** Enlarge triangle T by scale factor $-\frac{1}{2}$, centre (0, 0). Label the image P. [2]

(ii) Describe fully the **single** transformation that maps triangle P onto triangle T.

.....

..... [2]

(a)(i) Transformations (a)(ii) Transformations (b) Transformations (c) Transformations
(d)(i) Transformations (d)(ii) Transformations Click for more variations

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10(a)(i)	Image at (–5, 3), (–1, 3), (–1, 5)	**2**	**B1** for translation $\begin{pmatrix} -7 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ 1 \end{pmatrix}$
10(a)(ii)	Translation $\begin{pmatrix} 7 \\ -1 \end{pmatrix}$ cao	**1**	
10(b)	Image at (6, 4), (6, 6), (2, 6)	**2**	**B1** for reflection in line $x = 4$ or for reflection in line $y = k$
10(c)	Image at (2, –2), (2, –6), (4, –6)	**2**	**B1** for correct size and orientation or for rotation 90° anticlockwise about (0, 0)
10(d)(i)	Image at (–1, –1), (–3, –1), (–3, –2)	**2**	**B1** for correct size and orientation or for enlargement SF $\frac{1}{2}$, centre (0, 0)
10(d)(ii)	Enlargement and [centre] (0, 0) [factor] –2	**2**	**B1** for Enlargement **and** [centre] (0, 0) **B1** for [factor] –2

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