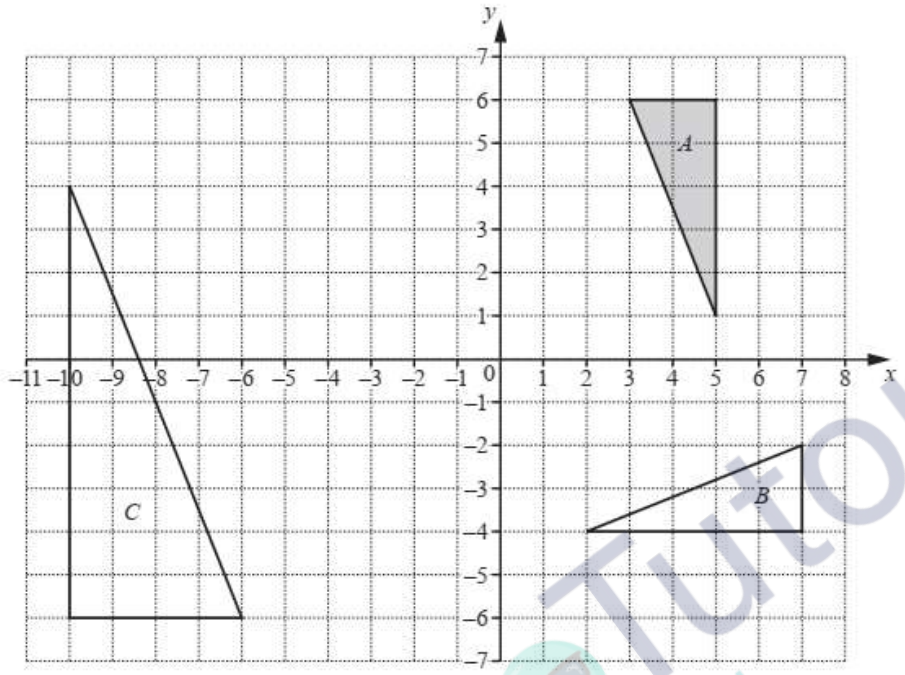
Past Papers Worksheet Transformations IGCSE Mathematics 0580

1. Describe fully the **single** transformation that maps



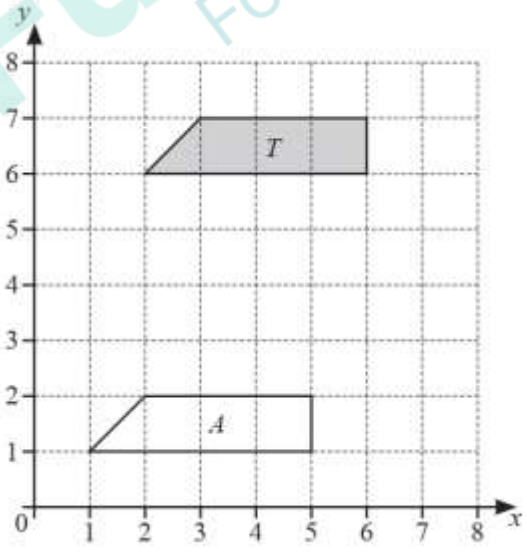
(a) triangle *A* onto triangle *B*, [3]

(b) triangle *A* onto triangle *C*. [3]

0580/22/M/J/19 Q25)

2. (a) Describe fully the single transformation that maps shape T onto shape A. [2]

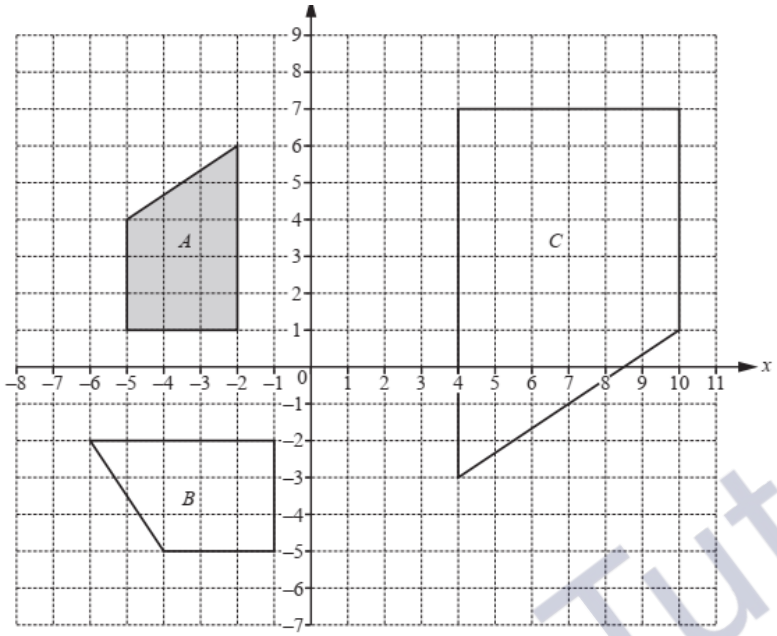
(b) On the grid, reflect shape T in the line $y = x$. [2]



0580/21/O/N/19 Q21)

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3. Describe fully the **single** transformation that maps

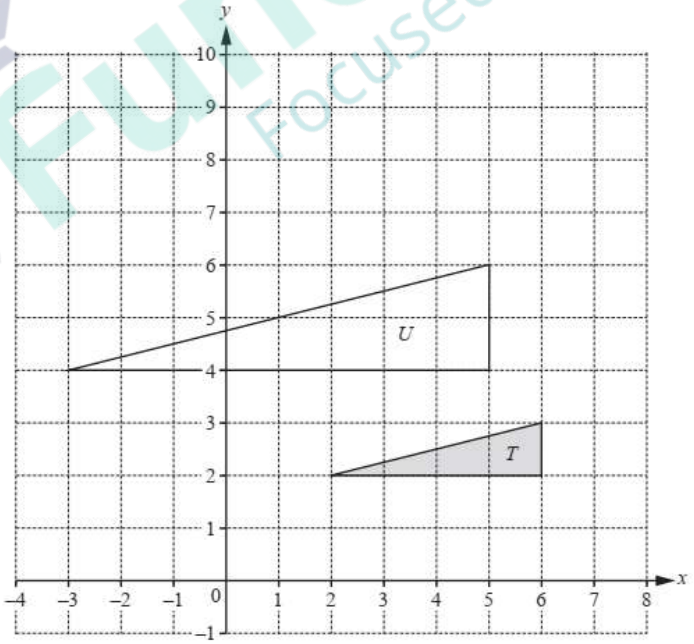


(a) shape *A* onto shape *B*, [3]

(b) shape *A* onto shape *C* [3]

0580/22/F/M/18 Q20)

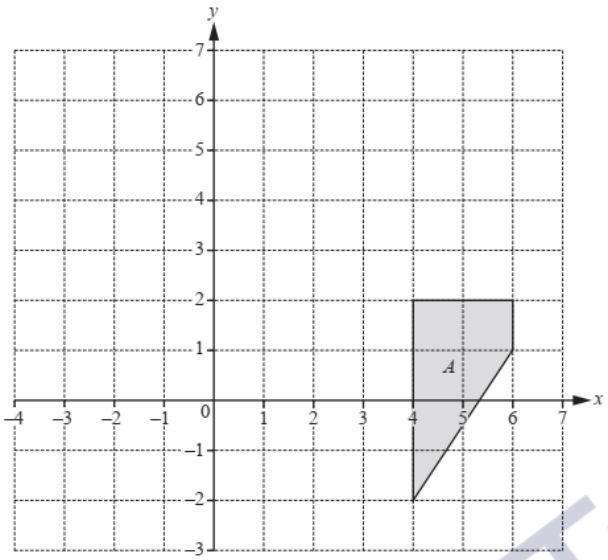
4. (a) Describe fully the **single** transformation that maps triangle T onto triangle U. [3]
(b) On the grid, draw the image of triangle T after a rotation through 90° clockwise about the point (7, 3). [3]



0580/23/M/J/18 0580/23/M/J/18 Q26)

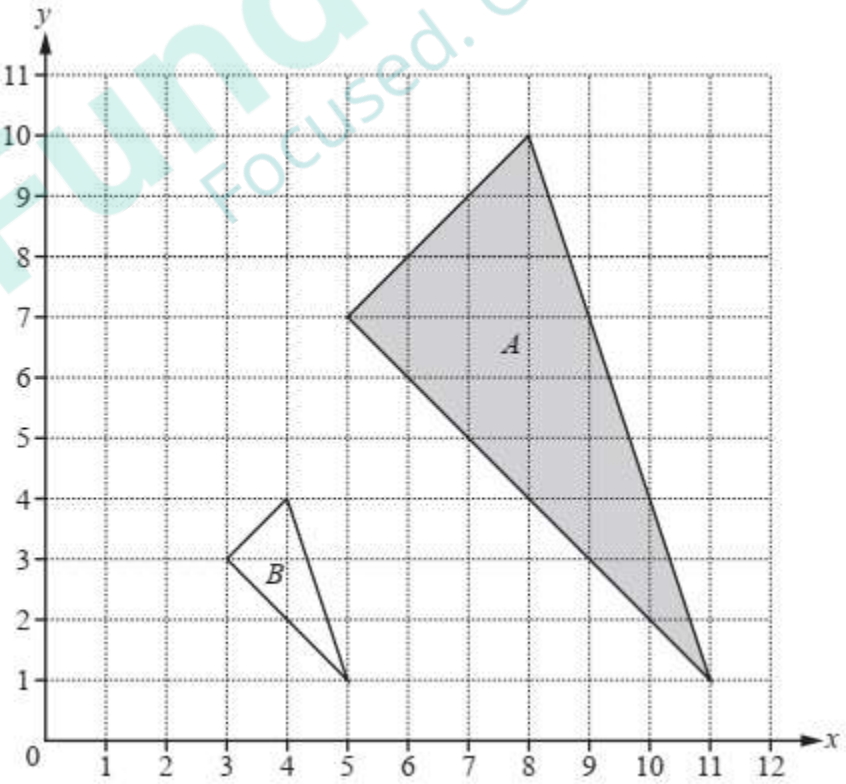
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5. T(X) is the image of the shape X after translation by the vector $\begin{pmatrix} -1 \\ 3 \end{pmatrix}$.



M(Y) is the image of the shape Y after reflection in the line $x = 2$.
On the grid, draw MT(A), the image of shape A after the transformation MT. [3]
0580/22/F/M/17 Q11)

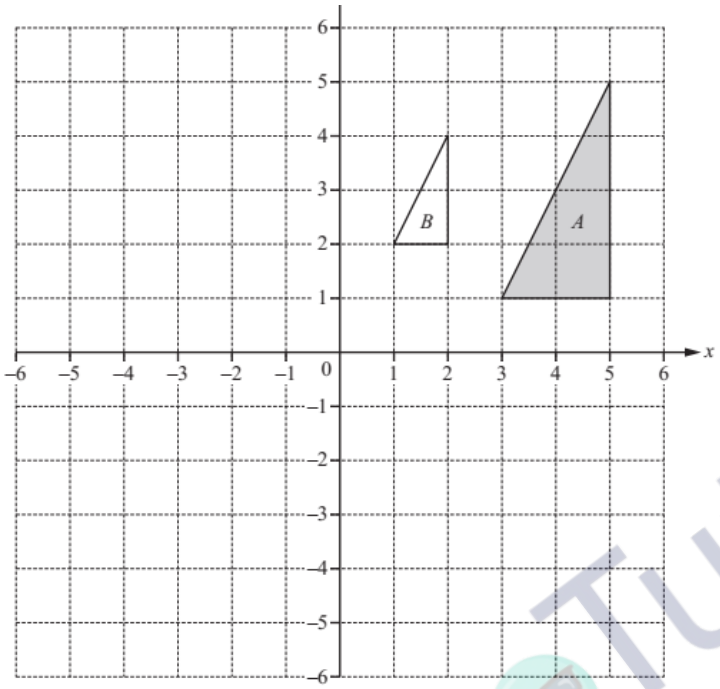
6. Describe fully the **single** transformation that maps triangle A onto triangle B [3]



0580/21/O/N/17 Q16)

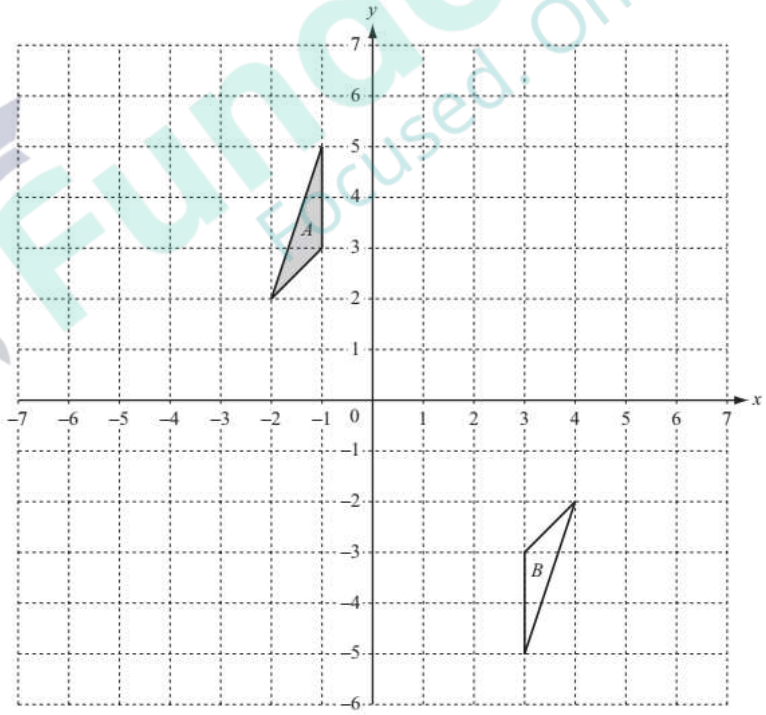
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7. Describe fully the single transformation that maps triangle A onto triangle B. [3]



0580/22/O/N/16 Q18)

8. (a) Draw the image of triangle A after a translation by the vector $\begin{pmatrix} 3 \\ -4 \end{pmatrix}$. [2]

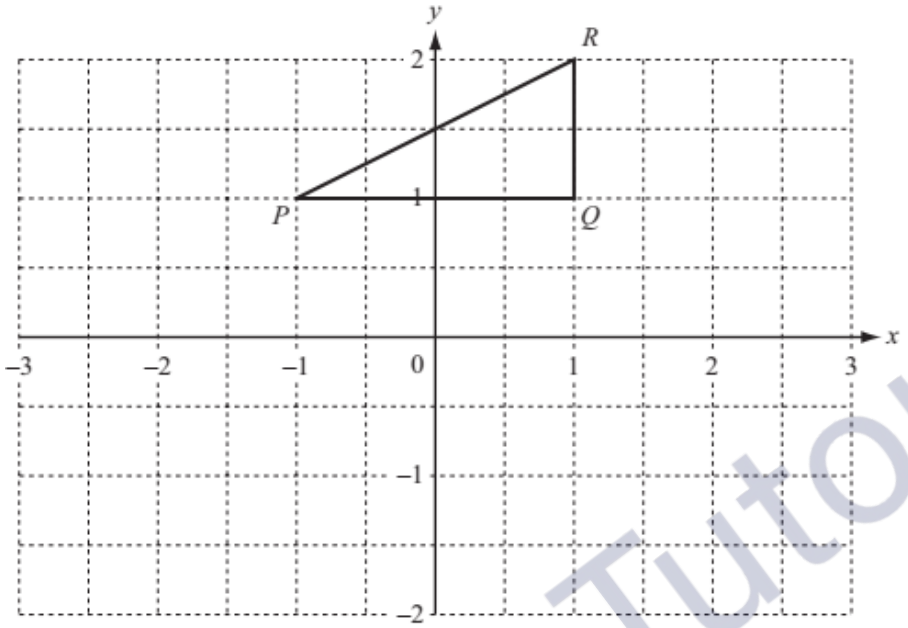


(b) Describe fully the **single** transformation which maps triangle A onto triangle B. [3]

0580/23/M/J/14 Q22)

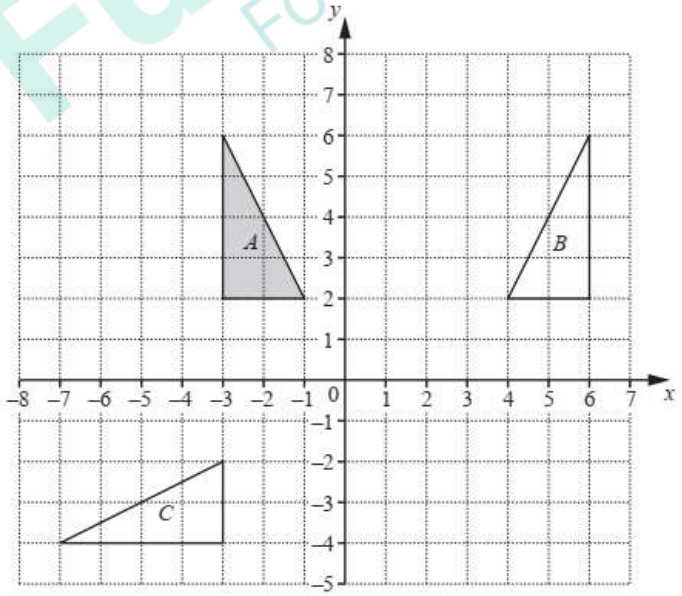
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9. The triangle PQR has co-ordinates P(-1, 1), Q(1, 1) and R(1, 2).



(a) Rotate triangle PQR by 90° clockwise about (0, 0).
Label your image P'Q'R'. [2]
(b) Reflect your triangle P'Q'R' in the line $y = -x$.
Label your image P''Q''R''. [2]
(c) Describe fully the single transformation which maps triangle PQR onto triangle P''Q''R''.
0580/21/O/N/12 Q21)

10. (a) Describe fully the single transformation that maps



(i) triangle A onto triangle B, [2]

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(ii) triangle A onto triangle C. [3]

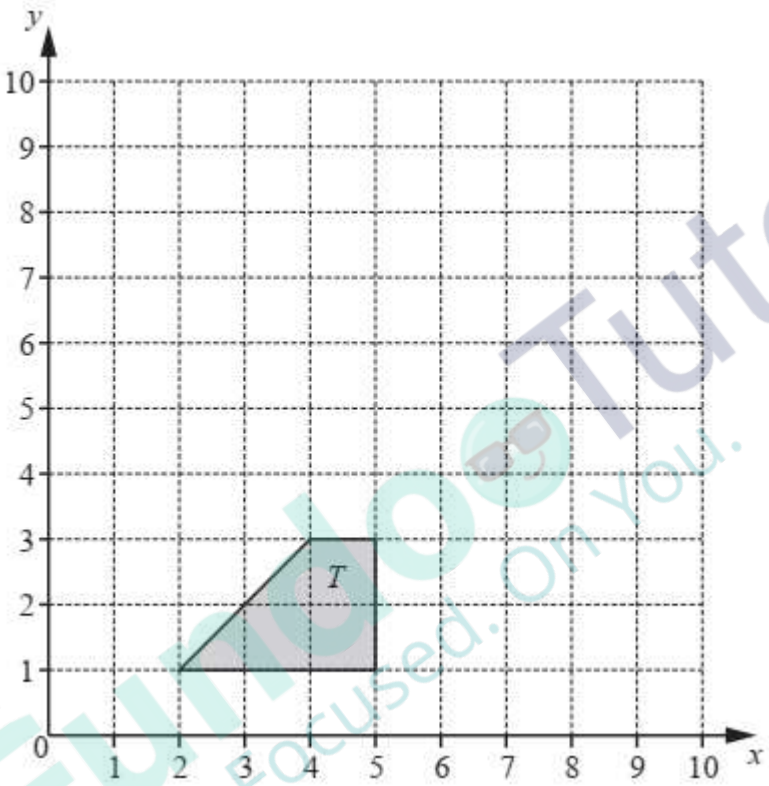
(b) On the grid, draw the image of

(i) triangle A after an enlargement, scale factor – 1/2 , centre (3, 0), [2]

(ii) triangle A after a translation by the vector $\begin{pmatrix}-3\\1\end{pmatrix}$. [2]

0580/42/F/M/19 Q2

11. (a) (i) Translate shape T by the vector $\begin{pmatrix}-1\\6\end{pmatrix}$.



Label the image A. [2]

(ii) Rotate shape T about the point (5, 3) through 180°.

Label the image B. [2]

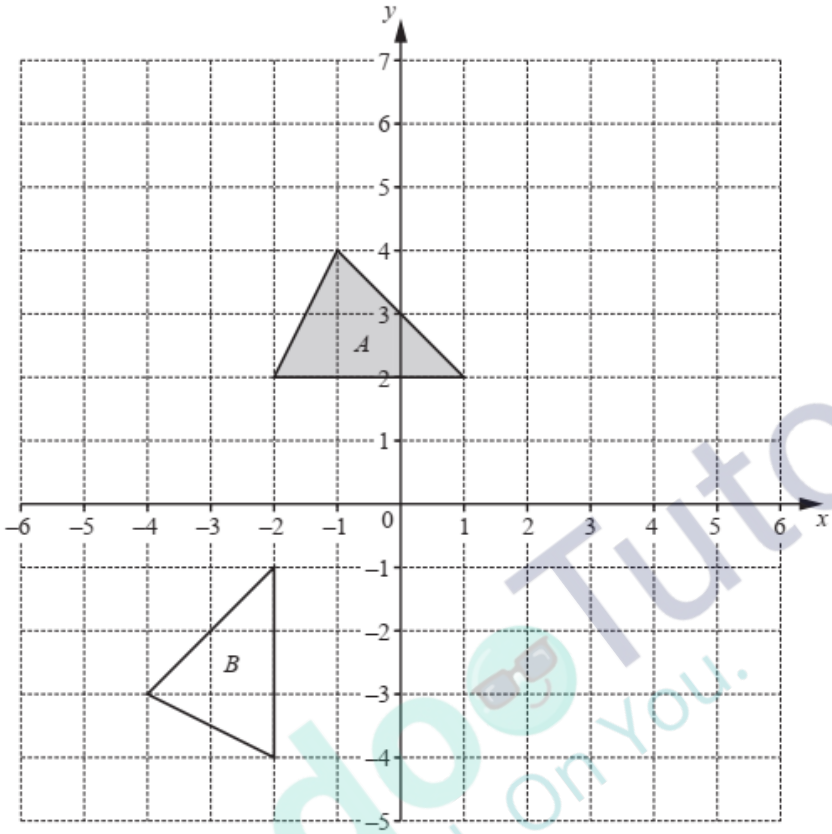
(iii) Describe fully the single transformation that maps shape A onto shape B. [3]

(b) (i) Reflect shape T in the line $y = x$. [2]

0580/41/M/J/19 Q1

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12. (a) On the grid, draw the image of



(i) triangle A after a translation by the vector $\begin{pmatrix}-3\\2\end{pmatrix}$. [2]

(ii) triangle A after a reflection in the line $y = x$. [2]

(b) Describe fully the single transformation that maps triangle A onto triangle B.[3]

0580/43/M/J/19 Q3)

13. A line joins A (1, 3) to B (5, 8)

The line AB is transformed to the line PQ.

Find the co-ordinates of P and the co-ordinates of Q after AB is transformed by

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

(ii) a rotation through 90° anticlockwise about the origin,[2]

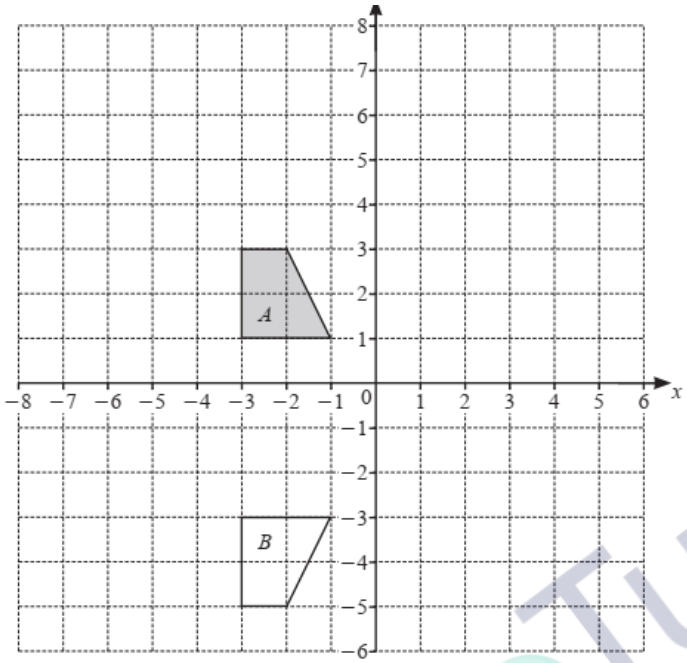
(iii) a reflection in the line $x = 2$, [2]

(c) Describe fully the single transformation that maps the line AB onto the line PQ where P is the point (-2, -6) and Q is the point (-10, -16) [3]

0580/42/O/N/19 Q3)

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14. (a) Describe fully the **single** transformation that maps shape A onto shape B. [2]



(b) On the grid, draw the image of

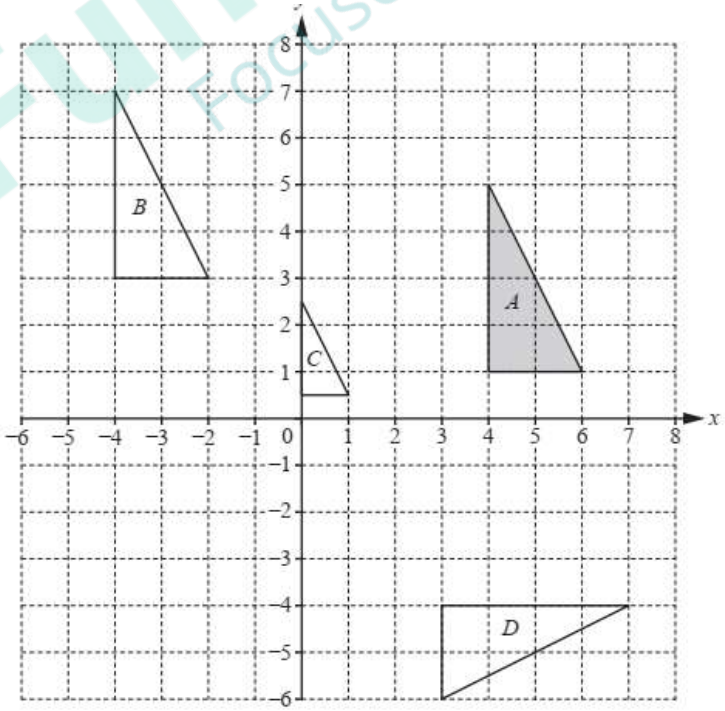
(i) shape A after a translation by the vector $\begin{pmatrix} -3 \\ 4 \end{pmatrix}$ [2]

(ii) shape A after a rotation through 180° about (0, 0), [2]

(iii) shape A after an enlargement, scale factor 2, centre (-7, 0). [2]

0580/43/O/N/19 Q7)

15. (a) Describe fully the single transformation that maps

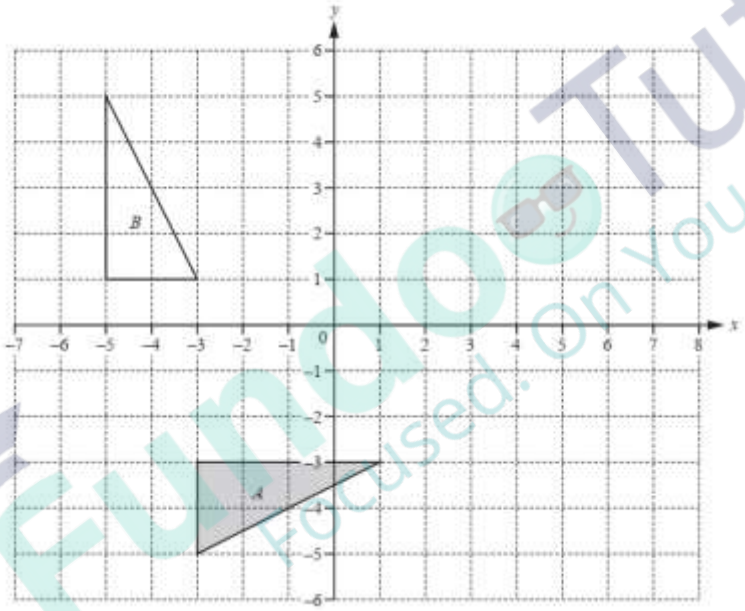


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(i) triangle A onto triangle B, [2]
(ii) triangle A onto triangle C, [3]
(iii) triangle A onto triangle D. [3]
(b) On the grid, draw the image of triangle A after an enlargement by scale factor 2, centre (7,3)[2]

0580/41/M/J/18 Q4)

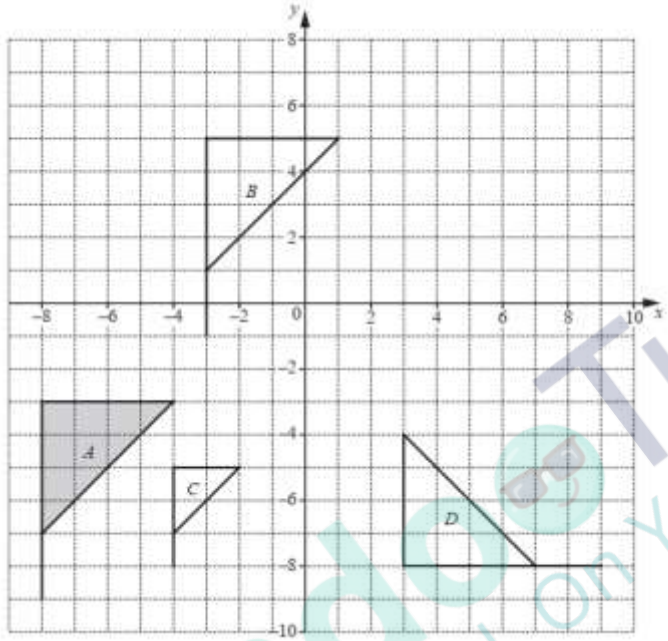
16. (a) (i) Draw the image of triangle A after a reflection in the line $x = 2$. [2]
(ii) Draw the image of triangle A after a translation by the vector $\begin{pmatrix} -2 \\ 4 \end{pmatrix}$ [2]
(iii) Draw the image of triangle A after an enlargement by scale factor –1/2 , centre (3, 1). [3]
(b) Describe fully the **single** transformation that maps triangle A onto triangle B. [3]



0580/42/M/J/18 Q3)

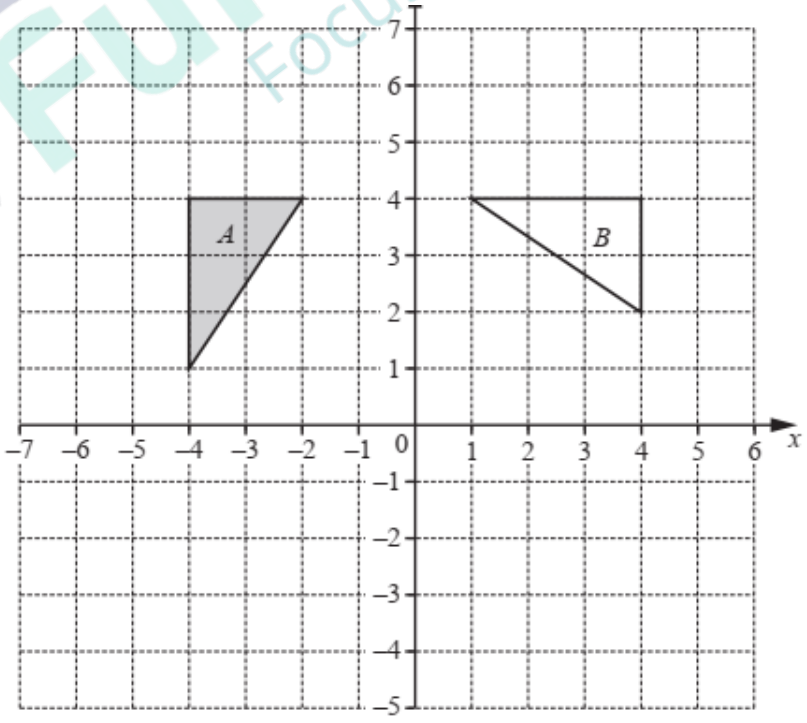
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17. (a) Describe fully the **single** transformation that maps
    (i) flag A onto flag B, [2]
    (ii) flag A onto flag C, [3]
    (iii) flag A onto flag D. [3]
    (b) Draw the reflection of flag A in the line y =-1. [2]



0580/41/O/N/18 Q2)

18. (a) Describe fully the single transformation that maps triangle A onto triangle B. [3]



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(b) On the grid, draw the image of

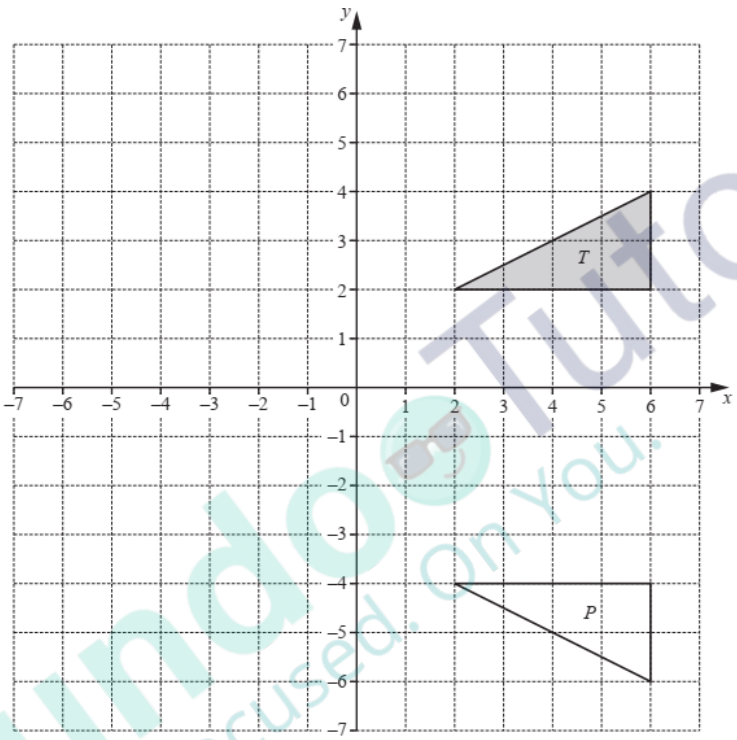
(i) triangle A after a reflection in the x-axis, [1]

(ii) triangle A after a translation by the vector $\begin{pmatrix} 7 \\ -5 \end{pmatrix}$, [2]

0580/42/O/N/18 Q3)

19. (i) Describe fully the single transformation that maps triangle T onto triangle P. [2]

(ii) Translate triangle T by the vector $\begin{pmatrix} -2 \\ -5 \end{pmatrix}$. [2]



(iii) Rotate triangle T through 90° anticlockwise about (0, 0). [2]

(iv) Enlarge triangle T by scale factor – 1/2 with centre (0, 0). [2]

0580/43/O/N/18 Q1

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

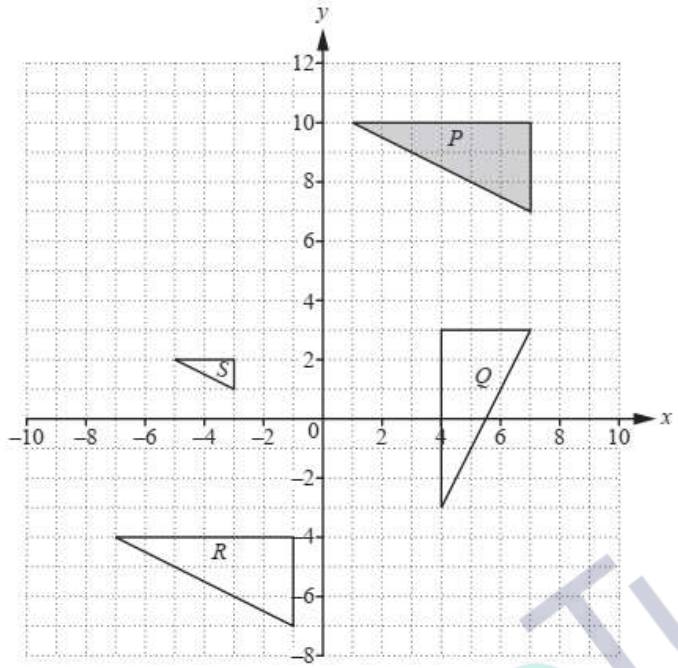
(i) shape P onto shape Q, [3]

(ii) shape P onto shape R, [2]

(iii) shape P onto shape S. [3]

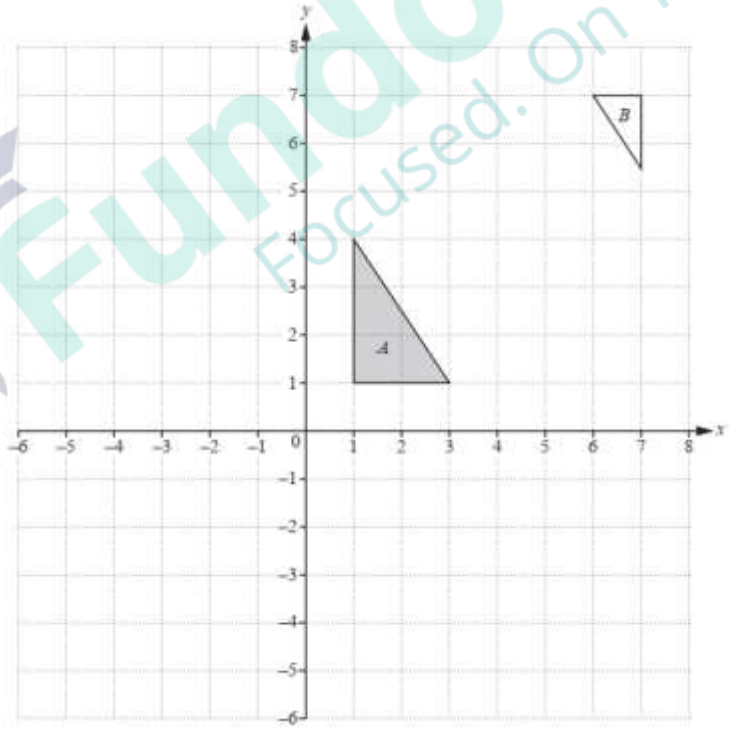
(b) (i) Draw the reflection of **shape S** in the line $y = x$ [2]

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0580/42/F/M/17 Q2)

21. (a) (i) Draw the image of triangle A after reflection in the line $x = 4$. [2]



(ii) Draw the image of triangle A after rotation of 90° anticlockwise about (0, 0). [2]

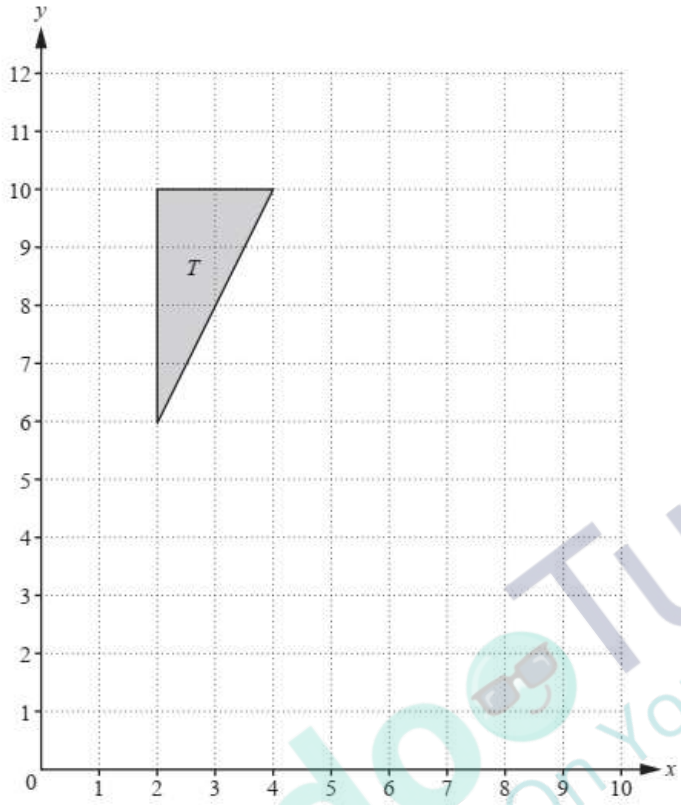
(iii) Draw the image of triangle A after translation by the vector $\begin{pmatrix} 1 \\ -5 \end{pmatrix}$. [2]

(b) Describe fully the **single** transformation that maps triangle A onto triangle B. [3]

0580/41/M/J/17 Q3)

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22. On the grid, draw the image of



(i) triangle T after translation by the $\begin{pmatrix} 6 \\ -5 \end{pmatrix}$. [2]

(ii) triangle T after rotation through 90° anticlockwise with centre (4, 10), [2]

(iii) triangle T after enlargement with scale factor 1/2 , centre (10, 0). [2]

0580/42/M/J/17 Q2

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

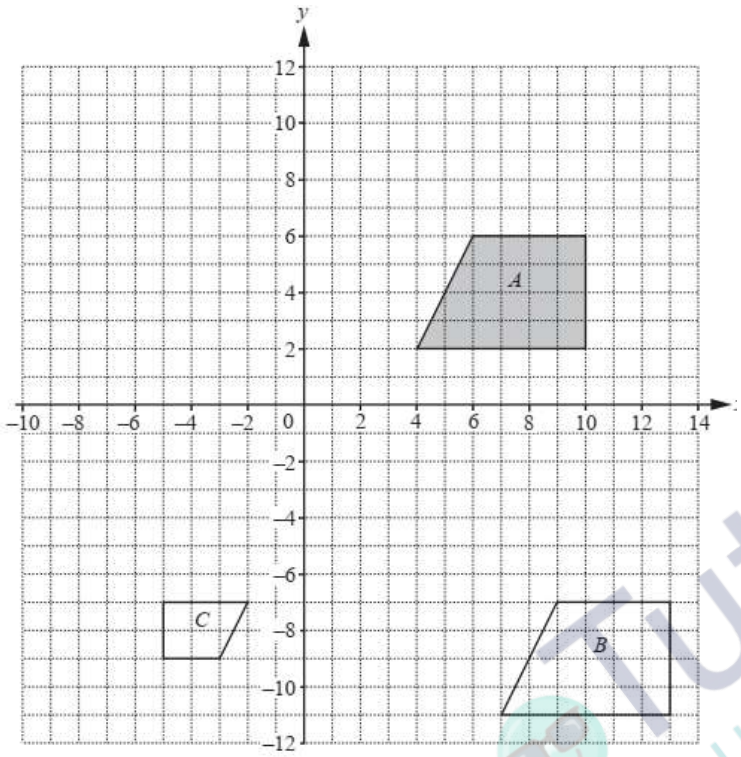
(i) shape B, [2]

(ii) shape C. [3]

(b) Draw the image of shape A after rotation through 90° anticlockwise about the point (3, -1). [2]

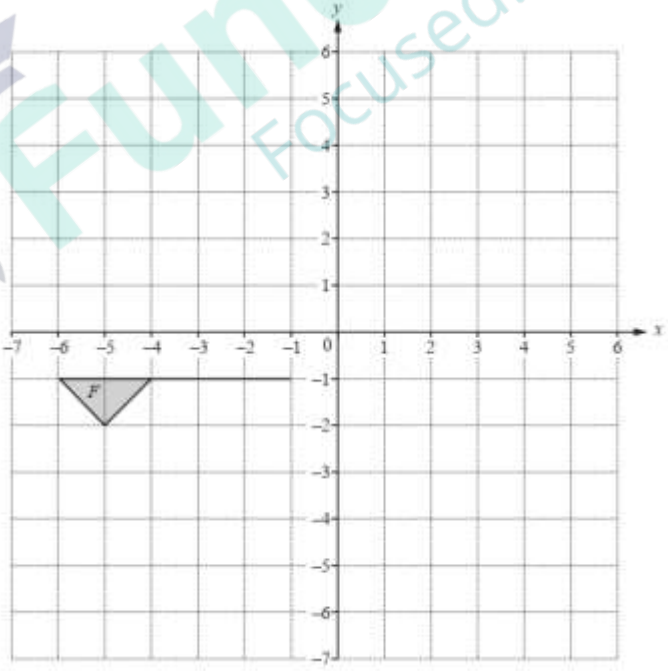
(c) Draw the image of shape A after reflection in y = 1. [2]

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0580/43/M/J/17 Q6)

24. (a) Draw the image of



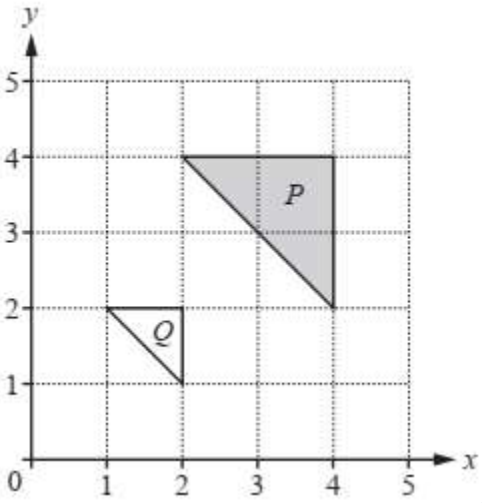
(i) flag F after translation by the vector $\begin{pmatrix} 6 \\ -2 \end{pmatrix}$ [2]

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(ii) flag F after rotation through 180° about (– 2, 0), [2]

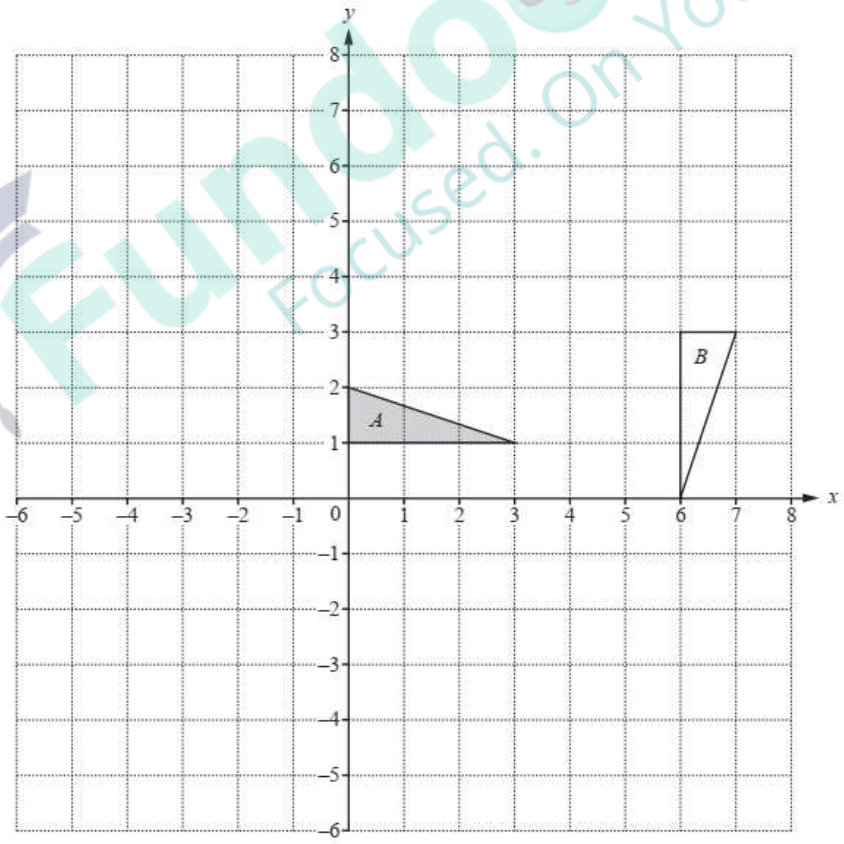
(iii) flag F after reflection in the line $y = x$. [2]

(b) (i) Describe fully the **single** transformation that maps triangle P onto triangle Q. [3]



0580/42/O/N/17 Q4)

25. (a) Draw the image of



(i) triangle A after a reflection in the line $x = 0$, [2]

(ii) triangle A after an enlargement, scale factor 2, centre (0, 4), [2]

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

(b) Describe fully the **single** transformation that maps triangle A onto triangle B. [3]

0580/43/O/N/17 Q5)

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

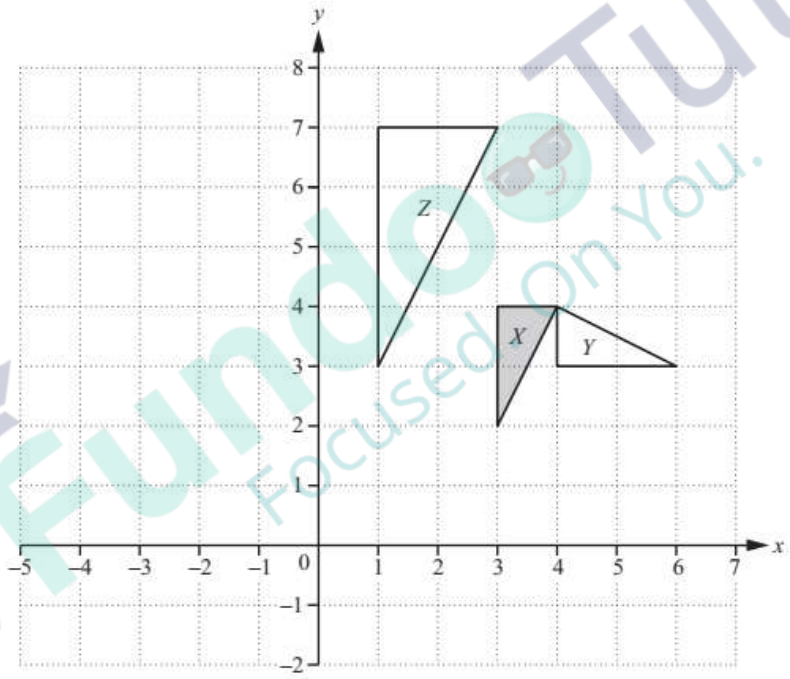
(i) triangle X onto triangle Y, [3]

(ii) triangle X onto triangle Z. [3]

(b) (i) Draw the image of triangle X after a translation by the vector $\begin{pmatrix}-5\\3\end{pmatrix}$

Label this triangle P. [2]

(ii) Draw the reflection of triangle P in the line $y = 3$. [2]



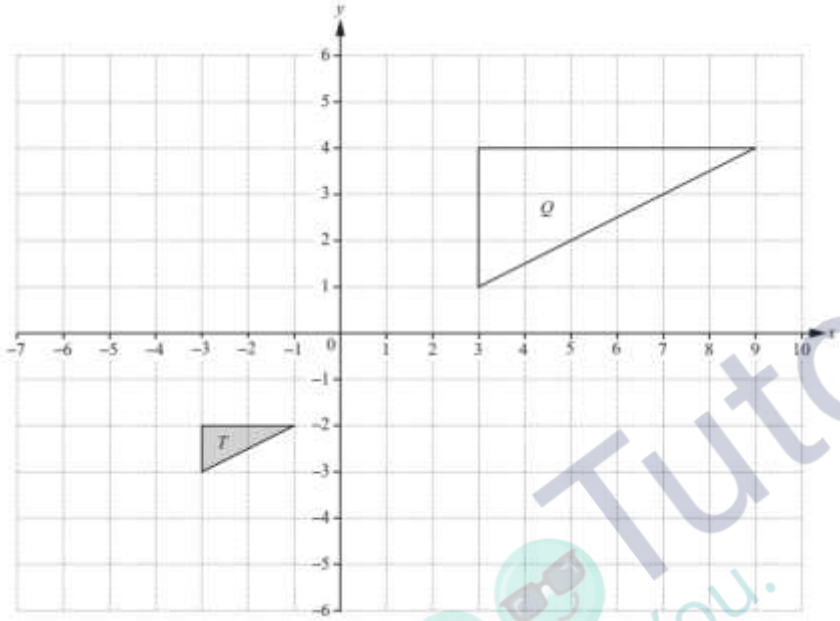
0580/42/F/M/16 Q6)

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

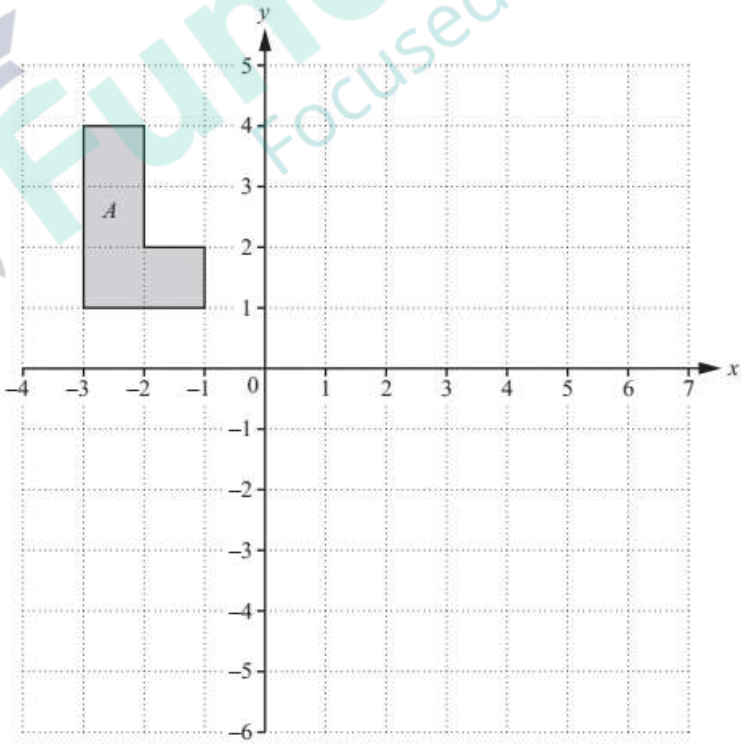
(ii) Draw the image of triangle *T* after a reflection in the line $y = 1$. [2]

(iii) Describe fully the **single** transformation that maps triangle *T* onto triangle *Q*. [3]



0580/41/M/J/16 Q2)

28. On the grid, draw the image of



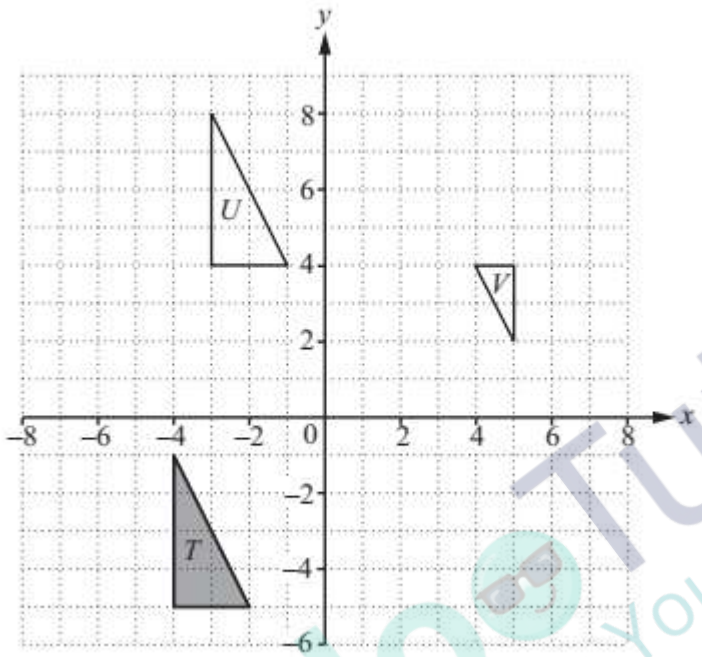
(i) shape A after a reflection in the line $x = 1$, [2]

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(ii) shape A after an enlargement with scale factor –2, centre (0, 1), [2]

0580/42/M/J/16 Q3)

29. (a) (i) Draw the image of triangle T after a reflection in the line $x = 0$. [2]



(ii) Draw the image of triangle T after a rotation through 90° clockwise about (–2, –1). [2]

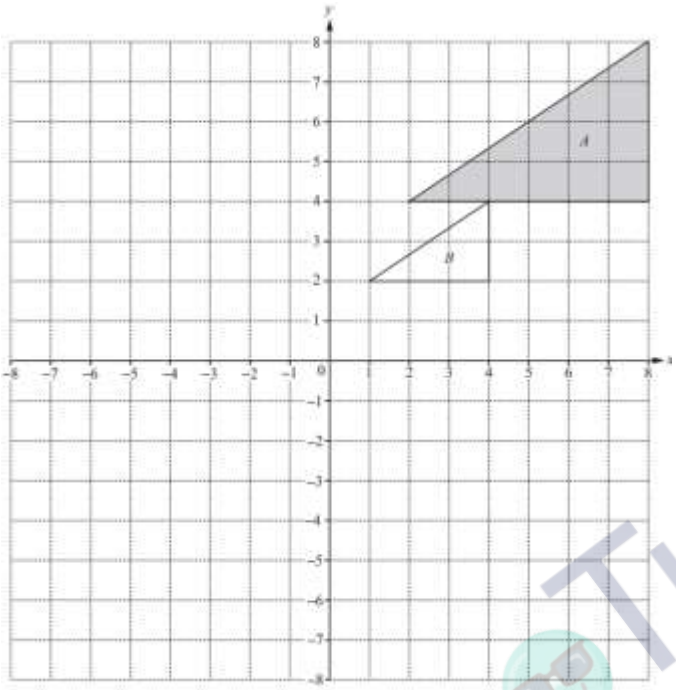
(iii) Describe fully the **single** transformation that maps triangle T onto triangle U. [2]

(iv) Describe fully the **single** transformation that maps triangle T onto triangle V. [3]

0580/43/M/J/16 Q6)

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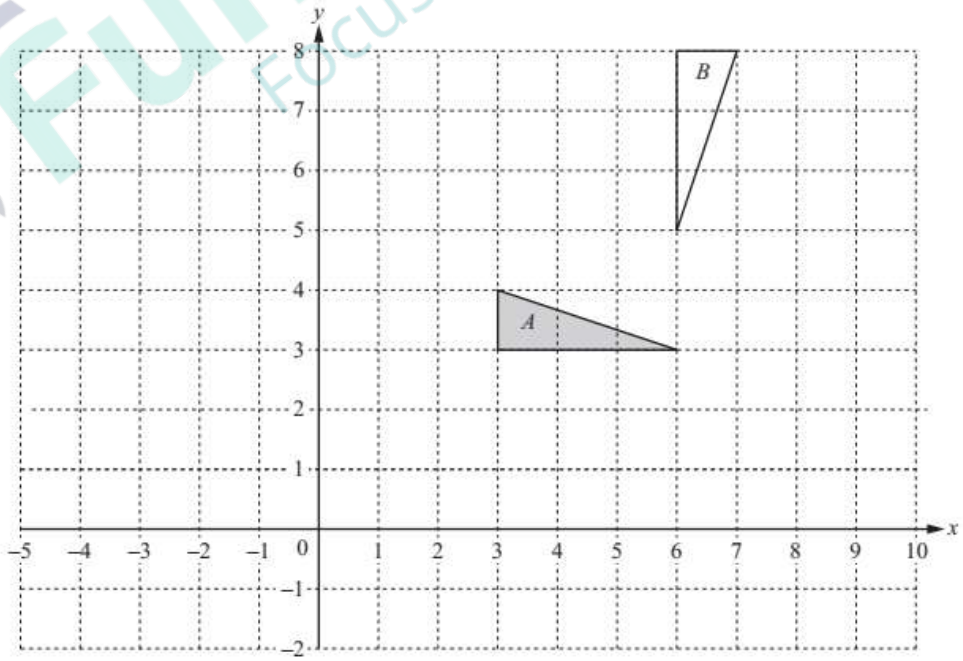
30. (a) (i) V = $\begin{pmatrix} -4 \\ -8 \end{pmatrix}$, Draw the image of triangle A after the translation by vector v. [2]



(b) (i) Describe fully the single transformation that maps triangle A onto triangle B. [3]

0580/41/O/N/16 Q5) (a)

31. (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]

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(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. [3]

0580/43/O/N/16 Q4)

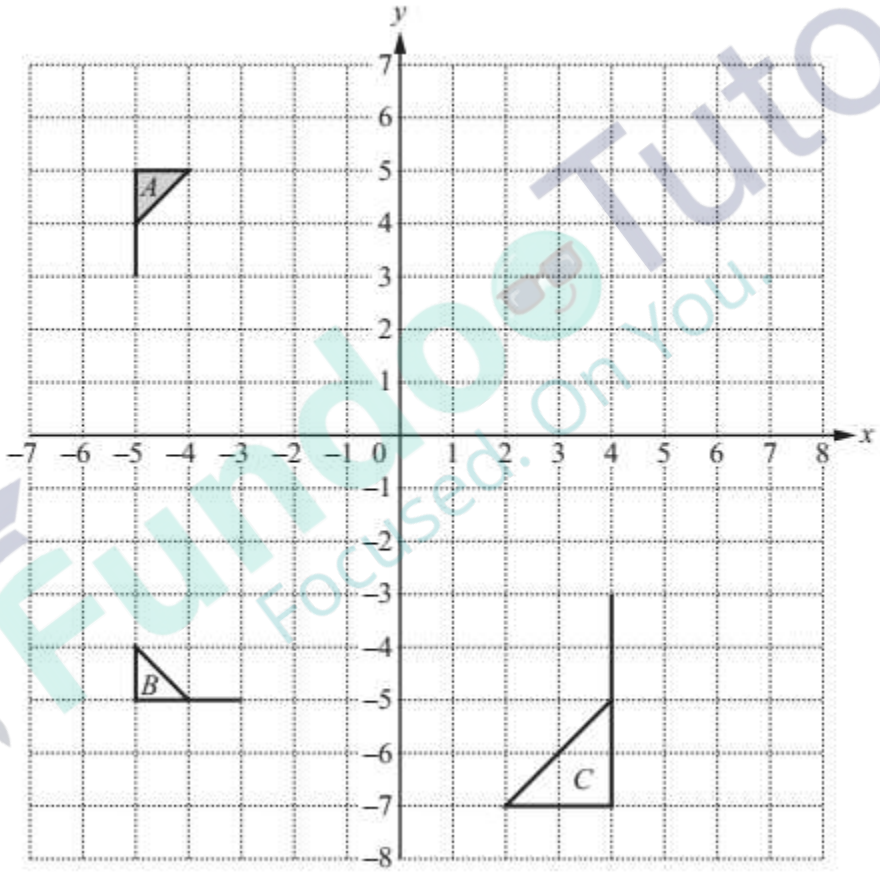
32. (a) Describe fully the **single** transformation that maps

(i) flag A onto flag B, [3]

(ii) flag A onto flag C. [3]

(b) Draw the image of flag A after a translation by the vector $\begin{pmatrix}2\\1\end{pmatrix}$ [2]

(c) Draw the image of flag A after a reflection in the line x = 1. [2]



0580/42/F/M/15 Q7)

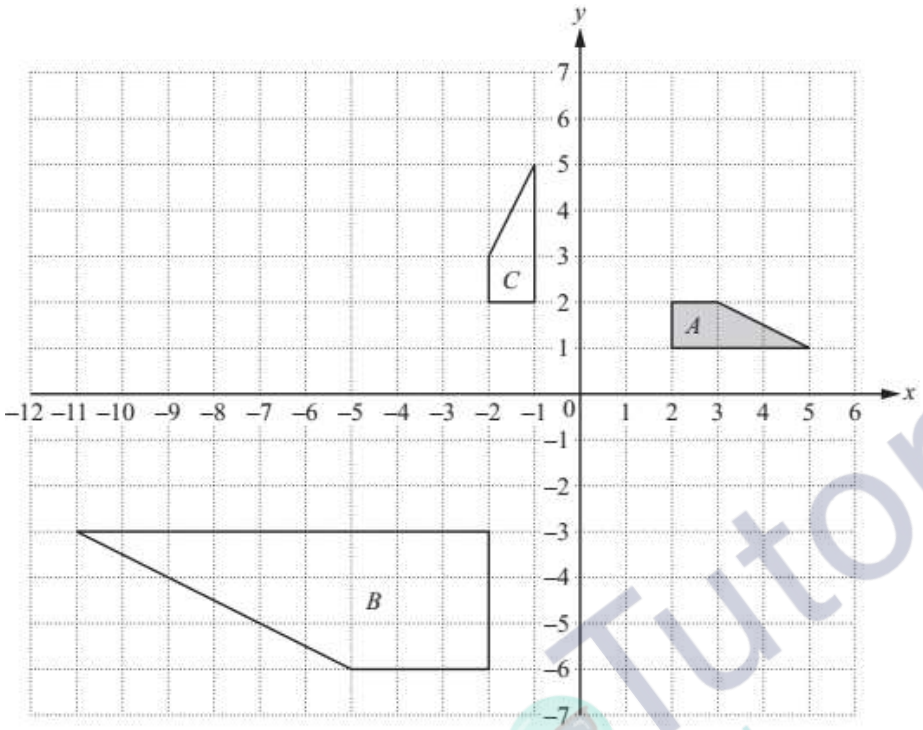
33. (a) Draw the image of

(i) shape A after a translation by $\begin{pmatrix}-1\\3\end{pmatrix}$, [2]

(ii) shape A after a rotation through 180° about the point (0, 0), [2]

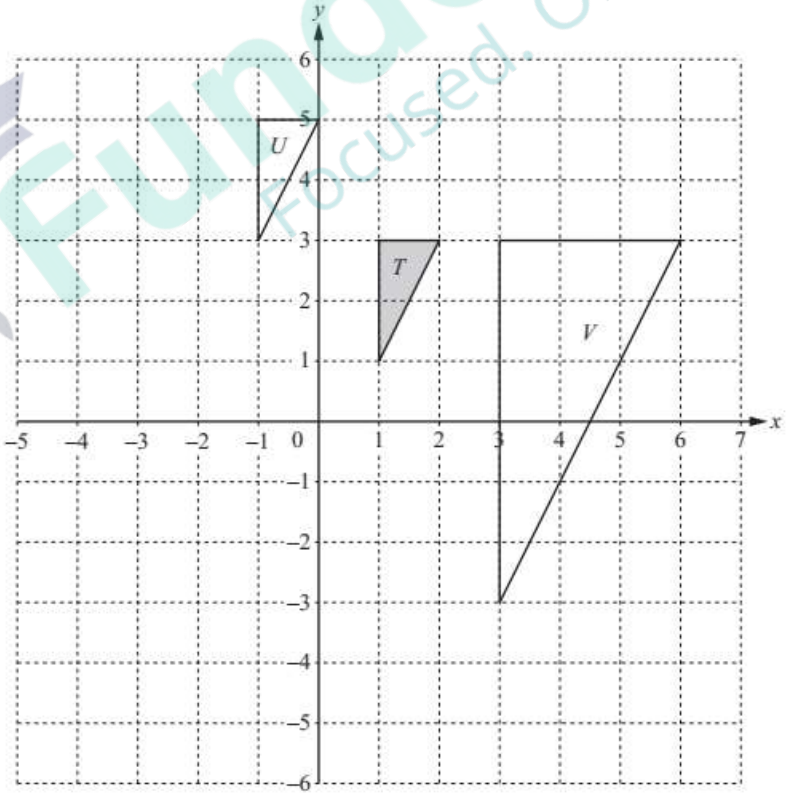
(b) Describe fully the single transformation that maps shape A onto shape B. [2]

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0580/41/M/J/15Q3)

34. (a) On the grid, draw the image of



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

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

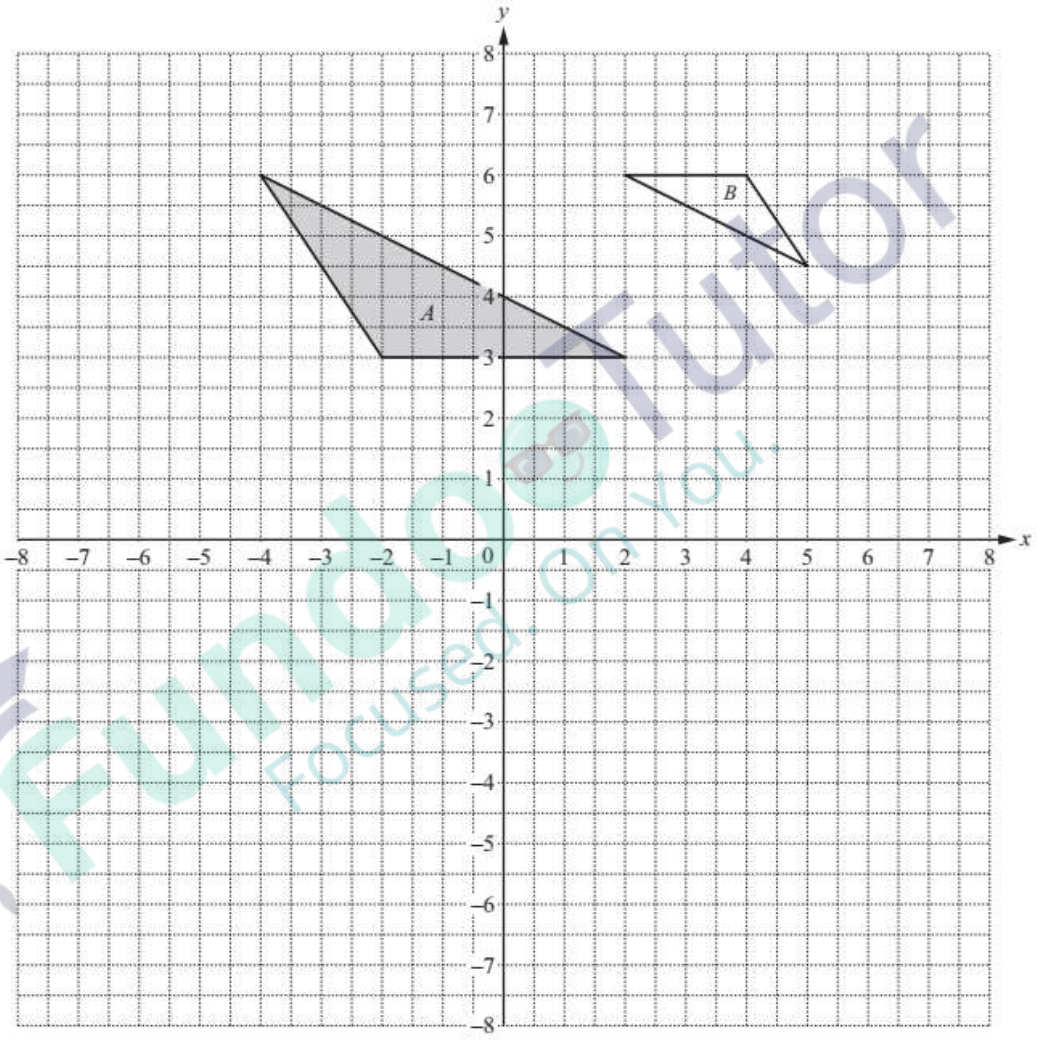
(b) Describe fully the single transformation that maps

(i) triangle T onto triangle U, [2]

(ii) triangle T onto triangle V. [3]

0580/43/M/J/15 Q1)

35. (a) Describe fully the **single** transformation that maps triangle A onto triangle B. [3]



(b) On the grid, draw the image of

(i) triangle A after a reflection in the line $x = -3$, [2]

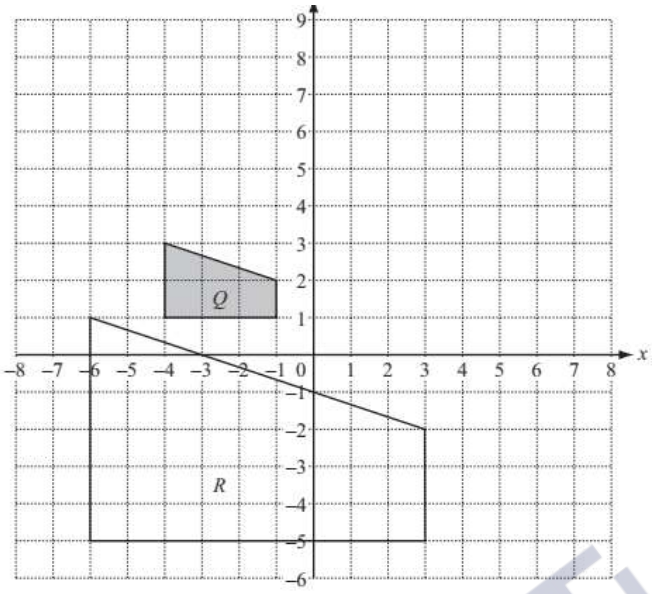
(ii) triangle A after a rotation about the origin through 270° anticlockwise, [2]

(iii) triangle A after a translation by the vector $\begin{pmatrix} -1 \\ -5 \end{pmatrix}$. [2]

0580/42/O/N/14 Q4)

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36. (a) Describe fully the **single** transformation that maps shape Q onto shape R. [3]

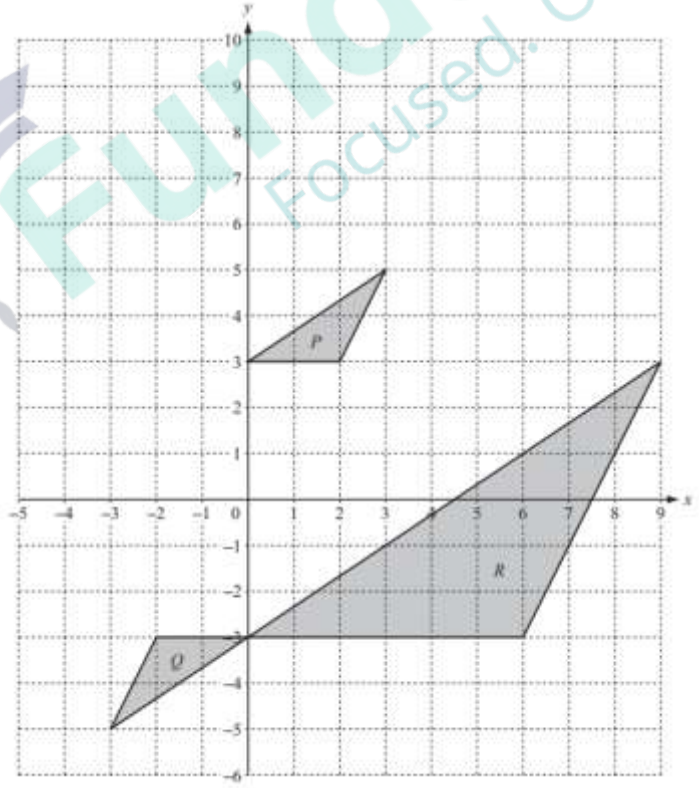


(b) (i) Draw the image when shape Q is translated by the vector $\begin{pmatrix}5\\4\end{pmatrix}$. [2]

(ii) Draw the image when shape Q is reflected in the line x = 2. [2]

0580/41/M/J/13 Q4)

37. (a) Describe fully



(i) the **single** transformation which maps **triangle P** onto triangle Q, [3]

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(ii) the **single** transformation which maps **triangle Q** onto triangle R, [3]

(iii) the **single** transformation which maps **triangle R** onto triangle P. [3]

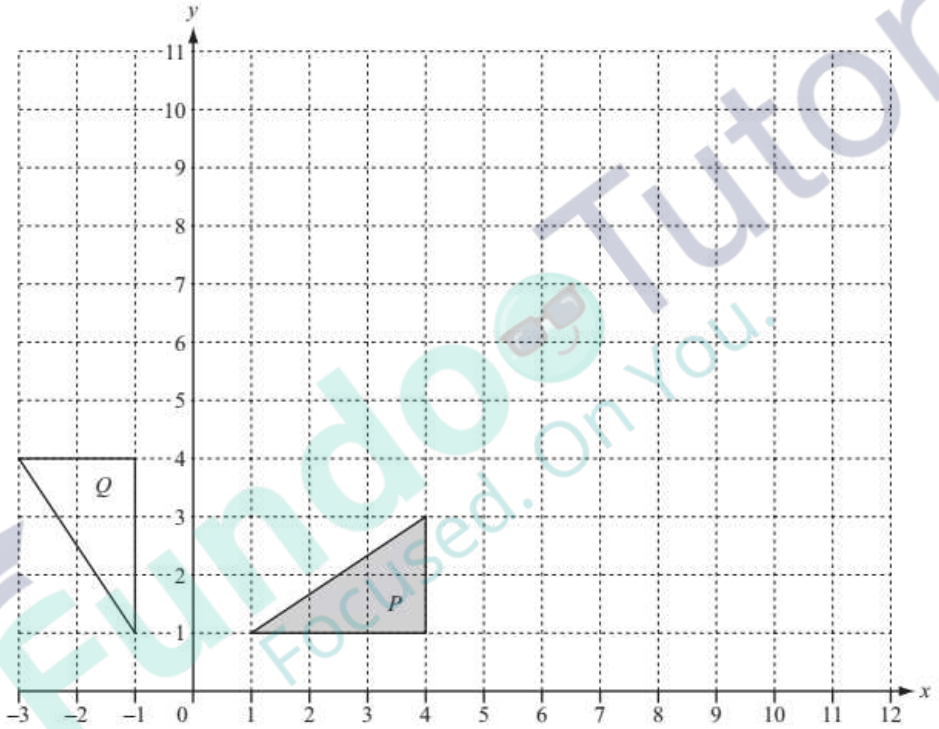
(b) On the grid, draw the image of

(i) **triangle P** after translation $\begin{pmatrix} -4 \\ -5 \end{pmatrix}$ [2]

(ii) **triangle P** after reflection in the line $x = -1$. [2]

0580/41/M/J/12 Q7)

38. (a) Draw the translation of triangle P by $\begin{pmatrix} 5 \\ 3 \end{pmatrix}$. [2]



(b) Draw the reflection of triangle P in the line $x = 6$. [2]

(c) (i) Describe fully the **single** transformation that maps triangle P onto triangle Q. [3]

0580/43/M/J/12 Q3)

39. Draw the images of the following transformations on the grid above.

(i) Translation of triangle A by the vector $\begin{pmatrix} 3 \\ -7 \end{pmatrix}$ [2]

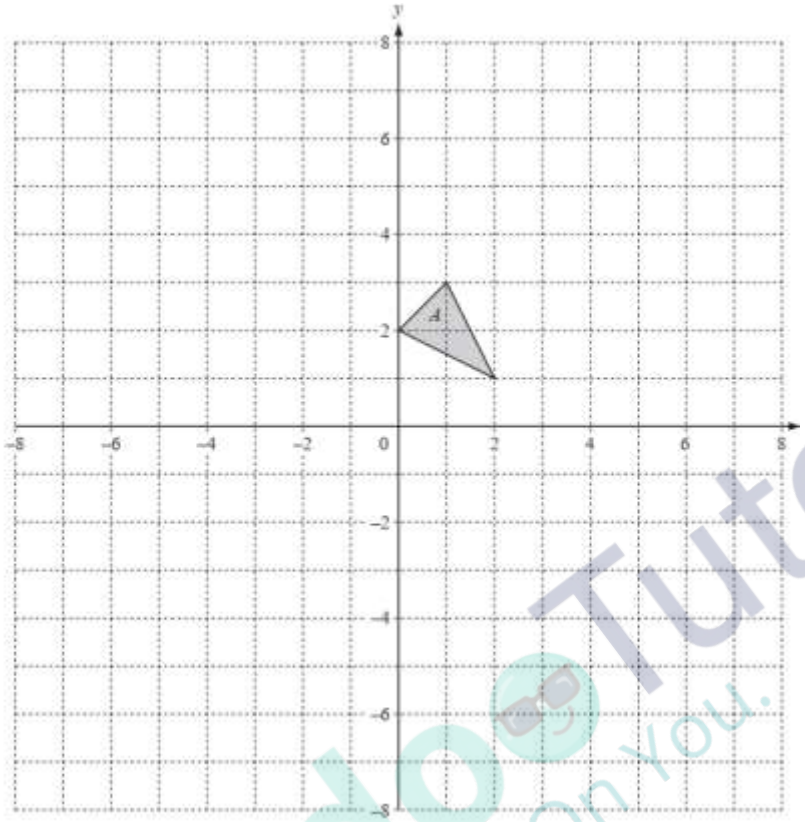
(ii) Reflection of triangle A in the line $x = 3$. Label the image C. [2]

(iii) Rotation of triangle A through 90° anticlockwise around the point (0, 0). Label the image D. [2]

(iv) Enlargement of triangle A by scale factor –4, with centre (0, 1).

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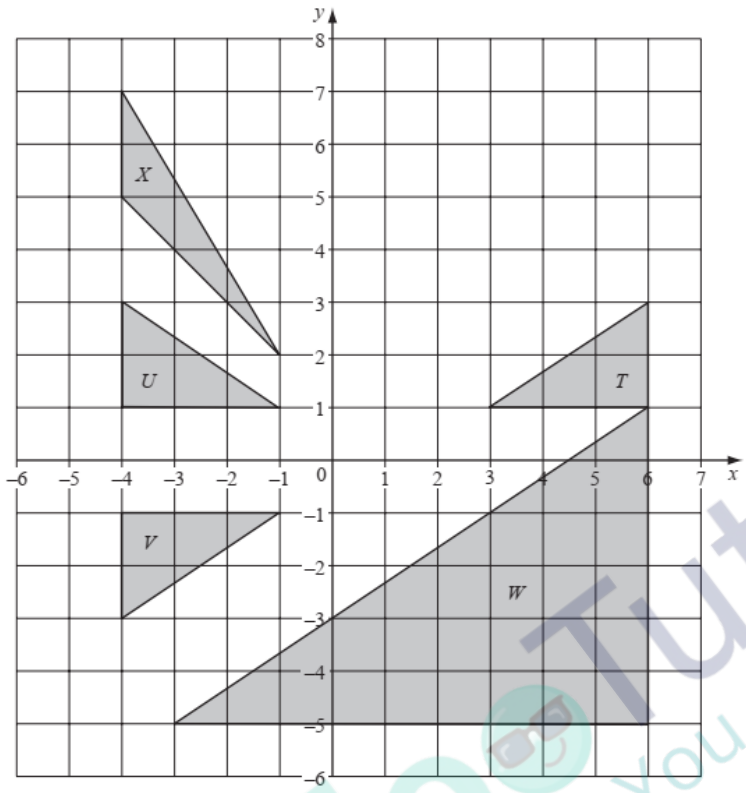
Label the image E. [2]



0580/42/O/N/10 Q8)

40. (a) Describe fully the single transformation which maps
    (i) triangle T onto triangle U, [2]
    (ii) triangle T onto triangle V, [3]
    (iii) triangle T onto triangle W, [3]

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0580/04/O/N/09 Q2)

Answers

1 (a) Rotation 90° clockwise oe (1, 0) (b) Enlargement – 2 (0, 2)	2 (a) Translation $\begin{pmatrix}-1\\-5\end{pmatrix}$ (b) Correct reflection at (6, 2), (6, 6), (7, 6), (7, 3)
3 **(**a) Rotation [centre] origin oe 90°[anti-clockwise] (b) Enlargement [centre] (0, 3) [sf] – 2	4 (a) Enlargement [scale factor] 2 [centre] (7, 0) (b) Image at (6, 4), (7, 4), (6, 8)
5 (-1,4) (-1,5) (1,5) (1,1)	6 Enlargement 1/3 (2,1)
7 (a) Enlargement [s.f.] 1/2 [centre] (−1 , 3)	8 **(**a) Triangle at (2,-1) (2,1) (1,-2) (b) Rotation [centre] (1, 0) 180° or half turn
9 (a) triangle at (1, 1), (1, –1), (2, –1) , (b) triangle at (–1, –1)(1, –1), (1, –2) (c) reflection in the x axis	10 (a)(i) Reflection x = 1.5 (ii) Rotation (0, −1) 90° [anticlockwise] oe (b)(i) Image at (5, −1) (6, −1) (6, −3) (ii) Image at (−6, 3) (−4, 3) (−6, 7)
11 **)** (a)(i) Image at (1, 7), (4, 7), (4, 9), (3, 9) (ii) Image at (5, 3), (6, 3), (8, 5), (5, 5) (iii) Rotation 180˚(4.5, 6) OR Enlargement, [factor] – 1 (4.5, 6) (b) (i) Image at (1, 2), (1, 5), (3, 5), (3, 4)	12 (a) (i)Image at (–5, 4), (–2, 4), (–4, 6)(ii) Image at (2, 1), (4, –1), (2, –2) (b) Rotation 90°[anticlockwise] oe (1, –1)

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13 (b)(i) (6, 1) (10, 6) (ii) (–3, 1) (–8, 5) (iii) (3, 3) (–1, 8) (c) Enlargement –2 Origin oe	14) (a) Reflection y = –1, (b)(i) Image at (–6, 5) (–6, 7) (–5, 7) (–4, 5) (ii) Image at (1, – 1) (3, –1) (3, –3) (2, –3) (iii) Image at (1, 2) (1, 6) (3, 6) (5, 2)
15 (a)(i) Translation $\begin{pmatrix}-8\\2\end{pmatrix}$ (ii) Enlargement [sf =] 1/2 oe (−4, 0) (iii) Rotation 90° clockwise oe (1, -1) (b) Triangle with (1, –1), (5, –1), (1,7)	16 (a)(i) Image at (3, – 3), (7, – 3), (7, – 5) (ii) Image at (– 5, 1), (– 1, 1), (– 5, – 1) (iii) Image at (6, 3), (6, 4), (4, 3) (b) Rotation 90° [anticlockwise]oe (– 6, – 2)
17 (a)(i) Translation $\begin{pmatrix}5\\8\end{pmatrix}$ (ii) Enlargement [sf] 0.5 oe [centre] (0, −7) (iii) Rotation 90 [anticlockwise] oe Origin oe (b) Image at (−8, 1) (−8, 5) (−8, 7) (−4, 1)	18 (a) Rotation 90[°] clockwise oe Origin oe (b)(i) Image at (–4, –1) (–4, –4) (–2, –4) (ii) Image at (3, –1) (5, –1) (3, –4)
19 (a)(i) Reflection y = –1 (ii) Triangle at (0, – 3), (4, –1), (4, –3) (iii) Triangle at (–2, 2), (–2, 6), (–4, 6) (iv) Triangle at (–3, –1), (–3, –2), (– 1, –1)	20 (a)(i) Rotation 1 90° [anticlockwise] oe 1 (9, 5) (ii) Translation $\begin{pmatrix}-8\\-14\end{pmatrix}$ (iii) Enlargement 1[sf] 1/3 (− 8, − 2) (b) Image at (1, − 3) (2, − 3) (2, − 5)
21 (a)(i) Image at (5, 1), (7, 1), (7, 4) (ii) Image at (–1, 1), (–4, 1), (–1, 3) (iii) Image at (2, – 4), (4, – 4), (2, – 1) (b) Enlargement [sf] – 0.5 oe (5, 5)	22 (a)(i) Image at (8, 1), (10, 5), (8, 5) (ii) Image at (4, 10), (4, 8), (8, 8) (iii) Image at (6, 3), (6, 5), (7, 5)
23 (i) Translation $\begin{pmatrix}3\\-13\end{pmatrix}$ (ii) Enlargement [sf] –1/2 (0, −4) (b) Image at (0, 0) (0, 6) (−4, 6) (−4, 2) (c) Image at (4, 0) (10, 0) (10, −4) (6, −4)	24 (a)(i)(1,-3),(2,-3),(5,-3),(1,-5) (a)(ii) (0,1),(2,1),(-3,1),(1,2) (a)(iii)(-1,-1),(-1,-4),(-1,-6),(-2,-5) (b)(i) Enlargement [factor] 1/2 or 0.5 [centre] (0, 0) oe
25 (a)(i) Image at (0, 1), (0, 2), (–3, 1) (ii) Image at (0, 0), (0, –2), (6, –2) (iii) Image at (–5, 4), (–5, 5), (–2, 4) (b) Rotation 90° clockwise oe (4, –1)	26 (a) (i) Rotation 90° [anticlockwise] oe (4 , 4) (ii) Enlargement [centre] (5 , 1) [scale factor] 2 (b) (i) Image at (−2, 5) (−2, 7) (−1, 7) (ii) Image at (−2, 1) (−2, −1) (−1, −1)
27 (a) (i) Triangle drawn, vertices (2, – 4), (2, – 5), (4, – 4) (ii) Triangle drawn, vertices (– 3, 4), (– 3, 5), (– 1, 4) (iii) Enlargement [factor] 3 [centre] (– 6, – 5)	28 (a) (i) Image at (3, 1), (5, 1), (5, 4), (4, 4), (4, 2), (3, 2) (ii) Image at (2, 1), (6, 1), (6, – 5), (4, – 5), (4, – 1), (2, – 1)
29 (i) Correct image (2, –5) (4, –5) (4, –1) (ii) Correct image (–2, 1) (–6, 1) (–6, –1) (iii) Translation by $\begin{pmatrix}1\\9\end{pmatrix}$ (iv) Enlargement [SF] –1/2 oe [Centre] (2, 1)	30 (i) Image at (–2, – 4), (4, – 4), (4, 0) (b) (i) Enlargement [factor] 0.5 oe [centre] (0, 0) oe
31 (a) Triangle drawn at (–4, 3), (–1, 3), (–1, 4) (b) Triangle drawn at	32 (a) (i) Rotation [centre] (0, 0) or origin 90° [anticlockwise] oe (ii) Enlargement [centre]

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(1, 7), (1, 6), (4, 6) (c) Triangle drawn at (2, 3), (2, 1), (8, 1) (d) Rotation 90º clockwise oe (7, 4)	(−2, 1) [s.f.] – 2 (b) vertices at (−3, 4) (−3, 5) (−3, 6)(−2, 6) (c) vertices at (7, 3) (7, 4) (7, 5) (6, 5)
33 (a) (i) image at (1, 4) (1, 5) (2, 5) (4, 4) (ii) image at (−2, −1) (−5, −1) (−2, −2) (−3, −2) (iii) image at (2, −1) (2, −2) (3 ,−2) (5, −1) enlargement (1, 0) [scale factor] − 3	34 (a) (i) Triangle at (–3, 1), (–3, 3), (–4, 3) (ii) Triangle at (–1, –1), (–2, –3), (–1, –3) (b) (i) Translation $\begin{pmatrix}-2\\2\end{pmatrix}$ (ii) Enlargement (0, 3) [factor] 3
35 (a) Enlargement [SF] – 1/2 oe [centre] (2, 5) (b) (i) Image at (–2, 6), (–8, 3), (–4, 3) (ii) Image at (3, –2), (3, 2), (6, 4) (iii) Image at (–5, 1), (–3, –2), (1, –2)	36 (a) Enlargement [centre] (–3, 4) [scale factor] 3 (b) (i) Image at (1 5), (4, 5), (4, 6), (1, 7) (ii) Image at (5, 1), (8, 1), (8, 3), (5, 2)
37 (a) (i) Rotation (centre/about) origin (O) (0,0) 180° (ii) Enlargement (centre/about) (0,− 3) SF – 3 (iii) Enlargement (centre/about) (0, 6) SF 1 /3 (b) (i) image at (−4, −2) (−2, −2) and (−1, 0) (ii) image at (− 2, 3) (− 4, 3) and (− 5, 5)	38 (a) Triangle with vertices (6, 4), (9, 4), (9, 6) (b) Triangle with vertices (11, 1), (8, 1), (8, 3) (c)(i) Rotation 90° [anticlockwise] oe [centre] (0, 0) oe
39 (a) (i) Correct translation to (3, –5), (5, –6) and (4, –4) (ii) Correct reflection to (4, 1), (5, 3) and (6, 2) (iii) Correct rotation to (–2, 0), (–1, 2) and (–3, 1) (iv) Correct enlargement to (0, –3), (–8, 1) and (–4, –7)	40 (a) (i) Reflection (M), x = 1 (ii) Rotation (R) 180 (centre) (1, 0) (iii) Enlargement (E) (centre) (6, 4) (scale factor) 3

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