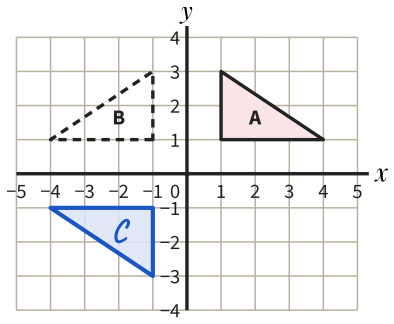
Combined transformations

ANSWERS

1

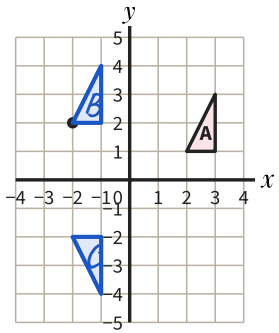
Reflect shape A in the y axis to give B.
Reflect B in the x axis to give C.



C (−1, −1), (−4, −1), (−1, −3)

2

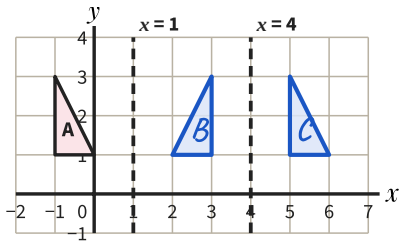
Translate shape A by $\begin{pmatrix} -4 \\ 1 \end{pmatrix}$ to give B.
Reflect B in the x axis to give C.



C (−2, −2), (−1, −2), (−1, −4)

3

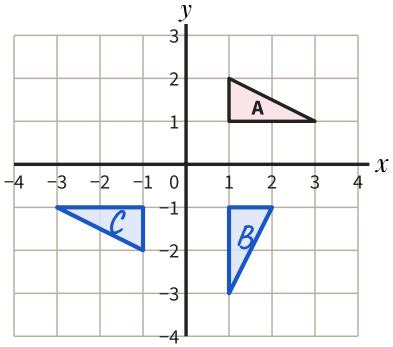
Reflect shape A in the line $x = 1$ to give B.
Reflect B in the line $x = 4$ to give C.



C (5, 1), (6, 1), (5, 3)

4

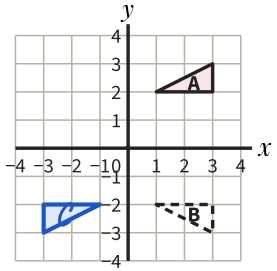
Rotate shape A 90° clockwise about (0, 0) to give B. Rotate B 90° clockwise about (0, 0) to give C.



C (−1, −1), (−3, −1), (−1, −2)

5 Notice the change!

Reflect A in the x axis to give B, then B in the y axis to give C. Describe fully the single transformation from A to C.

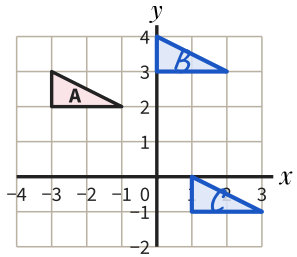


Rotation

180°, centre (0, 0)

6

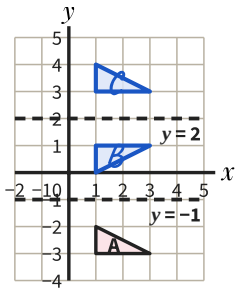
Translate A by $\begin{pmatrix} 3 \\ 1 \end{pmatrix}$ to give B, then B by $\begin{pmatrix} 1 \\ -4 \end{pmatrix}$ to give C. Describe fully the single transformation from A to C.



Translation by $\begin{pmatrix} 4 \\ -3 \end{pmatrix}$

7

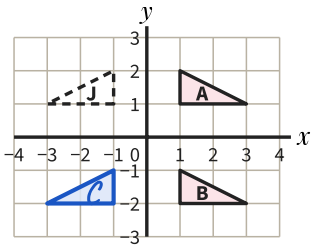
Reflect A in the line $y = -1$ to give B, then B in the line $y = 2$ to give C. Describe fully the single transformation from A to C.



Translation by $\begin{pmatrix} 0 \\ 6 \end{pmatrix}$

8

Jo should translate A by $\begin{pmatrix} 0 \\ -3 \end{pmatrix}$ to give B, then reflect B in the y axis. She draws B and J. Explain her mistake.



J is A reflected: reflect B, not A

C (−1, −2), (−3, −2), (−1, −1)

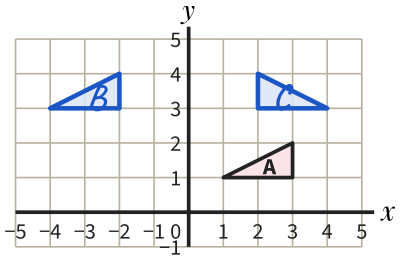
Combined transformations *further practice*

ANSWERS

9

Translate A by $\begin{pmatrix} -5 \\ 2 \end{pmatrix}$ to give B.

Reflect B in the y axis to give C.



(4, 3), (2, 3), (2, 4)

C

10

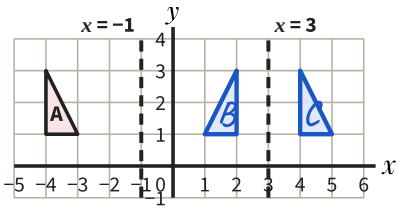
P (2, 5) is reflected in the x axis, then translated by $\begin{pmatrix} -3 \\ 1 \end{pmatrix}$. Where does P end up?

reflected: (2, −5)

Answer (−1, −4)

11

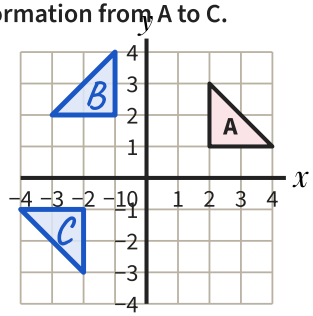
Reflect A in $x = -1$ to give B, then B in $x = 3$ to give C. Describe fully the single transformation from A to C.



Answer Translation by $\begin{pmatrix} 8 \\ 0 \end{pmatrix}$

12

Rotate A 90° anticlockwise about (0, 0) to give B, then B the same way to give C. Describe fully the single transformation from A to C.



Answer Rotation 180°, centre (0, 0)

13

P (3, 1): reflect in the y axis, then translate by $\begin{pmatrix} 2 \\ 0 \end{pmatrix}$. Now translate first, then reflect. Does the order matter?

reflect first: (−1, 1)

translate first: (−5, 1)

Answer Yes: (−1, 1) and (−5, 1)

14

A shape is rotated 90° clockwise about (0, 0) three times. Describe fully the single rotation that does the same.

270° clockwise is 90° anticlockwise

Answer 90° anticlockwise, centre (0, 0)

15

A shape is translated by a vector, then by $\begin{pmatrix} 2 \\ -1 \end{pmatrix}$. The single transformation is a translation by $\begin{pmatrix} 5 \\ 3 \end{pmatrix}$.

Find the first vector.

5 − 2 = 3, 3 − (−1) = 4

Answer $\begin{pmatrix} 3 \\ 4 \end{pmatrix}$

16

Ravi reflects a shape in the x axis, then rotates it 180° about (0, 0). He says the single transformation is a rotation. Explain why he is wrong and describe it fully.

flipped once: a rotation keeps it the same way round

Answer Reflection in the y axis