HIGHER ONLY

HIGHER TIER

Name ..... Class .....

G8: Combined transformations

Solve problems involving combinations of transformations

20 marks · 25 minutes · Non-calculator

1) The point (4, 1) is reflected in $x = 2$ and then in $y = 3$. Find where it ends up.

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[Question 1: 3 marks]

2) A point is rotated 90° clockwise about the origin twice. Describe the single transformation and find the image of (2, 3).

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[Question 2: 2 marks]

3) The point $(1, 4)$ is translated by $\begin{pmatrix} 3 \\ -2 \end{pmatrix}$ and then reflected in the y-axis. Does doing these in the opposite order give the same result? Show your working.

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[Question 3: 4 marks]

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4) A shape is reflected in $y = x$. Find the invariant point that also lies on the line $y = 2x - 3$

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[Question 4: 3 marks]

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5) A shape is reflected in the x-axis and then rotated 90° anticlockwise about the origin. Describe the single transformation that has the same effect.

[Question 5: 3 marks]

6) The point $(2, 7)$ is reflected in $x = 1$ and then in $x = 5$. Find the image and describe the single transformation.

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[Question 6: 3 marks]

7) A shape is rotated 120° about a point three times. Describe the result.

[Question 7: 2 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	$(0, 5)$	$(0, 1)$ (P1); reflect in $y = 3$ (P1); A1.
2	Rotation 180°; $(-2, -3)$	B1 each.
3	No	$(4, 2) \to (-4, 2)$ (P1); $(-1, 4) \to (2, 2)$ (P1, P1); different (C1).
4	$(3, 3)$	Invariant points lie on $y = x$ (P1); $x = 2x - 3$ (P1); A1.
5	Reflection in $y = x$	$(x, y) \to (x, -y) \to (y, x)$ (P1, P1); A1.
6	$(10, 7)$; translation $\begin{pmatrix} 8 \\ 0 \end{pmatrix}$	$(0, 7)$ (P1); $(10, 7)$ (A1); translation (A1).
7	Back to the start	$3 \times 120 = 360$ (P1); C1.