



KS3.M-G16 Transformations: Reflection and Rotation

AQA KS3.M-G16 · Calculators not allowed · about 60 minutes

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** Reflect point $P(3, 2)$ in the y -axis. Write down the coordinates of the image.

(1)

- 2** Reflect the triangle with vertices $A(1, 1)$, $B(4, 1)$ and $C(1, 3)$ in the x -axis. Give the coordinates of A' , B' and C' .

(2)

- 3** Point D is at $(-2, 5)$. Reflect D in the line $x = 0$ then in the line $y = 0$. Write the final coordinates.

(1)

- 4** Rotate point $E(2, 0)$ 90 degrees anticlockwise about the origin. State the coordinates of the image.

(2)

- 5** Rotate point $F(0, -3)$ 180 degrees about the origin. Give the coordinates of the image.

(2)

- 6** A square has vertices at (1, 1), (3, 1), (3, 3) and (1, 3). Rotate the whole square 90 degrees clockwise about the origin. Give the new coordinates in any order.

(3)

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- 7** Describe fully the single transformation that maps triangle T with vertices (2, 1), (4, 1), (2, 4) onto triangle T' with vertices (-1, 2), (-1, 4), (-4, 2).

(2)

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- 8** A shape is reflected in the line $y = x$. Point G at (2, 5) is one vertex. Find the coordinates of G' after reflection in $y = x$.

(2)

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- 9** Triangle with vertices A(2, 0), B(5, 0), C(2, 4) is rotated 270 degrees anticlockwise about the origin. Give the coordinates of A', B' and C'.

(3)

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- 10** Reflect the point H(-3, -2) in the line $x = -1$. Give the coordinates of the image H'.

(2)

- 11** A rectangle has corners at $(2, -1)$, $(6, -1)$, $(6, 1)$ and $(2, 1)$. First rotate the rectangle 90 degrees anticlockwise about the origin, then reflect the result in the x -axis. Give the final coordinates of the four vertices.

(3)

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- 12** Stretch question. The right-angled triangle with vertices $P(1, 0)$, $Q(4, 0)$ and $R(1, 3)$ is first rotated 90 degrees clockwise about the point $P(1, 0)$, then reflected in the line $y = 0$. Give the coordinates of P' , Q' and R' after both transformations.

(4)

Mark scheme · KS3.M-G16 Transformations: Reflection and Rotation

Question 1

- **B1** $(-3, 2)$ cao
- Answer: **$(-3, 2)$**

Question 2

- **M1** correct method: reflect y-values by negating them or show one reflected vertex, oe
- **A1** $A'(1, -1)$, $B'(4, -1)$, $C'(1, -3)$ cao
- Answer: **$A'(1, -1)$, $B'(4, -1)$, $C'(1, -3)$**

Question 3

- **B1** $(2, -5)$ cao
- Answer: **$(2, -5)$**

Question 4

- **M1** correct rotation method: $(x, y) \rightarrow (-y, x)$ or equivalent
- **A1** $(0, 2)$ cao
- Answer: **$(0, 2)$**

Question 5

- **M1** method: $(x, y) \rightarrow (-x, -y)$ or description
- **A1** $(0, 3)$ cao
- Answer: **$(0, 3)$**

Question 6

- **M1** correct map for one or more vertices using $(x, y) \rightarrow (y, -x)$ for 90 degrees clockwise
- **M1** correct mapping for remaining vertices or a consistent set
- **A1** images: $(1, -1)$, $(1, -3)$, $(3, -1)$, $(3, -3)$ cao (in any order)
- Answer: **$(1, -1)$, $(1, -3)$, $(3, -1)$, $(3, -3)$**

Question 7

- **M1** identify type of transformation or show centre/angle partially
- **A1** rotation 90 degrees anticlockwise about the point $(0, 0)$ oe
- Answer: **Rotation 90 degrees anticlockwise about the origin $(0, 0)$**

Question 8

- **M1** method: swap coordinates $(x, y) \rightarrow (y, x)$ or equivalent
- **A1** $(5, 2)$ cao
- Answer: **$(5, 2)$**

Question 9

- **M1** correct mapping rule for 270 degrees anticlockwise $(x, y) \rightarrow (y, -x)$ or equivalent
- **M1** apply to at least two points correctly
- **A1** $A'(0, -2)$, $B'(0, -5)$, $C'(4, -2)$ cao
- Answer: **$A'(0, -2)$, $B'(0, -5)$, $C'(4, -2)$**

Question 10

- **M1** method: find horizontal distance from H to the line $x = -1$ and reflect across it
- **A1** $H'(1, -2)$ cao
- Answer: **$(1, -2)$**

Question 11

- **M1** rotate 90 degrees anticlockwise: $(x, y) \rightarrow (-y, x)$ shown for at least one vertex
- **M1** reflect in x-axis: show $y \rightarrow -y$ for at least one rotated vertex
- **A1** final vertices $(1, -2), (1, -6), (-1, -6), (-1, -2)$ cao (in any order)
- **Answer: $(1, -2), (1, -6), (-1, -6), (-1, -2)$**

Question 12

- **M1** method for rotation about P shown, e.g. translate so P is origin and apply rotation rule
- **M1** apply rotation to at least two points correctly (examples: $Q \rightarrow (1, -3), R \rightarrow (4, 0)$)
- **M1** reflect in $y = 0$ shown ($y \rightarrow -y$) for at least one point
- **A1** final points $P'(1, 0), Q'(1, 3), R'(4, 0)$ cao (in any order)
- **Answer: $P'(1, 0), Q'(1, 3), R'(4, 0)$**