# Transformations: exam questions

11 questions · 23 marks · mark schemes at the end

Name _____ Date _____ Score / 23

- Calculators are allowed on both 4MA1 Higher papers (1H and 2H). Show your working: most marks are for method.
- Mark schemes start after the questions. M marks are for a correct method, A marks for an accurate answer that follows a correct method, and B marks for a correct result on its own.
- Online, with more practice: igcsemathrevision.com/igcse-frontend/4ma1/exam-questions/transformations

**1.** **1 mark**

The point $(2, -1)$ is translated by the vector $\begin{pmatrix} 3 \\ 4 \end{pmatrix}$.

Write down the coordinates of its image.

**2.** **2 marks**

The point $P$ is $(4, 1)$. Write down the coordinates of the image of $P$ after

(a) a reflection in the line $y = x$ **(1)**

(b) a reflection in the line $x = 2$. **(1)**

**3.** **2 marks**

Write down the image of

(a) the point $(3, 2)$ after a rotation of $90°$ clockwise about the origin **(1)**

(b) the point $(4, 3)$ after a rotation of $180°$ about $(1, 1)$. **(1)**

**4.** **2 marks**

The point $(2, 4)$ is enlarged by scale factor 3, centre $(1, 2)$.

Work out the coordinates of its image.

**5.** **2 marks**

Triangle $T$ has vertices $(1, 1)$, $(3, 1)$ and $(1, 2)$.

Write down the vertices of the image of $T$ after an enlargement with scale factor $-2$, centre the origin.

**6.** **2 marks**

A shape is enlarged by scale factor $\frac{1}{2}$, centre the origin.

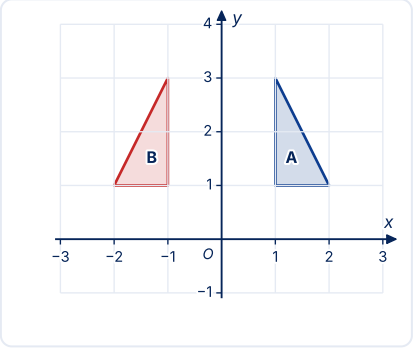
(a) A vertex of the shape is at $(6, 4)$. Write down the coordinates of its image. **(1)**

(b) Write down the scale factor of the change in area. **(1)**

**7.** **2 marks**

Triangle $A$ has vertices $(1, 1)$, $(2, 1)$ and $(1, 3)$. Triangle $B$ has vertices $(-1, 1)$, $(-2, 1)$ and $(-1, 3)$.

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



**8.** **2 marks**

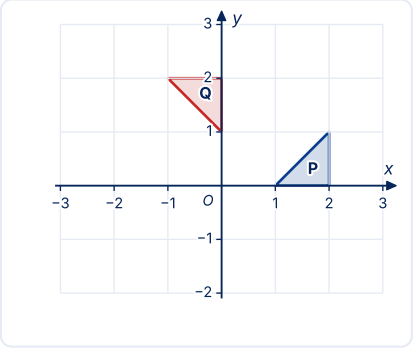
A shape has an area of 12 cm². It is enlarged by scale factor 3.

Work out the area of the enlarged shape.

**9.** **3 marks**

Shape $P$ has vertices $(1, 0)$, $(2, 0)$ and $(2, 1)$. Shape $Q$ has vertices $(0, 1)$, $(0, 2)$ and $(-1, 2)$.

Describe fully the single transformation that maps $P$ onto $Q$.




**10.** **2 marks**

A shape is reflected in the $x$-axis and then reflected in the $y$-axis.

Describe fully the single transformation that has the same effect.

**11.** **3 marks**

An enlargement with scale factor 3 maps $(2, 3)$ to $(5, 9)$ and $(4, 3)$ to $(11, 9)$.

Find the coordinates of the centre of enlargement.

## Answers and worked solutions

### Question 1 — 1 mark

**B1** $(5, 3)$

**Answer:** $(5, 3)$

### Question 2 — 2 marks

**(a)**

**B1** $(1, 4)$

**(b)**

**B1** $(0, 1)$

**Answer:** (a) $(1, 4)$; (b) $(0, 1)$

### Question 3 — 2 marks

**(a)**

**B1** $(2, -3)$

**(b)**

**B1** $(-2, -1)$

**Answer:** (a) $(2, -3)$; (b) $(-2, -1)$

### Question 4 — 2 marks

**M1** vector from the centre $\begin{pmatrix}1\\2\end{pmatrix}$ multiplied by 3

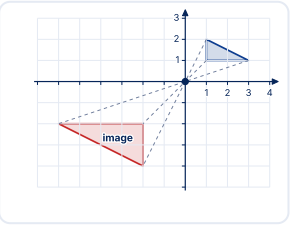
**A1** $(4, 8)$

**Answer:** $(4, 8)$

### Question 5 — 2 marks

**B2** $(-2, -2)$, $(-6, -2)$, $(-2, -4)$

B1 for two vertices correct, or all three with the wrong sign.




**Answer:** $(-2, -2)$, $(-6, -2)$, $(-2, -4)$

### Question 6 — 2 marks

**(a)**

**B1** $(3, 2)$

**(b)**

**B1** $\frac{1}{4}$

**Answer:** (a) $(3, 2)$; (b) $\frac{1}{4}$

### Question 7 — 2 marks

**B1** reflection

**B1** in the $y-$axis (the line $x = 0$)

**Answer:** reflection in the $y-$axis

### Question 8 — 2 marks

**M1** $12 \times 3^2$

**A1** $108\,\text{cm}^2$

**Answer:** $108\,\text{cm}^2$

### Question 9 — 3 marks

**B1** rotation

**B1** $90°$ anticlockwise

**B1** about the origin

**Answer:** rotation $90°$ anticlockwise about $(0, 0)$

### Question 10 — 2 marks

**B1** rotation of $180°$

**B1** about the origin

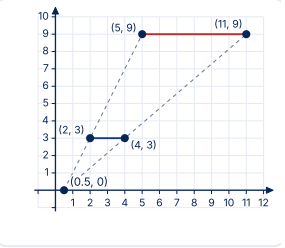
**Answer:** rotation $180°$ about $(0, 0)$

### Question 11 — 3 marks

**M1** $5 = a + 3(2 - a)$ or $9 = b + 3(3 - b)$

**A1** $a = 0.5$

**A1** $b = 0$, so the centre is $(0.5, 0)$




**Answer:** $(0.5, 0)$

Online, with every solution: igcsemathrevision.com/igcse-frontend/4ma1/exam-questions/transformations

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