



3.17F Transformations: Foundation Tier Practice

EDEXCEL Edexcel 1MA1 · Calculator allowed · about 50 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** Translate point P(2, 3) by the vector (4, -1). Write down the coordinates of the image.

(Total for Question 1 is 1 mark)

- 2** Reflect the point A(-1, 4) in the y-axis. Give the coordinates of the reflected point.

(Total for Question 2 is 1 mark)

- 3** Rotate the point B(3, 1) 90 degrees anticlockwise about the origin. Write down the new coordinates.

(Total for Question 3 is 2 marks)

- 4** Enlarge triangle T with vertices (1, 1), (3, 1) and (1, 2) by a scale factor of 2 from the origin. Give the coordinates of the enlarged triangle's vertices.

(Total for Question 4 is 3 marks)

- 5 Triangle ABC has vertices A(2, 0), B(5, 0) and C(2, 3). First translate the triangle by the vector (-2, 1). Then reflect the translated triangle in the x-axis. Give the coordinates of the final image of point C only.

(Total for Question 5 is 4 marks)

- 6 A square has vertices at (1, 1), (4, 1), (4, 4) and (1, 4). Drawn on a grid, the square is translated by the vector (2, 0) to make square S1. S1 is then rotated 180 degrees about the point (3, 3) to make square S2. Work out the coordinates of the vertex that started at (1, 1) after both transformations.

(Total for Question 6 is 5 marks)

- 7 The shape P is a triangle with vertices (0, 0), (2, 0) and (0, 2). Describe fully the single transformation that maps P to the triangle Q with vertices (0, 0), (0, 2) and (-2, 0). Give the type of transformation, the centre or axis or vector, and the angle if needed.

(Total for Question 7 is 6 marks)

- 8** Triangle R has vertices (2, 1), (5, 1) and (2, 3). The triangle is enlarged from the centre (2, 1) by a scale factor of 1.5. Work out the coordinates of the image of the vertex (5, 1). Give your answer as exact decimals.

(Total for Question 8 is 4 marks)

- 9** A right-angled isosceles triangle has vertices at (0, 0), (2, 0) and (0, 2). Apply the transformation: reflect in the line $y = x$, then translate by vector (1, -1). Work out the coordinates of the image of the point (2, 0).

(Total for Question 9 is 3 marks)

Mark scheme · 3.17F Transformations: Foundation Tier Practice

Question 1

- **B1** 6, 2 cao
- **Answer:** (6, 2)

Question 2

- **B1** 1, 4 cao
- **Answer:** (1, 4)

Question 3

- **M1** correct use of rotation rule $(x, y) \rightarrow (-y, x)$ or equivalent
- **A1** (-1, 3) cao
- **Answer:** (-1, 3)

Question 4

- **M1** correct method: multiply each coordinate by 2 (apply scale factor to coordinates)
- **M1** show multiplication for at least one vertex or evidence applied correctly to all vertices, e.g. $(1,1) \rightarrow (2,2)$ and $(3,1) \rightarrow (6,2)$
- **A1** (2, 2), (6, 2), (2, 4) cao
- **Answer:** (2, 2), (6, 2), (2, 4)

Question 5

- **M1** correct translation of C: $(2, 3) + (-2, 1) = (0, 4)$
- **M1** state or show correct intermediate point (0, 4) before reflection
- **M1** correct reflection in x-axis: $(x, y) \rightarrow (x, -y)$ applied to (0, 4)
- **A1** (0, -4) cao
- **Answer:** (0, -4)

Question 6

- **M1** translation step: $(1,1) + (2,0) = (3,1)$
- **M1** state vector or displacement from centre (3,3) to point (3,1): $(0, -2)$ or equivalent subtraction
- **M1** state effect of 180 degree rotation: $(x, y) \rightarrow (2 \times \text{centre}_x - x, 2 \times \text{centre}_y - y)$ or equivalent
- **M1** apply rotation to get image: $(3,1) \rightarrow (3,5)$ shown
- **A1** (3, 5) cao
- **Answer:** (3, 5)

Question 7

- **M1** identify transformation as rotation
- **M1** state correct centre: origin (0, 0)
- **M1** state correct angle and direction: 90 degrees anticlockwise
- **M1** apply to one vertex showing mapping, e.g. $(2,0) \rightarrow (0,2)$
- **M1** apply to second vertex or show $(0,2) \rightarrow (-2,0)$ to confirm mapping of triangle
- **A1** clear final statement: rotation 90 degrees anticlockwise about the origin cao
- **Answer:** Rotation 90 degrees anticlockwise about the origin (0, 0).

Question 8

- **M1** find vector from centre to point: $(5,1) - (2,1) = (3,0)$
- **M1** multiply vector by 1.5 to get $(4.5, 0)$
- **M1** show addition of scaled vector to centre
- **A1** add to centre: $(2,1) + (4.5,0) = (6.5, 1)$ cao
- **Answer:** (6.5, 1)

Question 9

- **M1** correct reflection in $y = x$: $(x, y) \rightarrow (y, x)$, so $(2,0) \rightarrow (0,2)$
- **M1** correct translation by $(1, -1)$: $(0,2) + (1,-1) = (1,1)$
- **A1** $(1, 1)$ cao
- **Answer: $(1, 1)$**