HIGHER

3.6 Geometric Transformations: Reflection, Rotation, Enlargement and Translation: Test Pack

EDEXCEL 4MA1 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A shape is reflected in the x-axis and then the image is reflected in the y-axis.
Describe fully the single transformation that is equivalent to these two reflections.

(Total for Question 1 is 3 marks)

2 Triangle XYZ has vertices X(3, 3), Y(-1, -3), Z(2, 2).
Triangle XYZ is enlarged with scale factor 3 and centre the origin.
Write down the coordinates of the vertices of the image X'Y'Z'.

(Total for Question 2 is 3 marks)

3 A shape is reflected in the line y = 3 and then the image is reflected in the line y = -4.
Describe fully the single transformation that is equivalent to these two reflections.

(Total for Question 3 is 3 marks)

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4 Triangle XYZ has vertices X(-1, 4), Y(-3, 0), Z(1, 1).
Triangle XYZ is enlarged with scale factor 2 and centre the origin.
Write down the coordinates of the vertices of the image X'Y'Z'.

(Total for Question 4 is 3 marks)

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5 A shape is reflected in the line y = 1 and then the image is reflected in the line y = -3.
Describe fully the single transformation that is equivalent to these two reflections.

(Total for Question 5 is 3 marks)

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6 Triangle ABC has vertices A(0, 0), B(4, 3), C(-2, 3).
Triangle ABC is enlarged with scale factor 3 and centre the origin.
Write down the coordinates of the vertices of the image A'B'C'.

(Total for Question 6 is 3 marks)

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7 Triangle ABC has vertices A(3, 3), B(-2, 5), C(1, -1). Its image A'B'C' has vertices A'(8, 3), B'(-2, 7), C'(4, -5).
Describe fully the single transformation that maps ABC onto A'B'C'.

(Total for Question 7 is 4 marks)

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8 Triangle PQR has vertices P(0, -1), Q(2, -3), R(-5, -4).
Triangle PQR is reflected in the line x = 0.
Write down the coordinates of the vertices of the image P'Q'R'.

(Total for Question 8 is 3 marks)

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9 A shape is reflected in the line y = 0 and then the image is reflected in the line y = -1.
Describe fully the single transformation that is equivalent to these two reflections.

(Total for Question 9 is 3 marks)

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10 Triangle PQR has vertices P(-2, 0), Q(-4, -1), R(1, -4). Its image P'Q'R' has vertices P'(-1, 0), Q'(-5, -2), R'(5, -8).
Describe fully the single transformation that maps PQR onto P'Q'R'.

(Total for Question 10 is 4 marks)

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11 Triangle ABC has vertices A(-5, 1), B(-5, -4), C(-3, 6).
Triangle ABC is reflected in the line y = -1.
Write down the coordinates of the vertices of the image A'B'C'.

(Total for Question 11 is 3 marks)

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12 Triangle ABC has vertices A(4, -1), B(-1, -3), C(-2, -1). Its image A'B'C' has vertices A'(-5, -4), B'(5, 0), C'(7, -4).
Describe fully the single transformation that maps ABC onto A'B'C'.

(Total for Question 12 is 4 marks)

13 Triangle XYZ has vertices X(4, -3), Y(1, -1), Z(5, 6).
Triangle XYZ is reflected in the line x = 4.
Write down the coordinates of the vertices of the image X'Y'Z'.

(Total for Question 13 is 3 marks)

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Mark scheme · 3.6 Geometric Transformations: Reflection, Rotation, Enlargement and Translation: Test Pack

Question 1

follows a point such as (1, 2) to (1, -2) then to (-1, -2) **M1**

recognises (x, y) -> (-x, -y) **M1**

Rotation of 180 degrees about the origin **A1**

Answer: Rotation of 180 degrees about the origin

Question 2

multiplies the distance of each vertex from the centre by 3 (a negative factor puts the image on the other side of the centre) **M1**

at least two image vertices correct, e.g. X'(9, 9) **A1**

X'(9, 9), Y'(-3, -9), Z'(6, 6) **A1**

Answer: X'(9, 9), Y'(-3, -9), Z'(6, 6)

Question 3

tests a point through both reflections, or uses that two parallel mirror lines give a translation **M1**

distance between the lines = -7, so the translation is twice this **M1**

Translation by the vector [0; -14] **A1**

Answer: Translation by the vector [0; -14]

Question 4

multiplies the distance of each vertex from the centre by 2 (a negative factor puts the image on the other side of the centre) **M1**

at least two image vertices correct, e.g. X'(-2, 8) **A1**

X'(-2, 8), Y'(-6, 0), Z'(2, 2) **A1**

Answer: X'(-2, 8), Y'(-6, 0), Z'(2, 2)

Question 5

tests a point through both reflections, or uses that two parallel mirror lines give a translation **M1**

distance between the lines = -4, so the translation is twice this **M1**

Translation by the vector [0; -8] **A1**

Answer: Translation by the vector [0; -8]

Question 6

multiplies the distance of each vertex from the centre by 3 (a negative factor puts the image on the other side of the centre) **M1**

at least two image vertices correct, e.g. A'(0, 0) **A1**

A'(0, 0), B'(12, 9), C'(-6, 9) **A1**

Answer: A'(0, 0), B'(12, 9), C'(-6, 9)

Question 7

identifies an enlargement **B1**

scale factor from a pair of corresponding sides or distances: 2 **M1**

centre found where the lines joining corresponding vertices meet **M1**

Enlargement with scale factor 2, centre (-2, 3) **A1**

Answer: Enlargement with scale factor 2, centre (-2, 3)

Question 8

each point and its image are the same perpendicular distance from the mirror line, on opposite sides **M1**

at least two image vertices correct, e.g. P'(0, -1) **A1**

P'(0, -1), Q'(-2, -3), R'(5, -4) **A1**

Answer: P'(0, -1), Q'(-2, -3), R'(5, -4)

Question 9

tests a point through both reflections, or uses that two parallel mirror lines give a translation **M1**

the lines are 1 unit apart, so the translation is twice this distance, in the direction from the first line to the second **M1**

Translation by the vector [0; -2] **A1**

Answer: Translation by the vector [0; -2]

Question 10

identifies an enlargement **B1**

scale factor from a pair of corresponding sides or distances: 2 **M1**

centre found where the lines joining corresponding vertices meet **M1**

Enlargement with scale factor 2, centre (-3, 0) **A1**

Answer: Enlargement with scale factor 2, centre (-3, 0)

Question 11

each point and its image are the same perpendicular distance from the mirror line, on opposite sides **M1**

at least two image vertices correct, e.g. A'(-5, -3) **A1**

A'(-5, -3), B'(-5, 2), C'(-3, -8) **A1**

Answer: A'(-5, -3), B'(-5, 2), C'(-3, -8)

Question 12

identifies an enlargement **B1**

scale factor from a pair of corresponding sides or distances: -2 **M1**

centre found where the lines joining corresponding vertices meet **M1**

Enlargement with scale factor -2, centre (1, -2) **A1**

Answer: Enlargement with scale factor -2, centre (1, -2)

Question 13

each point and its image are the same perpendicular distance from the mirror line, on opposite sides **M1**

at least two image vertices correct, e.g. X'(4, -3) **A1**

X'(4, -3), Y'(7, -1), Z'(3, 6) **A1**

Answer: X'(4, -3), Y'(7, -1), Z'(3, 6)

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