



KS2.M-Y4G1 Geometry: Symmetry, Coordinates and Translation

Calculators not allowed · about 45 minutes

Total Marks

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Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** How many lines of symmetry does an equilateral triangle have? Write the number.

(1)

- 2** A rectangle has sides of different lengths. How many lines of symmetry does it have? Write the number.

(2)

- 3** Plot the point (3, 4) on a coordinate grid. Then plot the point (3, 1). What is the vertical distance between these two points? Give your answer as a number of units.

(2)

- 4** On a grid, a point A is at (2, 5). Translate A 3 right and 2 down. Write the coordinates of the new point.

(2)

- 5** A square has one line of symmetry drawn through opposite corners. Is this line a line of symmetry for the square? Tick Yes or No and explain your answer in one sentence.

- ☐ Yes
☐ No

- 6** Here is a kite shape. It looks the same on the left and right when folded down the middle. Explain why this shows the kite has a line of symmetry. Full sentence please.

(1)

- 7** A shape has mirror symmetry across the vertical line $x = 4$. A point P on the shape is at (6, 2). What is the mirror image point P' across the line $x = 4$?

(2)

- 8** Complete the table. A point is moved 4 left and 1 up from each start position. Write the new coordinates.

Start (7, 3) ->

Start (4, 6) ->

(2)

- 9** A triangle has vertices at (1, 1), (1, 4) and (4, 1). Translate the triangle 2 right and 3 up. Give the coordinates of the three new vertices.

(2)

- 10** How many lines of symmetry does a regular pentagon have? Write the number.

(1)

- 11** A point is at (0, 0). It is reflected in the x-axis then translated 1 right and 2 up. What are the final coordinates?

(2)

- 12** Draw a rectangle with vertices at (2, 2), (6, 2), (6, 5) and (2, 5). A translation moves every point 4 right and 2 up. What are the coordinates of the translated rectangle's vertices?

(2)

- 13** A regular hexagon has a centre at (5, 5). One vertex is at (7, 5). What are the coordinates of the vertex directly opposite that vertex? (Assume the hexagon is regular and centred on the grid lines.)

(2)

- 14** True or false: A circle has an infinite number of lines of symmetry. Tick the correct answer.

- ☐ True
☐ False

- 15** A point B is at (8, 2). It is translated to (5, 5). Describe this translation as 'a right/left x and up/down y' using numbers, for example '3 left and 2 up'.

(2)

- 16** Here is a shape on a grid with a line of symmetry along the vertical line $x = 2.5$. One vertex of the shape is at (4, 1). Explain why there must be a matching vertex at (1, 1). Your answer should refer to distances from the line $x = 2.5$.

(3)

- 17** A pair of coordinates are $(1, 3)$ and $(7, 3)$. Which line are these two points symmetric about? Give the equation of the vertical line.

(2)

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- 18** A shape has vertices at $(1, 0)$, $(3, 0)$, $(3, 2)$ and $(1, 2)$. A translation slide moves the shape 2 left and 4 up. After the translation, what is the area of the shape? Explain your steps and give the final area in square units.

(3)

Mark scheme · KS2.M-Y4G1 Geometry: Symmetry, Coordinates and Translation

Question 1

- **B1** 3 cao
- Answer: **3**

Question 2

- **B1** 1 mark for recognising the two axes (vertical and horizontal) as possible
- **B1** 1 mark for two lines of symmetry cao
- Answer: **2**

Question 3

- **M1** Difference in y-coordinates seen, e.g. $4 - 1 = 3$
- **B1** 3 cao
- Answer: **3**

Question 4

- **M1** Addition of 3 to x and subtraction of 2 from y shown
- **B1** (5, 3) cao
- Answer: **(5, 3)**

Question 5

- **B1** 1 mark for ticking Yes
- **B1** 1 mark for explanation, e.g. 'Because the diagonal splits the square into two identical triangles' oe
- Answer: **Yes**

Question 6

- **B1** 1 mark for a correct explanation, e.g. 'If folded along the middle the two halves match exactly so it has a line of symmetry' oe
- Answer: **If folded along the middle the two halves match exactly so it has a line of symmetry**

Question 7

- **M1** Distance from line used: 6 is 2 to the right, so image is 2 to the left
- **B1** (2, 2) cao
- Answer: **(2, 2)**

Question 8

- **B1** (3, 4) cao for first
- **B1** (0, 7) cao for second
- Answer: **(3, 4); (0, 7)**

Question 9

- **M1** Correct translation applied to each coordinate
- **B1** (3, 4), (3, 7), (6, 4) cao
- Answer: **(3, 4), (3, 7), (6, 4)**

Question 10

- **B1** 5 cao
- Answer: **5**

Question 11

- **M1** Reflection in x-axis changes (0,0) to (0,0) or explanation that reflection leaves origin unchanged
- **B1** (1, 2) cao after translation
- **Answer: (1, 2)**

Question 12

- **M1** Add 4 to x and 2 to y for each vertex
- **B1** (6, 4), (10, 4), (10, 7), (6, 7) cao
- **Answer: (6, 4), (10, 4), (10, 7), (6, 7)**

Question 13

- **M1** Recognise opposite vertex is same distance on other side of centre: 2 units left
- **B1** (3, 5) cao
- **Answer: (3, 5)**

Question 14

- **B1** True cao
- **Answer: True**

Question 15

- **M1** Correct subtraction shown: 8 to 5 is 3 left, 2 to 5 is 3 up
- **B1** 3 left and 3 up cao
- **Answer: 3 left and 3 up**

Question 16

- **M1** States distance from line for given vertex, e.g. 4 is 1.5 to the right of $x = 2.5$
- **M1** States matching point must be same distance on other side, e.g. 1.5 to the left
- **B1** Concludes matching vertex at (1, 1) cao
- **Answer: 4 is 1.5 to the right of $x = 2.5$ so there must be a point 1.5 to the left at (1, 1)**

Question 17

- **M1** Find midpoint of x-coordinates: $(1 + 7)/2 = 4$
- **B1** $x = 4$ cao
- **Answer: $x = 4$**

Question 18

- **M1** Recognise translation does not change area or find base and height before or after translation
- **M1** Calculate base = $3 - 1 = 2$ and height = $2 - 0 = 2$, so area = 2×2
- **B1** 4 cm^2 or 4 square units cao
- **Answer: 4**