KS2.M-Y6G2 Geometry: Coordinates and Transformations

Total Marks

Calculators not allowed · about 60 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Point A is at (3, -2). Write down the coordinates of point A.

(1)

2 A point B is at (-4, 5). What is the x-coordinate of B?

(1)

3 Plot point C at (2, 3) and point D at (-1, 3) on a set of axes. What is the distance between C and D along the horizontal direction?

(2)

4 Triangle T has vertices at (1, 1), (4, 1) and (1, 4). Translate triangle T by the vector (2, -3). Write the coordinates of the image triangle T'.

(2)

5 Point E is at (-3, -4). Translate E by the vector (5, 0). What are the coordinates of the new point?

(1)

6 Reflect point F at (6, 2) in the x-axis. What are the coordinates of the reflected point F'?

(1)

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7 Reflect point G at (-2, 5) in the line y = x. What are the coordinates of G' after the reflection?

(2)

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8 A pentagon P has vertices at (2, 1), (4, 1), (5, 3), (3, 5) and (1, 3). First translate the pentagon by (-3, 2). Then reflect the translated pentagon in the y-axis. Give the coordinates of the final image.

(3)

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9 Points H(1, 2) and J(1, -4) are plotted. What is the length of HJ?

(2)

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10 Shape A is a square with corners at (-1, -1), (1, -1), (1, 1) and (-1, 1). Shape B is the image of shape A after a reflection in the y-axis. Explain your answer by giving the coordinates of shape B and stating the rule for the reflection.

(2)

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11 Find the midpoint of the line joining K(-6, 4) and L(2, -2).

(2)

12 Point M at (0, -3) is translated by the vector (-4, 6). What are the coordinates of M'?

(2)

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13 Quadrilateral Q has vertices at (2, -1), (5, -1), (5, 2) and (2, 2). Reflect Q in the x-axis. Give the coordinates of the image Q'.

(2)

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14 Point N lies on the y-axis at (0, 4). Explain why a reflection of N in the y-axis maps N to itself.

(2)

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15 Find the vector that maps P(-3, 2) to Q(4, -1).

(2)

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16 A rectangle R has vertices at (-2, 0), (2, 0), (2, 3) and (-2, 3). First translate R by (1, -2). Then translate the result by (-3, 4). Give the coordinates of the final rectangle.

(2)

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17 The line x = 1 is a line of reflection. Point S at (3, -2) is reflected in the line x = 1. What are the coordinates of S'?

(2)

18 Challenge: A triangle has vertices at A(0, 0), B(3, 0) and C(1, 2). It is translated by the vector (2, 1) then reflected in the x-axis. Give the coordinates of the final image and explain each step briefly.

(3)

Mark scheme · KS2.M-Y6G2 Geometry: Coordinates and Transformations

Question 1

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

Question 2

- **B1** -4 cao
- Answer: **-4**

Question 3

- **M1** Find horizontal difference, 2 - (-1) or |-1 to 2| seen
- **B1** 3 cao
- Answer: **3**

Question 4

- **M1** Add vector to at least one vertex correctly, showing translation method
- **B1** T' vertices (3, -2), (6, -2), (3, 1) cao
- Answer: **(3, -2), (6, -2), (3, 1)**

Question 5

- **B1** (2, -4) cao
- Answer: **(2, -4)**

Question 6

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

Question 7

- **M1** Swap x and y as part of reflection in y = x
- **B1** (5, -2) cao
- Answer: **(5, -2)**

Question 8

- **M1** Perform translation (-3, 2) correctly on at least one vertex
- **M1** Reflect translated coordinates in y-axis correctly (sign change of x) for at least one vertex
- **B1** Final vertices correctly given as (1, 3) -> after translation (-1, 3) reflect (1, 3); (4,1)->(1,3)->(-1,3) etc or full correct set cao
- Answer: **(1, 3), (-1, 3), (-2, 5), (0, 7), (2, 5)**

Question 9

- **M1** Find vertical difference: 2 - (-4) or |2 to -4| = 6
- **B1** 6 cao
- Answer: **6**

Question 10

- **M1** Give coordinates after reflection in y-axis for at least two corners or state x changes sign
- **B1** Full set (-1,-1)->(1,-1), (1,-1)->(-1,-1), (1,1)->(-1,1), (-1,1)->(1,1) and rule x becomes -x cao
- Answer: **B corners (1, -1), (-1, -1), (-1, 1), (1, 1); rule: (x, y) -> (-x, y) for reflection in the y-axis**

Question 11

- **M1** Find midpoint x as (-6 + 2)/2 = -2 and y as (4 + -2)/2 = 1
- **B1** (-2, 1) cao
- Answer: **(-2, 1)**

Question 12

- **M1** Add vector: 0 + (-4) and -3 + 6
- **B1** (-4, 3) cao
- Answer: **(-4, 3)**

Question 13

- **M1** Change sign of y for at least two vertices
- **B1** (2,1), (5,1), (5,-2), (2,-2) cao
- Answer: **(2, 1), (5, 1), (5, -2), (2, -2)**

Question 14

- **M1** State that reflecting in y-axis changes x to -x
- **B1** Conclude (0, 4) -> (-0, 4) which is same point so it maps to itself cao
- Answer: **(0, 4) maps to (-0, 4) which is (0, 4); x becomes -x so 0 stays 0**

Question 15

- **M1** Compute change in x: 4 - (-3) = 7 and change in y: -1 - 2 = -3
- **B1** Vector (7, -3) cao
- Answer: **(7, -3)**

Question 16

- **M1** Combine vectors: (1, -2) + (-3, 4) = (-2, 2) or apply translations sequentially
- **B1** Final vertices (-4, 2), (-0, 2), (0, 5), (-4, 5) cao
- Answer: **(-4, 2), (0, 2), (0, 5), (-4, 5)**

Question 17

- **M1** Recognise distance from x=1 is 2 units to the right so image is 2 units left of x=1
- **B1** S' at (-1, -2) cao
- Answer: **(-1, -2)**

Question 18

- **M1** Correct translation by (2,1) to give A(2,1), B(5,1), C(3,3)
- **M1** Correct reflection in x-axis: change sign of y to give A(2,-1), B(5,-1), C(3,-3)
- **B1** Final coordinates A'(2, -1), B'(5, -1), C'(3, -3) cao
- Answer: **A'(2, -1), B'(5, -1), C'(3, -3)**