4.3 Geometry: Transformations: 30-minute Pack

Calculator allowed · about 30 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Point Q has coordinates (4, 3).

(a) Write down the coordinates of the image of Q after a reflection in the x-axis. **(1)**

.....

(b) Write down the coordinates of the image of Q after a reflection in the y-axis. **(1)**

.....

2 State the order of rotational symmetry of a parallelogram that is not a rectangle.

(1)

3 Triangle DEF has vertices D(2, 3), E(5, 3) and F(2, 6). Reflect triangle DEF in the line y = x. Write down the coordinates of D', E' and F'.

(2)

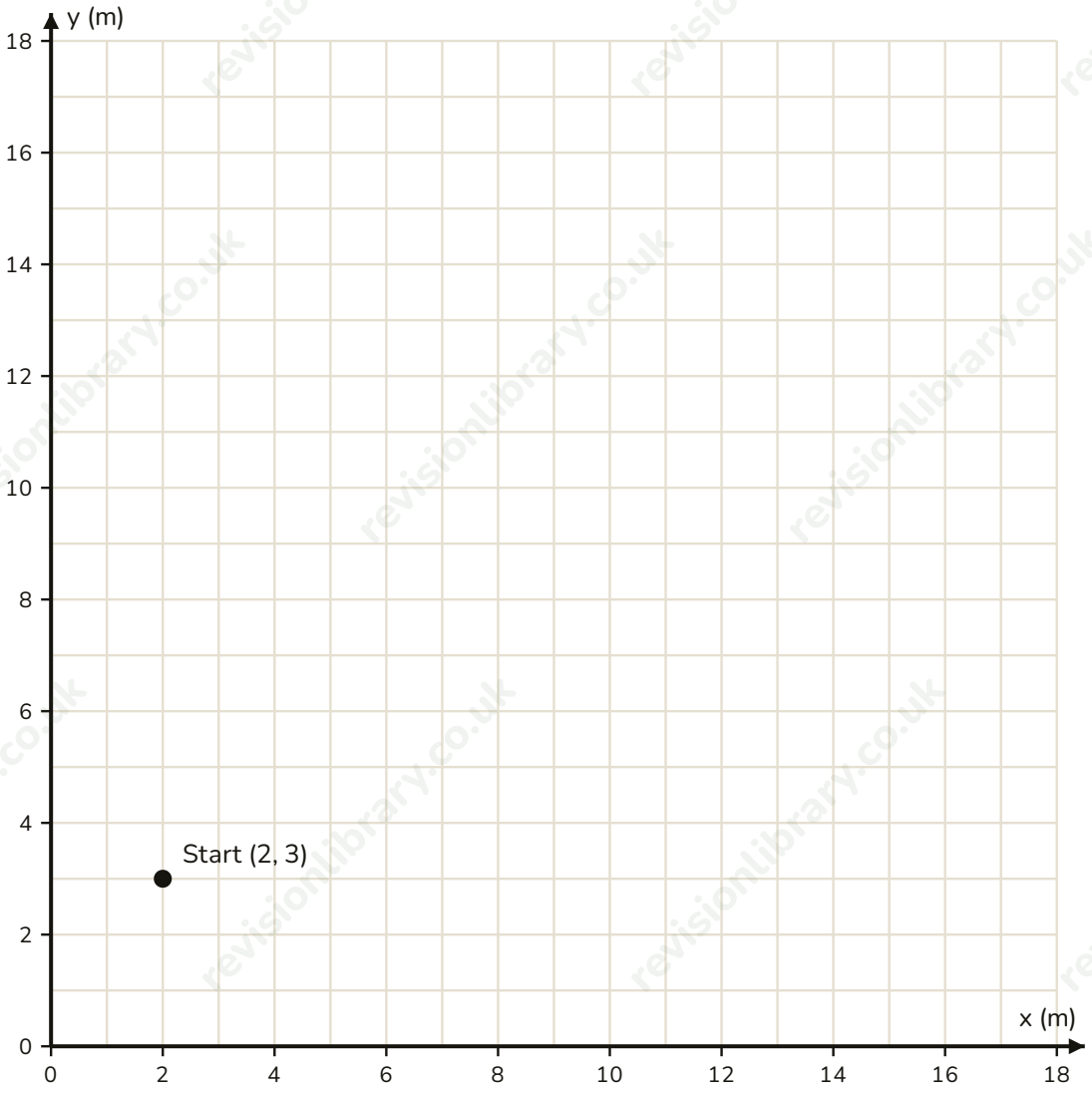
4 Reflect point S(6, -2) in the line y = x. Find the coordinates of the image.

(2)

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5 On a coordinate grid where distances are measured in metres, a drone starts at point (2, 3). It moves according to the vector (6, 8), then according to the vector (-2, 5).

Diagram NOT accurately drawn



(a) Work out the coordinates of the drone's final position. **(2)**

.....

(b) Calculate the direct straight-line distance between the drone's start and finish positions, giving your answer in metres to 1 decimal place. **(3)**

.....

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6 The points A (3, -5) and B (-5, 2) are reflected in the line x = -1. Write down the coordinates of the images A' and B'.

(2)

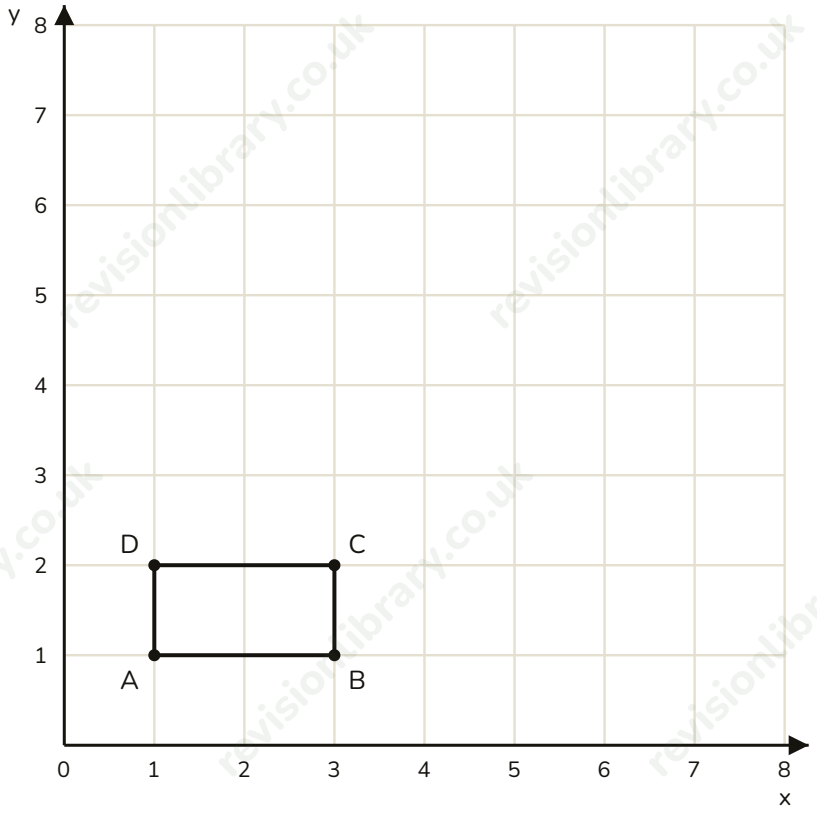
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7 The points A (6, 0) and B (2, 1) are reflected in the line y = x. Write down the coordinates of the images A' and B'.

(2)

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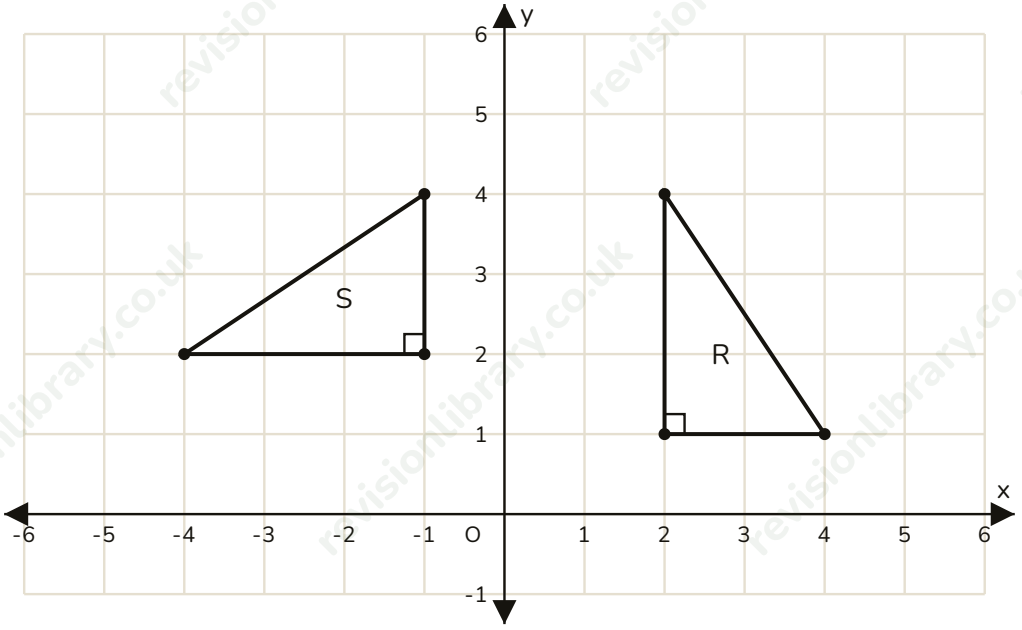
8 Rectangle ABCD has vertices A(1, 1), B(3, 1), C(3, 2) and D(1, 2). Enlarge rectangle ABCD by scale factor 2, centre (0, 0). Write down the coordinates of A', B', C' and D'.



(2)

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9 Shape R has vertices (2, 1), (2, 4) and (4, 1). Shape S has vertices (-1, 2), (-4, 2) and (-1, 4). Describe fully the single transformation that maps shape R onto shape S.



(3)

10 State the order of rotational symmetry of a regular octagon, and the size of the angle turned between each match.

(3)

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Mark scheme · 4.3 Geometry: Transformations: 30-minute Pack

A correct answer earns full marks unless the question asks for working, a method, proof or explanation.

Question 1

(a) (4, -3) cao **B1**

(a) Answer: **(4, -3)**

(b) (-4, 3) cao **B1**

(b) Answer: **(-4, 3)**

Question 2

2 cao **B1**

Answer: **2**

Question 3

swaps the coordinates of at least one vertex: (x, y) -> (y, x) **M1**

D'(3, 2), E'(3, 5), F'(6, 2) cao **A1**

Answer: **D'(3, 2), E'(3, 5), F'(6, 2)**

Question 4

method: swap coordinates (x, y) -> (y, x) **M1**

(-2, 6) cao **A1**

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

Question 5

(a) adds the vectors correctly, e.g. (2+6-2, 3+8+5) oe or finds intermediate point (8, 11) **M1**

(a) (6, 16) cao **A1**

(a) Answer: **(6, 16)**

(b) correct displacement vector (4, 13) oe, ft their part (a) **M1**

(b) correct use of Pythagoras: $\sqrt{4^2 + 13^2}$ **M1**

(b) awrt 13.6 m **A1**

(b) Answer: **13.6 m (1 dp)**

Question 6

A' = (-5, -5) **B1**

B' = (3, 2) **B1**

Answer: **(-5, -5), (3, 2)**

Question 7

A' = (0, 6) **B1**

B' = (1, 2) **B1**

Answer: **(0, 6), (1, 2)**

Question 8

multiplies each coordinate by 2, seen for at least one vertex **M1**

A'(2, 2), B'(6, 2), C'(6, 4), D'(2, 4) all correct cao **A1**

Answer: **A'(2, 2), B'(6, 2), C'(6, 4), D'(2, 4)**

Question 9

identifies the transformation as a rotation (not a translation or reflection) **M1**

angle and direction correct: 90 degrees anticlockwise **A1**

centre correct: (0, 0) **A1**

Answer: **Rotation of 90 degrees anticlockwise about the origin (0, 0)**

Question 10

identifies order of rotational symmetry equals the number of sides **M1**

order = 8 cao **A1**

angle = 360/8 = 45 degrees cao **A1**

Answer: **Order 8; angle between matches = 45 degrees**

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