4.17 Transformations: Translation and Enlargement: Test Pack

Calculators not allowed · about 60 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Write down the column vector that describes a translation 4 squares to the right and 2 squares up.

(1)

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2 The point Q is at (-1, 4). It is translated by (5, -6) then enlarged by scale factor 2 about the origin. Find the final coordinates.

(2)

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3 A triangle has vertices A(1, 2), B(4, 2) and C(1, 5). A enlargement with scale factor 1.5 about the origin maps A to A'. Find the coordinates of A', B' and C'. (Give any decimal answers to one decimal place if needed.)

(3)

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4 Stretch question. A shape is enlarged by scale factor 2 about the point (3, -1). One vertex of the original shape is at (7, 5) and the corresponding vertex of the image is at (11, 9). Verify these coordinates and explain whether these two points are consistent with enlargement by scale factor 2 about (3, -1). Show your working.

(4)

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5 A point A (-4, -2) is mapped to A' (-4, 0) by a translation. Write down the translation as a column vector in the form (x y), where x is the horizontal move and y the vertical move.

(2)

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6 A translation is given by the column vector (0, 6). Describe this translation in words.

(1)

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7 A point A (-4, 0) is mapped to A' (-8, -4) by a translation. Write down the translation as a column vector in the form (x y), where x is the horizontal move and y the vertical move.

(2)

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8 The points A (1, 0) and B (4, 1) are translated by 1 units to the right and 1 units up (negative values mean left or down). Write down the coordinates of A' and B'.

(2)

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9 The points A (-3, 2) and B (5, -4) are translated by -4 units to the right and 1 units up (negative values mean left or down). Write down the coordinates of A' and B'.

(2)

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10 The points P (1, 4) and Q (-1, 6) are enlarged by scale factor 3 about (0, 1). Write down the coordinates of the images P' and Q'.

(3)

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11 A shape of area 27 cm² is enlarged by scale factor 2. Work out the area of the image.

(2)

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12 A shape of area 28 cm² is enlarged by scale factor 5. Work out the area of the image.

(2)

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13 The points P (-2, -2) and Q (4, 0) are enlarged by scale factor -2 about (0, 2). Write down the coordinates of the images P' and Q'.

(3)

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14 The points P (2, 4) and Q (4, -1) are enlarged by scale factor 2 about (-1, 2). Write down the coordinates of the images P' and Q'.

(3)

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15 A triangle with vertices (3, 3), (5, 3) and (3, 6) is first translated by (2, -2) then enlarged by scale factor 2 about the origin. Find the coordinates after both transformations.

(3)

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16 A pentagon has a vertex at (0, 3). It is enlarged by scale factor 2 about the origin.

(a) Verify that the image of this vertex after the enlargement is (0, 6). **(1)**

(b) The original pentagon (before enlargement) is instead translated by the vector (2, -5). Find the coordinates of this translated vertex, starting from the original point (0, 3). **(2)**

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17 Priya says: "Enlarging a shape by scale factor 1 about any point always gives the same shape in the same place." Is Priya correct? Give a reason.

(3)

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18 Carry out the addition of the two column vectors. (3, -2) + (-4, 5).

(2)

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19 Enlarge the triangle with vertices (3, -2), (6, 2) and (3, 2) by scale factor 2 about the point (1, 0). Give the coordinates of the image.

(3)

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Mark scheme · 4.17 Transformations: Translation and Enlargement: Test Pack

Question 1

Correct column vector (4, 2) cao	B1

Answer: **[4, 2] (or column vector (4, 2))**

Question 2

Translates: (-1+5, 4-6) = (4, -2), then multiplies by 2	M1
Final point (8, -4) cao	A1

Answer: **(8, -4)**

Question 3

Multiplies coordinates by 1.5 for at least one point correctly	M1
Applies to remaining points or shows method	M1
Gives A'(1.5, 3.0), B'(6.0, 3.0), C'(1.5, 7.5) with acceptable rounding	A1

Answer: **A'(1.5, 3.0), B'(6.0, 3.0), C'(1.5, 7.5)**

Question 4

Finds vector from centre to original: (7-3, 5-(-1)) = (4, 6) or equivalent	M1
Multiplies that vector by 2 to get (8, 12)	M1
Adds centre back: (3+8, -1+12) = (11, 11) or shows this calculation	M1
Conclusion that image should be (11, 11), so given image (11, 9) is not consistent with scale factor 2 about (3, -1); explanation given	A1

Answer: **Not consistent. Correct image would be (11, 11), so (11, 9) is incorrect for scale factor 2 about (3, -1).**

Question 5

subtracts the coordinates (new - old)	M1
(0 2) cao	A1

Answer: **(0 2)**

Question 6

Description equivalent to "6 squares up" or "up 6" cao	B1

Answer: **Translate up 6**

Question 7

subtracts the coordinates (new - old)	M1
(-4 -4) cao	A1

Answer: **(-4 -4)**

Question 8

A' = (2, 1)	B1
B' = (5, 2)	B1

Answer: **(2, 1), (5, 2)**

Question 9

A' = (-7, 3)	B1
B' = (1, -3)	B1

Answer: **(-7, 3), (1, -3)**

Question 10

vector from the centre to a point found	M1
scaled by the scale factor	M1
(3, 10) and (-3, 16) cao	A1

Answer: **(3, 10), (-3, 16)**

Question 11

$2^2 = 4$	M1
108 cm² cao	A1

Answer: **108 cm^2**

Question 12

$5^2 = 25$	M1
700 cm² cao	A1

Answer: **700 cm^2**

Question 13

vector from the centre to a point found	M1
scaled by the scale factor	M1
(4, 10) and (-8, 6) cao	A1

Answer: **(4, 10), (-8, 6)**

Question 14

vector from the centre to a point found	M1
scaled by the scale factor	M1
(5, 6) and (9, -4) cao	A1

Answer: **(5, 6), (9, -4)**

Question 15

Applies translation to each point or shows one correct translated point	M1
Then multiplies translated coordinates by 2 about origin correctly	M1
Final coordinates correct: (10,2), (14,2), (10,8) cao	A1

Answer: **(10, 2), (14, 2), (10, 8)**

Question 16

(a) shows 2 x (0, 3) = (0, 6), confirming the image	B1

(a) Answer: **Confirmed: 2 x (0, 3) = (0, 6)**

(b) Applies translation to original vertex (0,3): (0+2, 3-5)	M1
(b) Gives (2, -2) cao	A1

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

Question 17

States whether correct or not: correct that shape is unchanged in size	M1
Explains that scale factor 1 means distances from centre are multiplied by 1 so points do not move	M1
Concludes that the shape remains in the same place and size; wording equivalent to this earns the mark	A1

Answer: **Yes. Scale factor 1 multiplies all distances from the centre by 1 so every point stays where it is; the shape is unchanged.**

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Question 18

Adds components correctly: (3 + -4, -2 + 5) or equivalent	**M1**
Gives final vector (-1, 3) cao	**A1**

Answer: **[-1, 3] (or column vector (-1, 3))**

Question 19

Subtracts centre (1,0) from a point, multiplies by 2 and adds centre for at least one point	**M1**
Applies method to remaining points or shows clear working	**M1**
All three image coordinates correct: (5, -4), (11, 4), (5, 4) cao	**A1**

Answer: **(5, -4), (11, 4), (5, 4)**

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