4.17 Transformations: Translation and Enlargement: 2-hour Pack

Calculators not allowed · about 120 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 The point P (-2, 5) is reflected in the x-axis and the image is then translated by 1 units to the right and 2 units up (negative means left or down). Write down the coordinates of the final image.

(3)

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2 The points A (-2, 0) and B (2, 0) are translated by 6 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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3 A shape of area 17 cm² is enlarged by scale factor 4. Work out the area of the image.

(2)

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4 The points A (1, 0) and B (-2, -5) are translated by -2 units to the right and 6 units up (negative values mean left or down). Write down the coordinates of A' and B'.

(2)

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5 A shape of area 9 cm² is enlarged by scale factor 3. Work out the area of the image.

(2)

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

(2)

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7 The points A (-2, -2) and B (4, -1) are translated by -5 units to the right and -6 units up (negative values mean left or down). Write down the coordinates of A' and B'.

(2)

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8 The points P (-1, -3) and Q (5, 2) are enlarged by scale factor 3 about (1, -1). Write down the coordinates of the images P' and Q'.

(3)

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9 The points A (-4, -2) and B (-3, -2) are translated by -3 units to the right and -6 units up (negative values mean left or down). Write down the coordinates of A' and B'.

(2)

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10 A shape of area 5 cm² is enlarged by scale factor 4. Work out the area of the image.

(2)

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11 The point P (-3, -1) is reflected in the y-axis and the image is then translated by 2 units to the right and -2 units up (negative means left or down). Write down the coordinates of the final image.

(3)

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12 The point P (-2, -3) is reflected in the y-axis and the image is then translated by 1 units to the right and 3 units up (negative means left or down). Write down the coordinates of the final image.

(3)

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13 On a square grid, shape S is translated by the vector (-2, 3) to form shape T. If a vertex of S is at (6, 1), what are the coordinates of the corresponding vertex of T?

(2)

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14 The point P (-5, 1) is reflected in the x-axis and the image is then translated by 3 units to the right and -4 units up (negative means left or down). Write down the coordinates of the final image.

(3)

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15 The point P (-1, 1) is reflected in the y-axis and the image is then translated by 2 units to the right and 0 units up (negative means left or down). Write down the coordinates of the final image.

(3)

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16 A shape of area 8 cm² is enlarged by scale factor 4. Work out the area of the image.

(2)

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17 The point P (4, -3) is reflected in the y-axis and the image is then translated by 2 units to the right and 3 units up (negative means left or down). Write down the coordinates of the final image.

(3)

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18 The points P (-4, -3) and Q (2, 5) are enlarged by scale factor -2 about the origin. Write down the coordinates of the images P' and Q'.

(2)

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19 The point P (-5, -3) is reflected in the x-axis and the image is then translated by 4 units to the right and -3 units up (negative means left or down). Write down the coordinates of the final image.

(3)

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

(3)

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21 The point P (-4, -1) is reflected in the y-axis and the image is then translated by 3 units to the right and 2 units up (negative means left or down). Write down the coordinates of the final image.

(3)

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22 The points P (5, -3) and Q (-2, -1) are enlarged by scale factor 4 about (2, 2). Write down the coordinates of the images P' and Q'.

(3)

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23 The points P (-4, -3) and Q (4, 2) are enlarged by scale factor -2 about the origin. Write down the coordinates of the images P' and Q'.

(2)

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24 The point P (5, 3) is reflected in the x-axis and the image is then translated by 0 units to the right and -1 units up (negative means left or down). Write down the coordinates of the final image.

(3)

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25 The point P (-4, -1) is reflected in the y-axis and the image is then translated by 3 units to the right and 3 units up (negative means left or down). Write down the coordinates of the final image.

(3)

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26 The points P (-2, 6) and Q (2, 2) are enlarged by scale factor 2 about (-1, 0). Write down the coordinates of the images P' and Q'.

(3)

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27 Enlarge the triangle with vertices (2, -1), (5, 3) and (2, 3) by scale factor 3 about the point (1, 0). Give the coordinates of the image.

(3)

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28 A square with corners at (2, 2), (5, 2), (5, 5), (2, 5) is enlarged by scale factor 1/2 about the origin. Give the coordinates of the image.

(2)

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29 Write down the column vector that describes a translation 5 squares to the right and 3 squares down.

(1)

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30 Enlarge point P(5, 7) by scale factor 5 about the point (1, 2). Work out the image P'.

(2)

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31 Translate the point (-3, -5) by the vector (6, 1). Write down the coordinates of the image.

(2)

32 Enlarge the rectangle with corners (2, 2), (6, 2), (6, 4), (2, 4) by scale factor 0.5 about the point (2, 2). Give the coordinates of the image.

(3)

33 The point Q is at (-2, 5). It is translated by (4, -7) then enlarged by scale factor 3 about the origin. Find the final coordinates.

(3)

34 A triangle has vertices at (3, 0), (5, 0) and (3, 4). It is enlarged by scale factor 4 about the point (3, 0). Give the coordinates of the image.

(3)

35 Write down the column vector that describes a translation 2 squares to the left and 6 squares up.

(1)

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36 A triangle has vertices at A(2, 3), B(5, 3) and C(3, 6). Translate the triangle by the vector (-2, 4). Write the new coordinates of A, B and C.

(2)

37 On a square grid, shape S is translated by the vector (3, -4) to form shape T. If a vertex of S is at (5, 2), what are the coordinates of the corresponding vertex of T?

(2)

38 Enlarge the triangle with vertices (2, 1), (5, 1) and (2, 4) by scale factor 3 about the origin (0, 0). Write the coordinates of the image.

(3)

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Mark scheme · 4.17 Transformations: Translation and Enlargement: 2-hour Pack

Question 1

reflection carried out	M1
intermediate image (-2, -5)	A1
(-1, -3) cao	A1

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

Question 2

A' = (4, 1)	B1
B' = (8, 1)	B1

Answer: **(4, 1), (8, 1)**

Question 3

$4^2 = 16$	M1
272 cm² cao	A1

Answer: **272 cm²**

Question 4

A' = (-1, 6)	B1
B' = (-4, 1)	B1

Answer: **(-1, 6), (-4, 1)**

Question 5

$3^2 = 9$	M1
81 cm² cao	A1

Answer: **81 cm²**

Question 6

A' = (7, -2)	B1
B' = (-1, -1)	B1

Answer: **(7, -2), (-1, -1)**

Question 7

A' = (-7, -8)	B1
B' = (-1, -7)	B1

Answer: **(-7, -8), (-1, -7)**

Question 8

vector from the centre to a point found	M1
scaled by the scale factor	M1
(-5, -7) and (13, 8) cao	A1

Answer: **(-5, -7), (13, 8)**

Question 9

A' = (-7, -8)	B1
B' = (-6, -8)	B1

Answer: **(-7, -8), (-6, -8)**

Question 10

$4^2 = 16$	M1
80 cm² cao	A1

Answer: **80 cm²**

Question 11

reflection carried out	M1
intermediate image (3, -1)	A1
(5, -3) cao	A1

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

Question 12

reflection carried out	M1
intermediate image (2, -3)	A1
(3, 0) cao	A1

Answer: **(3, 0)**

Question 13

Applies translation to coordinates (6 + -2, 1 + 3) or equivalent	M1
Gives (4, 4) cao	A1

Answer: **(4, 4)**

Question 14

reflection carried out	M1
intermediate image (-5, -1)	A1
(-2, -5) cao	A1

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

Question 15

reflection carried out	M1
intermediate image (1, 1)	A1
(3, 1) cao	A1

Answer: **(3, 1)**

Question 16

$4^2 = 16$	M1
128 cm² cao	A1

Answer: **128 cm²**

Question 17

reflection carried out	M1
intermediate image (-4, -3)	A1
(-2, 0) cao	A1

Answer: **(-2, 0)**

Question 18

multiplies the position vector(s) from the centre by the scale factor	M1
(8, 6) and (-4, -10) cao	A1

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

Question 19

reflection carried out	M1
intermediate image (-5, 3)	A1
(-1, 0) cao	A1

Answer: **(-1, 0)**

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Question 20

vector from the centre to a point found	M1
scaled by the scale factor	M1
(10, -7) and (-2, 11) cao	A1

Answer: **(10, -7), (-2, 11)**

Question 21

reflection carried out	M1
intermediate image (4, -1)	A1
(7, 1) cao	A1

Answer: **(7, 1)**

Question 22

vector from the centre to a point found	M1
scaled by the scale factor	M1
(14, -18) and (-14, -10) cao	A1

Answer: **(14, -18), (-14, -10)**

Question 23

multiplies the position vector(s) from the centre by the scale factor	M1
(8, 6) and (-8, -4) cao	A1

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

Question 24

reflection carried out	M1
intermediate image (5, -3)	A1
(5, -4) cao	A1

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

Question 25

reflection carried out	M1
intermediate image (4, -1)	A1
(7, 2) cao	A1

Answer: **(7, 2)**

Question 26

vector from the centre to a point found	M1
scaled by the scale factor	M1
(-3, 12) and (5, 4) cao	A1

Answer: **(-3, 12), (5, 4)**

Question 27

Subtracts centre (1,0) from a point, multiplies by 3 and adds centre for at least one point	M1
Applies method to remaining points or shows clear working	M1
All three image coordinates correct: (4, -3), (13, 9), (4, 9) cao	A1

Answer: **(4, -3), (13, 9), (4, 9)**

Question 28

Multiplies each coordinate by 1/2 or 0.5	M1
Gives (1,1), (2.5,1), (2.5,2.5), (1,2.5) cao	A1

Answer: **(1, 1), (2.5, 1), (2.5, 2.5), (1, 2.5)**

Question 29

Correct column vector (5, -3) cao	B1

Answer: **[5, -3] (or column vector (5, -3))**

Question 30

Subtracts centre (1,2): vector (4,5), multiplies by 5 to get (20,25) then adds centre	M1
P'(21,27) cao	A1

Answer: **P'(21, 27)**

Question 31

Adds vector to point correctly: (-3 + 6, -5 + 1)	M1
(3, -4) cao	A1

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

Question 32

Subtracts centre (2,2) from a corner: e.g. (0,0), (4,0), (4,2), (0,2) then multiplies by 0.5	M1
Adds centre back to get image coordinates for points other than the centre	M1
Gives images: (2,2), (4,2), (4,3), (2,3) cao	A1

Answer: **(2, 2), (4, 2), (4, 3), (2, 3)**

Question 33

Translates: (-2+4, 5-7) = (2, -2)	M1
Multiplies translated point by 3, showing working	A1
Final point (6, -6) cao	A1

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

Question 34

Takes (3,0) as centre, subtracts centre for other points: (0,0), (2,0), (0,4)	M1
Multiplies by 4 and adds centre back correctly	M1
Image coordinates: (3,0), (11,0), (3,16) cao	A1

Answer: **(3, 0), (11, 0), (3, 16)**

Question 35

Correct column vector (-2, 6) cao	B1

Answer: **[-2, 6] (or column vector (-2, 6))**

Question 36

Adds vector to each point correctly, showing at least one correct addition	M1
All three coordinates correct: A'(0,7), B'(3,7), C'(1,10) cao	A1

Answer: **A'(0, 7), B'(3, 7), C'(1, 10)**

Question 37

Applies translation to coordinates (5 + 3, 2 + -4) or equivalent	M1
Gives (8, -2) cao	A1

Answer: **(8, -2)**

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Question 38

Multiplies coordinates by 3 for at least one point correctly	**M1**
Shows method for other points or lists transformed coordinates	**M1**
All three correct: (6,3), (15,3), (6,12) cao	**A1**

Answer: **(6, 3), (15, 3), (6, 12)**

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