1.12 Coordinates: 2-hour Pack

EDEXCEL 1MA1 · Calculator allowed · about 120 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A is the point (7, 0) and B is the point (2, 5). Find the coordinates of the midpoint of AB.

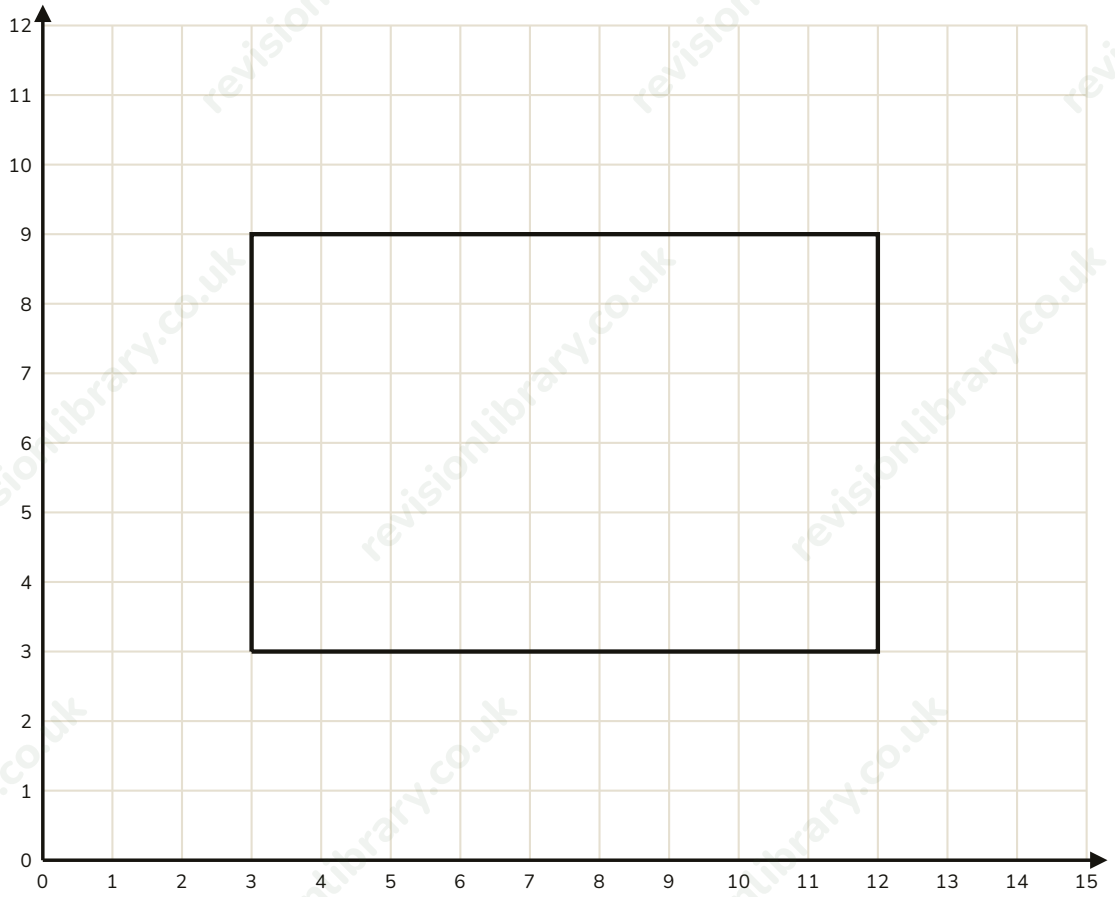
(Total for Question 1 is 2 marks)

2 ABCD is a rectangle with sides parallel to the axes. A is the point (0, 0), B is the point (4, 0) and C is the point (4, 7). Find the coordinates of D.

(Total for Question 2 is 2 marks)

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3 A rectangle has vertices at (3, 3), (12, 3), (12, 9) and (3, 9). Work out (a) the perimeter and (b) the area of the rectangle. Each unit on the axes is 1 cm.



(Total for Question 3 is 3 marks)

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4 M is the midpoint of the line AB. A is the point (-1, -2) and M is the point (5, 0). Find the coordinates of B.

(Total for Question 4 is 3 marks)

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5 A is the point (5, 8) and B is the point (5, 0). Find the coordinates of the midpoint of AB.

(Total for Question 5 is 2 marks)

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6 ABCD is a rectangle with sides parallel to the axes. A is the point (3, -1), B is the point (10, -1) and C is the point (10, 4). Find the coordinates of D.

(Total for Question 6 is 2 marks)

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7 ABCD is a rectangle with sides parallel to the axes. A is the point (-2, 4), B is the point (5, 4) and C is the point (5, 7). Find the coordinates of D.

(Total for Question 7 is 2 marks)

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8 A stage designer places props on a grid marked out on the floor of a school hall, where the corner of the hall is the origin.

(a) The piano is placed 7 units from the left wall and 3 units from the front wall. Write down the coordinates of the piano. **(1)**

.....

(b) The microphone stand is placed on the front-wall line (the x-axis), 4 units to the left of the corner. Write down the coordinates of the microphone stand. **(1)**

.....

(Total for Question 8 is 2 marks)

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9 Each part gives the coordinates of a point. Write down which quadrant (1, 2, 3 or 4) the point lies in. If the point lies on an axis, write 'on an axis' instead of a quadrant number.

(a) (5, -3) **(1)**

(b) (-6, 2) **(1)**

(c) (-1, -8) **(1)**

(d) (0, 4) **(1)**

(Total for Question 9 is 4 marks)

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10 Find the equation of the straight line that passes through the points (-3, 2) and (-3, 9).

(Total for Question 10 is 2 marks)

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11 Point U is at (2, 3) and point V is at (8, 11). Work out the coordinates of the midpoint of the line segment UV.

(Total for Question 11 is 2 marks)

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12 Point A is at the intersection of the vertical line $x = -2$ and the horizontal line $y = 5$. Write down the coordinates of A.

(Total for Question 12 is 1 mark)

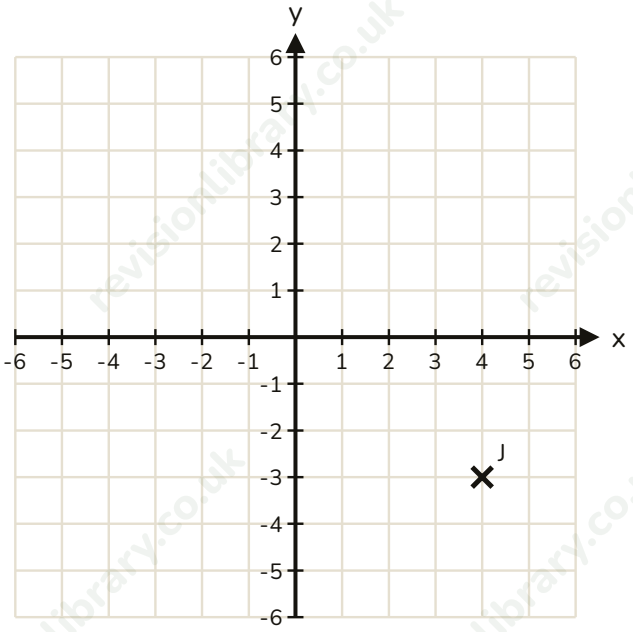
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13 Which quadrant contains the point C with coordinates (-6, 2)?

(Total for Question 13 is 1 mark)

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14 The diagram shows a coordinate grid. Point J is marked with a cross. Write down the coordinates of point J.



(Total for Question 14 is 1 mark)

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15 Point K lies on the x-axis, 5 units to the left of the origin. Write down the coordinates of K.

(Total for Question 15 is 1 mark)

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16 Point A is at (5, 3).

(a) Point A is reflected in the x-axis to give point B. Write down the coordinates of B. **(1)**

.....

(b) Point A is reflected in the y-axis to give point C. Write down the coordinates of C. **(1)**

.....

(Total for Question 16 is 2 marks)

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17 A sequence of points is generated on a grid. The first point is (1, -2). Each new point is formed by adding 3 to the x-coordinate and adding 2 to the y-coordinate of the previous point.

(a) Write down the coordinates of the second point in the sequence. **(1)**

.....

(b) Write down the coordinates of the third point in the sequence. **(1)**

.....

(c) One of the points in the sequence has coordinates (16, y). Work out the value of y. **(2)**

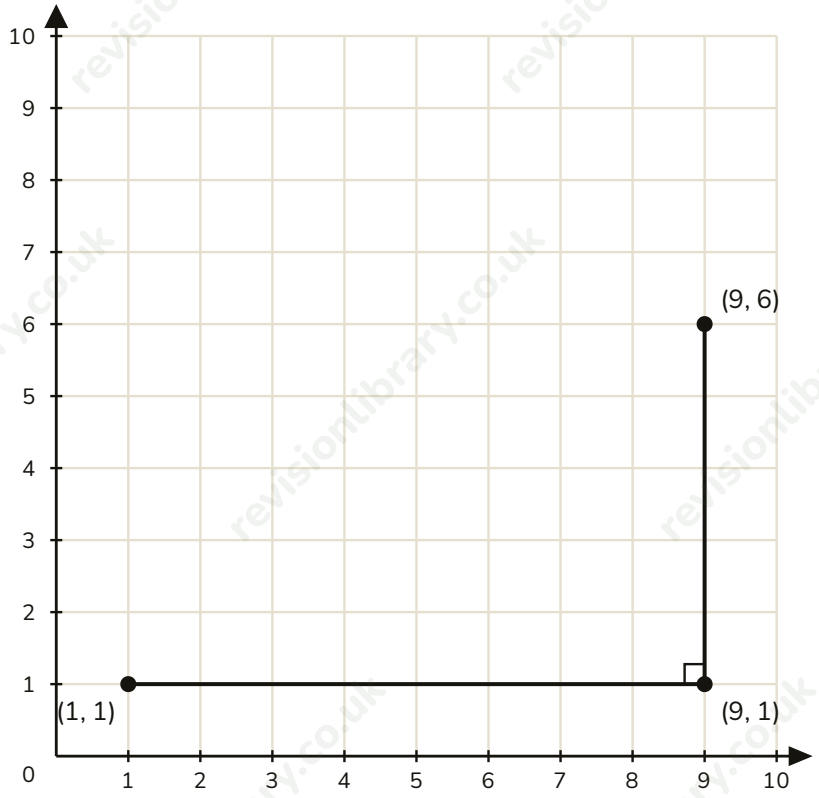
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(Total for Question 17 is 4 marks)

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18 A rectangular garden is drawn on a coordinate grid, where 1 unit represents 1 metre. Three corners of the garden are at (1, 1), (9, 1) and (9, 6).

Diagram NOT accurately drawn



(a) Find the coordinates of the fourth corner of the garden. **(2)**

.....

(b) Work out the perimeter of the garden. **(2)**

.....

(Total for Question 18 is 4 marks)

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19 KLMN is a parallelogram. K = (-3, 1), L = (2, 1), M = (5, 6). The diagonals of a parallelogram bisect each other.

(a) Work out the coordinates of N. **(3)**

.....

(b) Show that side KL is parallel to side NM. **(1)**

(Total for Question 19 is 4 marks)

---

20 Point Y is at (3, -5). Point Y is reflected in the x-axis to give point Z. Work out the distance YZ.

(Total for Question 20 is 2 marks)

---

21 Answer the following questions, where each point has one coordinate given as a letter.

(a) The point (k, 7) lies on the same vertical line as the point (3, -2). Write down the value of k. **(1)**

.....

(b) The point (5, m) lies on the same horizontal line as the point (-9, 12). Write down the value of m. **(1)**

.....

(c) The point (2k, 9) lies on the same vertical line as the point (-8, 1). Work out the value of k. **(2)**

.....

(Total for Question 21 is 4 marks)

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22 Point A is at (6, -2). Point A is reflected in the x-axis to give point B. Point B is then reflected in the y-axis to give point C. Work out the coordinates of point C.

(Total for Question 22 is 2 marks)

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23 A search-and-rescue drone starts at point (-6, 5) on a grid, where each grid unit represents 10 metres.

(a) The drone flies 9 units to the right and 8 units down to hover above point S. Work out the coordinates of S. **(2)**

.....

(b) The drone then flies in a straight horizontal line from S to point T(-5, -3). Work out the real-world distance flown from S to T, in metres. **(2)**

.....

(Total for Question 23 is 4 marks)

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24 The midpoint of the line segment WX is (4, -1). Point W is at (-2, 5). Work out the coordinates of point X.

(Total for Question 24 is 3 marks)

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25 The table shows the coordinates of four points on a grid.

Point	x	y
E	-4	3
F	5	3
G	2	-5
H	-1	-2

Write down the letter of the point that lies in the third quadrant, and state its coordinates.

(Total for Question 25 is 2 marks)

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26 Point P(-2, 3) is translated by the vector (5, -7). Find the coordinates of the image of P after the translation.

(Total for Question 26 is 3 marks)

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27 Find the midpoint of the line segment with endpoints A(2, -3) and B(6, 5).

(Total for Question 27 is 2 marks)

---

28 On a scale map of a park (1 unit = 100 m), the tutoring centre is at (2, 6) and the cafe is at (10, 2). A bench is to be placed at the midpoint of the straight path joining them. Work out the coordinates of the bench.

(Total for Question 28 is 2 marks)

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29 Point A is at (-3, 5) and point B is at (4, -2). Find the column vector that translates point A onto point B.

(Total for Question 29 is 2 marks)

---

30 Find the coordinates of D to complete the rectangle with vertices A(-2, 1), B(4, 1) and C(4, 6).

(Total for Question 30 is 3 marks)

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31 A rectangle has vertices at A(2, 1), B(6, 1) and C(6, 4). Find the coordinates of the fourth vertex D.

(Total for Question 31 is 3 marks)

---

32 A school marks out a square flower bed on a coordinate grid, where 1 unit represents 1 metre. Three of its corners are at A(-3, -3), B(2, -3) and C(2, 2). Find the coordinates of the fourth corner D, and work out the perimeter of the flower bed.

(Total for Question 32 is 3 marks)

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33 The midpoint of the line segment AB is (3, -1). Point A is at (-2, 4). Find the coordinates of point B.

(Total for Question 33 is 3 marks)

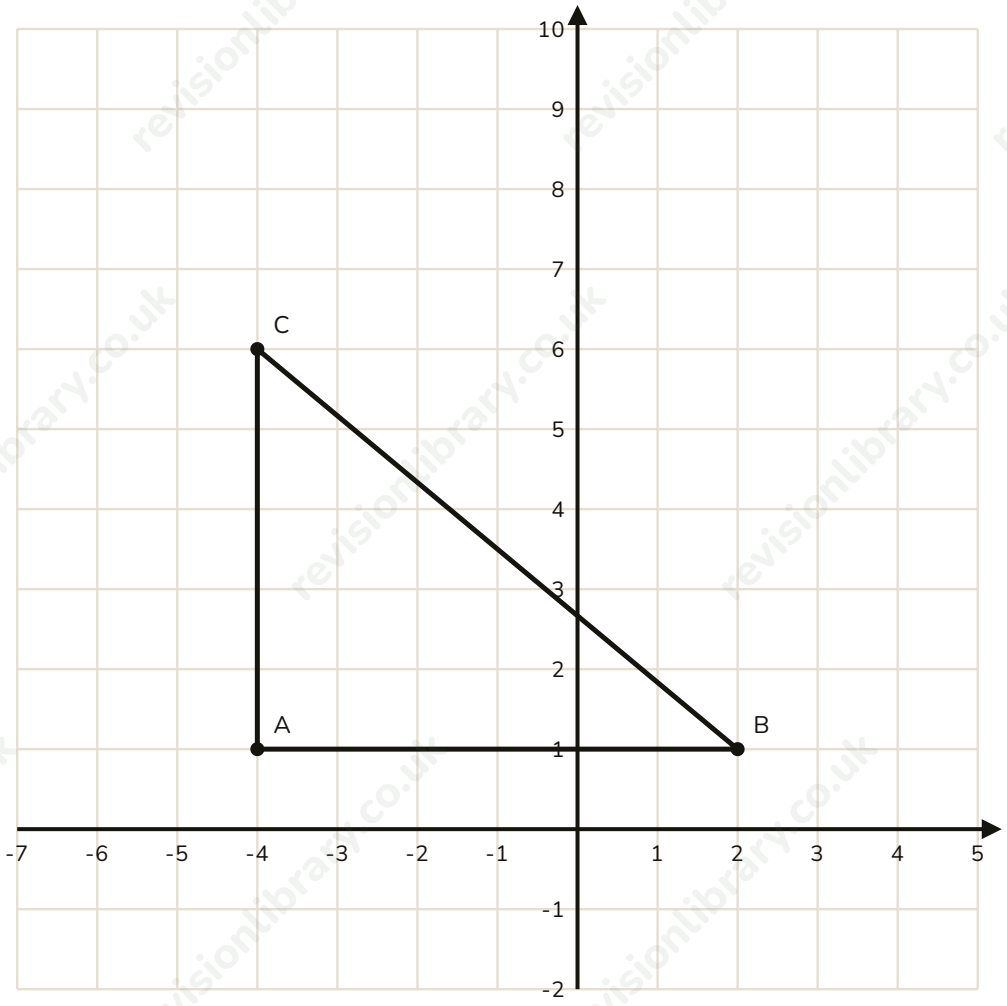
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34 Given points A(-1, 2), B(3, 5) and C(6, 1) are three consecutive vertices of a parallelogram ABCD in that order. Find the coordinates of D.

(Total for Question 34 is 3 marks)

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35 Triangle ABC has vertices A(-4, 1), B(2, 1) and C(-4, 6).



(a) Work out the length of AB. **(1)**

.....

(b) Work out the length of AC. **(1)**

.....

(c) Given that angle BAC is a right angle, work out the area of triangle ABC. **(2)**

.....

(Total for Question 35 is 4 marks)

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Mark scheme · 1.12 Coordinates: 2-hour Pack

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

Question 1

adds the x-coordinates and divides by 2, or the y-coordinates **M1**

(4.5, 2.5) cao **A1**

Answer: (4.5, 2.5)

Question 2

uses the fact that D has the same x as A and same y as C **M1**

(0, 7) cao **A1**

Answer: (0, 7)

Question 3

finds side lengths **M1**

perimeter 30 cm **A1**

area 54 cm² **A1**

Answer: perimeter 30 cm, area 54 cm^2

Question 4

finds the change from A to M **M1**

adds the same change again to M **M1**

(11, 2) cao **A1**

Answer: (11, 2)

Question 5

adds the x-coordinates and divides by 2, or the y-coordinates **M1**

(5, 4) cao **A1**

Answer: (5, 4)

Question 6

uses the fact that D has the same x as A and same y as C **M1**

(3, 4) cao **A1**

Answer: (3, 4)

Question 7

uses the fact that D has the same x as A and same y as C **M1**

(-2, 7) cao **A1**

Answer: (-2, 7)

Question 8

(a) (7, 3) cao **B1**

(a) Answer: (7, 3)

(b) (-4, 0) cao **B1**

(b) Answer: (-4, 0)

Question 9

(a) quadrant 4 cao **B1**

(a) Answer: Quadrant 4

(b) quadrant 2 cao **B1**

(b) Answer: Quadrant 2

(c) quadrant 3 cao **B1**

(c) Answer: Quadrant 3

(d) on an axis cao (the y-axis) **B1**

(d) Answer: On an axis (the y-axis)

Question 10

recognising both points have the same x-coordinate, oe **M1**

x = -3 cao **A1**

Answer: x = -3

Question 11

correct method, e.g. (2 + 8)/2 and/or (3 + 11)/2 **M1**

(5, 7) cao **A1**

Answer: (5, 7)

Question 12

(-2, 5) cao **B1**

Answer: (-2, 5)

Question 13

Quadrant II or Q2 oe **B1**

Answer: Quadrant II

Question 14

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

Answer: (4, -3)

Question 15

(-5, 0) cao **B1**

Answer: (-5, 0)

Question 16

(a) (5, -3) cao **B1**

(a) Answer: (5, -3)

(b) (-5, 3) cao **B1**

(b) Answer: (-5, 3)

Question 17

(a) (4, 0) cao **B1**

(a) Answer: (4, 0)

(b) (7, 2) cao **B1**

(b) Answer: (7, 2)

(c) correct method to find which term has x = 16, e.g. 1 + 3n = 16 so n = 5, oe **M1**

(c) y = 8 cao **A1**

(c) Answer: y = 8

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Question 18

(a) recognising the fourth corner shares an x-coordinate with (1,1) and a y-coordinate with (9,6), oe **M1**

(a) (1, 6) cao **A1**

(a) Answer: (1, 6)

(b) length = 8 and width = 5 found, oe **M1**

(b) 26 metres cao **A1**

(b) Answer: 26 metres

Question 19

(a) finding the midpoint of diagonal KM, e.g. ((-3+5)/2, (1+6)/2) = (1, 3.5) **M1**

(a) dep on the first M1: setting this equal to the midpoint of LN and forming an equation for N, oe **M1**

(a) (0, 6) cao **A1**

(a) Answer: (0, 6)

(b) KL and NM are both horizontal (or have the same direction), e.g. K to L is (5, 0) and N to M is (5, 0) **B1**

(b) Answer: KL and NM are both horizontal, so they are parallel.

Question 20

correct reflection, e.g. Z = (3, 5) seen, or correct method for the distance **M1**

10 units cao **A1**

Answer: 10 units

Question 21

(a) k = 3 cao **B1**

(a) Answer: k = 3

(b) m = 12 cao **B1**

(b) Answer: m = 12

(c) correct equation, e.g. 2k = -8, oe **M1**

(c) k = -4 cao **A1**

(c) Answer: k = -4

Question 22

reflecting A in the x-axis correctly, e.g. B = (6, 2) seen **M1**

(-6, 2) cao, ft their B if M1 awarded **A1**

Answer: (-6, 2)

Question 23

(a) correct method, e.g. -6 + 9 and/or 5 - 8 **M1**

(a) (3, -3) cao **A1**

(a) Answer: (3, -3)

(b) correct method using their value of S, e.g. their Sx - (-5), oe, ft **M1**

(b) 80 metres cao (dep on a correct S) **A1**

(b) Answer: 80 metres

Question 24

correct method for the x-coordinate, e.g. 2 x 4 - (-2), oe **M1**

correct method for the y-coordinate, e.g. 2 x (-1) - 5, oe **M1**

(10, -7) cao **A1**

Answer: (10, -7)

Question 25

H **B1**

(-1, -2) cao **B1**

Answer: H, (-1, -2)

Question 26

add vector components: x: -2 + 5 shown **M1**

add vector components: y: 3 + (-7) shown **M1**

(3, -4) cao **A1**

Answer: (3, -4)

Question 27

add x-coordinates and divide by 2, and add y-coordinates and divide by 2 (method shown) **M1**

(4, 1) cao **A1**

Answer: (4, 1)

Question 28

((2+10)/2, (6+2)/2) shown **M1**

(6, 4) cao **A1**

Answer: (6, 4)

Question 29

subtract coordinates: (4 - (-3), -2 - 5) shown **M1**

(7, -7) cao **A1**

Answer: (7, -7)

Question 30

recognise x-coordinate of D equals x of A (-2) or vector method **M1**

recognise y-coordinate of D equals y of C (6) **M1**

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

Answer: (-2, 6)

Question 31

recognise x-coordinate of D equals x of A (2) or use vector method **M1**

recognise y-coordinate of D equals y of C (4) **M1**

(2, 4) cao **A1**

Answer: (2, 4)

Question 32

recognise D has x-coordinate -3 (same as A) and y-coordinate 2 (same as C), or use vector method **M1**

D = (-3, 2) cao **A1**

perimeter = 4 x 5 = 20 m ft their side length **B1**

Answer: D = (-3, 2); perimeter = 20 m

Question 33

set up 3 = (-2 + x)/2, or double the midpoint x-coordinate and subtract A's x-coordinate, shown **M1**

set up -1 = (4 + y)/2, or double the midpoint y-coordinate and subtract A's y-coordinate, shown **M1**

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

Answer: (8, -6)

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Question 34

calculate vector BC = C - B = (3, -4) or show method	**M1**
apply vector to A: D = A + BC shown	**M1**
(2, -2) cao	**A1**

Answer: (2, -2)

Question 35

(a) 6 cao	**B1**

(a) Answer: 6

(b) 5 cao	**B1**

(b) Answer: 5

(c) 0.5 x 6 x 5 shown, using AB and AC as the base and height	**M1**
(c) 15 (square units) cao	**A1**

(c) Answer: 15 square units

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