2.11 Area and Perimeter: 2-hour Pack

EDEXCEL 1MA1 · Calculator allowed · about 120 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A rectangular picture frame has a length of 45 cm and a width of 0.3 m.

Work out the perimeter of the frame in centimetres.

(Total for Question 1 is 3 marks)

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2 A garden gate is cut from a rectangular sheet of wood measuring 1.2 m wide and 1.4 m tall. To let the gate swing clear of a sloping path, a right-angled triangular corner is cut off the top of the sheet. The triangular corner removed has a base of 0.6 m and a perpendicular height of 0.4 m.

Work out the area of the gate that remains after the corner is cut off.

(Total for Question 2 is 3 marks)

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3 A square patio has an area of 49 m².

Work out the perimeter of the patio.

(Total for Question 3 is 3 marks)

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4 A triangular sail has a base of 3.6 m and a perpendicular height of 2.5 m.

Work out the area of the sail.

(Total for Question 4 is 2 marks)

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5 A triangular flag has an area of 24 cm² and a base of 8 cm.

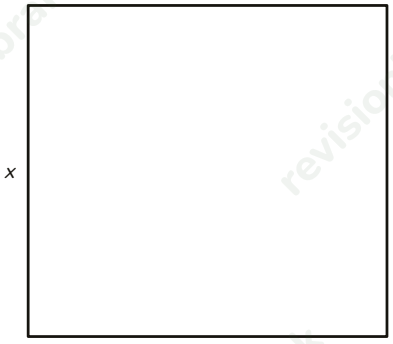
Work out the perpendicular height of the flag.

(Total for Question 5 is 3 marks)

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6 A rectangle has a perimeter of 50 cm. One side is 13 cm. Work out the length of the other side.

Diagram NOT accurately drawn



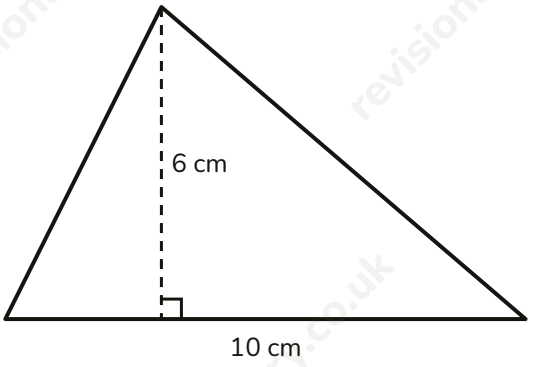
Perimeter = 50 cm

(Total for Question 6 is 2 marks)

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7 Work out the area of a triangle with base 10 cm and height 6 cm.

Diagram NOT accurately drawn



(Total for Question 7 is 1 mark)

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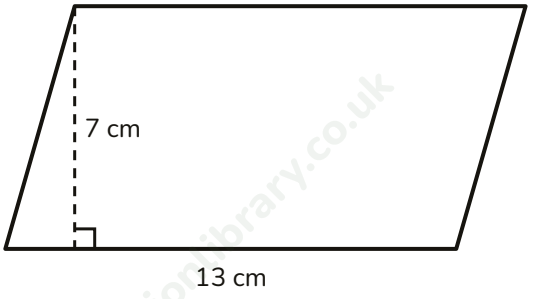
8 A triangular window pane has a base of 18 cm and a height of 11 cm. Work out the area of the window pane.

(Total for Question 8 is 1 mark)

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9 A parallelogram-shaped ceramic tile has a base of 13 cm and a perpendicular height of 7 cm. Calculate the area of the tile.

Diagram NOT accurately drawn



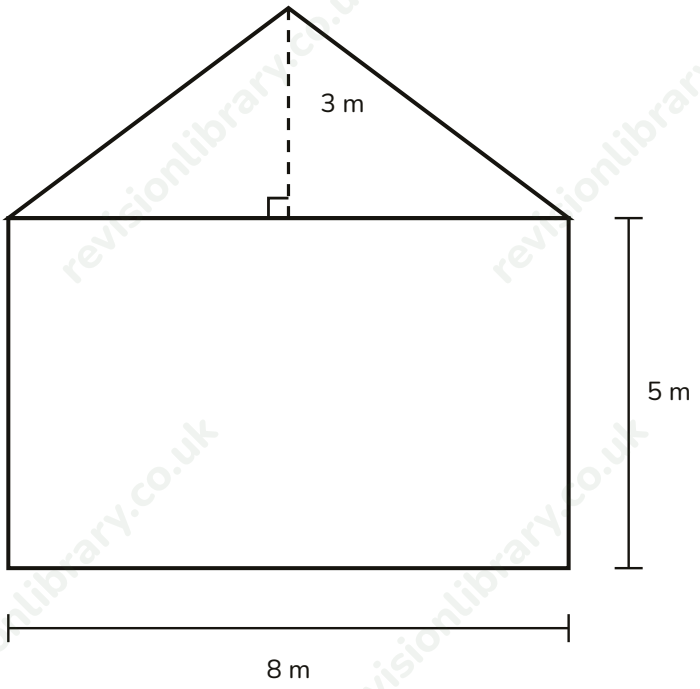
(Total for Question 9 is 1 mark)

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10 A garden shed end wall is shaped like a rectangle with a triangular roof section on top. The rectangle is 8 m wide and 5 m tall. The triangular roof section has a base of 8 m and a height of 3 m.

Work out the total area of the shed end wall.

Diagram NOT accurately drawn



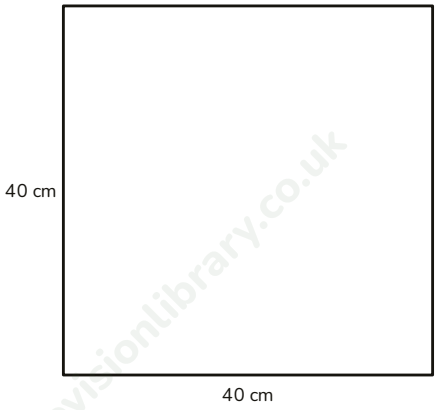
(Total for Question 10 is 3 marks)

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11 A rectangular floor measures 10 m by 2 m. Square tiles measuring 40 cm by 40 cm are used to cover the floor exactly, with no cutting or overlap. Each tile costs £3.60.

Work out the total cost of the tiles needed to cover the floor.

Diagram NOT accurately drawn

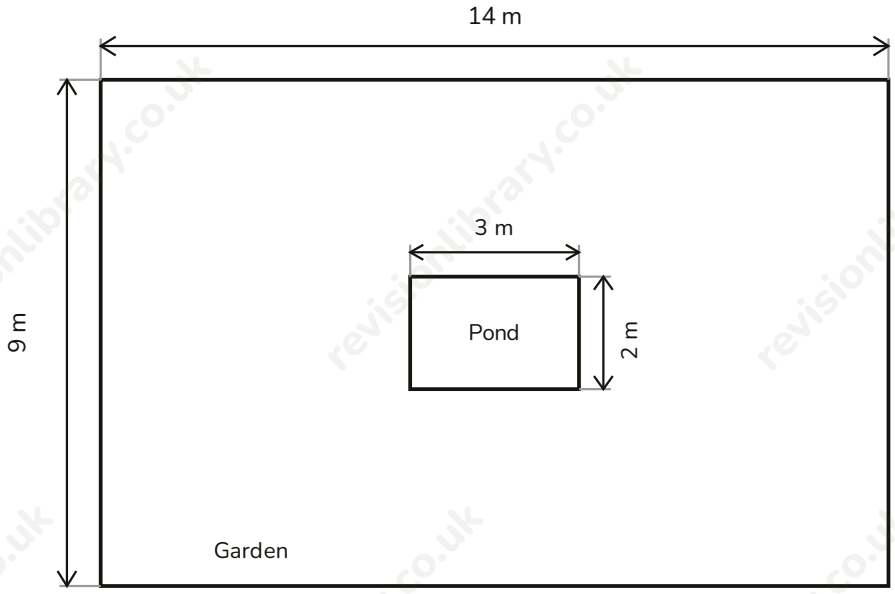


(Total for Question 11 is 4 marks)

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12 A rectangular garden measures 14 m by 9 m. Inside the garden there is a rectangular pond measuring 3 m by 2 m, which does not touch the edge of the garden. The rest of the garden needs turfing, and the whole perimeter of the garden needs fencing. Turf costs £8.50 per m^2 and fencing costs £6 per metre.

Diagram NOT accurately drawn



(a) Work out the area of the garden that needs turfing (that is, the total garden area minus the pond). **(3)**

.....

(b) Work out the cost of the turf. **(2)**

.....

(c) Work out the cost of the fencing needed for the whole perimeter of the garden. **(3)**

.....

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(d) Work out the total cost of the turf and the fencing. **(1)**

.....

(Total for Question 12 is 9 marks)

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13 Mr Whitfield is repainting one wall of the school hall storeroom. The wall measures 6 m by 2.4 m. One tin of paint covers 5 m^2, and tins can only be bought whole. Each tin costs £18.50.

(a) Work out the area of the wall. **(1)**

.....

(b) Work out the number of tins of paint needed. **(2)**

.....

(c) Work out the total cost of the paint. **(1)**

.....

(Total for Question 13 is 4 marks)

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14 A classroom floor measures 8 m by 6 m. The school is comparing two ways of covering the floor:

Vinyl flooring costs £9.20 per m^2.
Carpet tiles are sold in boxes costing £45 each, and each box covers exactly 3 m^2.

(a) Work out the area of the classroom floor. **(1)**

.....

(b) Work out the cost of covering the floor with vinyl flooring. **(2)**

.....

(c) Work out the cost of covering the floor with carpet tiles. **(3)**

.....

(d) State which type of flooring is cheaper, and work out the difference in cost. **(2)**

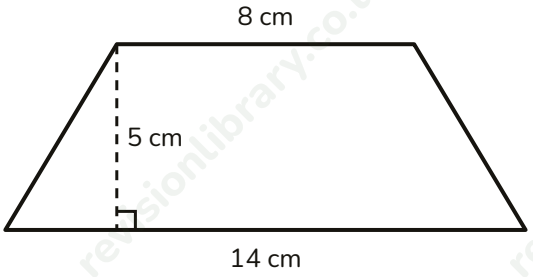
.....

(Total for Question 14 is 8 marks)

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15 Calculate the area of a trapezium with parallel sides 8 cm and 14 cm and height 5 cm.

Diagram NOT accurately drawn



(Total for Question 15 is 2 marks)

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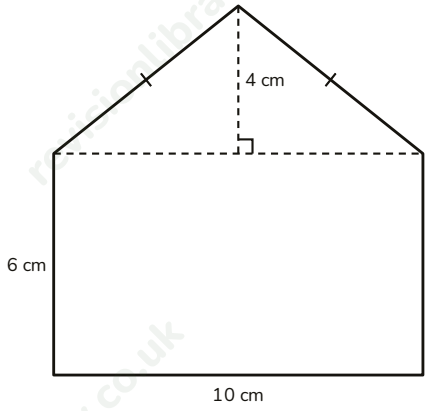
16 The area of a triangle is 72 cm² and its perpendicular height is 8 cm. Work out the length of the base.

(Total for Question 16 is 2 marks)

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17 A composite shape is made of a rectangle 10 cm by 6 cm with an isosceles triangle on one 10 cm side. The triangle has base 10 cm and height 4 cm. Work out the total area of the shape.

Diagram NOT accurately drawn



(Total for Question 17 is 2 marks)

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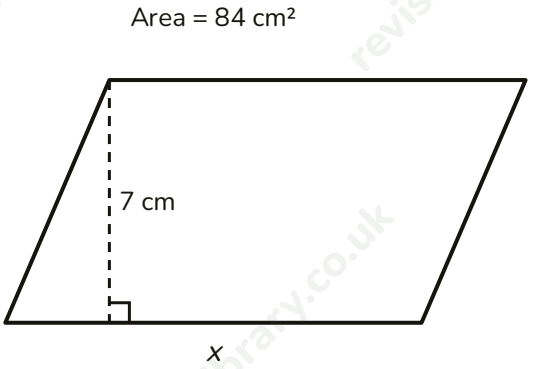
18 The area of a triangle is 45 cm² and its base is 9 cm. Work out the height of the triangle.

(Total for Question 18 is 2 marks)

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19 A parallelogram has area 84 cm² and its perpendicular height is 7 cm. Work out the length of the base.

Diagram NOT accurately drawn

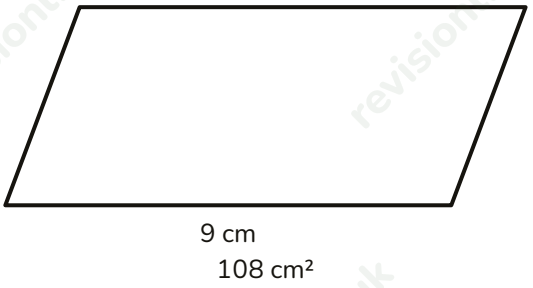


(Total for Question 19 is 2 marks)

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20 A parallelogram has an area of 108 cm² and a base of 9 cm. Work out the perpendicular height of the parallelogram.

Diagram NOT accurately drawn

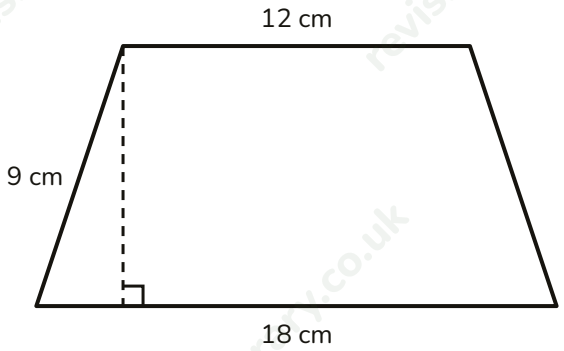


(Total for Question 20 is 2 marks)

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21 A trapezium-shaped tabletop has parallel sides of length 12 cm and 18 cm and a height of 9 cm. Calculate the area of the tabletop.

Diagram NOT accurately drawn

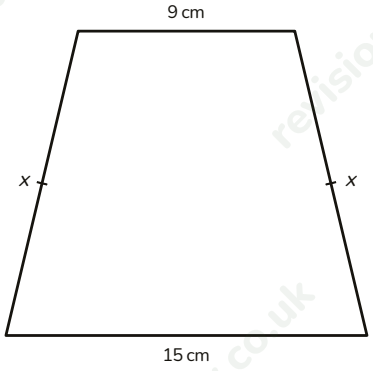


(Total for Question 21 is 2 marks)

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22 A trapezium has parallel sides 9 cm and 15 cm. The two non-parallel sides are equal in length. The perimeter is 50 cm. Work out the length of each non-parallel side.

Diagram NOT accurately drawn



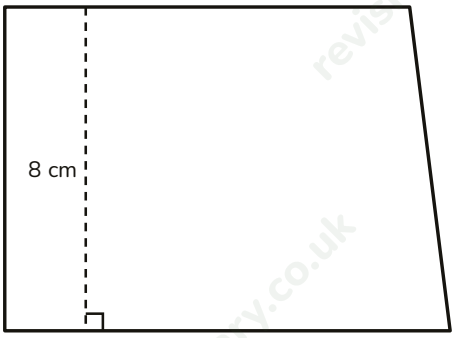
Perimeter = 50 cm

(Total for Question 22 is 2 marks)

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23 A trapezium has an area of 84 cm², a height of 8 cm and one parallel side of length 11 cm. Work out the length of the other parallel side.

Diagram NOT accurately drawn

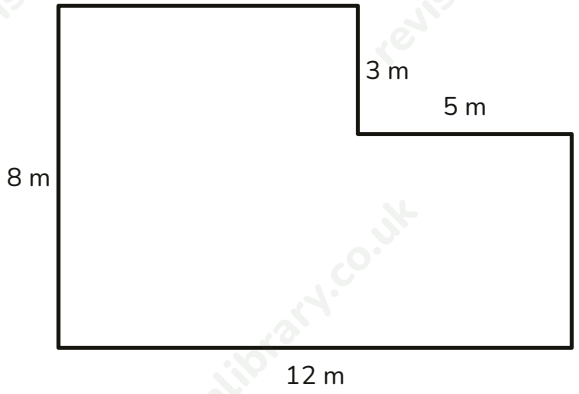


(Total for Question 23 is 2 marks)

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24 The diagram shows the floor plan of an L-shaped room. The overall length of the room is 12 m and the overall width is 8 m. A rectangular corner measuring 5 m by 3 m has been cut away, with its edges parallel to the sides of the room. Work out the perimeter of the room.

Diagram NOT accurately drawn



(Total for Question 24 is 3 marks)

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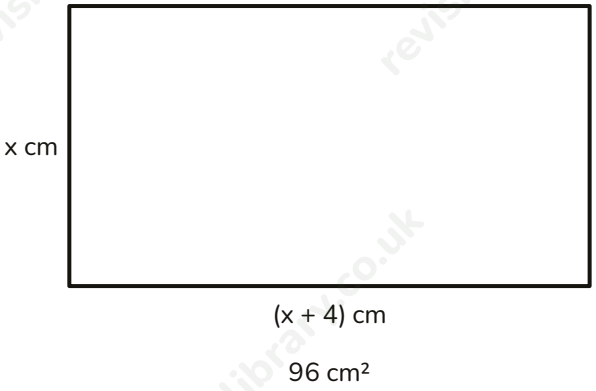
25 A rectangular garden measures 15 m by 8 m. A uniform path of width x m is laid around the inside so that the lawn that remains has area 66 m² less than the original garden. Work out x, giving your answer correct to 2 decimal places.

(Total for Question 25 is 4 marks)

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26 A rectangle has length (x + 4) cm and width x cm. The area of the rectangle is 96 cm². Work out the value of x.

Diagram NOT accurately drawn

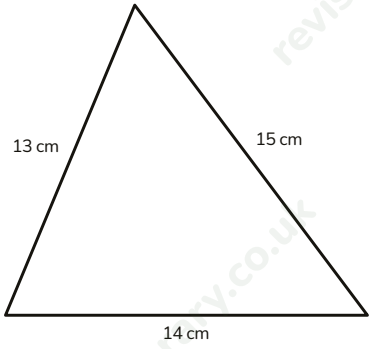


(Total for Question 26 is 3 marks)

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27 A triangle has side lengths 13 cm, 14 cm and 15 cm. Work out the area of the triangle.

Diagram NOT accurately drawn



(Total for Question 27 is 3 marks)

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Mark scheme · 2.11 Area and Perimeter: 2-hour Pack

Question 1

0.3 m = 30 cm oe	**M1**
2 x (45 + 30) oe	**M1**
150 cao	**A1**

Answer: 150 cm

Question 2

1.2 x 1.4	**M1**
0.5 x 0.6 x 0.4	**M1**
1.56 cao	**A1**

Answer: 1.56 m^2

Question 3

finds the side length: $\sqrt{49}$ = 7 oe	**M1**
4 x 7, ft their side length	**M1**
28 cao	**A1**

Answer: 28 m

Question 4

0.5 x 3.6 x 2.5 oe	**M1**
4.5 cao	**A1**

Answer: 4.5 m^2

Question 5

0.5 x 8 x h = 24 oe	**M1**
24 x 2 / 8 or 48 / 8 oe	**M1**
6 cao	**A1**

Answer: 6 cm

Question 6

Use 2(a + b) = 50 so a + b = 25, then subtract 13 from 25	**M1**
12 cm cao	**A1**

Answer: 12 cm

Question 7

Area = 1/2 × 10 × 6 = 30 cm² cao	**B1**

Answer: 30 cm^2

Question 8

Area = 1/2 x 18 x 11 = 99 cm² cao	**B1**

Answer: 99 cm^2

Question 9

Area = base x height = 13 x 7 = 91 cm² cao	**B1**

Answer: 91 cm^2

Question 10

8 x 5	**M1**
0.5 x 8 x 3	**M1**
52 cao	**A1**

Answer: 52 m^2

Question 11

10 x 2 = 20 (floor area in m^2)	**M1**
0.4 x 0.4 = 0.16 (tile area in m^2, or equivalent working in cm^2)	**M1**
20 / 0.16 = 125 (number of tiles), ft their areas	**M1**
450 (pounds) cao	**A1**

Answer: £450

Question 12

(a) 14 x 9 = 126	**M1**
(a) 3 x 2 = 6	**M1**
(a) 120 cao	**A1**

(a) Answer: 120 m^2

(b) 120 x 8.50, ft their (a)	**M1**
(b) 1020 (pounds) cao	**A1**

(b) Answer: £1020

(c) 2(14 + 9) = 46	**M1**
(c) 46 x 6, ft their perimeter	**M1**
(c) 276 (pounds) cao	**A1**

(c) Answer: £276

(d) 1296 (pounds), ft their (b) + (c)	**B1**

(d) Answer: £1296

Question 13

(a) 14.4 cao	**B1**

(a) Answer: 14.4 m^2

(b) 14.4 / 5 = 2.88, ft their (a)	**M1**
(b) 3, since tins can only be bought whole and 2 tins (covering 10 m²) would not be enough to cover the wall	**A1**

(b) Answer: 3 tins

(c) 55.50 (pounds), ft their (b)	**B1**

(c) Answer: £55.50

Question 14

(a) 48 cao	**B1**

(a) Answer: 48 m^2

(b) 48 x 9.20, ft their (a)	**M1**
(b) 441.60 (pounds) cao	**A1**

(b) Answer: £441.60

(c) 48 / 3 = 16 (boxes), ft their (a)	**M1**
(c) 16 x 45, ft their number of boxes	**M1**
(c) 720 (pounds) cao	**A1**

(c) Answer: £720

(d) 720 - 441.60, ft their (b) and (c)	**M1**
(d) Vinyl flooring, 278.40 (pounds) cao	**A1**

(d) Answer: Vinyl flooring, £278.40 cheaper

Question 15

Use area = 1/2 × (sum of parallel sides) × height = 1/2 × (8 + 14) × 5	**M1**
55 cm² cao	**A1**

Answer: 55 cm^2

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Question 16

Use base = 2 × area / height = 2 × 72 / 8 **M1**

18 cm cao **A1**

Answer: 18 cm

Question 17

Area rectangle = 10 × 6 = 60; area triangle = 1/2 × 10 × 4 = 20 **M1**

Total area = 80 cm² cao **A1**

Answer: 80 cm^2

Question 18

Use 45 = 1/2 × 9 × h so h = (2 × 45) / 9 **M1**

10 cm cao **A1**

Answer: 10 cm

Question 19

Use base = area / height = 84 / 7 **M1**

12 cm cao **A1**

Answer: 12 cm

Question 20

Use height = area / base = 108 / 9 **M1**

12 cm cao **A1**

Answer: 12 cm

Question 21

Use area = 1/2 x (sum of parallel sides) x height = 1/2 x (12 + 18) x 9 **M1**

135 cm² cao **A1**

Answer: 135 cm^2

Question 22

Let each non-parallel side be s: 9 + 15 + 2s = 50 so 2s = 26 **M1**

s = 13 cm cao **A1**

Answer: 13 cm

Question 23

Use 84 = 1/2 x (11 + b) x 8 to form an equation for the other parallel side, b **M1**

10 cm cao **A1**

Answer: 10 cm

Question 24

Missing horizontal edge = 12 - 5 = 7 m **M1**

Missing vertical edge = 8 - 3 = 5 m **M1**

Perimeter = 12 + 8 + 5 + 3 + 7 + 5 = 40 m cao **A1**

Answer: 40 m

Question 25

Write inner area = (15 - 2x)(8 - 2x) and set equal to 120 - 66 = 54 **M1**

Expand to form quadratic: $4x^2 - 46x + 66 = 0$ (or equivalent) **M1**

Use quadratic formula to find positive solution for x **M1**

x = 1.68 m awrt (1.6803...) **A1**

Answer: 1.68 m

Question 26

Forms the equation x(x + 4) = 96 **M1**

Rearranges and factorises: $x^2 + 4x - 96 = 0 \rightarrow (x + 12)(x - 8) = 0$ **M1**

x = 8 cao (x = -12 rejected since a length cannot be negative) **A1**

Answer: x = 8

Question 27

Compute semiperimeter s = (13 + 14 + 15) / 2 = 21 **M1**

Substitute into Heron: area = $\sqrt{21(21-13)(21-14)(21-15)}$ **M1**

84 cm² cao **A1**

Answer: 84 cm^2

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