



4.17F Plans and Elevations: Foundation Tier Practice

EDEXCEL 1MA1 · Calculator allowed · about 50 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** A cuboid has length 6 cm, width 3 cm and height 2 cm.
Write down the shape of the top elevation (the view from above).

(Total for Question 1 is 1 mark)

- 2** A solid is a triangular prism. The triangular face is an equilateral triangle with side 4 cm and the prism length is 8 cm.
What is the shape of the front elevation (the view looking at the triangular face)?

(Total for Question 2 is 1 mark)

- 3** A solid has a square base 5 cm by 5 cm and height 7 cm.
What is the shape of the side elevation (the view from one side)?

(Total for Question 3 is 1 mark)

- 4** Look at this description of a solid and its three elevations.
- Plan (view from above): a 6 cm by 4 cm rectangle with a 2 cm by 2 cm square removed from one corner.
 - Front elevation: a rectangle 6 cm by 3 cm with a 2 cm square notch at the top right.
 - Side elevation: a rectangle 4 cm by 3 cm.

Which of these statements must be true? Tick the correct answer.

- A. The solid has overall height 3 cm.
B. The solid has a full 2 cm cube removed from its corner.
C. The plan shows a hole all the way through the solid.
D. The front elevation shows a triangular shape.

- ☐ A
☐ B
☐ C
☐ D

(Total for Question 4 is 1 mark)

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- 5** A model is made from cubes of side 1 cm. Its plan (view from above) is a 3 by 4 rectangle. The front elevation shows two rows of cubes: the bottom row 4 cubes long, the top row 4 cubes long. The side elevation shows a column of height 2 and width 3. Work out how many small 1 cm cubes are used in the model.

(Total for Question 5 is 3 marks)

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- 6** A solid has plan a 5 cm by 3 cm rectangle. The front elevation is a trapezium with top base 3 cm, bottom base 5 cm and height 4 cm. The side elevation is a rectangle 3 cm by 4 cm. Work out the volume of the solid in cubic centimetres.

(Total for Question 6 is 3 marks)

- 7** A shape has plan a cross shaped layout on a 3 by 3 grid: central square and the middle square on each side, so 5 unit squares in the plan. The front elevation shows the central column has height 3 and the four arm columns have height 1.
Work out the total number of unit cubes used.

(Total for Question 7 is 3 marks)

- 8** A block has plan a 4 by 2 rectangle. From the front elevation you see two columns: left column height 3, right column height 2. From the side elevation the heights are 3 and 2 across the width of 2.
Draw a short method and work out the total volume of the block in cm^3 .

(Total for Question 8 is 4 marks)

- 9** A model is built from 1 cm cubes. The plan is a 2 by 3 rectangle. The front elevation shows heights 2 and 1 across the width: left column height 2 cm, right column height 1 cm, for each of the 3 positions along the length.
Work out the total number of 1 cm cubes used in the model.

(Total for Question 9 is 4 marks)

10 A model is built from 1 cm cubes. The plan is a 3 by 3 square. The heights at each plan position are as follows: the central position has height 3; every other position (the 8 surrounding cells) has height 2.

(a) Work out the total number of small cubes used.

(b) Work out the volume of the model in cubic centimetres.

(c) Work out the total external surface area of the model in cm^2 . Show your method clearly.

(a) Work out the total number of small cubes used. **(3)**

(b) Work out the volume of the model in cubic centimetres. **(1)**

(c) Work out the total external surface area of the model in cm^2 . Show your method. **(6)**

(Total for Question 10 is 10 marks)

Mark scheme · 4.17F Plans and Elevations: Foundation Tier Practice

Question 1

- **B1** rectangle cao
- **Answer: Rectangle (6 cm by 3 cm).**

Question 2

- **B1** triangle/equilateral triangle cao
- **Answer: Triangle (equilateral, side 4 cm).**

Question 3

- **B1** rectangle cao
- **Answer: Rectangle (5 cm by 7 cm).**

Question 4

- **B1** A cao
- **Answer: A**

Question 5

- **M1** find plan area $3 \times 4 = 12$ (use plan to get number of stacks) or show 3 by 4
- **M1** use elevation height 2 to get total cubes $12 \times 2 = 24$
- **A1** 24 cao
- **Answer: 24**

Question 6

- **M1** find area of trapezium cross-section $= (3 + 5) / 2 \times 4 = 16 \text{ cm}^2$
- **M1** use side elevation to confirm depth/width $= 3 \text{ cm}$ or interpret width correctly
- **A1** $16 \times 3 = 48 \text{ cm}^3$ cao
- **Answer: 48**

Question 7

- **M1** identify heights for each of the 5 plan positions: central 3, four arms 1 each
- **M1** calculate total $3 + 4 \times 1 = 7$
- **A1** 7 cao
- **Answer: 7**

Question 8

- **M1** recognise plan has $4 \times 2 = 8$ positions
- **M1** use front elevation to assign heights across width: for each length position heights sum $= 3 + 2 = 5$
- **M1** calculate total $= 4 \times 5 = 20$
- **A1** 20 cm^3 cao
- **Answer: 20**

Question 9

- **M1** identify number of stacks from plan 2×3 and per-stack heights (for each of 3 positions heights sum $2 + 1 = 3$)
- **M1** calculate per-position total 3, show multiplication by 3 positions
- **M1** compute $3 \times 3 = 9$
- **A1** 9 cao
- **Answer: 9**

Question 10

- (a) **M1** identify central height 3 and eight others height 2
- (a) **M1** calculate $3 + 8 \times 2$
- (a) **A1** 19 cao
- **(a) Answer: 19**
- (b) **B1** 19 cm^3 cao
- **(b) Answer: 19 cm^3**
- (c) **M1** count top faces 9 and bottom faces 9 (top and bottom area = $9 + 9$)
- (c) **M1** calculate outer side faces: corners ($4 \text{ corners} \times 2 \text{ outside sides} \times \text{height } 2$) = 16 and edge non-corners ($4 \text{ edges} \times 1 \text{ outside side} \times \text{height } 2$) = 8, total outer side area = 24
- (c) **M1** calculate internal side faces from height differences: centre (height 3) adjacent to 4 neighbours height 2 gives 4 exposed unit faces
- (c) **M1** combine side areas: outer 24 + internal 4 = 28 cm^2
- (c) **M1** sum top, bottom and side: $9 + 9 + 28$
- (c) **A1** 46 cm^2 cao
- **(c) Answer: 46 cm^2**