

Exercise walk-through

C4.2

Geometrical constructions

IGCSE Mathematics

You must be able to

- Construct SSS triangles with visible compass arcs
- Measure lines and angles accurately
- Interpret and draw nets with matching face dimensions

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The method

Method — Key knowledge: Geometrical constructions

Use a ruler for straight edges and a protractor to measure or draw angles. For a triangle given three sides, use a ruler and compasses only: draw the base, draw arcs of the two remaining radii from the endpoints, join their intersection. Leave construction arcs visible. A net folds into a solid without overlap; match shared edges and count all faces. Core does not require perpendicular or angle bisectors.

Exercises 2.1·2.3

2.1 Draw a line 6.4 cm long and an angle of 65° with a ruler and protractor. [2]

2.2 Construct a triangle with sides 6, 4 and 3 cm using ruler and compasses. Keep the arcs. [2]

2.3 Draw a net of a cube of edge 2 cm on squared paper. [2]

Exercises 2.1·2.3

2.1 Draw a line 6.4 cm long and an angle of 65° with a ruler and protractor. [2]

2.1

- **Line 6.4 cm; angle 65°** , allowing normal drawing accuracy. Align the protractor centre and baseline.

2.2 Construct a triangle with sides 6, 4 and 3 cm using ruler and compasses. Keep the arcs. [2]

2.2

- **Base 6 cm; arcs of radii 4 and 3 cm from its endpoints; join the intersection to both ends.**

2.3 Draw a net of a cube of edge 2 cm on squared paper. [2]

2.3

- **Six 2 cm squares in a valid net**, for example four in a row with one above and one below the second square.

Exercise 2.4

2.4 A cuboid net has two 4×3 , two 4×2 and two 3×2 cm rectangles. Find its surface area. [2]

3 Exam-style questions

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3 Exam-style questions

2.4

- $S = 2(12 + 8 + 6) = \mathbf{52} \text{ cm}^2$.

Exercise 3.1 (a)

3.1 Apply the geometrical constructions methods below. Show working and include units where appropriate.

(a) Construct triangle ABC with $AB = 8$ cm, $AC = 5$ cm and $BC = 5$ cm. Keep construction arcs. [2]

Exercise 3.1 (a)

3.1 Apply the geometrical constructions methods below. Show working and include units where appropriate.

(a) Construct triangle ABC with $AB = 8$ cm, $AC = 5$ cm and $BC = 5$ cm. Keep construction arcs. [2]

(a)

- Base AB 8 cm; equal 5 cm arcs from A and B ; join the crossing C .

Exercise 3.1 (b)

3.1 Apply the geometrical constructions methods below. Show working and include units where appropriate.

(b) Measure angle ABC using a protractor.

[2]

Exercise 3.1 (b)

3.1 Apply the geometrical constructions methods below. Show working and include units where appropriate.

(b) Measure angle ABC using a protractor.

[2]

(b)

- The base angle is about 37° (accept 35° to 39° for a drawing).

Exercise 3.1 (c)

3.1 Apply the geometrical constructions methods below. Show working and include units where appropriate.

(c) A triangular prism has this triangle as cross-section and length 10 cm. Describe the shapes and dimensions of its five net faces. [2]

Exercise 3.1 (c)

3.1 Apply the geometrical constructions methods below. Show working and include units where appropriate.

(c) A triangular prism has this triangle as cross-section and length 10 cm. Describe the shapes and dimensions of its five net faces. [2]

(c)

- **Two triangles with sides 8, 5, 5 cm; one 8×10 cm rectangle; two 5×10 cm rectangles.**

Exercise 3.2 (a)

3.2 A triangular prism has length 7 cm. Its triangular ends have sides 3, 4 and 5 cm.

(a) Construct one triangular end using only ruler and compasses. Leave all arcs visible.^[3]

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3.2 A triangular prism has length 7 cm. Its triangular ends have sides 3, 4 and 5 cm.

(a) Construct one triangular end using only ruler and compasses. Leave all arcs visible.[3]

(a)

- Draw a **5 cm base** accurately.
- Draw arcs of **3 cm and 4 cm** centred at its endpoints.
- Join their intersection to the endpoints and retain the construction arcs.

Exercise 3.2 (b)

3.2 A triangular prism has length 7 cm. Its triangular ends have sides 3, 4 and 5 cm.

(b) Describe the five faces needed for a net and find its total surface area. The 3 cm and 4 cm sides meet at a right angle. [3]

Exercise 3.2 (b)

3.2 A triangular prism has length 7 cm. Its triangular ends have sides 3, 4 and 5 cm.

(b) Describe the five faces needed for a net and find its total surface area. The 3 cm and 4 cm sides meet at a right angle. [3]

(b)

- Use two 3–4–5 triangles and rectangles 3×7 , 4×7 , 5×7 cm.
- Area $S = 2(3 \times 4/2) + 7(3 + 4 + 5)$, so $S = \mathbf{96}$ cm².