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2D Perimeter and Area

Solutions & Answer Key

Full worked solutions, marking scheme & answer key

IGCSE Mathematics

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Companion to the *Student Worksheet*

Contents

4 Part IV — Complete Solutions **2**
4.1 Solutions — Units and Conversions 2
4.2 Solutions — Rectangles and Squares 4
4.3 Solutions — Triangles 5
4.4 Solutions — Parallelograms and Trapeziums 6
4.5 Solutions — Circles 7
4.6 Solutions — Sectors and Arcs 9
4.7 Solutions — Composite Shapes 11
4.8 Solutions — Shaded Regions 12
4.9 Solutions — Real-World Applications 14
4.10 Solutions — Mixed Review 15
4.11 Marking Scheme — Examination-Style Practice 17

5 Part V — Common Mistakes & Learning Tips **18**

6 Part VI — Final Answer Key **20**

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Note

About this booklet. These are the complete solutions to every question in the *2D Perimeter and Area — Student Worksheet*. Question numbers match exactly: units and conversions U1–U5, rectangles and squares R1–R6, triangles T1–T5, parallelograms and trapeziums G1–G6, circles C1–C6, sectors and arcs E1–E6, composite shapes K1–K5, shaded regions H1–H5, applications A1–A5, the Mixed Review MR1–MR10, and the examination questions 1–8 of Part III.
Each solution names the formula being applied and works one step at a time. Values of π are kept exact until the final line. Part V collects the common mistakes to watch for, and Part VI is a quick answer key for fast marking.

4 Part IV — Complete Solutions

Note

Each solution names the formula being applied and shows the steps in order, exactly as the notes recommend. Depth is scaled to difficulty — brief for basic questions, fuller for the harder ones.

4.1 Solutions — Units and Conversions

Solution U1

Area conversions are *squared*.
(a) $1\,\text{cm}^2 = 10^2 = 100\,\text{mm}^2$, so

$$6 \times 100 = \boxed{600\,\text{mm}^2}.$$

(b) $1\,\text{m}^2 = 100^2 = 10\,000\,\text{cm}^2$, so

$$4 \times 10\,000 = \boxed{40\,000\,\text{cm}^2}.$$

Solution U2

(a) Divide by 10 000:

$$25\,000 \div 10\,000 = \boxed{2.5\,\text{m}^2}.$$

(b) $1\,\text{km}^2 = 1000^2 = 1\,000\,000\,\text{m}^2$, so

$$3.2 \times 1\,000\,000 = \boxed{3\,200\,000\,\text{m}^2}.$$

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Solution U3

Step 1 — one unit. $0.6\,\text{m} = 60\,\text{cm}$.
Step 2 — area:

$$A = 60 \times 45 = \boxed{2700\,\text{cm}^2}.$$

Step 3 — convert: divide by 10 000:

$$2700 \div 10\,000 = \boxed{0.27\,\text{m}^2}.$$

Check: $0.6 \times 0.45 = 0.27\,\text{m}^2$. ✓

Solution U4

The error: the student used the *length* conversion factor once, but area has two dimensions, so the factor must be used twice.
A square of side 1 m is the same as a square of side 100 cm, and

$$100 \times 100 = 100^2 = 10\,000.$$

$$\boxed{1\,\text{m}^2 = 10\,000\,\text{cm}^2}$$

Solution U5

Step 1 — convert: $80\,\text{mm} = 8\,\text{cm}$.
Step 2 — perimeter:

$$P = 2(\ell + w) = 2(12 + 8) = 2 \times 20 = \boxed{40\,\text{cm}}.$$

Step 3 — area:

$$A = 12 \times 8 = \boxed{96\,\text{cm}^2}.$$

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Common Mistake

Never substitute mixed units into a formula. Convert first, then calculate.

Preview ends here

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