

Exercise walk-through

C5.1

Units of measure

IGCSE Mathematics

You must be able to

- Convert lengths, areas and volumes using the correct powers
- Convert litres, millilitres and cubic units
- Use consistent units before counting containers

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The method

Method — Key knowledge: Units of measure

Length scales by the unit conversion factor; area scales by its square and volume by its cube. $1 \text{ m} = 100 \text{ cm}$, so $1 \text{ m}^2 = 10000 \text{ cm}^2$ and $1 \text{ m}^3 = 1000000 \text{ cm}^3$. $1 \text{ litre} = 1000 \text{ ml} = 1000 \text{ cm}^3$. Also $1 \text{ kg} = 1000 \text{ g}$ and $1 \text{ km} = 1000 \text{ m}$. Keep units attached.

Exercises 2.1-2.3

2.1 Convert 2.7 km to m and 48 mm to cm. [2]

2.2 Convert 6200 cm^2 to m^2 . [2]

2.3 Convert 0.008 m^3 to cm^3 . [2]

Exercises 2.1·2.3

2.1 Convert 2.7 km to m and 48 mm to cm. [2]

2.1

- $l_1 = 2.7(1000) = \mathbf{2700}$ m; $l_2 = 48/10 = \mathbf{4.8}$ cm.

2.2 Convert 6200 cm² to m². [2]

2.2

- $A = 6200/100^2 = \mathbf{0.62}$ m².

2.3 Convert 0.008 m³ to cm³. [2]

2.3

- $V = 0.008(100)^3 = \mathbf{8000}$ cm³.

Exercise 2.4

2.4 Convert 2.35 litres to ml and 4500 g to kg.

[2]

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[2]

2.4

- $V = 2.35(1000) = \mathbf{2350}$ ml; $m = 4500/1000 = \mathbf{4.5}$ kg.

Exercise 3.1 (a)

3.1 Apply the units of measure methods below. Show working and include units where appropriate.

(a) A tank holds 0.075 m^3 . Convert this to litres.

[2]

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3.1 Apply the units of measure methods below. Show working and include units where appropriate.

(a) A tank holds 0.075 m^3 . Convert this to litres. [2]

(a)

- $V = 0.075(1000) = \mathbf{75}$ litres.

Exercise 3.1 (b)

3.1 Apply the units of measure methods below. Show working and include units where appropriate.

(b) Find the number of full 250 ml bottles it can fill.

[2]

Exercise 3.1 (b)

3.1 Apply the units of measure methods below. Show working and include units where appropriate.

(b) Find the number of full 250 ml bottles it can fill.

[2]

(b)

- $N = 75000/250 = \mathbf{300}$ bottles.

Exercise 3.1 (c)

3.1 Apply the units of measure methods below. Show working and include units where appropriate.

(c) A label has area 18 cm^2 . Convert this to mm^2 .

[2]

Exercise 3.1 (c)

3.1 Apply the units of measure methods below. Show working and include units where appropriate.

(c) A label has area 18 cm^2 . Convert this to mm^2 .

[2]

(c)

- $A = 18(10)^2 = \mathbf{1800} \text{ mm}^2$.

Exercise 3.2 (a)

3.2 A tank holds 0.024 m^3 of water. Water is poured into 750 ml bottles.

(a) Convert the capacity to litres and find how many full bottles it fills. [3]

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(a) Convert the capacity to litres and find how many full bottles it fills. [3]

(a)

- $V_L = 1000V_m = 1000(0.024) = \mathbf{24}$ litres.
- Each bottle is 0.75 litres, so $N = 24/0.75$, giving **32 bottles**.

Exercise 3.2 (b)

3.2 A tank holds 0.024 m^3 of water. Water is poured into 750 ml bottles.

(b) A label has area 0.015 m^2 . Convert this to cm^2 and explain why multiplying by 100 would be incorrect. [3]

Exercise 3.2 (b)

3.2 A tank holds 0.024 m^3 of water. Water is poured into 750 ml bottles.

(b) A label has area 0.015 m^2 . Convert this to cm^2 and explain why multiplying by 100 would be incorrect. [3]

(b)

- Each metre contains 100 cm, so the area factor is 100^2 .
- $A_{\text{cm}^2} = 0.015(100)^2$, giving **150 cm^2** .