

WA6MMGMM1

Modelling with measurement and geometry

Core + Challenge

# Problem Solving with Measurement

I can solve real problems with timetables, distance, area, volume and money, and justify my answers.

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Score: \_\_\_\_\_ / 58

## Key idea

**Area** of a rectangle = length  $\times$  width ( $\text{m}^2$ ,  $\text{cm}^2$ ). **Volume** of a box = length  $\times$  width  $\times$  height ( $\text{m}^3$ ,  $\text{cm}^3$ ).

Before you calculate, change every measurement into the **same unit**.

Solve in four steps: **analyse** (what do I know and need?), **represent** (a table, diagram or number sentence), **solve**, then **check and justify**.

Example: a 5 m by 3.5 m deck has area  $5 \times 3.5 = 17.5 \text{ m}^2$ ; at \$12 per  $\text{m}^2$  it costs **\$210**.

### 1 Analyse

Circle the question. List what you know and the units.

### 2 Represent

Draw a diagram, table, map or number sentence.

### 3 Solve

Convert units, then calculate step by step.

### 4 Justify

Does it make sense? Answer in a sentence with units.

A

## Warm up *area, volume, maps and units*

/ 16 marks

Find the **area** of each rectangle. Include the units. 1 mark each.

### 1 Area



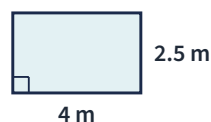
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### 2 Area



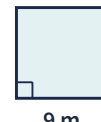
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### 3 Area



\_\_\_\_\_

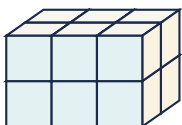
### 4 Area of the square



\_\_\_\_\_

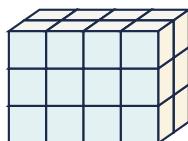
Find the **volume** of each box. Each small cube is  $1 \text{ cm}^3$ . 1 mark each.

### 5 Volume



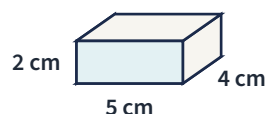
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### 6 Volume



\_\_\_\_\_

### 7 Volume



\_\_\_\_\_

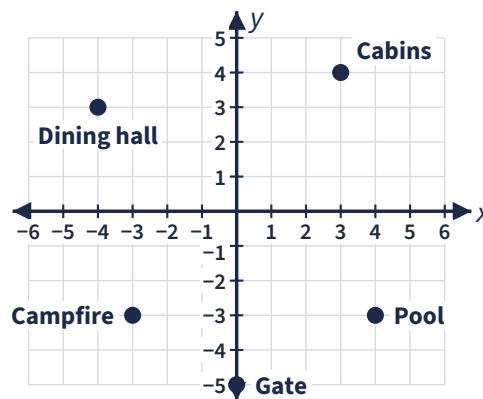
### 8 Volume



\_\_\_\_\_

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This is a map of a school camp. Each unit on the map is **10 m**. 1 mark each.



- 9 Coordinates of the **pool**

\_\_\_\_\_

- 10 Coordinates of the **campfire**

\_\_\_\_\_

- 11 What is at  $(-4, 3)$ ?

\_\_\_\_\_

- 12 Distance from the campfire to the pool

\_\_\_\_\_

Convert. 1 mark each.

- 13  $1.25 \text{ L} = \text{_____ mL}$

- 14  $3 \text{ h } 20 \text{ min} = \text{_____ min}$

- 15  $0.6 \text{ km} = \text{_____ m}$

- 16  $2 \text{ kg } 50 \text{ g} = \text{_____ kg}$

## B Practise *use the skill*

/ 23 marks

- 1 **Rottnest day trip.** The Nguyen family must be back in Fremantle by **5:00 pm**. They want as much time on the island as possible. **a)** Which two ferries should they catch? **b)** How long will they have on Rottnest?

[3 marks]

| Fremantle → Rottnest |                 |
|----------------------|-----------------|
| Leave Fremantle      | Arrive Rottnest |
| 07:30                | 08:05           |
| 09:15                | 09:45           |
| 11:00                | 11:30           |

| Rottnest → Fremantle |                  |
|----------------------|------------------|
| Leave Rottnest       | Arrive Fremantle |
| 14:45                | 15:20            |
| 16:10                | 16:40            |
| 17:30                | 18:00            |

\_\_\_\_\_

\_\_\_\_\_

Answer: \_\_\_\_\_

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- 2 The family is **2 adults** and children aged **10, 7 and 3**. Everyone who is 4 or older hires a bike. The 3-year-old rides in a child bike seat. They have **\$350**. Is that enough for the ferry and bikes? Show your working. [3 marks]

| Rottnest day trip prices |                                     |              |         |
|--------------------------|-------------------------------------|--------------|---------|
|                          | Adult                               | Child (4–12) | Under 4 |
| Return ferry             | \$74                                | \$38         | free    |
| Bike hire (1 day)        | \$30                                | \$22         | –       |
| Child bike seat          | \$10 each (fits on an adult's bike) |              |         |

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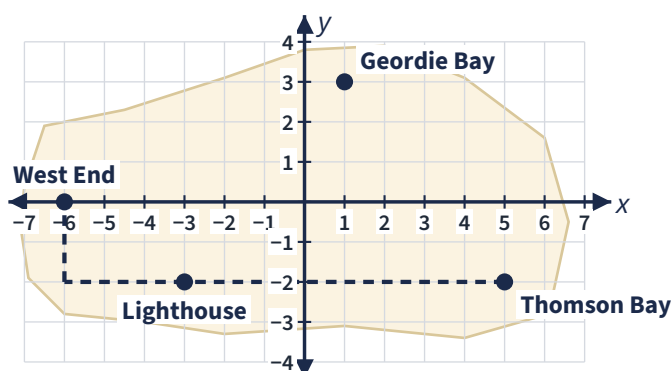
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Answer: \_\_\_\_\_

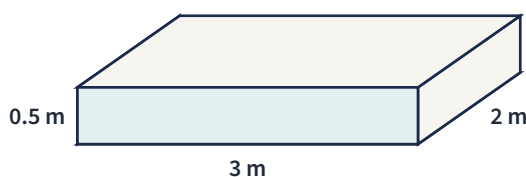
- 3 They ride along the road (dashed) from **Thomson Bay** to the **Lighthouse**, then on to the **West End**. Each unit is **500 m**. **a)** How far is it from Thomson Bay to the Lighthouse, in km? **b)** They ride back the same way. How far do they ride altogether, in km? [3 marks]



a) \_\_\_\_\_

b) \_\_\_\_\_

- 4 A raised garden bed is **3 m** long, **2 m** wide and **0.5 m** deep. **a)** What is the area of its base? **b)** What volume of soil fills it? **c)** Soil costs **\$45 per m<sup>3</sup>** plus **\$60** delivery. What is the total cost? [3 marks]




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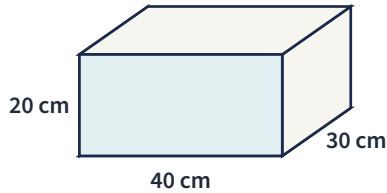


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Answer: \_\_\_\_\_

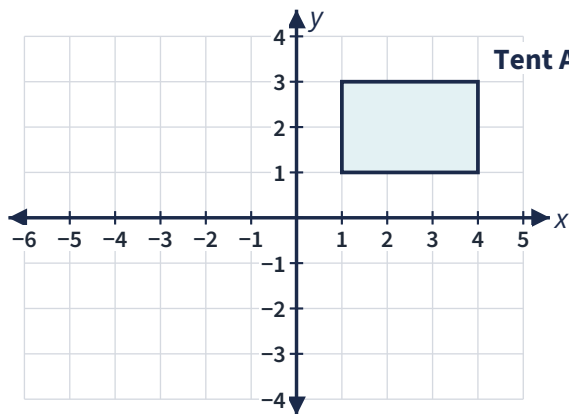
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- 5 Toy blocks are cubes with **10 cm** edges. They are packed into cartons **40 cm** long, **30 cm** wide and **20 cm** high. **a)** How many blocks fit in one carton? **b)** How many cartons are needed for **150** blocks? [2 marks]



Answer: \_\_\_\_\_

- 6 Each unit on the camp plan is **2 m**. Tent B is Tent A moved **6 left** and **4 down**. **a)** Draw Tent B and write the coordinates of its corners. **b)** What is the floor area of one tent, in  $\text{m}^2$ ? [3 marks]



- a) \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 b) \_\_\_\_\_  
 \_\_\_\_\_

- 7 For the camp lunch, each of **26** students gets **250 mL** of juice. Juice comes in **2 L** bottles costing **\$3.20** each. How many bottles are needed, and what is the cost? [2 marks]

Answer: \_\_\_\_\_

- 8 The camp bus leaves school at **08:10**. The drive to Dwellingup takes **1 h 50 min**, plus a **25-minute** stop at Pinjarra. What time does the bus arrive? Give a 12-hour time. [2 marks]

Answer: \_\_\_\_\_

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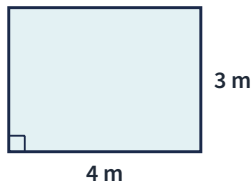
- 9 The bus trailer can carry **1 t**. There are **45** bags that each weigh **12 kg**, and **8** food crates that each weigh **35 kg**. Is the load under the limit? By how much is it under (or over)? [2 marks]

Answer: \_\_\_\_\_

**C** Think it through *explain your thinking*

/ 10 marks

- 1 Ben says the area of this rug is **14 m<sup>2</sup>**. Do you agree with Ben? Explain his mistake. [2 marks]



- 2 **True or false?** “If you **double** every edge of a box, its volume **doubles**.” Test it with a box 2 cm × 3 cm × 4 cm. [2 marks]

- 3 **Always, sometimes or never true?** “A rectangle with a **bigger perimeter** has a **bigger area**.” Give examples. [2 marks]  
**Always / Sometimes / Never**

- 4 Which is the **odd one out**? 90 min, 1.5 h, 1 h 30 min, 1 h 50 min Explain. [2 marks]

- 5 Mr Ali needs **7 L** of paint. A **4 L** tin costs **\$58** and a **1 L** tin costs **\$16**. What is the **cheapest** way to buy at least 7 L? Justify your choice. [2 marks]

**D****Challenge** *stretch yourself*

/ 9 marks

- 1 A rectangular garden bed must have **whole-metre** sides and use exactly **20 m** of edging. Find **all** the possible beds. Which one gives the **most** area for planting? [3 marks]

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Answer: \_\_\_\_\_

- 2 A box is made of **24** centimetre cubes and has whole-number edges. Find **all** the different boxes it could be (a  $2 \times 3 \times 4$  box is the same as  $4 \times 3 \times 2$ ). Which is **closest to a cube**? [3 marks]

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Answer: \_\_\_\_\_

- 3 45 people are going to camp, **98 km** away. **Option A:** hire a bus. It costs **\$2.10** for every km it drives, and it drives there and back. The bus price is the same for any group size. **Option B:** train and bus tickets at **\$6.50 per person each way**. **a)** Which option is cheaper, and by how much? **b)** What is the **largest** group size for which Option B is cheaper? [3 marks]

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Answer: \_\_\_\_\_

**How did I go?**Warm up \_\_\_\_ / 16 Practise \_\_\_\_ / 23 Think it through \_\_\_\_ / 10 Challenge \_\_\_\_ / 9 **Total \_\_\_\_ / 58**Want help with Year 6 maths? Our tutors make it click. **Book a free trial class at [edulift.com.au](https://www.edulift.com.au)**