

Metric units for area and volume

Year 7 About 60 minutes Calculator allowed 50 marks



Hints online, answers free with an account:
mathswariz.uk/worksheets/ks3-year-7-metric-units-for-area-and-volume/

Date _____

A Do Now

Quick questions to start.

- A1** Needed today [1 mark]

Work out 4.7×100 .

A2 Needed today [1 mark]

A cuboid measures 6 cm by 5 cm by 2 cm. Work out its volume.

Answer

Answer

- A3** Last lesson [1 mark]

Triangles ABC and PQR are congruent, with A matching P and B matching Q . $AB = 9$ cm. Write down the length of PQ .

A4 From chapter 4 [1 mark]

Work out 35% of 60.

Answer

Answer

B Example, then your turn

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Your teacher works through each example with you. Then try the one beside it.

EXAMPLE 1

Convert (a) 4.3 cm^2 to mm^2 (b) 0.26 m^2 to cm^2 .

Hint $1 \text{ cm} = 10 \text{ mm}$, so $1 \text{ cm}^2 = 10 \times 10 = 100 \text{ mm}^2$.
 $1 \text{ m} = 100 \text{ cm}$, so $1 \text{ m}^2 = 100 \times 100 = 10\,000 \text{ cm}^2$. A large unit to a small unit: multiply.

- B1** Convert (a) 6.8 cm^2 to mm^2 (b) 0.09 m^2 to cm^2 . [2 marks]

Answer (a) mm^2 (b) cm^2

EXAMPLE 2

Convert (a) 7400 mm^3 to cm^3 (b) $2\,300\,000 \text{ cm}^3$ to m^3 (c) 650 cm^3 to litres.

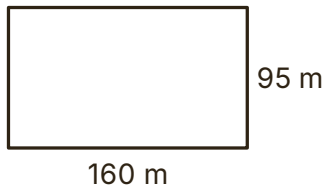
Hint $1 \text{ cm}^3 = 1000 \text{ mm}^3$, $1 \text{ m}^3 = 1\,000\,000 \text{ cm}^3$ and 1 litre = 1000 cm^3 . A small unit to a large unit: divide.

- B2** Convert (a) 920 mm^3 to cm^3 (b) $560\,000 \text{ cm}^3$ to m^3 (c) 3800 litres to m^3 . [3 marks]

Answer (a) cm^3 (b) m^3 (c) m^3

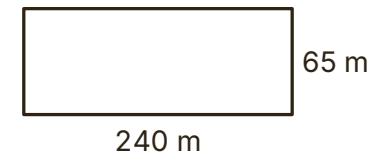
EXAMPLE 3

A rectangular field measures 160 m by 95 m. Work out its area in hectares.



Not drawn accurately

Hint Work out the area in m^2 first. 1 hectare = 10 000 m^2 .

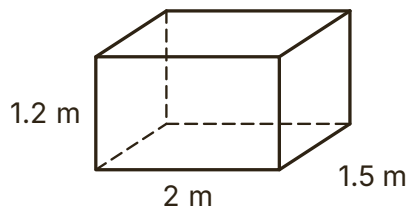
B3 A rectangular field measures 240 m by 65 m. Work out its area in hectares. [2 marks]

Not drawn accurately

Answer

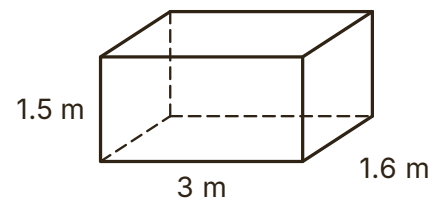
EXAMPLE 4

A water tank is a cuboid. It is two-thirds full. Work out the number of litres of water in the tank.



Not drawn accurately

Hint Find the volume in m^3 , take two-thirds of it, then use $1 \text{ m}^3 = 1000$ litres.

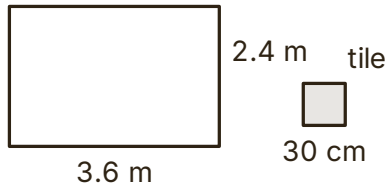
B4 A water tank is a cuboid. It is three-fifths full. Work out the number of litres of water in the tank. [3 marks]

Not drawn accurately

Answer

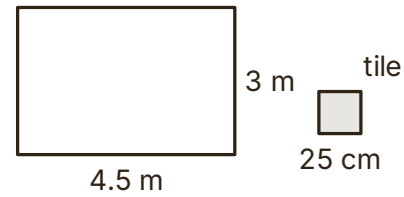
EXAMPLE 5

A rectangular floor is 3.6 m by 2.4 m. It is covered with square tiles of side 30 cm. How many tiles are needed?



Not drawn accurately

Hint Change the floor's sizes into cm first, so both sizes are in the same unit.

B5 A rectangular floor is 4.5 m by 3 m. It is covered with square tiles of side 25 cm. How many tiles are needed? [3 marks]

Not drawn accurately

Answer

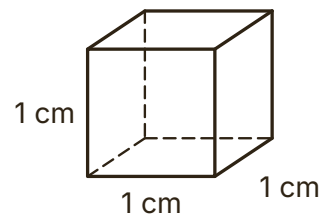
c Practice

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C1 Which is larger, 0.48 m^2 or 4500 cm^2 ? Show how you decide. [2 marks]

Answer

C2 The diagram shows a cube with edges of 1 cm. Explain why $1 \text{ cm}^3 = 1000 \text{ mm}^3$. [2 marks]



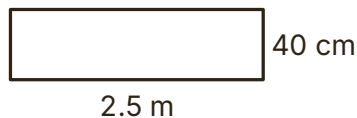
C3 Write these areas in order of size, smallest first: 0.7 hectares, 6500 m^2 , $72\,000\,000 \text{ cm}^2$. [2 marks]

Answer

C4 A jug holds 1.35 litres of juice. How many glasses that each hold 150 cm^3 can be filled from the jug? [2 marks]

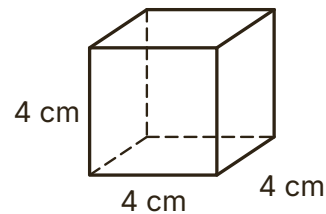
Answer

- C5** A rectangular board is 2.5 m long and 40 cm wide. Work out its area (a) in cm^2 (b) in m^2 . [3 marks]



Not drawn accurately

- C6** A cube has edges of 4 cm. Work out its volume in mm^3 . [2 marks]



Answer (a) cm^2 (b) m^2

Answer

D Exam-style questions

GCSE Foundation

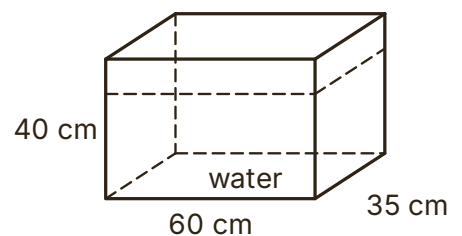
- D1** Kai says, "3 m^2 is the same as 300 cm^2 , because there are 100 cm in 1 m." [2 marks]

Kai is wrong. Explain why, and write 3 m^2 in cm^2 .

Answer 3 m^2 = cm^2

- D2** A fish tank is a cuboid. It is 60 cm long, 35 cm wide and 40 cm high. The water in the tank is 30 cm deep.

- (a) Work out the volume of water in the tank. [3 marks]
Give your answer in litres.



Answer

Not drawn accurately

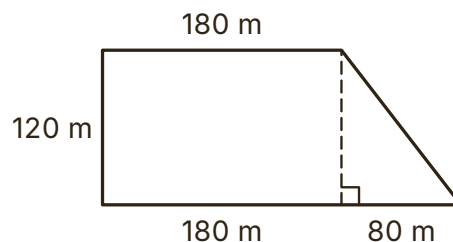
- (b) More water is added until the water is 38 cm deep. How many litres of water are added? [2 marks]

Answer

Total for D2: 5 marks

D3 The diagram shows a field. It is a rectangle with a right-angled triangle on one end.

- (a) Work out the area of the field. Give your [3 marks]
answer in hectares.



Answer Not drawn accurately

- (b) The field is sold for £8500 per hectare. Work out the price of the field. [2 marks]

Answer

Total for D3: 5 marks

- D4** A path is made of concrete. It is 12 m long, 90 cm wide and 8 cm deep. Concrete [4 marks]
costs £110 per m^3 . Work out the cost of the concrete for the path. You must show
your working.



Not drawn accurately

Answer

E Extension

Stretch

No route is given. The hints are at the end of the sheet. Use one at a time.

- E1** A cube with edges of 1 m is cut into small cubes with edges of 2 cm. The small [4 marks]
cubes are put in one straight line, touching. How long is the line? Give your
answer in kilometres.

Answer

Extension hints

Cover these with paper. Uncover one at a time.

- E1 Hint 1** Work out how many small cubes fit along one edge of
the big cube.
- Hint 2** $100 \div 2 = 50$ small cubes along each edge, so there
are $50 \times 50 \times 50$ small cubes.
- Hint 3** $50^3 = 125\,000$ cubes. The line is $125\,000 \times 2 = 250\,000$
cm = 2500 m = 2.5 km.

How did it go?

Colour one circle on each line: not yet, nearly, yes.

I can convert between mm^2 , cm^2 , m^2 and hectares. ☐ ☐ ☐

I can convert between mm^3 , cm^3 , m^3 and litres. ☐ ☐ ☐

I can use unit conversions to solve problems about fields, tanks and tiles. ☐ ☐ ☐