Worksheet - Metric and imperial units, perimeter, area and volume

Year: Year 5 · 20

Show your working.

Question 1

Question 1 – Changing lengths *(Section A · Practice)*

Change each length to the unit shown.

a. 3.5 km to metres
b. 450 cm to metres
c. 2.4 m to centimetres
d. 65 mm to centimetres
e. 3,200 m to kilometres

Question 2

Question 2 – Changing mass and capacity *(Section A · Practice)*

Change each amount to the unit shown.

a. 4,500 g to kilograms
b. 2.4 litres to millilitres
c. 750 ml to litres
d. 0.35 kg to grams
e. 1.5 kg to grams

Question 3

Question 3 – Imperial and metric *(Section A · Practice)*

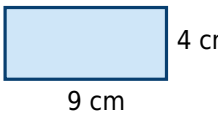
Use the approximate equivalents to answer these. Remember 1 inch ≈ 2.5 cm, 1 foot ≈ 30 cm, 8 km ≈ 5 miles, 1 kg ≈ 2.2 lb and 1 pint ≈ 570 ml.

a. About how many centimetres are 10 inches?
b. About how many centimetres are 3 feet?
c. About how many miles are 40 km?
d. About how many pounds are 5 kg?
e. About how many millilitres are 2 pints?

Question 4

Question 4 – Perimeter of rectangles *(Section A · Practice)*

Find the perimeter of each shape.



a. A rectangle 9 cm by 4 cm
b. A square with sides of 7 cm
c. A rectangle with length 15 m and width 6 m
d. A rectangle has a perimeter of 30 cm and a length of 9 cm. Find its width.

Question 5

Question 5 – Area of rectangles *(Section A · Practice)*

Find the area of each shape.

a. A rectangle 12 cm by 7 cm
b. A rectangle 15 m by 9 m
c. A square with sides of 8 cm
d. A rectangle has an area of 56 cm^2 and a length of 8 cm. Find its width.

Question 6

Question 6 – Counting cubes *(Section A · Practice)*

Each cuboid below is made from 1 cm cubes. Find the volume of each.

a. A cuboid 4 cubes long, 3 cubes wide and 2 cubes high
b. A cuboid 5 cubes long, 2 cubes wide and 2 cubes high
c. A cube with 3 cubes along each edge
d. A cuboid with a bottom layer of 12 cubes and 3 layers

Question 7

Question 7 – The playground *(Section B · Real-life practice)*

The school playground is a rectangle 60 m long and 40 m wide. A running track goes round the edge.

a. Find the perimeter of the playground.
b. How many laps are needed to run 1 km?
c. Ravi runs 3 laps. How far does he run in metres? Write the answer in kilometres too.
d. The caretaker puts a fence round the playground. Fencing costs £8 per metre. Find the cost.

Question 8

Question 8 – Carpet for the bedroom *(Section B · Real-life practice)*

Mia's bedroom floor is a rectangle 5 m long and 4 m wide. She is buying a carpet that costs £12 per square metre.

a. What is the area of the floor?
b. How much does the carpet cost?
c. A wooden strip goes round the edge of the room. How long is the strip?
d. The strip is sold in 2 m lengths. How many lengths must she buy?

Question 9

Question 9 – Baking measures *(Section B · Real-life practice)*

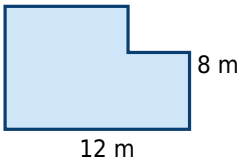
Gran's old recipe book uses imperial units. A cake needs 1 pint of milk, 2 lb of flour and 6 inches for the width of the tin.

a. About how many millilitres is 1 pint of milk?
b. About how many kilograms is 2.2 lb? How many pounds is 2 kg?
c. About how many centimetres is 6 inches?
d. Mum makes 2 cakes. How many millilitres of milk does she need in total, and is that more or less than 1 litre?

Question 10

Question 10 – The L-shaped garden *(Section B · Real-life practice)*

Mr Dean has an L-shaped lawn. The picture shows its shape.



The lawn is a 12 m by 8 m rectangle with a 4 m by 3 m corner cut out for the patio.

a. What is the area of the 12 m by 8 m rectangle?
b. What is the area of the corner that is cut out?
c. What is the area of the lawn?
d. Grass seed is sold in bags that cover 20 m². How many bags are needed?

Question 11

Question 11 – Fish tank *(Section B · Real-life practice)*

A small fish tank is a cuboid. Its base is 10 cm by 5 cm and the tank is 4 cm deep. Water is poured in until the tank is full.

a. How many 1 cm cubes fit in the bottom layer of the tank?

b. What is the volume of the tank in cm^3?
c. 1 cm^3 of water is 1 ml. How many millilitres of water does the tank hold?
d. Write your answer to (c) in litres.

Question 12

Question 12 – Journey to the coast *(Section B · Real-life practice)*

The Evans family drive from their home to the coast. The sign says 40 miles. The satnav says the distance is 64 km.

a. Using 8 km ≈ 5 miles, about how many miles is 64 km?
b. Is the sign close to the satnav? Explain.
c. The car uses about 1 litre of petrol for every 12 km. About how many litres are used for the 64 km?
d. Petrol costs £1.50 a litre. About how much does the journey cost?

Question 13

Question 13 – At the swimming pool *(Section B · Real-life practice)*

A swimming pool is a rectangle 25 m long and 10 m wide. A rope marks lanes along the length.

a. Find the perimeter of the pool.
b. Find the area of the water surface.
c. Ali swims 4 lengths. How far is that in metres? How many metres short is it of 1 km?
d. The tiles round the edge cost £6 per metre. How much do the tiles cost for the perimeter?

Question 14

Question 14 – The supermarket *(Section B · Real-life practice)*

Sam buys 2 kg of potatoes, 750 g of carrots and 1.5 kg of apples at the supermarket.

a. How many grams of potatoes does he buy?
b. How many kilograms of fruit and vegetables does he buy altogether?
c. The apples cost £2 per kilogram. How much does he pay for the apples?
d. His bag can hold 5 kg. How many more grams can he put into the bag?

Question 15

Question 15 – Painting the classroom wall *(Section C · Problem solving)*

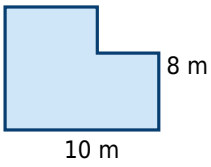
A classroom wall is 6 m long and 3 m high. It has a rectangular window 2 m wide and 1 m high that will not be painted.

a. What is the area of the whole wall?
b. What is the area of the window?
c. What area needs painting?
d. One tin of paint covers 8 m². How many tins are needed?
e. Each tin costs £14. How much does the paint cost?

Question 16

Question 16 – The allotment *(Section C · Problem solving)*

An allotment is in the shape of an L. It is a 10 m by 8 m rectangle with a 4 m by 3 m corner cut out for a shed. The plan is shown.



a. Find the area of the allotment.
b. Find the perimeter of the allotment. (Remember to add all six sides.)
c. A fence goes all the way round the allotment. Fencing costs £9 per metre. What is the total cost?
d. Each plant needs 1 m². How many plants can be grown on the whole allotment?
e. The gardener wants to make half of the allotment into a lawn. How big is that area?

Question 17

Question 17 – Packing cubes into a box *(Section C · Problem solving)*

Kai has a box in the shape of a cuboid that is 6 cm long, 4 cm wide and 3 cm high. He packs it with 1 cm cubes.

a. How many cubes are in the bottom layer?
b. How many cubes fill the box?
c. Each cube has a mass of 2 g. What is the total mass in grams? Write it in kilograms.
d. Kai has 100 cubes. How many are left after he has filled the box?
e. He builds a second box that is 5 cm by 5 cm by 4 cm. Which box holds more cubes, and how many more?

Question 18

Question 18 – Same perimeter, different area *(Section C · Problem solving)*

Otto has 24 m of fencing and makes different rectangular pens with whole-number sides, using all the fencing.

Length	Width	Area
11 m	1 m	?
10 m	2 m	?
9 m	3 m	?
8 m	4 m	?
6 m	6 m	?

a. Check that the perimeter of the 8 m by 4 m pen is 24 m.
b. Complete the area column.
c. Which pen has the greatest area and what is its shape?
d. Which pen has the smallest area?
e. A farmer says "a longer pen always has a bigger area". Use the table to show he is wrong.

Question 19

Question 19 – Fruit punch for the party *(Section C · Problem solving)*

For a school party Otto makes fruit punch from 3.5 litres of orange juice, 1,250 ml of pineapple juice and 0.75 litres of lemonade.

a. Write each amount in millilitres.
b. How many millilitres of punch is that in total? How many litres?
c. Each cup holds 250 ml. How many full cups can be filled?
d. There are 30 children and each has one cup. How much more punch is needed? Give the answer in litres.
e. Mum says a 2-pint jug is big enough to hold all the punch. Is she right? Use 1 pint ≈ 570 ml.

Question 20

Question 20 – Challenge: the water tank *(Section D · Challenge)*

A fish tank has a rectangular base 20 cm by 10 cm. Water is poured in until it holds exactly 2 litres. (1 litre = 1,000 cm^3.)

a. How many cm^3 is 2 litres?
b. What is the area of the base of the tank?
c. How deep is the water? Show how you worked it out.
d. A stone is placed in the tank and the water rises by 1 cm. What is the volume of the stone in cm^3?