Worksheet - Converting units, area, perimeter and volume

Year: Year 6 · 20

Show your working.

Question 1

Question 1 – Converting metric units *(Section A · Skills practice)*

Convert each measurement to the unit shown. Decide first whether you will multiply or divide.

a. 3.5 km to metres
b. 2 400 g to kilograms
c. 450 cm to metres
d. 3.2 litres to millilitres
e. 0.6 m to centimetres

Question 2

Question 2 – Metric and imperial units *(Section A · Skills practice)*

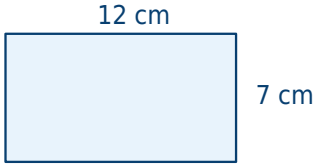
Use these facts: 1 inch is about 2.5 cm, 5 miles is about 8 km, 1 kg is about 2.2 pounds and 1 gallon is about 4.5 litres.

a. A ruler is 12 inches long. About how many centimetres is that?
b. About how many kilometres is 15 miles?
c. About how many pounds is 5 kg?
d. A car's petrol tank holds 10 gallons. About how many litres is that?
e. A road sign says 40 miles to a town. About how many kilometres is that?

Question 3

Question 3 – Perimeter *(Section A · Skills practice)*

Work out the perimeter of each shape. Remember to write the unit.



a. The rectangle in the diagram.
b. A square with sides of 8.5 cm.
c. A rectangle that is 3.5 m long and 2.4 m wide.

d. A regular hexagon with each side 6.5 cm.

Question 4

Question 4 – Area of rectangles and compound shapes *(Section A · Skills practice)*

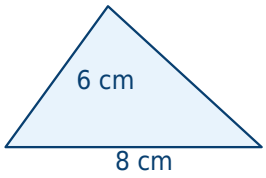
Work out each area. Write the unit.

a. The rectangle in question 3, 12 cm by 7 cm.
b. A rectangle 10 cm by 6 cm has a 4 cm by 3 cm rectangle cut out of one corner. Find the area of the shape that is left.
c. A square with sides of 9 cm.
d. A rectangle with an area of 54 cm² and a length of 9 cm. Find its width.

Question 5

Question 5 – Triangles and parallelograms *(Section A · Skills practice)*

Find the area of each shape. The height is always the perpendicular height.



a. The triangle shown, with a base of 8 cm and a height of 6 cm.
b. A parallelogram with a base of 9 cm and a perpendicular height of 5 cm.
c. A triangle with a base of 11 cm and a height of 4 cm.
d. A triangle has an area of 30 cm² and a base of 12 cm. Find its perpendicular height.

Question 6

Question 6 – Volume of cuboids *(Section A · Skills practice)*

Find the missing measurement or volume in each question.

a. Find the volume of a cuboid that is 5 cm long, 4 cm wide and 3 cm high.
b. Find the volume of a cube with sides of 6 cm.
c. A cuboid has a volume of 120 cm³. It is 8 cm long and 5 cm wide. How high is it?
d. A fish tank is 50 cm long, 30 cm wide and 40 cm high. How many litres of water can it hold? (1 litre = 1 000 cm³)

Question 7

Question 7 – Glasses of juice *(Section B · Real-life practice)*

Hana is serving drinks at a party. She has a jug that holds 1.5 litres of orange juice and glasses that each hold 250 ml.

a. How many millilitres of juice are in a full jug?
b. How many glasses can she fill from one full jug?
c. There are 20 guests and each guest has 2 glasses. How many litres of juice does she need?
d. Juice is sold in 2-litre cartons. How many cartons does she need to buy?

Question 8

Question 8 – Running laps *(Section B · Real-life practice)*

A running track is 400 m long. Omar is training for a 5 km charity run. The distance of 1 mile is about 1.6 km.

a. How many metres are in 5 km?
b. How many laps of the track is that?
c. Omar has run 3.5 km. How many more laps must he run to complete 5 km?
d. About how many miles is 5 km? Give your answer to 1 decimal place.

Question 9

Question 9 – Driving in France *(Section B · Real-life practice)*

The Taylor family drives from Calais to Paris. The distance is 290 km. Road signs in the UK are in miles, but in France they are in kilometres. Use 5 miles is about 8 km.

a. The speed limit on a French motorway is 130 km/h. About how many miles per hour is this?
b. The family's car uses about 4.5 litres of petrol for every 40 miles. How many litres will it use on the 290 km journey? Use 1 mile = 1.6 km.
c. The petrol costs £1.50 for each litre. Work out the cost of the fuel.
d. They have driven 120 km. How many miles is that?

Question 10

Question 10 – Carpeting a bedroom *(Section B · Real-life practice)*

Ben\'s bedroom floor is a rectangle 4.5 m long and 3.2 m wide. He wants to fit new carpet and skirting board.

a. What is the area of the floor?
b. Carpet costs £12.50 for each square metre. How much will it cost?
c. Work out the perimeter of the room.
d. Skirting board is sold in 2.4 m lengths. The door is 0.9 m wide and has no skirting board. How many lengths must he buy?

Question 11

Question 11 – The lawn and the pond *(Section B · Real-life practice)*

A garden has a rectangular lawn that is 12 m long and 8 m wide. In the middle of the lawn there is a square pond with sides of 3 m.

a. Work out the area of the lawn without the pond.
b. One kilogram of grass seed covers 30 m². How many kilograms of seed are needed to cover the grass area? Seed is only sold in whole kilograms.
c. Seed costs £6.50 for 1 kg. How much will it cost?
d. The gardener puts a fence round the outside of the whole lawn. Work out the length of fence, and the cost at £8.40 per metre.

Question 12

Question 12 – Sails for the boat *(Section B · Real-life practice)*

A boat has a triangular sail. The base of the sail is 2.4 m and its perpendicular height is 3.5 m.

a. Work out the area of the sail.
b. The boat has two sails of this size. What is the total area of sail?
c. Sail cloth costs £18 for each square metre. What is the cost of the cloth for the two sails?
d. A bigger sail has a base of 3 m and an area of 6.3 m². What is its height?

Question 13

Question 13 – The fish tank *(Section B · Real-life practice)*

Jade has a fish tank 60 cm long, 30 cm wide and 35 cm high. She fills it with water to 5 cm below the top.

a. What is the volume of the whole tank in cm³ and in litres?
b. What height does the water reach?
c. How many litres of water are in the tank?
d. Each fish needs 4.5 litres of water. What is the greatest number of fish she can keep?

Question 14

Question 14 – Packing the boxes *(Section B · Real-life practice)*

A factory packs small boxes into a large carton. Each small box is 20 cm long, 15 cm wide and 10 cm high. The large carton is 60 cm long, 45 cm wide and 30 cm high.

a. What is the volume of one small box?
b. What is the volume of the large carton?

c. How many small boxes fit exactly in the carton?
d. Show by working out how many small boxes fit along each edge of the carton that your answer is sensible.

Question 15

Question 15 – The swimming pool *(Section C · Problem solving)*

A leisure centre has a swimming pool that is 25 m long and 10 m wide. The depth of the water is 1.2 m everywhere. A cubic metre is equal to 1 000 litres.

a. Work out the volume of water when the pool is full, in cubic metres.
b. How many litres is this?
c. A pump fills the pool at 1 500 litres per minute. How long does it take to fill the empty pool? Give the answer in hours and minutes.
d. The pool has a surface area of 25 m by 10 m. The cover for the pool costs £14 for each square metre. How much does it cost?
e. Around the pool there is a path 2 m wide, as shown in the sketch. Work out the area of the path. (The path goes all round the pool.)
f. Tiles for the path cost £22 for each square metre. How much do they cost?

Question 16

Question 16 – Same area, different perimeter *(Section C · Problem solving)*

A farmer has a rectangular field. She wants to put a fence round the edge of the field.

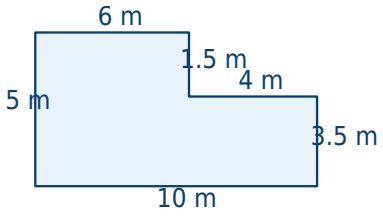
Rectangle	Length	Width
A	4 m	4 m
B	8 m	2 m
C	16 m	1 m

a. Show that all three rectangles have the same area of 16 m².
b. Work out the perimeter of each rectangle.
c. Which rectangle needs the least fencing? Which needs the most?
d. Fencing costs £9.50 for each metre. How much more does it cost to fence rectangle C than to fence rectangle A?
e. The farmer has exactly 24 m of fencing. List all the rectangles with whole-number sides that she could make, with their areas. Which has the greatest area?

Question 17

Question 17 – The L-shaped room *(Section C · Problem solving)*

The diagram shows the floor plan of an L-shaped room. All the corners are right angles.



a. Work out the area of the floor by splitting it into two rectangles.
b. Floor tiles cost £18 for each square metre. How much do they cost?
c. Work out the perimeter of the room.
d. A rug in the shape of a rectangle is 3 m by 2 m. What fraction of the floor does it cover? Give the answer in its simplest form.

Question 18

Question 18 – The farmer's field *(Section C · Problem solving)*

A field is made from a parallelogram and a triangle that share a side. The parallelogram has a base of 40 m and a perpendicular height of 25 m. The triangle has the same base of 40 m and a perpendicular height of 18 m.

a. Work out the area of the parallelogram.
b. Work out the area of the triangle.
c. Work out the total area of the field in square metres.
d. One hectare is 10 000 m². What fraction of a hectare is the field? Give your answer as a decimal.
e. Fertiliser is spread at the rate of 1 bag for each 100 m². How many bags does the farmer need, and what do they cost at £12.50 a bag?

Question 19

Question 19 – The water tank *(Section C · Problem solving)*

A rectangular water tank is 2 m long, 1.5 m wide and 1 m high. One cubic metre holds 1 000 litres of water.

a. Work out the volume of the tank in cubic metres.
b. How many litres of water does the tank hold when it is full?
c. Water leaks out of the tank at 0.5 litres each minute. How many minutes does it take for a full tank to empty? Give the answer in hours.
d. The tank is only $\frac{3}{4}$ full. How many litres are in the tank?
e. A cylindrical bucket holds 12 litres. How many full buckets can be filled from the tank when it is $\frac{3}{4}$ full?

Question 20

Question 20 – Challenge: the rectangle with a perimeter of 30 cm *(Section D · Challenge)*

A rectangle has a perimeter of 30 cm. One side is 9 cm long.

a. Find the width and the area of the rectangle.
b. A square has the same perimeter as the rectangle. Find the side of the square and its area.
c. The square has a larger area than the rectangle. Find the difference in the areas.
d. A cuboid has this square as its base and a height of 4 cm. Find its volume.