Worksheet - Perimeter, area and volume

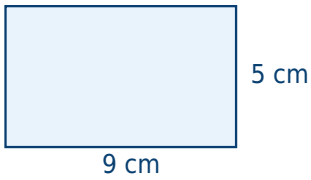
Year: Year 7 · 20

Show your working.

Question 1

Question 1 – Perimeter and area of rectangles *(Section A · Skills practice)*

Work out the perimeter and the area of each rectangle.



a. A rectangle 9 cm by 5 cm (shown).
b. A square of side 7.5 cm.
c. A rectangle 2.4 m by 85 cm. Give your answers in metres and square metres.

Question 2

Question 2 – Triangles and parallelograms *(Section A · Skills practice)*

Work out the area of each shape.

a. A triangle with base 12 cm and perpendicular height 7 cm.
b. A triangle with base 9.6 m and perpendicular height 5 m.
c. A parallelogram with base 15 cm and perpendicular height 8 cm.
d. A parallelogram with area 96 cm² and base 12 cm. Find its height.

Question 3

Question 3 – Trapezia and compound shapes *(Section A · Skills practice)*

Use the formula for the area of a trapezium: $A = \frac{1}{2}(a + b)h$.

a. A trapezium has parallel sides 6 cm and 10 cm and height 4 cm.
b. A trapezium has parallel sides 8.5 m and 11.5 m and height 6 m.
c. An L-shape is made from a rectangle 10 cm by 6 cm with a 4 cm by 3 cm rectangle cut from one corner. Find the area.
d. Find the perimeter of the L-shape in part (c).

Question 4

Question 4 – Volume of cuboids *(Section A · Skills practice)*

Work out the volume of each cuboid and its total surface area.

a. Length 8 cm, width 5 cm, height 3 cm.
b. A cube of side 4 cm.
c. Length 2.5 m, width 1.2 m, height 0.8 m.
d. A cuboid has volume 120 cm^3, length 8 cm and width 3 cm. Find its height.

Question 5

Question 5 – Units *(Section A · Skills practice)*

Convert these measurements.

a. 3.5 m^2 into cm^2
b. 45 000 cm^2 into m^2
c. 2.4 litres into cm^3
d. 5 000 cm^3 into litres
e. 1 m^3 into litres

Question 6

Question 6 – Working backwards *(Section A · Skills practice)*

Find the missing measurement in each case.

a. A rectangle has area 84 cm^2 and length 12 cm. Find its width and perimeter.
b. A square has perimeter 36 cm. Find its area.
c. A triangle has area 30 cm^2 and base 12 cm. Find its height.
d. A rectangle has perimeter 34 cm and length 10 cm. Find its width and area.

Question 7

Question 7 – Painting a classroom wall *(Section B · Real-life practice)*

A wall in a classroom is 6.5 m long and 2.8 m high. It has a window 1.5 m by 1.2 m and a door 2 m by 0.9 m. A tin of paint covers 12 m^2 and costs £16.50.

a. Work out the area of the wall including the window and door.
b. Work out the area that needs painting.
c. How many tins are needed?
d. How much will the paint cost?

Question 8

Question 8 – The football pitch *(Section B · Real-life practice)*

A school football pitch is 90 m long and 60 m wide. The groundsman paints a white line round the outside and a centre line across the width.

a. Find the perimeter of the pitch.
b. Find the total length of line painted.
c. Find the area of the pitch in square metres.
d. Grass seed is sold in bags that cover 150 m². How many bags are needed to reseed the whole pitch?

Question 9

Question 9 – Tiling a bathroom *(Section B · Real-life practice)*

Priya is tiling a bathroom floor that measures 2.4 m by 1.8 m. She uses square tiles of side 30 cm. Each box contains 10 tiles and costs £14.

a. Find the area of the floor in cm².
b. Find the area of one tile.
c. How many tiles are needed?
d. How many boxes must she buy and how much will they cost?

Question 10

Question 10 – The swimming pool *(Section B · Real-life practice)*

A school swimming pool is a cuboid 12 m long, 6 m wide and 1.5 m deep. It is filled to the top.

a. Work out the volume of water in cubic metres.
b. How many litres is that? (1 m³ = 1 000 litres)
c. A pump moves 4 500 litres per hour. How long does it take to fill the pool?
d. The pool walls and floor are to be painted. Find the area to be painted (no top).

Question 11

Question 11 – Gift wrapping *(Section B · Real-life practice)*

A gift box is a cuboid 30 cm long, 20 cm wide and 10 cm high. Wrapping paper costs £0.60 per 1 000 cm².

a. Find the volume of the box.
b. Find the surface area of the box.
c. How much paper (area) is needed if 10% extra is added for overlaps?
d. Find the cost of the paper.

Question 12

Question 12 – The garden *(Section B · Real-life practice)*

Mr Davies has a rectangular lawn 14 m by 9 m. He plans a patio in one corner that is 5 m by 4 m. The rest is lawn. He also wants to put edging all round the lawn area.

a. Work out the area of the whole garden.
b. Work out the area of the lawn.
c. What fraction of the garden is lawn?
d. Work out the length of edging needed round the outside of the garden, and the cost at £2.30 per metre.

Question 13

Question 13 – A tank of water *(Section B · Real-life practice)*

A rectangular fish tank is 60 cm long, 30 cm wide and 40 cm high.

a. Work out the volume of the tank in cm^3.
b. How many litres can the tank hold?
c. Maya fills it to a depth of 32 cm. How many litres of water is that?
d. She adds a rock of volume 1 800 cm^3. By how much does the water level rise?

Question 14

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

A school buys a recycling bin in the shape of a cuboid, 90 cm long, 60 cm wide and 100 cm high. Every week the caretaker empties it. Each plastic bottle takes up about 600 cm^3 when squashed.

a. Work out the volume of the bin in cm^3 and in litres.
b. How many squashed bottles can fit in the bin if there is no gap at all?
c. In practice only 80% of the space can be used. How many bottles is that?
d. The bin is painted on the outside (four sides and the top). Find the area to be painted.

Question 15

Question 15 – The garden pond *(Section C · Problem solving)*

A garden has a rectangular pond. The pond is 3 m long, 2 m wide and 0.6 m deep. A path of width 0.5 m goes all the way round the outside of the pond.

a. Find the volume of the pond.
b. The outer rectangle (pond and path) is 4 m by 3 m. Find the area of the path.
c. Paving slabs 50 cm by 50 cm are used for the path. How many slabs are needed?
d. Slabs are sold in packs of 10 for £18. What is the cost?

Question 16

Question 16 – Compound shape *(Section C · Problem solving)*

A school hall floor is L-shaped. It is made of a rectangle 20 m by 12 m joined to a rectangle 8 m by 5 m.

a. Find the total area of the floor.
b. The perimeter of the L-shape is found by going round the outside. The two rectangles share a side of 8 m along their join, which is not on the perimeter. Find the perimeter.
c. The floor is to be varnished at a cost of £4.50 per m^2. Find the cost.
d. What percentage of the floor is the smaller rectangle?

Question 17

Question 17 – Best value paint *(Section C · Problem solving)*

A decorator paints the four walls of a room that is 5 m by 4 m with walls 2.5 m high. Doors and windows total 8 m^2 and are not painted. One coat uses 1 litre of paint for every 10 m^2. The room needs 2 coats.

a. Find the area of the four walls.
b. Find the area to be painted.
c. How many litres of paint are needed for 2 coats?
d. A 2.5 litre tin costs £19 and a 5 litre tin costs £34. Find the cheapest way to buy at least the amount needed.

Question 18

Question 18 – Spot the mistake *(Section C · Problem solving)*

Each pupil made one mistake. Find it and correct it.

a. Ali: the area of a triangle with base 10 cm and height 6 cm is $10 \times 6 = 60$ cm^2.
b. Beth: the volume of a cuboid 4 cm by 3 cm by 2 cm is $4 + 3 + 2 = 9$ cm^3.
c. Carl: $2\ m^2 = 200\ cm^2$.
d. Dina: a rectangle with area 36 cm^2 must have perimeter 24 cm.

Question 19

Question 19 – Volume problem *(Section C · Problem solving)*

A cuboid-shaped container is 50 cm long, 40 cm wide and 25 cm high. It is filled to a depth of 20 cm with water. Then 6 litres of water are poured out.

a. Find the volume of water in the container before pouring, in litres.
b. Find the volume after pouring out 6 litres.
c. What is the depth of water now?

d. How many more litres can the container hold?

Question 20

Question 20 – Challenge: same perimeter, different area *(Section D · Challenge)*

A farmer has 40 m of fencing and wants to make a rectangular pen against a straight wall, so only three sides need fencing (two widths and one length).

a. Let the width be x metres. Write an expression for the length.
b. Write an expression for the area.
c. Complete the table of areas for x = 5, 8, 10, 12, 15.
d. Which width gives the greatest area?