Unit 8 · Area and Volume

HARDER PRACTICE QUESTIONS

Full marks 31

Write your answers on separate paper. Show your working, and write the unit with every length and area. Draw a figure wherever it helps.

1 One triangle, three heights [3]

A triangle has sides 13 cm, 14 cm and 15 cm, and its height onto the 14 cm side is 12 cm.

i. Find its area.
ii. Find its height onto the 15 cm side.
iii. Which of the three heights is the longest? Explain without working it out.

2 Work backwards [3]

An isosceles triangle has a base of 10 cm and an area of 60 cm^2. Find its height, each equal side, and its perimeter. Then check your answer with the formula $\frac{b}{4}\sqrt{4a^2 - b^2}$.

3 Same perimeter, three shapes [4]

An equilateral triangle, a square and a circle each have a perimeter of 24 cm. Find the area of each, and say what you notice. (Take $\sqrt{3} = 1.73$ and $\pi = \frac{22}{7}$, and give the areas to one decimal place.)

4 A rhombus from a side [3]

A rhombus has sides of 13 cm and one diagonal of 24 cm. Find its other diagonal, its area and its height.

5 A path round a pond [3]

A round pond of diameter 28 m has a path 3.5 m wide all round it. ($\pi = \frac{22}{7}$)

i. Find the area of the path.
ii. What does it cost to pave the path at Rs 200 per square meter?

6 Spot the error [3]

Find the mistake and correct it.

A big round roti has a diameter of 28 cm and a small one a diameter of 14 cm. Swastika says: "The big one is twice as wide, so two small rotis are as much food as one big one." Compare their areas, with $\pi = \frac{22}{7}$, and say how many small rotis she should have said.

7 One inside the other [4]

A circle of radius 7 cm just fits inside a square, touching all four sides. A smaller square just fits inside the circle, with its four corners on the circle. ($\pi = \frac{22}{7}$)

i. Find the area of the large square.
ii. Find the area of the small square.
iii. Find the area of the circle, and of the part of the circle outside the small square.
iv. What is the ratio of the area of the large square to the area of the small one?

8 In a real setting [4]

A goat is tied by a 7 m rope to a post in a rectangular field 20 m long and 15 m wide. ($\pi = \frac{22}{7}$)

i. If the post is at a corner of the field, what area can it graze, and what area is out of its reach?
ii. If the post is moved to the middle of a long side, what area can it graze?
iii. The post stays at the corner. About how long must the rope be for the goat to graze twice the area of i.?

9 Think [2]

Triangle ABC has base BC. Its top corner A is moved along a line parallel to BC, and the triangle leans further and further over. Does its area change? Does its perimeter? Explain.

10 Make your own [2]

Make up a parallelogram and a trapezium that have the same height and the same area. Give the base of the parallelogram and the two parallel sides of the trapezium, and show that the areas are equal. What must be true of the parallel sides in every such pair?