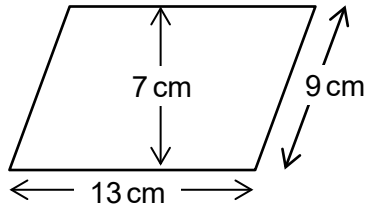


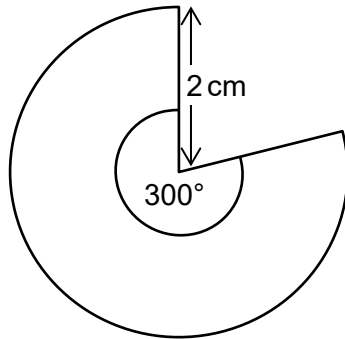
## Foundation Check In - 10.03 Area calculations

1. Calculate the area of this parallelogram.



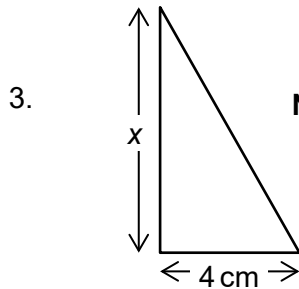
Not to scale

2. Calculate the area of the sector below.

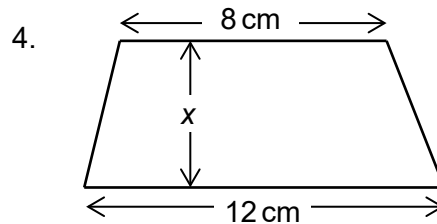


Not to scale

The shapes in questions 3 and 4 each have an area of  $10 \text{ cm}^2$ .  
Find the missing length  $x$  in each diagram.

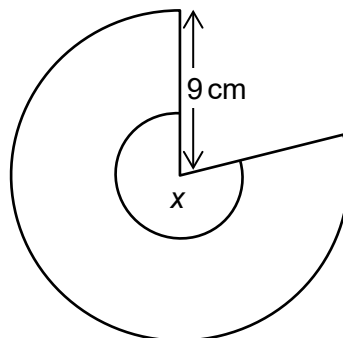


Not to scale



Not to scale

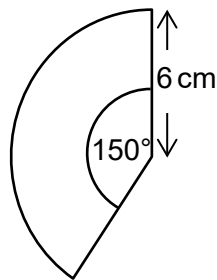
5. The area of the sector below is  $230 \text{ cm}^2$ . Find angle  $x$ .



Not to scale

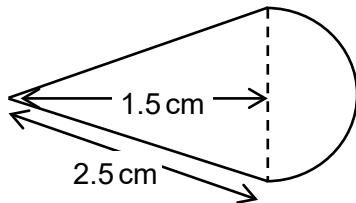


6. Show that the area of the sector below is  $15\pi \text{ cm}^2$ .



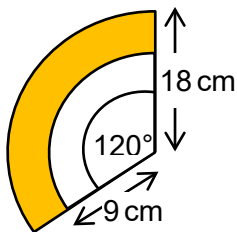
Not to scale

7. Show that the total area of the shape below is  $(3 + 2\pi) \text{ cm}^2$ .



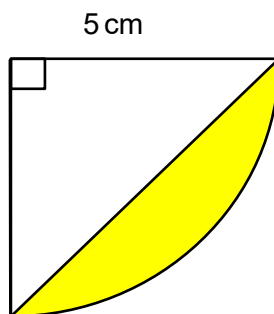
Not to scale

8. Show that the shaded region is  $\frac{3}{4}$  of the area of the total sector.



Not to scale

9. Calculate the shaded area.



Not to scale

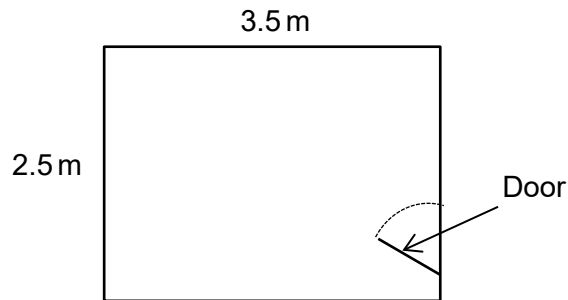
10. Toby has a 9 m by 12 m lawn that he wants to water. He has two sprinklers, each of which can water grass within a 7.5 m radius. Toby sets up the two sprinklers so that they are on opposite corners of the lawn. Work out what percentage of the lawn he will be able to water with the sprinklers.



# GCSE (9-1) MATHEMATICS

## Extension

A square tile has an area of  $64 \text{ cm}^2$  and is sold in packs of 20 for £8.50.  
The manager of an exclusive spa is going to tile every wall in three identical treatment rooms (see plan view below).



Each wall is 2.5 m high and the door occupies a space of  $1.28 \text{ m}^2$  which does not require tiles.

How much money should the manager budget for the cost of the tiles to the nearest £100?



## Answers

1.  $91 \text{ cm}^2$

2.  $10.5 \text{ cm}^2$

3.  $5 \text{ cm}$

4.  $1 \text{ cm}$

5.  $325^\circ$

6.  $\frac{150}{360} \times \pi \times 6^2 = \frac{5}{12} \times 36\pi = 5 \times 3\pi = 15\pi \text{ cm}^2$

7. Base of triangle  $= 2\sqrt{2.5^2 - 1.5^2} = 4$

Area of triangle  $= \frac{1}{2} \times 4 \times 1.5 = 3$  and area of semi-circle  $= \frac{1}{2} \times \pi \times 2^2 = 2\pi$

Total area  $= (3 + 2\pi) \text{ cm}^2$

8. Fraction  $= \frac{\text{shaded area}}{\text{total area}} = \frac{\frac{120}{360}\pi \times 18^2 - \frac{120}{360}\pi \times 9^2}{\frac{120}{360}\pi \times 18^2} = \frac{\frac{1}{3}\pi(324 - 81)}{\frac{1}{3}\pi \times 324} = \frac{243}{324} = \frac{3}{4}$

9.  $7.13 \text{ cm}^2$

10. Length of the diagonal of the lawn is  $\sqrt{12^2 + 9^2} = \sqrt{225} = 15 \text{ m}$ , so the midpoint is  $7.5 \text{ m}$ . As the maximum reach of the sprinkler is  $7.5 \text{ m}$ , the sprinklers will not overlap.

Area covered with water  $= \frac{1}{2} \times \pi \times 7.5^2 = 88.357 \text{ m}^2$

Percentage covered with water  $= \frac{88.357}{108} \times 100 = 81.8\%$



# GCSE (9-1) MATHEMATICS

## Extension

Each tile has sides of length  $\sqrt{64} = 8$  cm

$350 \div 8 = 43.75$ , so 44 tiles needed

$250 \div 8 = 31.25$ , so 32 tiles needed

The total number of tiles needed per room is:

$$2 \times 44 \times 32 = 2816$$

$$2 \times 32 \times 32 = 2048$$

$$12800 \div 64 = 200$$

$$2816 + 2048 - 200 = 4664 \text{ tiles}$$

The total number of tiles for all three rooms is  $4664 \times 3 = 13992$  tiles

Total number of packs required:  $13992 \div 20 = 699.6$ , rounded to 700 complete packs

Cost =  $700 \times \text{£}8.50 = \text{£}5950$  so the manager should budget  $\text{£}6000$  for the tiles.



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Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Find the area of a parallelogram			
AO1	2	Find the area of a sector			
AO1	3	Use the area formula for a triangle			
AO1	4	Use the area formula for a trapezium			
AO1	5	Find the angle of a sector given the area and the radius			
AO2	6	Find the area of a sector in terms of pi			
AO2	7	Find the area of a composite shape			
AO2	8	Find the difference between two sector areas			
AO3	9	Solve a problem using area formulae			
AO3	10	Solve a problem using area formulae			

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