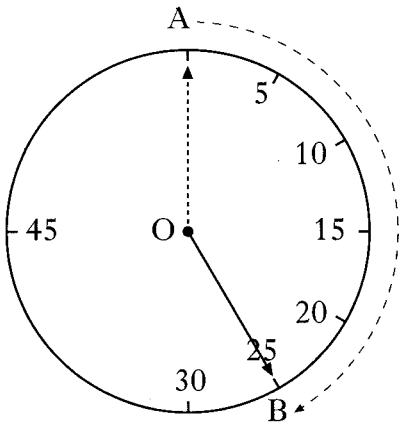
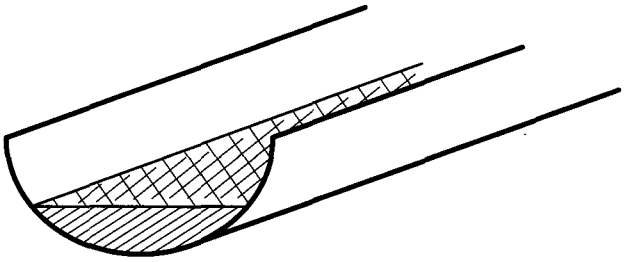
The Circle

2008 P2	**9.** Contestants in a quiz have 25 seconds to answer a question. This time is indicated on the clock. The tip of the clock hand moves through the arc AB as shown.  (*a*) Calculate the size of angle AOB. (*b*) The length of arc AB is 120 centimetres. Calculate the length of the clock hand.	1	4
Ans	(a) 150° (b) 45.8cm		

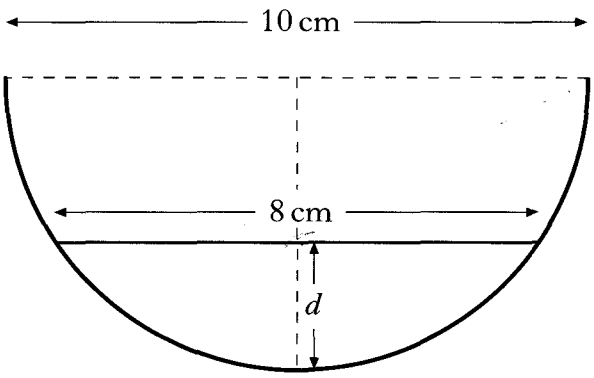
2007 P1

12. The diagram shows water lying in a length of roof guttering.



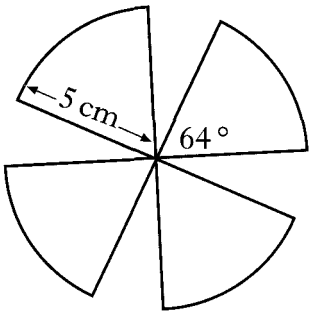
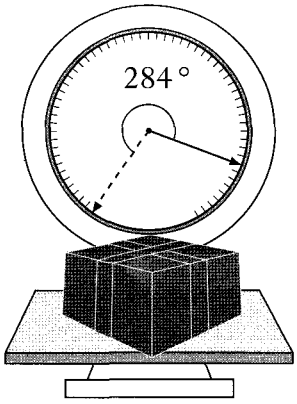
The cross-section of the guttering is a semi-circle with diameter 10 centimetres.

The water surface is 8 centimetres wide.



Calculate the depth, d, of water in the guttering. 4

Ans 2cm

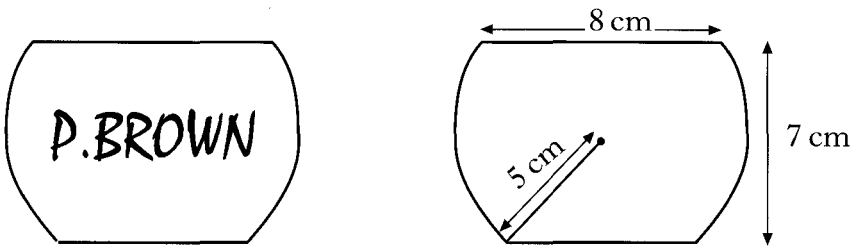
2007 P2	**7.** A fan has four identical plastic blades.  Each blade is a sector of a circle of radius 5 centimetres. The angle at the centre of each sector is 64°. Calculate the **total** area of plastic required to make the blades.	3	
Ans	55.84cm^2		
2006 P2	**8.** A set of scales has a circular dial. The pointer is 9 centimetres long. The tip of the pointer moves through an arc of 2 centimetres for each 100 grams of weight on the scales.  A parcel, placed on the scales, moves the pointer through an angle of 284°. Calculate the weight of the parcel.		4
Ans	2230g		

2005 P1

10. A badge is made from a circle of radius 5 centimetres.

Segments are taken off the top and the bottom of the circle as shown.

The straight edges are parallel.



The badge measures 7 centimetres from the top to the bottom.
The top is 8 centimetres wide.

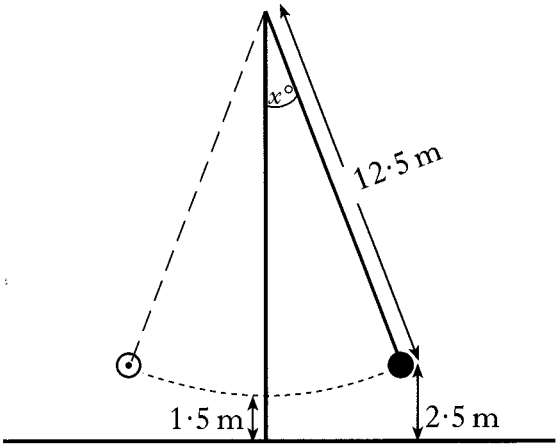
Calculate the width of the base. 5

Ans 6cm

2005 P2

10. The chain of a demolition ball is 12·5 metres long.

When vertical, the end of the chain is 1·5 metres from the ground.

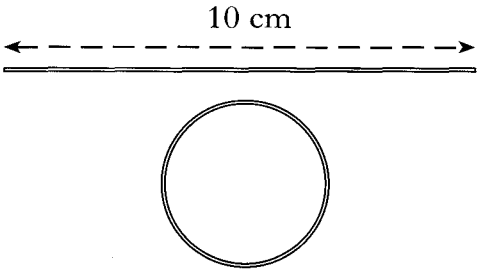
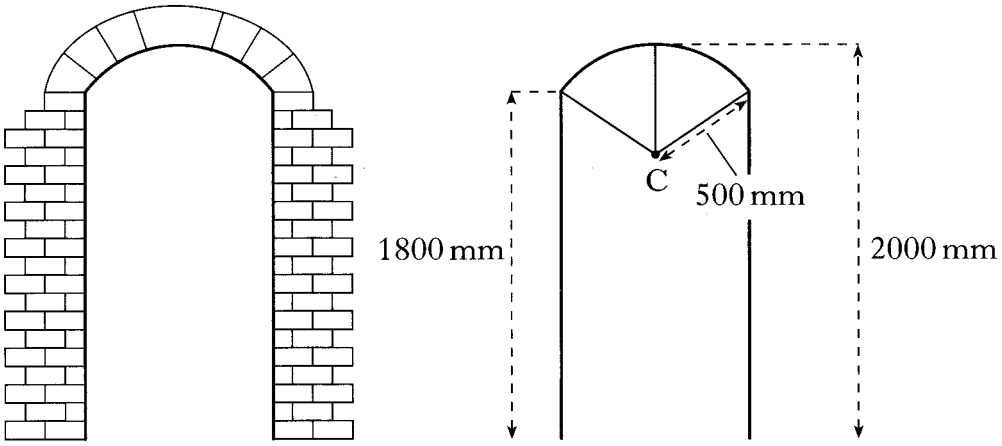


It swings to a maximum height of 2·5 metres above the ground on both sides.

(*a*) At this maximum height, show that the angle $x°$, which the chain makes with the vertical, is approximately 23°. 4

(*b*) Calculate the maximum length of the arc through which the end of the chain swings. Give your answer **to 3 significant figures**. 4

Ans (a) 23° (b) 10.0m

2004 P1	**12.** A piece of gold wire 10 centimetres long is made into a circle.  The circumference of the circle is equal to the length of the wire. Show that the area of the circle is **exactly** $\frac{25}{\pi}$ square centimetres.		4
Ans	Proof.		
2004 P2	**8.** The curved part of a doorway is an arc of a circle with radius 500 millimetres and centre C. The height of the doorway to the top of the arc is 2000 millimetres. The vertical edge of the doorway is 1800 millimetres.  Calculate the width of the doorway.		5
Ans	800mm		

2003 P2

10. A sheep shelter is part of a cylinder as shown in Figure 1.

It is 6 metres wide and 2 metres high.

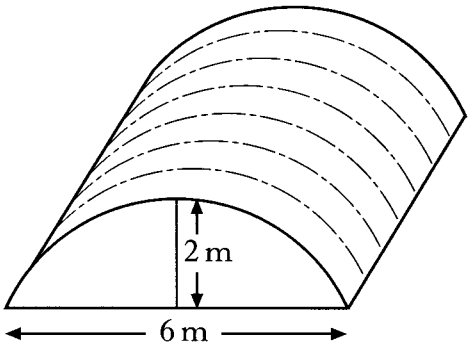


Figure 1

The cross-section of the shelter is a segment of a circle with centre O, as shown in Figure 2.

OB is the radius of the circle.

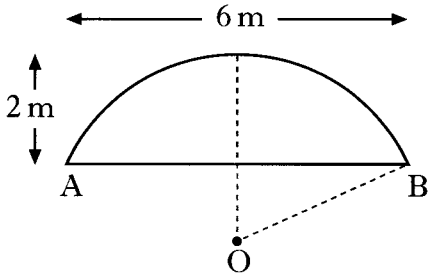
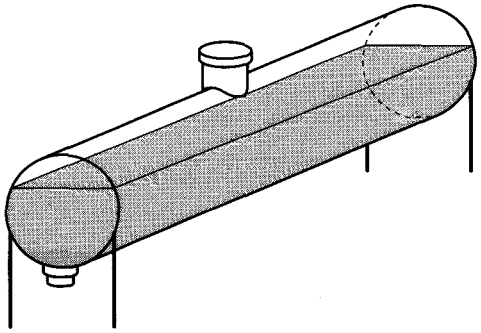
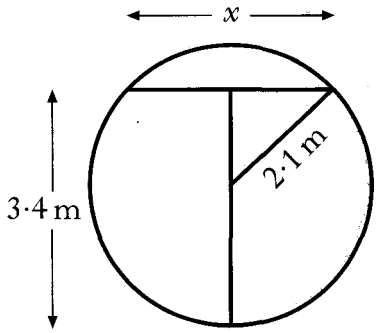


Figure 2

Calculate the length of OB. 4

Ans 3.25m

2002 P2	**6.** An oil tank has a circular cross-section of radius 2·1 metres. It is filled to a depth of 3·4 metres.   (*a*) Calculate x, the width in metres of the oil surface.	3	
	(*b*) What other depth of oil would give the same surface width?		1
Ans	(a) 3.3m (b) 0.8m		