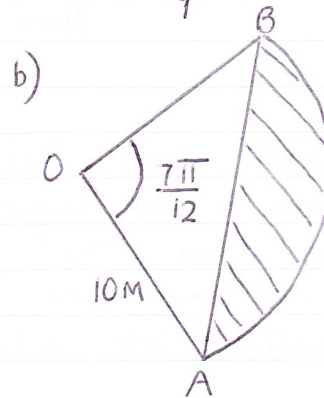
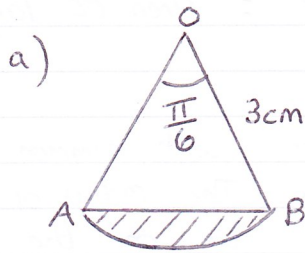
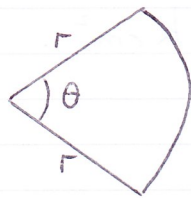


Trigonometry 5: Arcs and Sectors

- i) In each case calculate the length of arc AB, the area of the sector AOB and the area of the shaded segment.



- 2) A piece of wire of length 40cm is bent into the shape of a sector of a circle of radius r cm and angle θ rads.

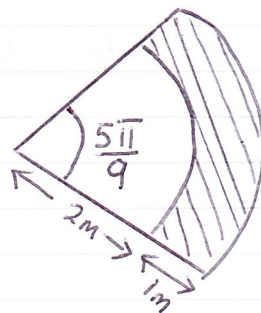


- a) Show that the area of the sector is $A = 20r - r^2$

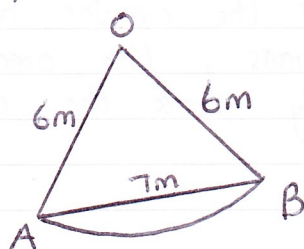
- b) Find the value of r that gives the maximum sector area. Find this maximum area and the corresponding value of θ .

- 3) The pendulum of a grandfather clock is 0.75m long and swings in a circular arc. It takes 1 second to swing from one end of the arc to the other and the 'weight' on the end moves 0.65m. What angle does it sweep out in 1 second

- 4) Calculate the area shaded



- 5) Calculate the perimeter of the sector AOB.



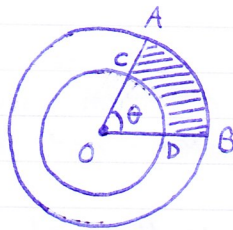
- 6) A chord of length 4cm divides a circle of radius 3.3cm into two segments.
Find the ratio

Area of small segment : Area of large segment

- 7) The diagram shows two concentric circles with common centre O . The radius of the larger circle is R cm. The radius of the smaller circle is r cm. The points A and B lie on the larger circle and are such that $\angle AOB = \theta$ rads. The smaller circle cuts OA and OB at C and D respectively.

The length of the arc AB is L cm greater than the length of the arc CD .

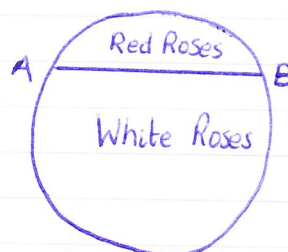
The area of the shaded region is K cm².



- Write down an expression for L in terms of R , r and θ
- Write down an expression for K in terms of R , r and θ
- Hence show that

$$r = \frac{2K}{L} - R$$

- 8) A circular rose bed is divided up into two regions as shown



AB is a plank placed across the circular flower bed of radius r m. If O is the centre of the circular bed, show that when $\angle AOB$ is 2.6 radians, the area of the white rose segment is approximately twice the area containing red roses.