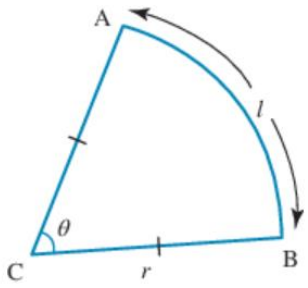
Lesson 7 Homework

8. **WE12** The total surface area of a closed cylinder is $200\,\text{cm}^2$. The base radius is $r\,\text{cm}$ and the height is $h\,\text{cm}$.
   a. Express h in terms of r.
   b. Show that the volume, $V\,\text{cm}^3$, is $V = 100r - \pi r^3$.
   c. Hence, show that for maximum volume the height must equal the diameter of the base.
   d. Calculate, to the nearest integer, the minimum volume if $2 \leq r \leq 4$.

Hint: Use surface area formula on your formula sheet

Refer to the last question of the lesson if you're stuck.

10. A section of a rose garden is enclosed by edging to form the shape of a sector ABC of radius r metres and arc length l metres. The perimeter of this section of the garden is 8 metres.



   a. If θ is the angle in radian measure subtended by the arc at C, express θ in terms of r.
   b. The formula for the area of a sector is $A_{\text{sector}} = \frac{1}{2}r^2\theta$. Express the area of a sector in terms of r.
   c. Calculate the value of θ when the area is greatest.

Hint: Perimeter = 8m

Arc length: $l = r \times \theta$

Perimeter: $P = l + r + r$

For B: substitute theta with what you found in A