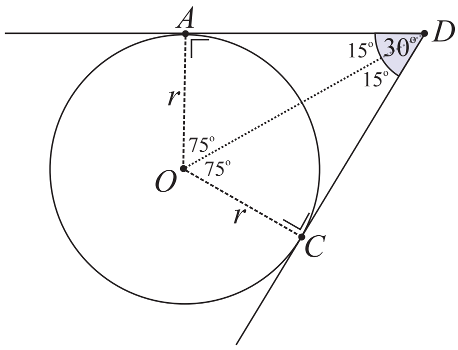
Sample Paper 5: Paper 2

Question 3 (25 marks)

Question 3 (a)



Draw radii from the centre of the circle *O*, to points of contact *A* and *C*. *OA* and *OC* are perpendicular to tangents *AD* and *CD* respectively.
Triangles *ADO* and *DOC* are congruent (RHS) because:

$|AO| = |OC| = r$

$|OD| = |OD|$ [Common side]

$|\angle OAD| = |\angle OCD|$ [Right angle]

0Therefore, the minor angle *AOC* at the centre of the circle is 150°.

Minor arc $|AC| = 2\pi(8)\left(\frac{150^\circ}{360^\circ}\right) = 20.9$ cm

$l = 2\pi r\left(\frac{\theta}{360^\circ}\right)$

Question 3 (b) (i)

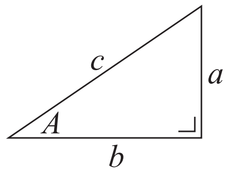
$|BC|^2 + 5^2 = 13^2$

$|BC|^2 + 25 = 169$

$|BC|^2 = 169 - 25 = 144$

$|BC| = \sqrt{144} = 12$

Pythagoras



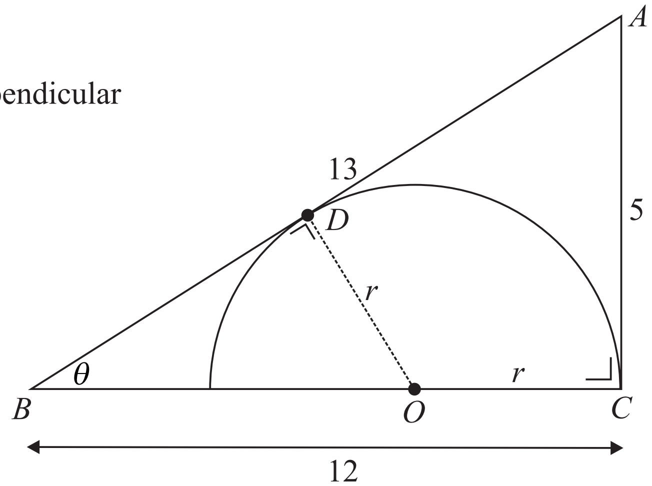
$\sin A = \frac{a}{c}$

$c^2 = a^2 + b^2$

Question 3 (b) (ii)

Consider the right-angled triangle *ABC*:

$\sin\theta = \frac{|AC|}{|AB|} = \frac{5}{13}$



Consider the right-angled triangle *BDO*:
$|\angle BDO| = 90^\circ$ because the radius *OD* is perpendicular to tangent *AB* at the point of contact *D*.

$\sin\theta = \frac{|DO|}{|BO|} = \frac{r}{12-r} = \frac{5}{13}$

$\therefore 13r = 5(12 - r)$

$13r = 60 - 5r$

$18r = 60$

$\therefore r = \frac{60}{18} = \frac{10}{3}$