



In the diagram, AB is an arc of a circle with centre O and radius r . The line XB is a tangent to the circle at B and A is the mid-point of OX .

- (i) Show that angle $AOB = \frac{1}{3}\pi$ radians. [2]

Express each of the following in terms of r , π and $\sqrt{3}$:

- (ii) the perimeter of the shaded region, [3]
 (iii) the area of the shaded region. [2]