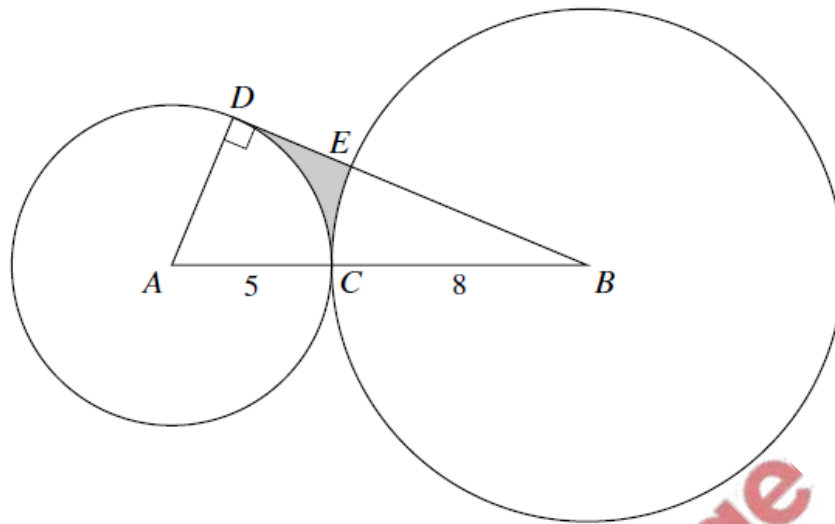**1.** March/2022/Paper_9709/12/No.10

The diagram shows a circle with centre A of radius 5 cm and a circle with centre B of radius 8 cm. The circles touch at the point C so that ACB is a straight line. The tangent at the point D on the smaller circle intersects the larger circle at E and passes through B.

(a) Find the perimeter of the shaded region. [5]

(b) Find the area of the shaded region. [3]
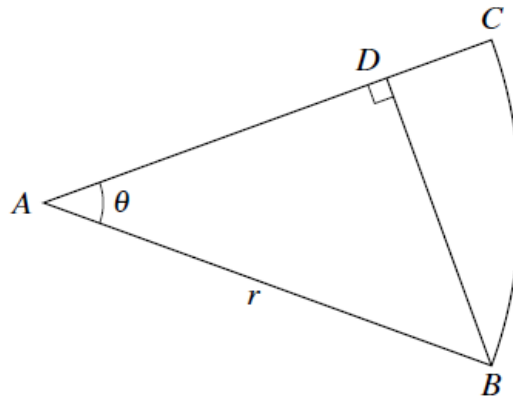
The diagram shows a sector ABC of a circle with centre A and radius r. The line BD is perpendicular to AC. Angle CAB is θ radians.

(a) Given that $\theta = \frac{1}{6}\pi$, find the exact area of BCD in terms of r. [3]

(b) Given instead that the length of BD is $\dfrac{\sqrt{3}}{2}r$, find the exact perimeter of BCD in terms of r.   [4]
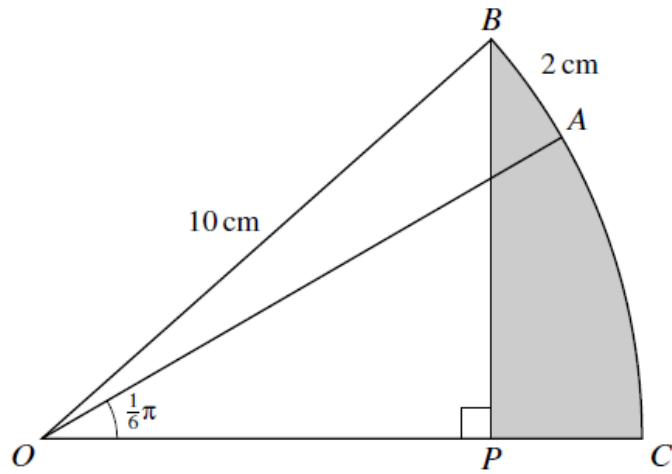
The diagram shows a sector $OBAC$ of a circle with centre O and radius $10\,cm$. The point P lies on OC and BP is perpendicular to OC. Angle $AOC = \frac{1}{6}\pi$ and the length of the arc AB is $2\,cm$.

(a) Find the angle BOC. [2]

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(b) Hence find the area of the shaded region *BPC* giving your answer correct to 3 significant figures.

[4]

The diagram shows triangle ABC with $AB = BC = 6\,\text{cm}$ and angle $ABC = 1.8$ radians. The arc CD is part of a circle with centre A and ABD is a straight line.

(a) Find the perimeter of the shaded region. [5]

(b) Find the area of the shaded region. [3]

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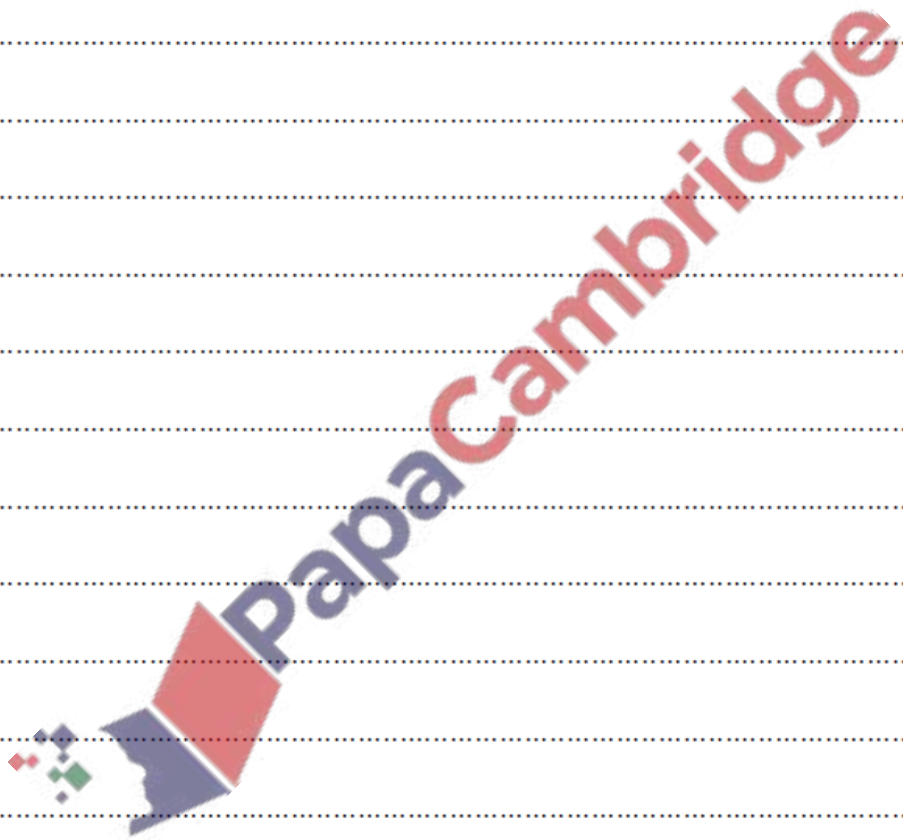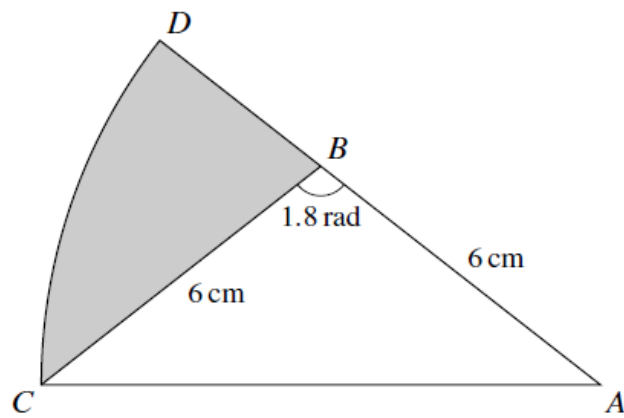
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