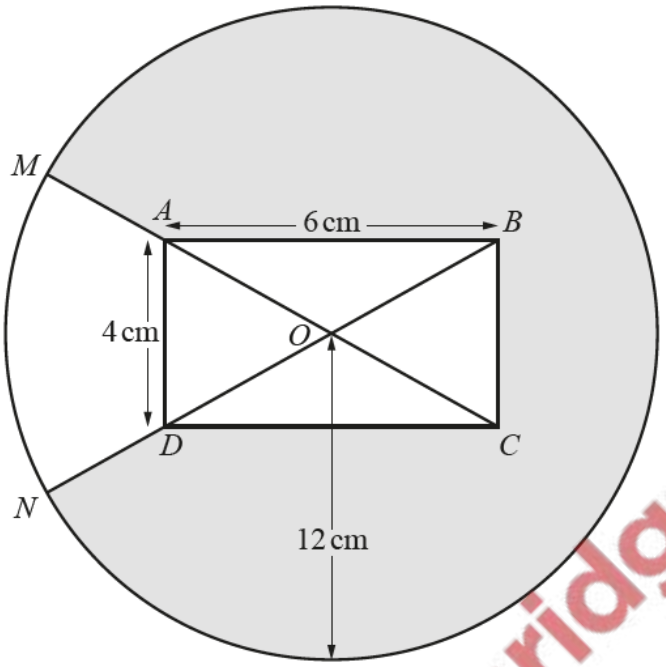
Circular measure – 2021 O Level Additional Math

1. Nov/2021/Paper_12/No.9



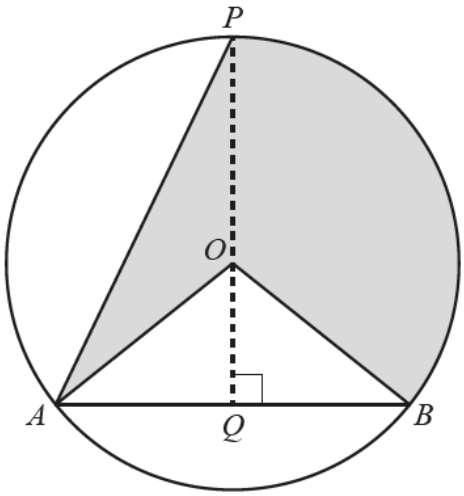
The diagram shows a circle, centre O, radius 12 cm, and a rectangle $ABCD$. The diagonals AC and BD intersect at O. The sides AB and AD of the rectangle have lengths 6 cm and 4 cm respectively. The points M and N lie on the circumference of the circle such that MAC and NDB are straight lines.

(a) Show that angle AOD is 1.176 radians correct to 3 decimal places. [2]

(b) Find the perimeter of the shaded region. [4]

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

2. Nov/2021/Paper_13/No.7



The diagram shows a circle, centre O, radius 10 cm. The points A, B and P lie on the circumference of the circle. The chord AB is of length 14 cm. The point Q lies on AB and the line POQ is perpendicular to AB.

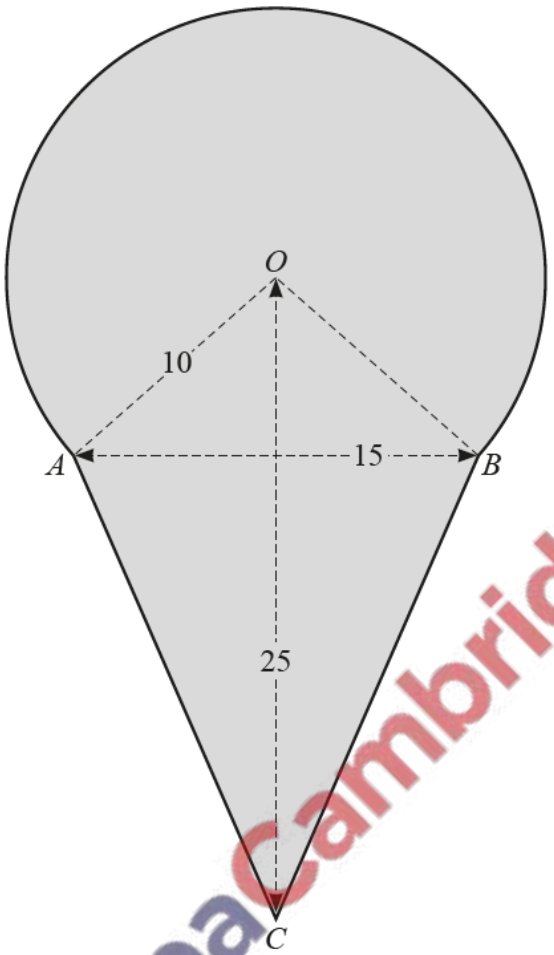
(a) Show that angle POA is 2.366 radians, correct to 3 decimal places. [2]

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

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

3. June/2021/Paper_11/No.10

In this question all lengths are in centimetres.



The diagram shows a shaded shape. The arc AB is the major arc of a circle, centre O, radius 10. The line AB is of length 15, the line OC is of length 25 and the lengths of AC and BC are equal.

(a) Show that the angle AOB is 1.70 radians correct to 2 decimal places. [2]

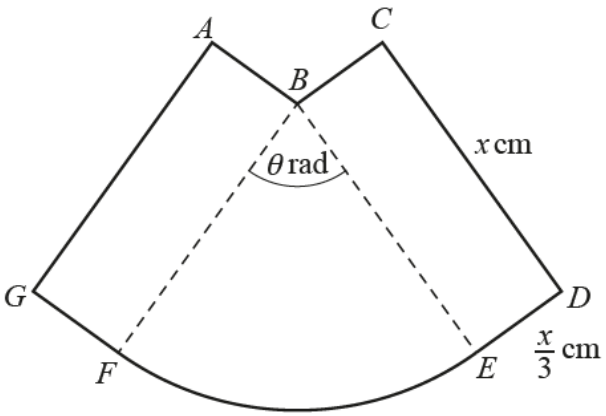
(b) Find the perimeter of the shaded shape. [4]

(c) Find the area of the shaded shape. [5]

(b) Given that angle $BCD = \theta$ radians, find the value of $\cot\theta$ in the form $c + d\sqrt{3}$, where c and d are integers. [3]

(c) Using your answer to **part (b)**, find the value of $\text{cosec}^2\theta$ in the form $e + f\sqrt{3}$, where e and f are integers. [2]

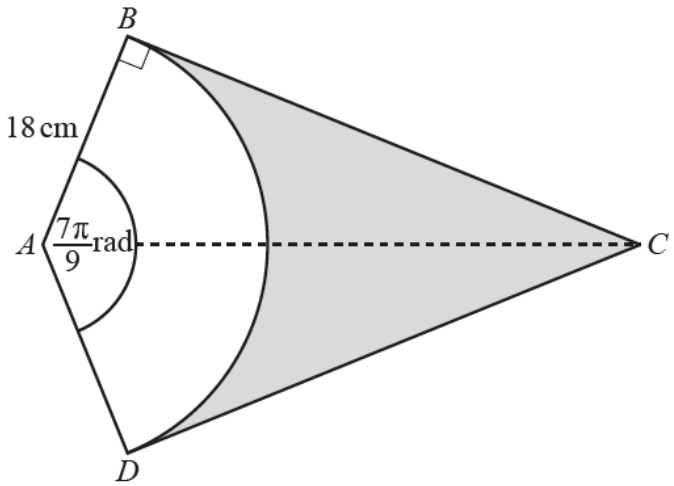
5. June/2021/Paper_14/No.10



The diagram shows the figure $ABCDEFG$, where $ABFG$ and $BCDE$ are rectangles of length x cm and width $\frac{x}{3}$ cm. The sector BFE of the circle, centre B, radius x cm, has an angle of θ radians. It is given that the area of BFE is $2\,\text{cm}^2$.

(a) Show that the perimeter, P cm, of the figure $ABCDEFG$ is given by $P = \frac{10x}{3} + \frac{4}{x}$. [5]

6. June/2021/Paper_22/No.7



DAB is a sector of a circle, centre *A*, radius 18 cm. The lines *CB* and *CD* are tangents to the circle. Angle *DAB* is $\frac{7\pi}{9}$ radians.

(a) Find the perimeter of the shaded region. [3]

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