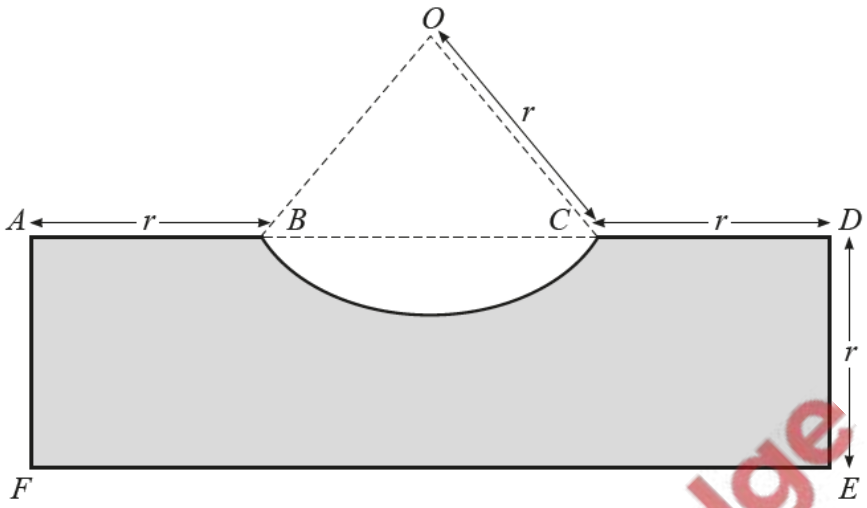
Circular measure – 2020 O Level Additional Math

1. Nov/2020/Paper_12/No.11

In this question all lengths are in centimetres and all angles are in radians.



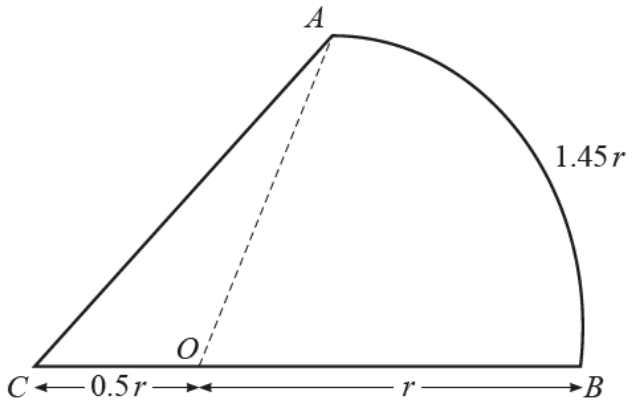
The diagram shows the rectangle $ADEF$, where $AF = DE = r$. The points B and C lie on AD such that $AB = CD = r$. The curve BC is an arc of the circle, centre O, radius r and has a length of $1.5r$.

(a) Show that the perimeter of the shaded region is $(7.5 + 2\sin 0.75)r$. [5]

(b) Find the area of the shaded region, giving your answer in the form kr^2, where k is a constant correct to 2 decimal places. [4]

2. Nov/2020/Paper_13/No.8

In this question all lengths are in centimetres.



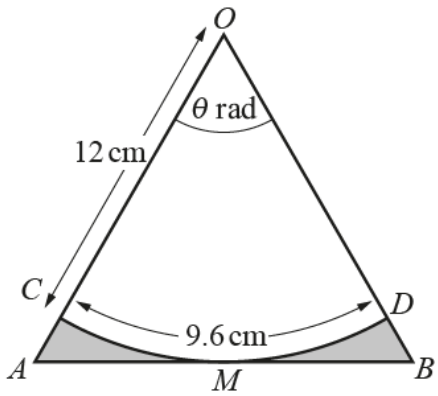
The diagram shows the figure ABC. The arc AB is part of a circle, centre O, radius r, and is of length $1.45r$. The point O lies on the straight line CB such that $CO = 0.5r$.

(a) Find, in radians, the angle AOB. [1]

(b) Find the area of ABC, giving your answer in the form kr^2, where k is a constant. [3]

(c) Given that the perimeter of ABC is 12 cm, find the value of r. [4]

3. June/2020/Paper_11/No.7



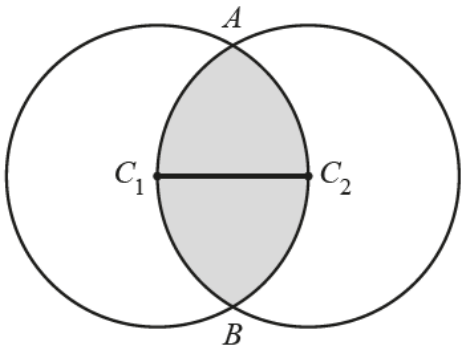
The diagram shows an isosceles triangle OAB such that $OA = OB$ and angle $AOB = \theta$ radians. The points C and D lie on OA and OB respectively. CD is an arc of length 9.6 cm of the circle, centre O, radius 12 cm. The arc CD touches the line AB at the point M.

(a) Find the value of θ. [1]

(b) Find the total area of the shaded regions. [4]

(c) Find the total perimeter of the shaded regions. [3]

4. June/2020/Paper_22/No.11



The circles with centres C_1 and C_2 have equal radii of length r cm. The line C_1C_2 is a radius of both circles. The two circles intersect at A and B.

(a) Given that the perimeter of the shaded region is 4π cm, find the value of r. [4]

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