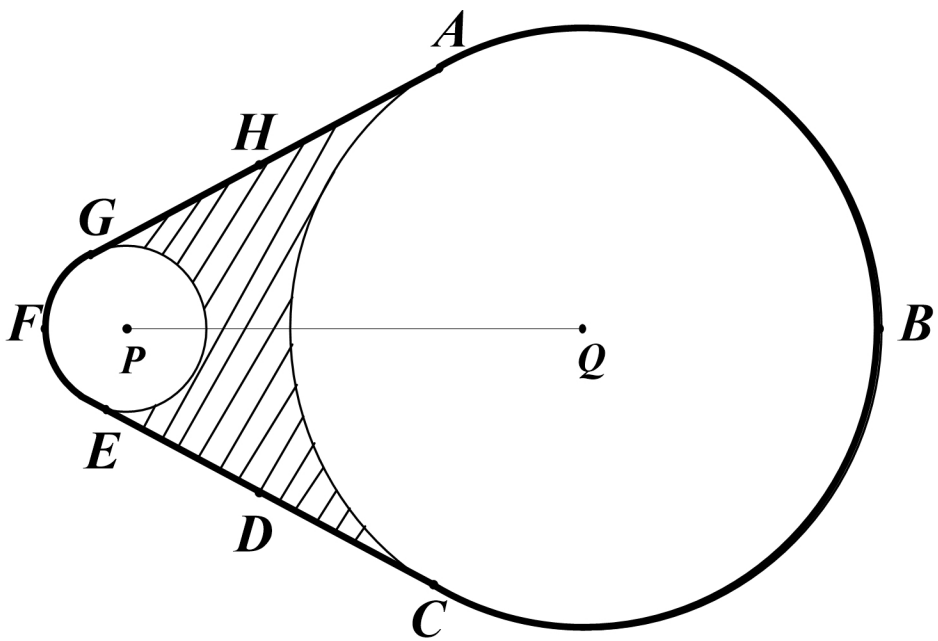


Topic: Circular Measure

Question 1 [2009 S4 EOY, Q21]	marks
A pulley system in a car comprises two circular discs with circumferences 28π cm and 8π cm respectively. The two discs are bound tightly by a belt ABCDEFGHA and their centres P and Q are 20 cm apart.  (i) Show that angle AQP is $\frac{\pi}{3}$ radians.	[2]
(ii) Find the length of the belt ABC in contact with the bigger disc.	[3]

(iii)

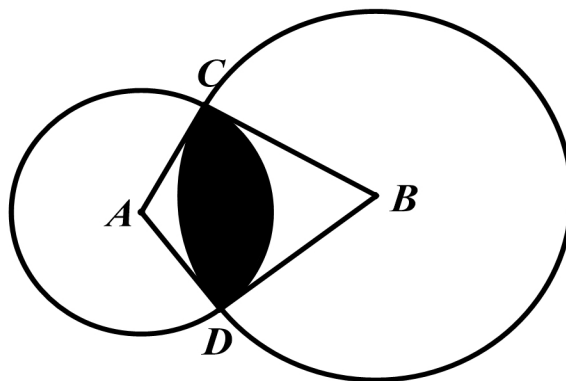
Find the area of the shaded region.

[4]

Question 2 [2010 S4 EOY, Q16]

marks

The diagram shows two circles with centres A and B , intersecting at points C and D . The radii of the circles are 8 cm and 12 cm respectively, and angle $ACB = \text{angle } ADB = \frac{\pi}{2}$ radians.



(i)

Show that angle CBD is approximately 1.18 radians.

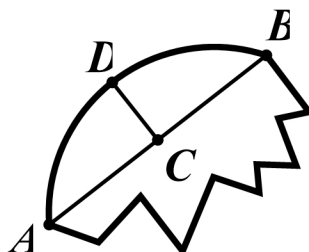
[2]

The shaded region is bounded by minor arcs CD with centres A and B respectively. (ii) Find the perimeter of the shaded region.	[3]
(iii) Find the area of the shaded region.	[5]

Question 3 [2011 S4 EOY, Q8]

marks

During a school field trip, Jane discovered a broken circular plate, as shown in the diagram below, from a deserted historical site. She measured the length of the chord AB as 14 cm and from C , the mid-point of AB , she measured the length CD as 1 cm where D is the point on the circumference nearest to C .



Find

(i)

the radius of the plate,

[3]

(ii)

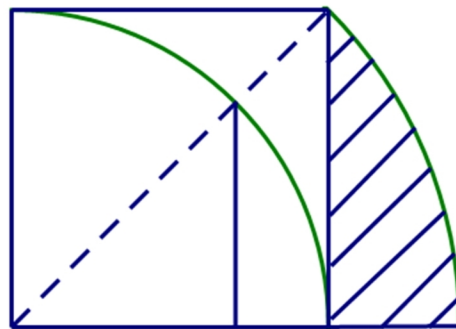
the area of the segment ADB .

[4]

Question 4 [2012 S4 EOY, Q9]

marks

The diagram shows a quadrant inscribed in the square $ABCD$ of sides 6 cm. ACE is a sector centred at A . F is the point of intersection of the diagonal AC and the arc DB . FG is perpendicular to AE .



Find

(i)

the area of the shaded region BCE ,

[3]

(ii)

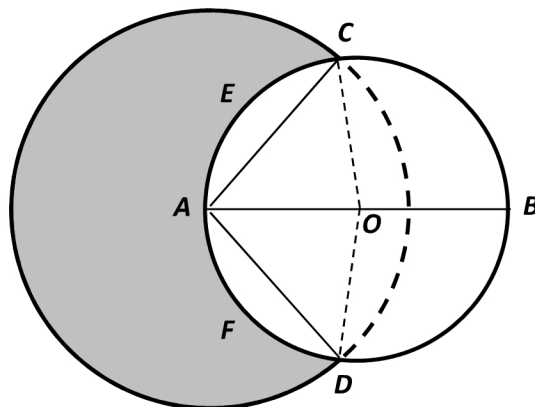
the perimeter of $FGBE CF$.

[4]

Question 5 [2013 S4 EOY, Q15]

marks

Two circles are such that A is the centre of the bigger circle and AB is the diameter of the smaller circle. The radius of the bigger circle is 7 cm and the diameter AB is of length 10 cm. Points C and D are the intersection of the two circles and O is the centre of the smaller circle.



(i)

Show that $\cos \angle CAO$ is $\frac{7}{10}$.

[2]

(ii)

Find the area of the minor segment ACE .

[3]

(iii)

Find the area of the shaded crescent.

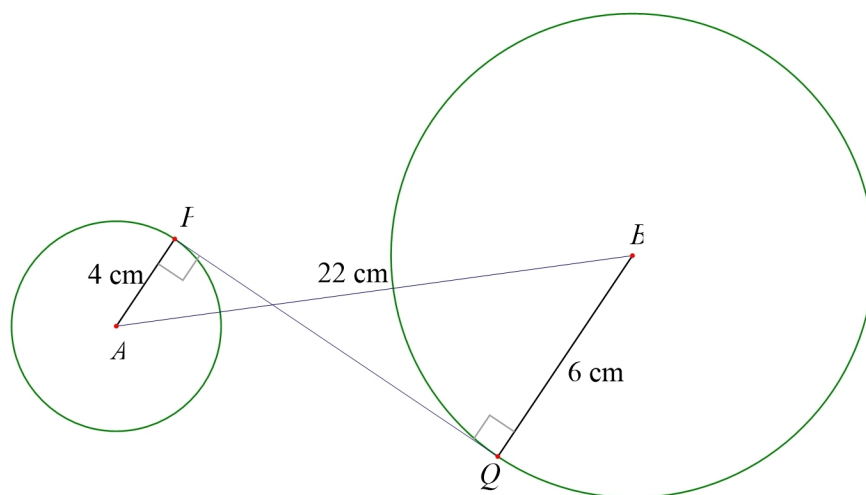
[3]

Question 6 [2014 S4 EOY, Q6]

marks

The diagram shows two circles, circle A , with radius $AP = 4$ cm and circle B , with radius $BQ = 6$ cm having a common internal tangent PQ . If the distance between A and B is 22 cm, find PQ .

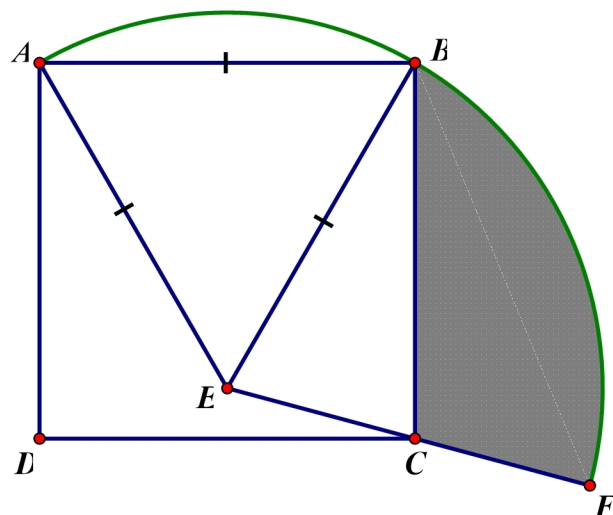
[3]



Question 7 [2015 S4 EOY, Q9]

marks

The diagram shows a square $ABCD$ of length 2 cm and an equilateral triangle ABE . An arc ABF is drawn with radius AE and centre at E . Points E , C and F lie on a straight line.



(i)

Show that $\angle BEC = \frac{5}{12}\pi$ radians.

[2]

(ii)

Find the length of line segment CE ,

[2]

(iii) Find the perimeter of the shaded region,	[2]
(iv) Find the area of the shaded region, leave your answer in the form $a\pi + b$, where a and b are constants to be determined.	[3]