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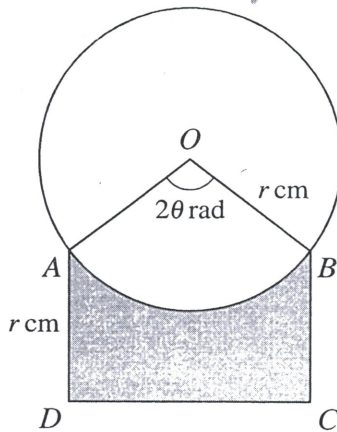
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Pure Mathematics-1

TOPIC- Circular Measure

CIRCULAR MEASURE

01



The diagram shows a circle with radius r cm and centre O . Points A and B lie on the circle and $ABCD$ is a rectangle. Angle $AOB = 2\theta$ radians and $AD = r$ cm.

- (i) Express the perimeter of the shaded region in terms of r and θ . [3]

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- (ii) In the case where $r = 5$ and $\theta = \frac{1}{6}\pi$, find the area of the shaded region. [4]

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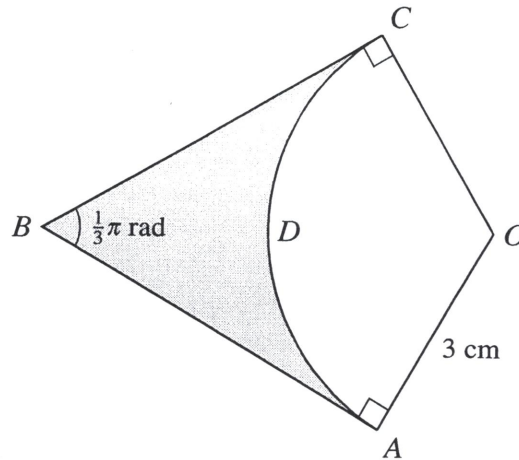
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8-17-12-CM-AL

8-17-12-CM-A

CIRCULAR MEASURE

2



In the diagram, $OADC$ is a sector of a circle with centre O and radius 3 cm. AB and CB are tangents to the circle and angle $ABC = \frac{1}{3}\pi$ radians. Find, giving your answer in terms of $\sqrt{3}$ and π ,

- (i) the perimeter of the shaded region,
(ii) the area of the shaded region.

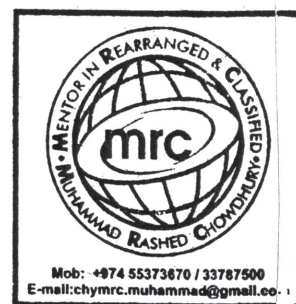
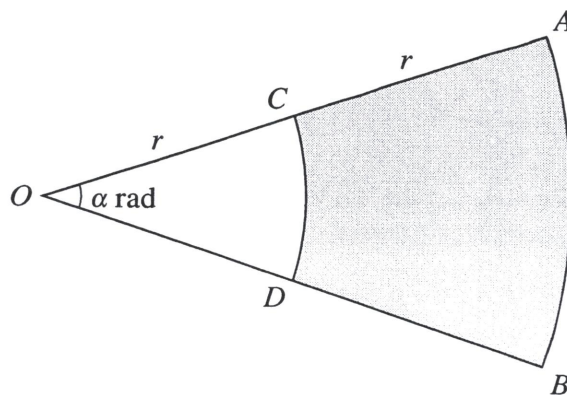
N-14-13-21

[3]

[3]

CIRCULAR MEASURE

3



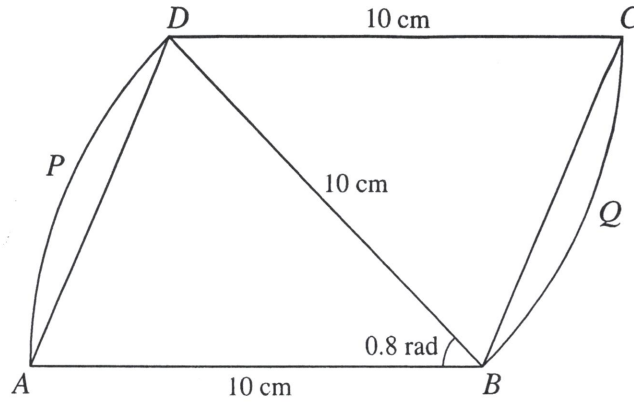
T-16-11-CM

In the diagram OCA and ODB are radii of a circle with centre O and radius $2r$ cm. Angle $AOB = \alpha$ radians. CD and AB are arcs of circles with centre O and radii r cm and $2r$ cm respectively. The perimeter of the shaded region $ABDC$ is $4.4r$ cm.

- (i) Find the value of α . [2]
- (ii) It is given that the area of the shaded region is 30 cm^2 . Find the value of r . [3]

CIRCULAR MEASURE

4

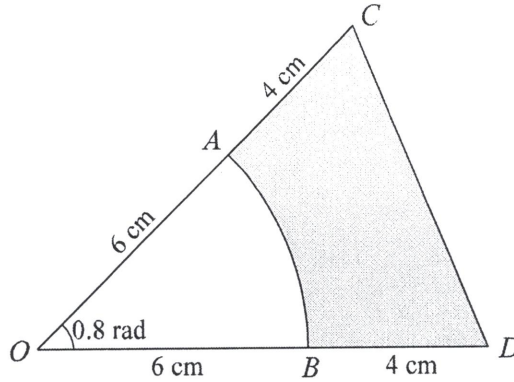


In the diagram, $ABCD$ is a parallelogram with $AB = BD = DC = 10$ cm and angle $ABD = 0.8$ radians. APD and BQC are arcs of circles with centres B and D respectively.

- (i) Find the area of the parallelogram $ABCD$. [2]
- (ii) Find the area of the complete figure $ABQCDP$. [2]
- (iii) Find the perimeter of the complete figure $ABQCDP$. [2]

CIRCULAR MEASURE

5



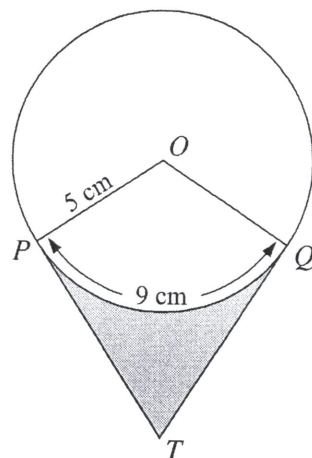
In the diagram, OCD is an isosceles triangle with $OC = OD = 10$ cm and angle $COD = 0.8$ radians. The points A and B , on OC and OD respectively, are joined by an arc of a circle with centre O and radius 6 cm. Find

J-4

- (i) the area of the shaded region, [3]
- (ii) the perimeter of the shaded region. [4]

CIRCULAR MEASURE

6

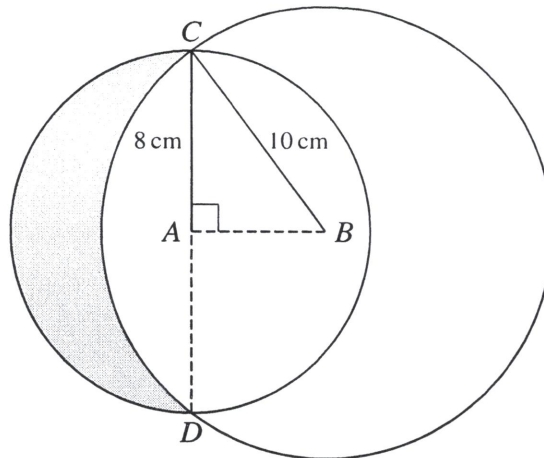


In the diagram, the circle has centre O and radius 5 cm. The points P and Q lie on the circle, and the arc length PQ is 9 cm. The tangents to the circle at P and Q meet at the point T . Calculate

- (i) angle POQ in radians, N-8-(6) [2]
- (ii) the length of PT , [3]
- (iii) the area of the shaded region. [3]

CIRCULAR MEASURE

7



The diagram shows two circles with centres A and B having radii 8 cm and 10 cm respectively. The two circles intersect at C and D where CAD is a straight line and AB is perpendicular to CD .

Q-17-13-CM

- (i) Find angle ABC in radians. [1]

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- (ii) Find the area of the shaded region. [6]

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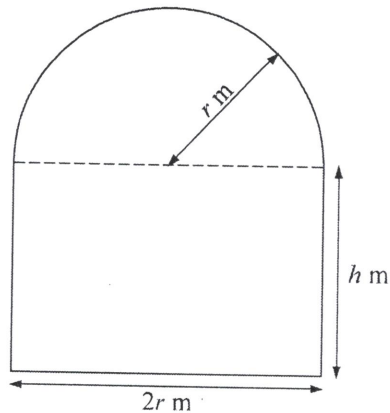
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CIRCULAR MEASURE-ARC LENGTH

8



The diagram shows a glass window consisting of a rectangle of height h m and width $2r$ m and a semicircle of radius r m. The perimeter of the window is 8 m.

J-4

(i) Express h in terms of r .

[2]

(ii) Show that the area of the window, A m², is given by

$$A = 8r - 2r^2 - \frac{1}{2}\pi r^2.$$

[2]

Given that r can vary,

(iii) find the value of r for which A has a stationary value,

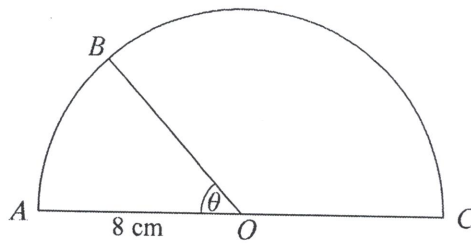
[4]

(iv) determine whether this stationary value is a maximum or a minimum.

[2]

CIRCULAR MEASURE-ARC LENGTH

9



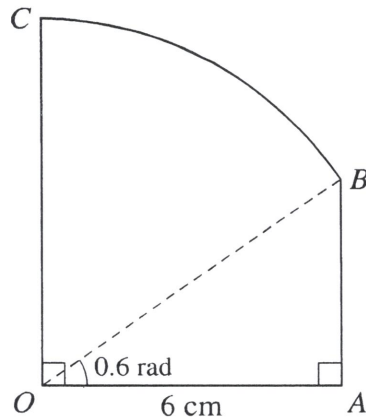
The diagram shows a semicircle ABC with centre O and radius 8 cm. Angle $AOB = \theta$ radians.

- (i) In the case where $\theta = 1$, calculate the area of the sector BOC . [3]
- (ii) Find the value of θ for which the perimeter of sector AOB is one half of the perimeter of sector BOC . [3]
- (iii) In the case where $\theta = \frac{1}{3}\pi$, show that the exact length of the perimeter of triangle ABC is $(24 + 8\sqrt{3})$ cm. [3]

J-3

CIRCULAR MEASURE

10



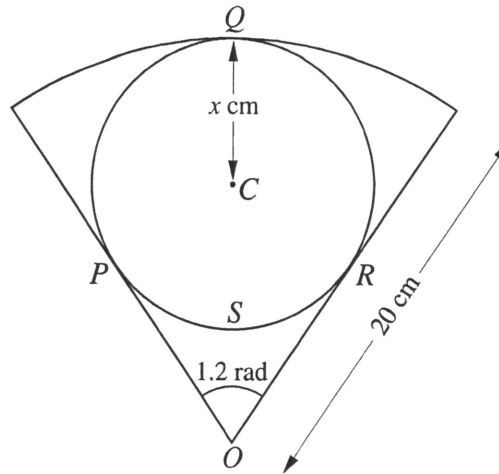
The diagram shows a metal plate $OABC$, consisting of a right-angled triangle OAB and a sector OBC of a circle with centre O . Angle $AOB = 0.6$ radians, $OA = 6$ cm and OA is perpendicular to OC .

- (i) Show that the length of OB is 7.270 cm, correct to 3 decimal places. [1]
- (ii) Find the perimeter of the metal plate. [3]
- (iii) Find the area of the metal plate. [3]

T-15-12-CP

CIRCULAR MEASURE

11

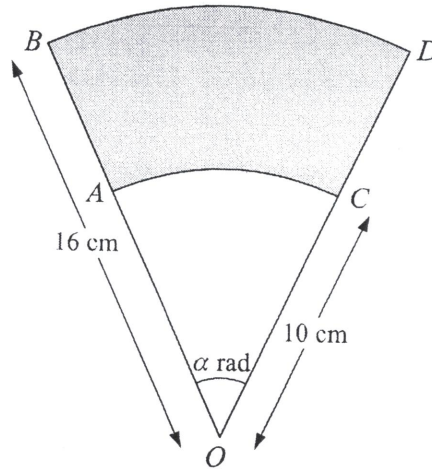


The diagram shows a sector of a circle with centre O and radius 20 cm. A circle with centre C and radius x cm lies within the sector and touches it at P , Q and R . Angle $POR = 1.2$ radians.

- N 12-12 (11)*
- (i) Show that $x = 7.218$, correct to 3 decimal places. [4]
 - (ii) Find the total area of the three parts of the sector lying outside the circle with centre C . [2]
 - (iii) Find the perimeter of the region $OPSR$ bounded by the arc PSR and the lines OP and OR . [4]

CIRCULAR MEASURE-ARC LENGTH

12



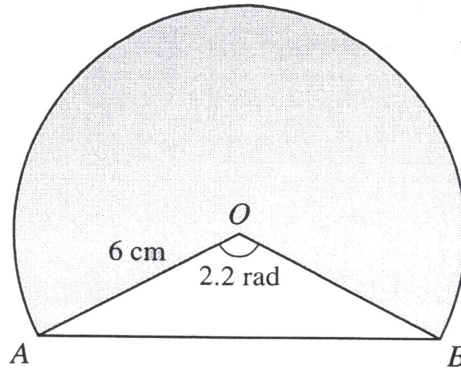
In the diagram, OAB and OCD are radii of a circle, centre O and radius 16 cm. Angle $AOC = \alpha$ radians. AC and BD are arcs of circles, centre O and radii 10 cm and 16 cm respectively.

- (i) In the case where $\alpha = 0.8$, find the area of the shaded region. [2]
- (ii) Find the value of α for which the perimeter of the shaded region is 28.9 cm. [3]

N-5

CIRCULAR MEASURE

13



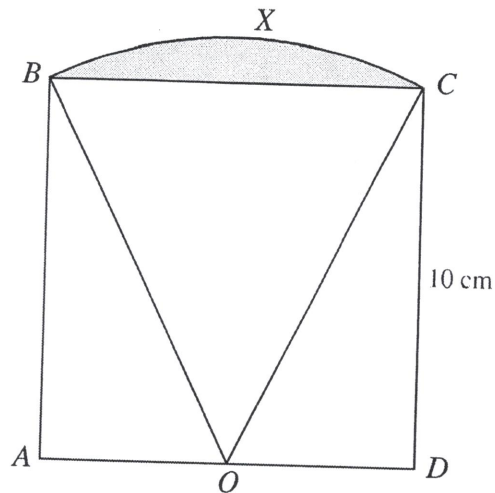
The diagram shows part of a circle with centre O and radius 6 cm . The chord AB is such that angle $AOB = 2.2$ radians. Calculate

$\sqrt{14-13-3}$

- (i) the perimeter of the shaded region, [3]
- (ii) the ratio of the area of the shaded region to the area of the triangle AOB , giving your answer in the form $k : 1$. [3]

CIRCULAR MEASURE

14



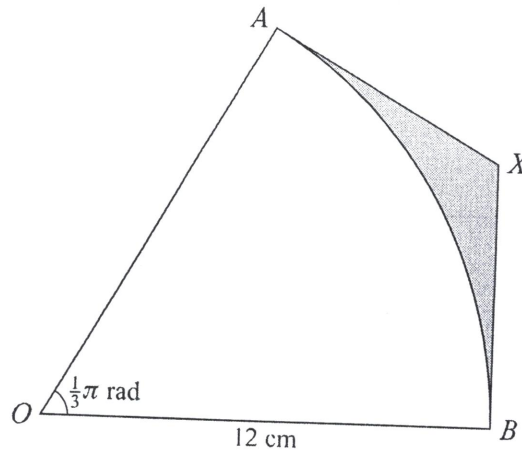
The diagram shows a square $ABCD$ of side 10 cm. The mid-point of AD is O and BXC is an arc of a circle with centre O .

$\approx 1\frac{1}{2} - 124$

- (i) Show that angle BOC is 0.9273 radians, correct to 4 decimal places. [2]
- (ii) Find the perimeter of the shaded region. [3]
- (iii) Find the area of the shaded region. [2]

CIRCULAR MEASURE-AREA OF SECTOR

15



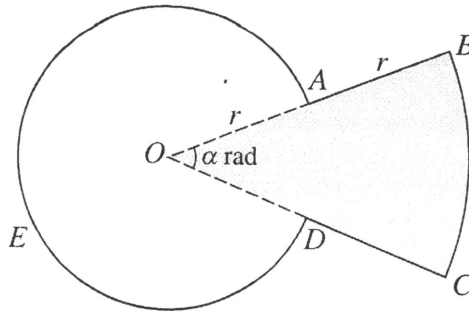
In the diagram, OAB is a sector of a circle with centre O and radius 12 cm . The lines AX and BX are tangents to the circle at A and B respectively. Angle $AOB = \frac{1}{3}\pi$ radians.

7-7-(5)

- (i) Find the exact length of AX , giving your answer in terms of $\sqrt{3}$. [2]
- (ii) Find the area of the shaded region, giving your answer in terms of π and $\sqrt{3}$. [3]

CIRCULAR MEASURE

16



The diagram shows a metal plate made by fixing together two pieces, **OABCD** (shaded) and **OAED** (unshaded). The piece **OABCD** is a minor sector of a circle with centre **O** and radius $2r$. The piece **OAED** is a major sector of a circle with centre **O** and radius r . Angle **AOD** is α radians. Simplifying your answers where possible, find, in terms of α , π and r ,

N-13-11-61

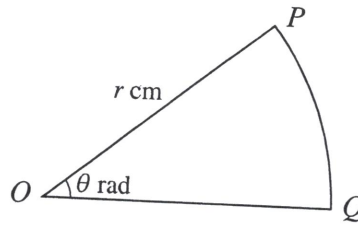
- (i) the perimeter of the metal plate, [3]
- (ii) the area of the metal plate. [3]

It is now given that the shaded and unshaded pieces are equal in area.

- (iii) Find α in terms of π . [2]

CIRCULAR MEASURE

17



A piece of wire of length 50 cm is bent to form the perimeter of a sector POQ of a circle. The radius of the circle is r cm and the angle POQ is θ radians (see diagram). N-9-12-(7)

- (i) Express θ in terms of r and show that the area, A cm², of the sector is given by

$$A = 25r - r^2.$$

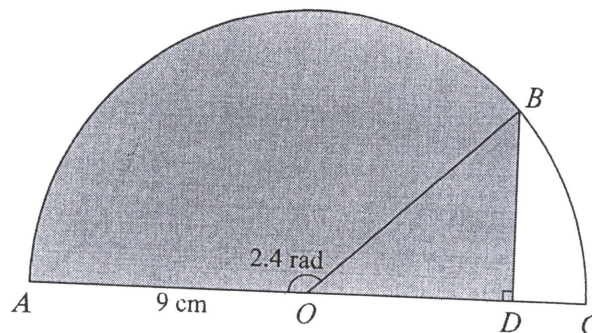
[4]

- (ii) Given that r can vary, find the stationary value of A and determine its nature.

[4]

CIRCULAR MEASURE-ARC LENGTH

18



In the diagram, ABC is a semicircle, centre O and radius 9 cm. The line BD is perpendicular to the diameter AC and angle $AOB = 2.4$ radians.

- (i) Show that $BD = 6.08$ cm, correct to 3 significant figures.
- (ii) Find the perimeter of the shaded region.
- (iii) Find the area of the shaded region.

J-5

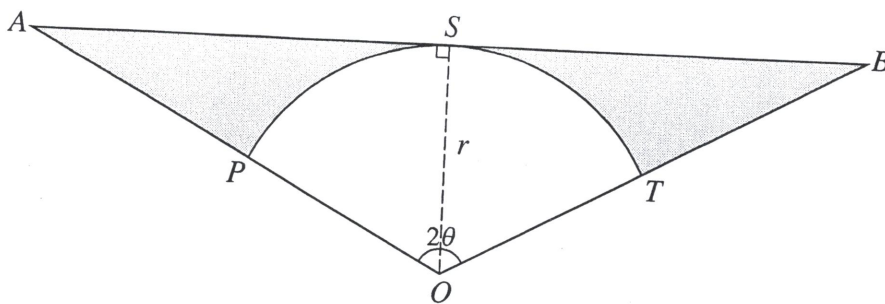
[2]

[3]

[3]

CIRCULAR MEASURE

19



In the diagram, OAB is an isosceles triangle with $OA = OB$ and angle $AOB = 2\theta$ radians. Arc PST has centre O and radius r , and the line ASB is a tangent to the arc PST at S .

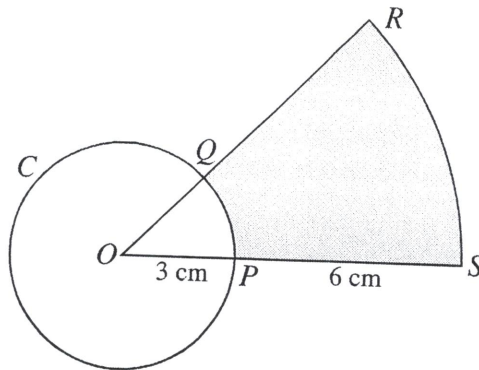
- (i) Find the total area of the shaded regions in terms of r and θ . [4]
- (ii) In the case where $\theta = \frac{1}{3}\pi$ and $r = 6$, find the total perimeter of the shaded regions, leaving your answer in terms of $\sqrt{3}$ and π . [5]

J-11-11-9



CIRCULAR MEASURE

20



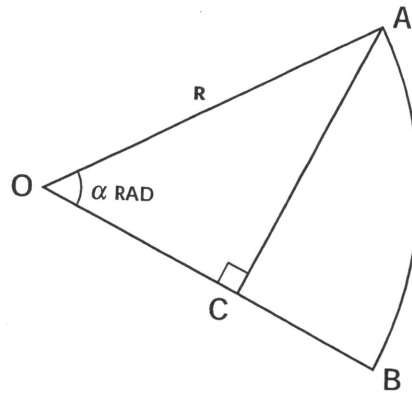
The diagram shows a circle C with centre O and radius 3 cm. The radii OP and OQ are extended to S and R respectively so that ORS is a sector of a circle with centre O . Given that $PS = 6$ cm and that the area of the shaded region is equal to the area of circle C ,

J-13-13-(2)

- (i) show that angle $POQ = \frac{1}{4}\pi$ radians, [3]
- (ii) find the perimeter of the shaded region. [2]

CIRCULAR MEASURE

2.1



In the diagram, OAB is a sector of a circle with centre O and radius r . The point C on OB is such that angle ACO is a right angle. Angle AOB is α radians and is such that AC divides the sector into two regions of equal area.

7-15-13-11

(i) Show that $\sin \alpha \cos \alpha = \frac{1}{2}\alpha$.

[4]

It is given that the solution of the equation in part (i) is $\alpha = 0.9477$, correct to 4 decimal places.

(ii) Find the ratio

perimeter of region OAC : perimeter of region ACB ,

giving your answer in the form $k : 1$, where k is given correct to 1 decimal place.

[5]

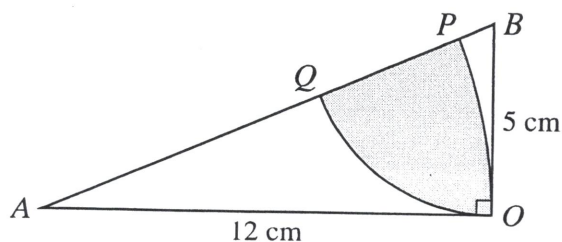
(iii) Find angle AOB in degrees.

[1]

8-15-13-CM

CIRCULAR MEASURE

22



The diagram shows a triangle AOB in which OA is 12 cm, OB is 5 cm and angle AOB is a right angle. Point P lies on AB and OP is an arc of a circle with centre A . Point Q lies on AB and OQ is an arc of a circle with centre B .

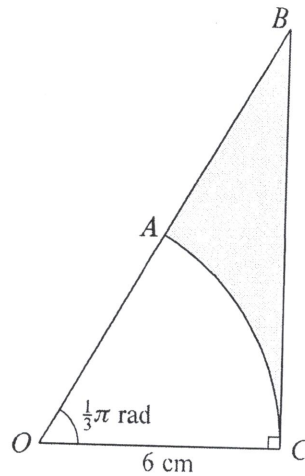
N-14-12-21

- (i) Show that angle BAO is 0.3948 radians, correct to 4 decimal places. [1]
- (ii) Calculate the area of the shaded region. [5]

CIRCULAR MEASURE-ARC LENGTH

23

N-4-3

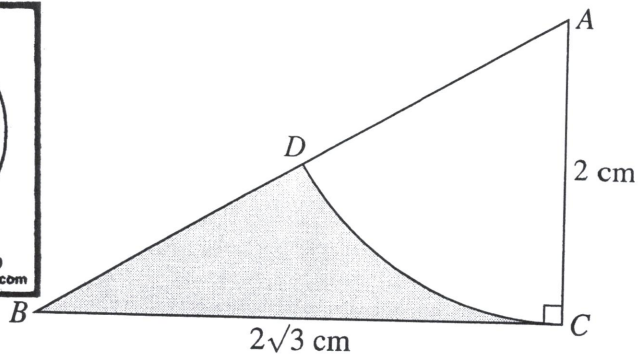


In the diagram, AC is an arc of a circle, centre O and radius 6 cm. The line BC is perpendicular to OC and OAB is a straight line. Angle $AOC = \frac{1}{3}\pi$ radians. Find the area of the shaded region, giving your answer in terms of π and $\sqrt{3}$.

N-4 [5]

CIRCULAR MEASURE

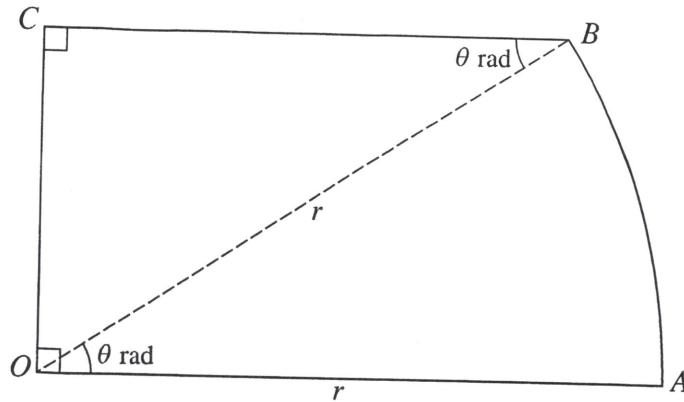
24



In the diagram, D lies on the side AB of triangle ABC and CD is an arc of a circle with centre A and radius 2 cm. The line BC is of length $2\sqrt{3}$ cm and is perpendicular to AC . Find the area of the shaded region BDC , giving your answer in terms of π and $\sqrt{3}$. N-12-13-4 [4]

CIRCULAR MEASURE

25



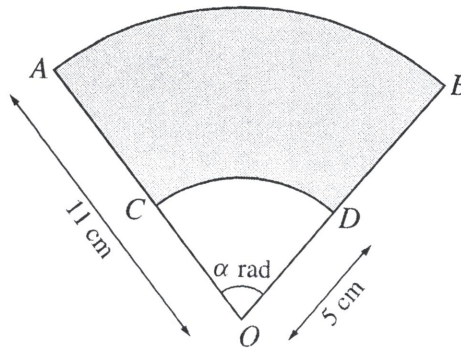
The diagram represents a metal plate $OABC$, consisting of a sector OAB of a circle with centre O and radius r , together with a triangle OCB which is right-angled at C . Angle $AOB = \theta$ radians and OC is perpendicular to OA .

N-11-11-(5)

- (i) Find an expression in terms of r and θ for the perimeter of the plate. [3]
- (ii) For the case where $r = 10$ and $\theta = \frac{1}{5}\pi$, find the area of the plate. [3]

CIRCULAR MEASURE

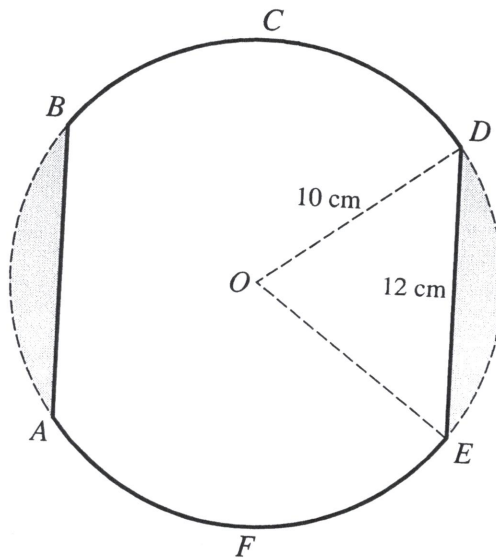
26



The diagram shows sector OAB with centre O and radius 11 cm. Angle $AOB = \alpha$ radians. Points C and D lie on OA and OB respectively. Arc CD has centre O and radius 5 cm.

- (i) The area of the shaded region $ABDC$ is equal to k times the area of the unshaded region OCD . Find k . [3]
- (ii) The perimeter of the shaded region $ABDC$ is equal to twice the perimeter of the unshaded region OCD . Find the exact value of α . [4]

N-13-13-(C)

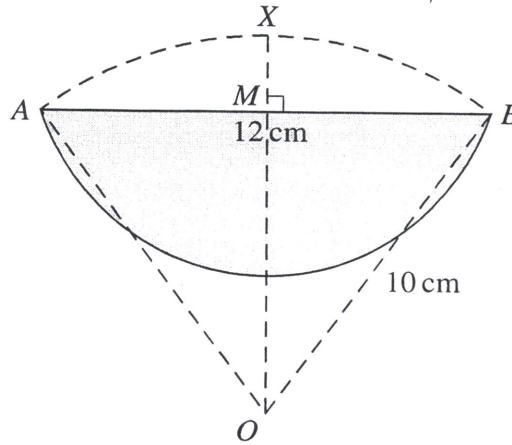


The diagram shows a metal plate $ABCDEF$ which has been made by removing the two shaded regions from a circle of radius 10 cm and centre O . The parallel edges AB and ED are both of length 12 cm.

- (i) Show that angle DOE is 1.287 radians, correct to 4 significant figures. ✓ 10-13-(7) [2]
- (ii) Find the perimeter of the metal plate. [3]
- (iii) Find the area of the metal plate. [3]

CIRCULAR MEASURE

28



8-17-11 CM

In the diagram, $OAXB$ is a sector of a circle with centre O and radius 10 cm . The length of the chord AB is 12 cm . The line OX passes through M , the mid-point of AB , and OX is perpendicular to AB . The shaded region is bounded by the chord AB and by the arc of a circle with centre X and radius XA .

- (i) Show that angle AXB is 2.498 radians, correct to 3 decimal places. [3]

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

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

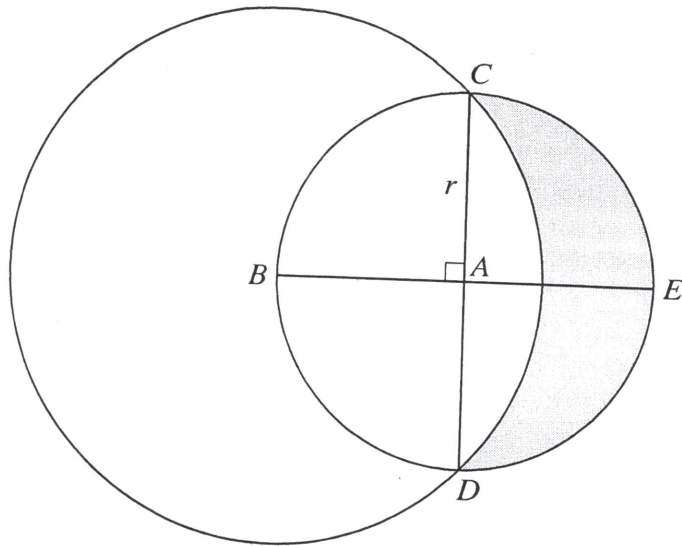
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CIRCULAR MEASURE

29



The diagram shows a circle with centre A and radius r . Diameters CAD and BAE are perpendicular to each other. A larger circle has centre B and passes through C and D .

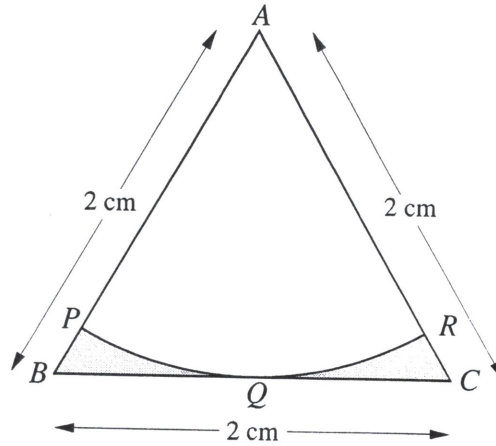
- (i) Show that the radius of the larger circle is $r\sqrt{2}$. [1]
- (ii) Find the area of the shaded region in terms of r . [6]

F-15-11- CM

CIRCULAR MEASURE

30

7-12-11



In the diagram, ABC is an equilateral triangle of side 2 cm. The mid-point of BC is Q . An arc of a circle with centre A touches BC at Q , and meets AB at P and AC at R . Find the total area of the shaded regions, giving your answer in terms of π and $\sqrt{3}$.

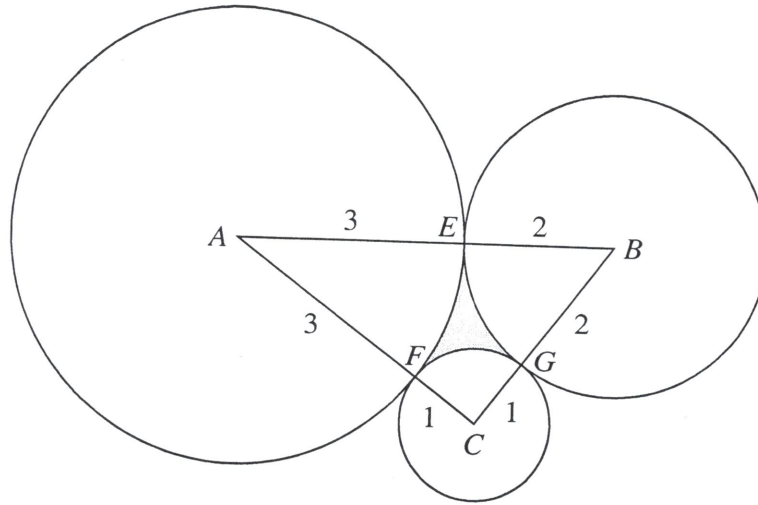
7-12-11-131

[5]

CIRCULAR MEASURE

31

2-16-13 CM



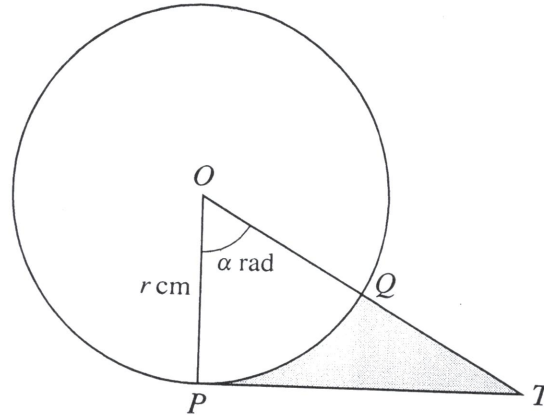
The diagram shows triangle ABC where $AB = 5$ cm, $AC = 4$ cm and $BC = 3$ cm. Three circles with centres at A , B and C have radii 3 cm, 2 cm and 1 cm respectively. The circles touch each other at points E , F and G , lying on AB , AC and BC respectively. Find the area of the shaded region EFG .

[7]



CIRCULAR MEASURE

32



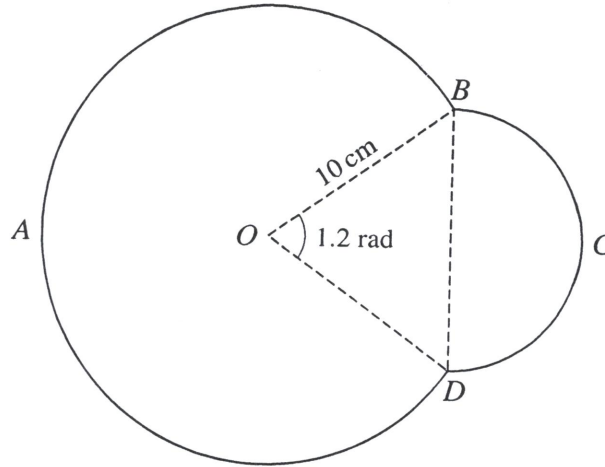
The diagram shows a circle with radius r cm and centre O . The line PT is the tangent to the circle at P and angle $POT = \alpha$ radians. The line OT meets the circle at Q .

- (i) Express the perimeter of the shaded region PQT in terms of r and α . [3]
- (ii) In the case where $\alpha = \frac{1}{3}\pi$ and $r = 10$, find the area of the shaded region correct to 2 significant figures. [3]

CIRCULAR MEASURE

33

F-16-12-CM

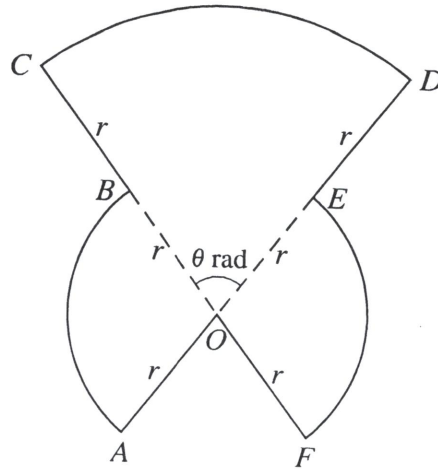


The diagram shows a metal plate $ABCD$ made from two parts. The part BCD is a semicircle. The part DAB is a segment of a circle with centre O and radius 10 cm. Angle BOD is 1.2 radians.

- (i) Show that the radius of the semicircle is 5.646 cm, correct to 3 decimal places. [2]
- (ii) Find the perimeter of the metal plate. [3]
- (iii) Find the area of the metal plate. [3]

CIRCULAR MEASURE

34



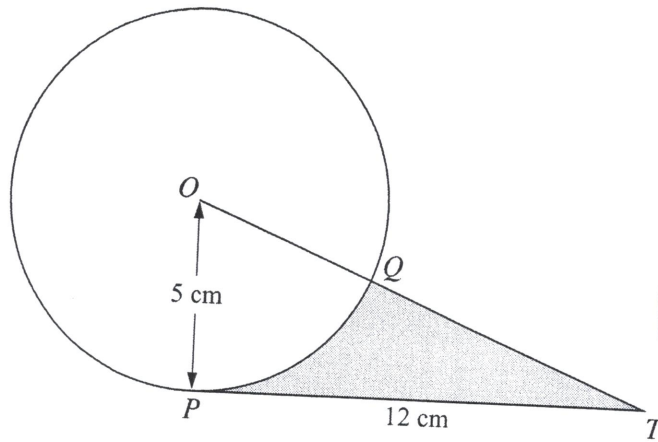
The diagram shows a metal plate $OABCDEF$ consisting of 3 sectors, each with centre O . The radius of sector COD is $2r$ and angle COD is θ radians. The radius of each of the sectors BOA and FOE is r , and $AOED$ and $CBOF$ are straight lines.

- (i) Show that the area of the metal plate is $r^2(\pi + \theta)$. [3]
- (ii) Show that the perimeter of the metal plate is independent of θ . [4]

7-15-18
CM

CIRCULAR MEASURE

35



The diagram shows a circle with centre O and radius 5 cm . The point P lies on the circle, PT is a tangent to the circle and $PT = 12\text{ cm}$. The line OT cuts the circle at the point Q .

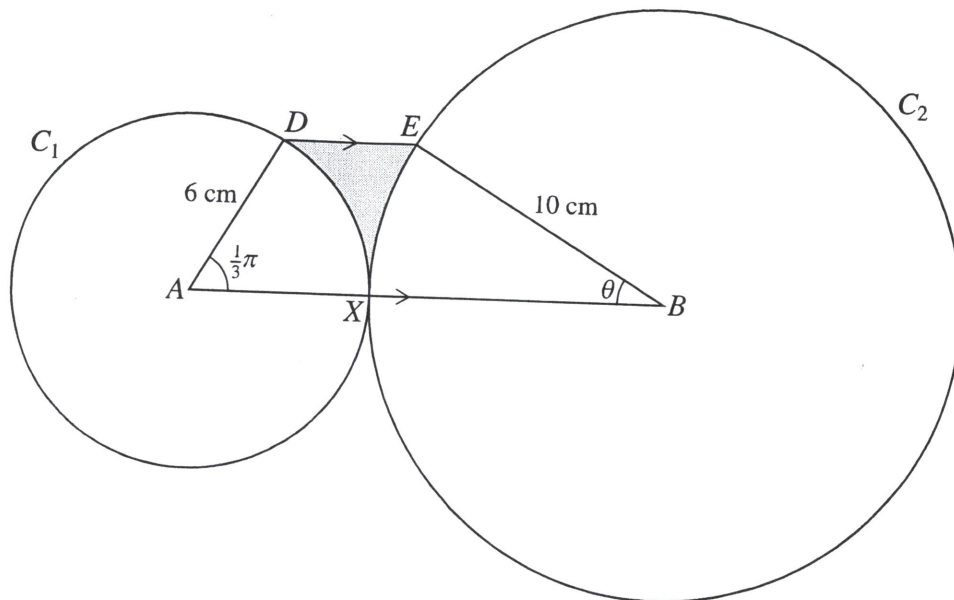
(i) Find the perimeter of the shaded region.

J-Q-(5)

[4]

(ii) Find the area of the shaded region.

[3]



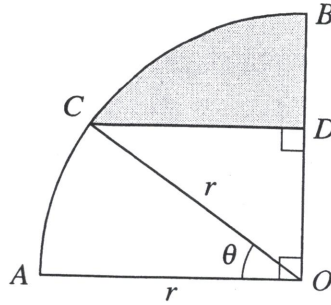
The diagram shows a circle C_1 touching a circle C_2 at a point X . Circle C_1 has centre A and radius 6 cm, and circle C_2 has centre B and radius 10 cm. Points D and E lie on C_1 and C_2 respectively and DE is parallel to AB . Angle $DAX = \frac{1}{3}\pi$ radians and angle $EBX = \theta$ radians. N-11-12-(6)

- (i) By considering the perpendicular distances of D and E from AB , show that the exact value of θ is $\sin^{-1}\left(\frac{3\sqrt{3}}{10}\right)$. [3]
- (ii) Find the perimeter of the shaded region, correct to 4 significant figures. [5]



CIRCULAR MEASURE

37

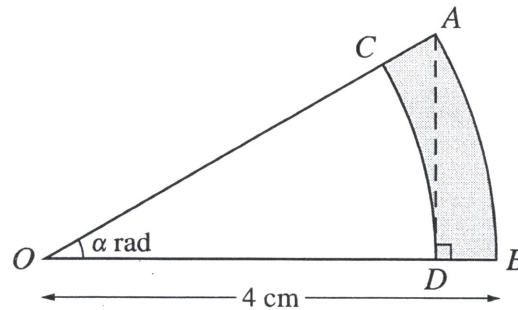


In the diagram, AOB is a quarter circle with centre O and radius r . The point C lies on the arc AB and the point D lies on OB . The line CD is parallel to AO and angle $AOC = \theta$ radians.

- (i) Express the perimeter of the shaded region in terms of r , θ and π . [4]
- (ii) For the case where $r = 5$ cm and $\theta = 0.6$, find the area of the shaded region. [3]

CIRCULAR MEASURE

38

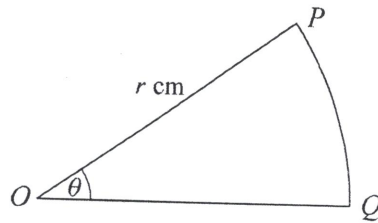


In the diagram, AB is an arc of a circle with centre O and radius 4 cm. Angle AOB is α radians. The point D on OB is such that AD is perpendicular to OB . The arc DC , with centre O , meets OA at C .

- N-14-11-18*
- (i) Find an expression in terms of α for the perimeter of the shaded region $ABDC$. [4]
- (ii) For the case where $\alpha = \frac{1}{6}\pi$, find the area of the shaded region $ABDC$, giving your answer in the form $k\pi$, where k is a constant to be determined. [4]

CIRCULAR MEASURE

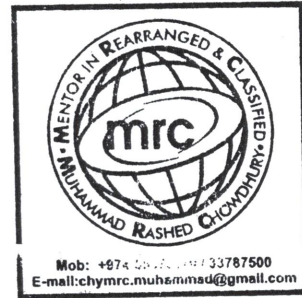
39



The diagram shows the sector OPQ of a circle with centre O and radius r cm. The angle POQ is θ radians and the perimeter of the sector is 20 cm.

N-3

- (i) Show that $\theta = \frac{20}{r} - 2$.
- (ii) Hence express the area of the sector in terms of r .
- (iii) In the case where $r = 8$, find the length of the chord PQ .



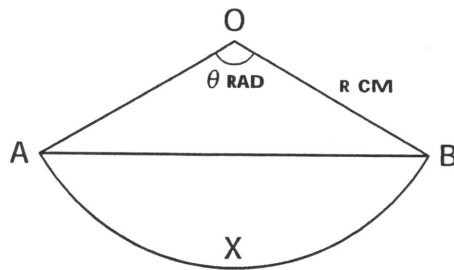
[2]

[2]

[3]

CIRCULAR MEASURE

40

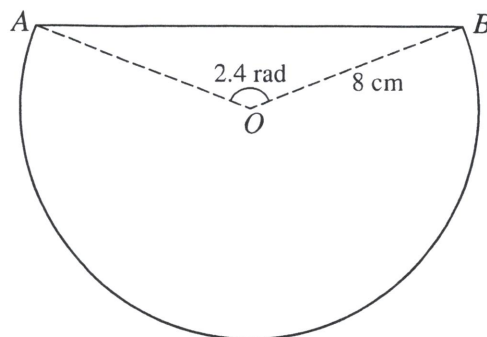


The diagram shows a sector of a circle with radius r cm and centre O . The chord AB divides the sector into a triangle AOB and a segment AXB . Angle AOB is θ radians. $\sim 7-14-12-4$

- (i) In the case where the areas of the triangle AOB and the segment AXB are equal, find the value of the constant p for which $\theta = p \sin \theta$. [2]
- (ii) In the case where $r = 8$ and $\theta = 2.4$, find the perimeter of the segment AXB . [3]

CIRCULAR MEASURE

4 1



The diagram shows a metal plate made by removing a segment from a circle with centre O and radius 8 cm . The line AB is a chord of the circle and angle $AOB = 2.4$ radians. Find

- (i) the length of AB ,
- (ii) the perimeter of the plate,
- (iii) the area of the plate.

J-12-12-(6)

[2]

[3]

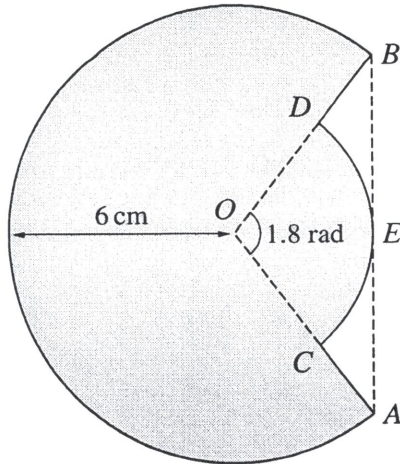
[3]



CIRCULAR MEASURE

42

T-16-13-CM

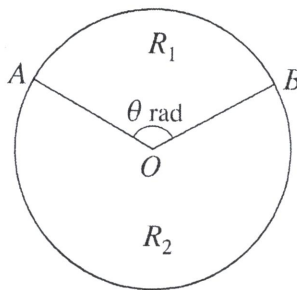


The diagram shows a major arc AB of a circle with centre O and radius 6 cm. Points C and D on OA and OB respectively are such that the line AB is a tangent at E to the arc CED of a smaller circle also with centre O . Angle $COD = 1.8$ radians.

- (i) Show that the radius of the arc CED is 3.73 cm, correct to 3 significant figures. [2]
- (ii) Find the area of the shaded region. [4]

CIRCULAR MEASURE

43



The diagram shows a circle with centre O . The circle is divided into two regions, R_1 and R_2 , by the radii OA and OB , where angle $AOB = \theta$ radians. The perimeter of the region R_1 is equal to the length of the major arc AB .

7-9-(5)

(i) Show that $\theta = \pi - 1$.

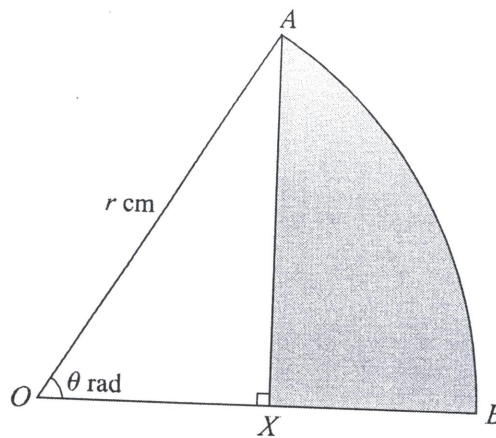
[3]

(ii) Given that the area of region R_1 is 30 cm^2 , find the area of region R_2 , correct to 3 significant figures.

[4]

CIRCULAR MEASURE-AREA OF SECTOR

44



In the diagram, AB is an arc of a circle, centre O and radius r cm, and angle $AOB = \theta$ radians. The point X lies on OB and AX is perpendicular to OB .

- (i) Show that the area, A cm², of the shaded region AXB is given by

N-7-7

$$A = \frac{1}{2}r^2(\theta - \sin \theta \cos \theta).$$

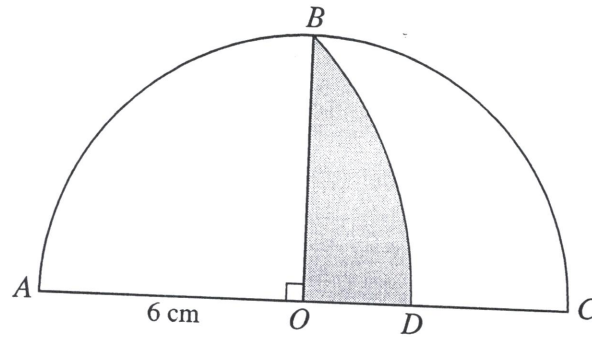
[3]

- (ii) In the case where $r = 12$ and $\theta = \frac{1}{6}\pi$, find the perimeter of the shaded region AXB , leaving your answer in terms of $\sqrt{3}$ and π .

[4]

CIRCULAR MEASURE-AREA OF SECTOR

45



The diagram shows a semicircle ABC with centre O and radius 6 cm. The point B is such that angle BOA is 90° and BD is an arc of a circle with centre A . Find

- (i) the length of the arc BD ,
- (ii) the area of the shaded region.

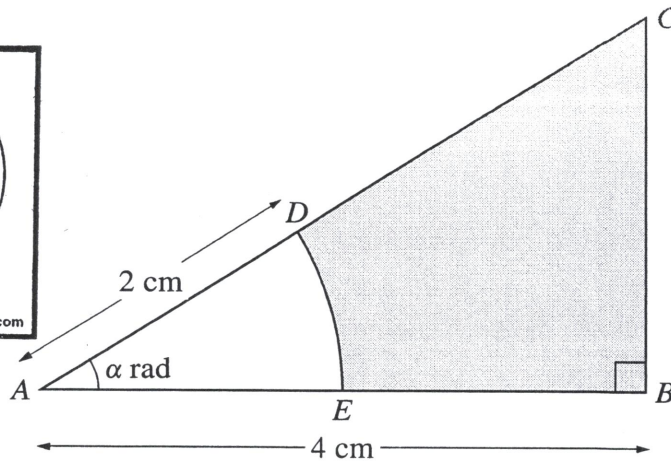
$\sqrt{-9-11-5}$

[4]

[3]

CIRCULAR MEASURE

46



IM

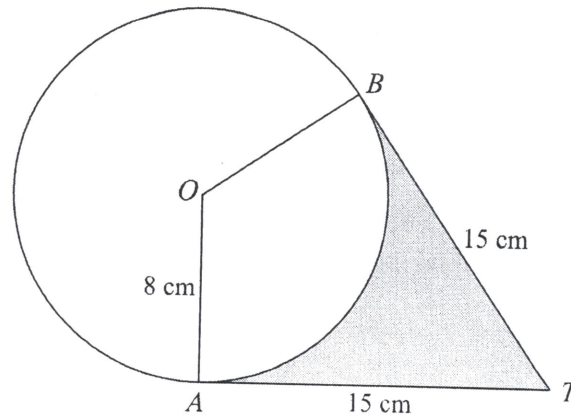
The diagram shows triangle ABC in which AB is perpendicular to BC . The length of AB is 4 cm and angle CAB is α radians. The arc DE with centre A and radius 2 cm meets AC at D and AB at E . Find, in terms of α ,

J-14-11-6

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

CIRCULAR MEASURE-AREA OF SECTOR

47



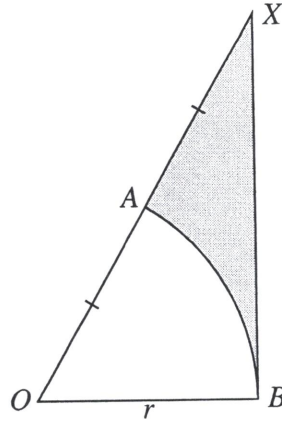
The diagram shows a circle with centre O and radius 8 cm. Points A and B lie on the circle. The tangents at A and B meet at the point T , and $AT = BT = 15$ cm.

J-6

- (i) Show that angle AOB is 2.16 radians, correct to 3 significant figures. [3]
- (ii) Find the perimeter of the shaded region. [2]
- (iii) Find the area of the shaded region. [3]

CIRCULAR MEASURE

48



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 . 7-12-13-18

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

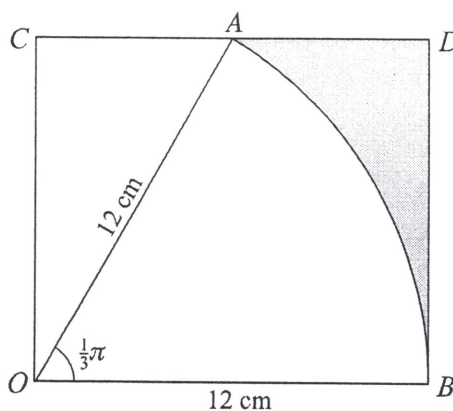
Express each of the following in terms of r , π and $\sqrt{3}$:

(ii) the perimeter of the shaded region, [3]

(iii) the area of the shaded region. [2]

CIRCULAR MEASURE-AREA OF SECTOR

49

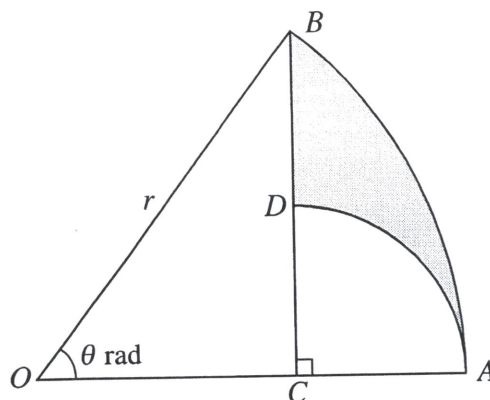


In the diagram, AOB is a sector of a circle with centre O and radius 12 cm. The point A lies on the side CD of the rectangle $OCDB$. Angle $AOB = \frac{1}{3}\pi$ radians. Express the area of the shaded region in the form $a(\sqrt{3}) - b\pi$, stating the values of the integers a and b .

N-6 [6]

CIRCULAR MEASURE

50



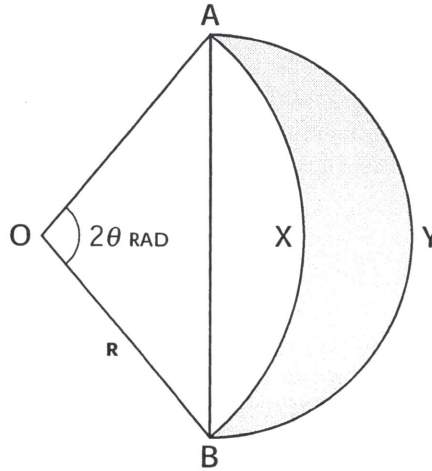
The diagram shows a sector OAB of a circle with centre O and radius r . Angle AOB is θ radians. The point C on OA is such that BC is perpendicular to OA . The point D is on BC and the circular arc AD has centre C .

- N-12-011-6
- (i) Find AC in terms of r and θ . [1]
- (ii) Find the perimeter of the shaded region ABD when $\theta = \frac{1}{3}\pi$ and $r = 4$, giving your answer as an exact value. [6]

CIRCULAR MEASURE

51

31-15-12
CM



In the diagram, **AYB** is a semicircle with **AB** as diameter and **OAXB** is a sector of a circle with centre **O** and radius r . Angle **AOB** = 2θ radians. Find an expression, in terms of r and θ , for the area of the shaded region. [4]

CIRCULAR MEASURE

52

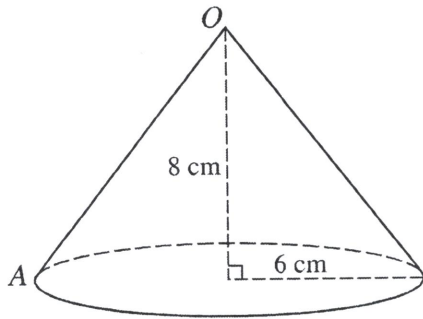


Fig. 1

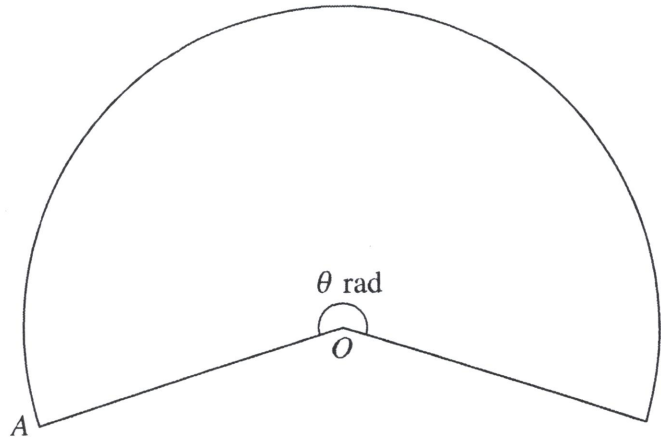


Fig. 2

Fig. 1 shows a hollow cone with no base, made of paper. The radius of the cone is 6 cm and the height is 8 cm . The paper is cut from A to O and opened out to form the sector shown in Fig. 2. The circular bottom edge of the cone in Fig. 1 becomes the arc of the sector in Fig. 2. The angle of the sector is θ radians. Calculate

$N-13-12-2$

- (i) the value of θ ,
- (ii) the area of paper needed to make the cone.

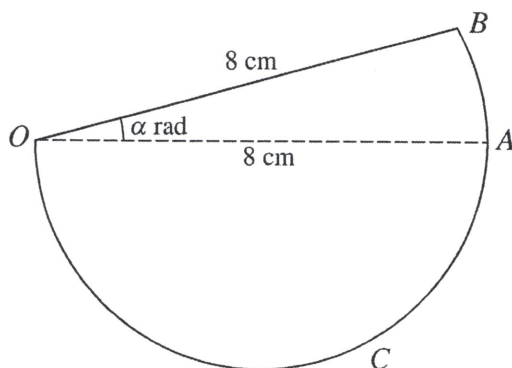
[4]

[2]



CIRCULAR MEASURE

53



In the diagram, OAB is a sector of a circle with centre O and radius 8 cm. Angle BOA is α radians. OAC is a semicircle with diameter OA . The area of the semicircle OAC is twice the area of the sector OAB .

2-13-11-3

- (i) Find α in terms of π . [3]
- (ii) Find the perimeter of the complete figure in terms of π . [2]