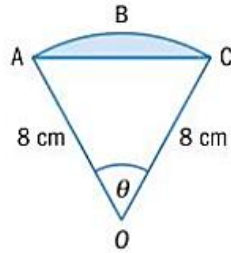
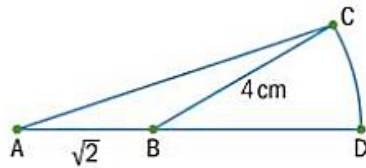


- 13** OABC is a sector of a circle with radius 8 cm.

Find the shaded area when $\theta = \frac{\pi}{6}$

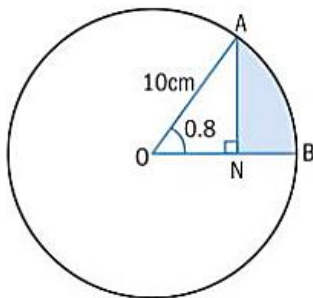


- 14** This diagram shows a triangle ABC and a sector BDC of a circle with centre B and radius 4 cm. The points A, B and D are on the same line and $AB = \sqrt{2}$ cm, $BC = 4$ cm, the area of triangle ABC is 2 cm^2 and angle ABC is obtuse. Find:

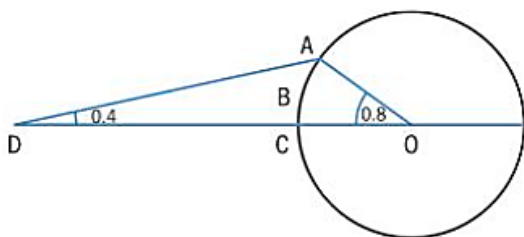


- the angle ABC
- the exact area of the sector BDC.

- 17** This circle has a radius 10 cm with centre O. The points A and B are on the circle, and angle AOB is 0.8 radians. Angle ONA is a right angle. Find the area of the shaded region.

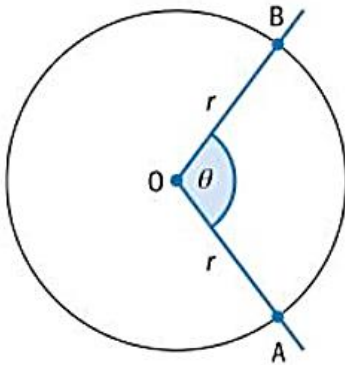


- 18** This circle has centre O and radius 8 cm. The points A , B and C lie on the circle. O , C , and D lie on a straight line. Angle $ADC = 0.4$ radians and angle $AOC = 0.8$ radians. Find:




- a** AD
- b** OD
- c** the area of sector $OABC$
- d** the area of region $ABCD$.

- 28 P1:** The diagram shows a circle with centre O and radius r . The points A and B lie on the circumference of the circle.

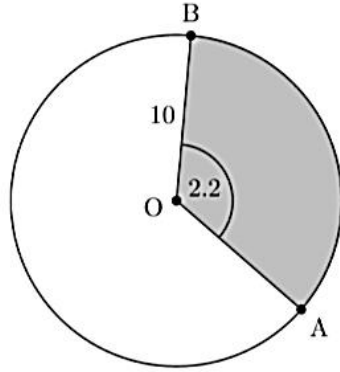


Let $\theta = \widehat{AOB}$.

- a** If $\theta = \frac{2\pi}{3}$ and $r = 2$ cm, state, in terms of π
- the area of the sector AOB
 - the length of the arc AB .
- (2 marks)
- b** Given that the area of the sector AOB is πcm^2 and the length of the arc AB is $\frac{\pi}{3}$ cm, find the exact value of
- r
 - θ .
- (5 marks)

[Maximum mark: 7] 

The following diagram shows a circle with centre O and radius 10 cm.



Points A, B lie on the circle and $\widehat{AOB} = 2.2$ radians.


(a) Find:

- (i) the length of the minor arc AB;
- (ii) the perimeter of the shaded region.

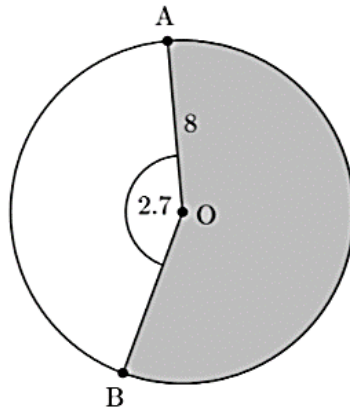
[4]

(b) Find the area of the shaded region.

[3]

[Maximum mark: 7] 

The following diagram shows a circle with centre O and radius 8 cm.



Points A, B lie on the circle and $\widehat{AOB} = 2.7$ radians.


(a) Find:

- (i) the length of the major arc AB;
- (ii) the perimeter of the shaded region.

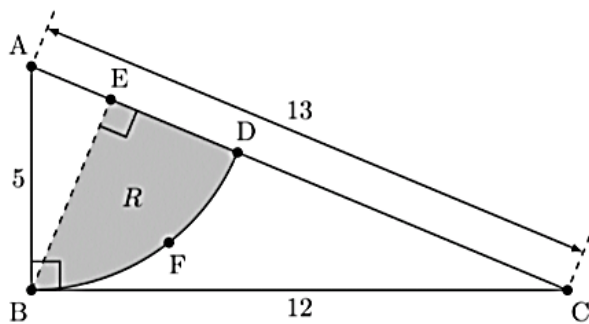
[4]

(b) Find the area of the shaded region.

[3]


[Maximum mark: 6] 

The following diagram shows a right-angled triangle ABC and a sector ABD of a circle with centre A . The point E lies on $[AC]$ such that $[BE]$ is perpendicular to $[AC]$. The region R is bounded by $[DE]$, $[BE]$ and arc BFD .

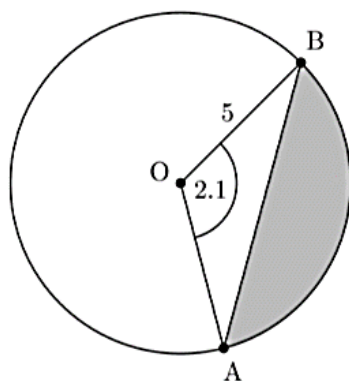


$AB = 5$ cm, $AC = 13$ cm, $BC = 12$ cm.

- (a) Find \hat{BAC} , giving your answer in radians. [2]
 (b) Find the area of R . [4]


[Maximum mark: 7] 

The following diagram shows a circle with centre O and radius 5 cm.

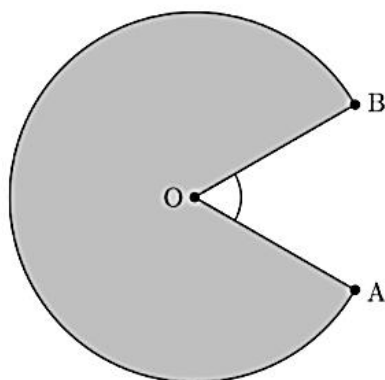


Points A, B lie on the circle and $\hat{AOB} = 2.1$ radians.


- (a) Find the length of:
 (i) minor arc AB ;
 (ii) chord AB . [4]
 (b) Find the area of the shaded region. [3]

[Maximum mark: 5] 

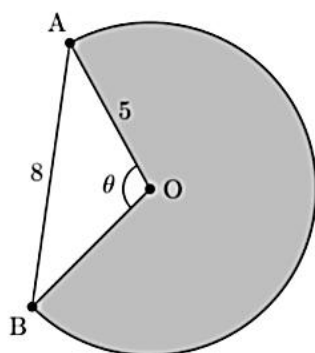
The app logo, for a mobile arcade game, is a sector of a circle of radius 3 cm, shown as shaded in the diagram below. The area of the logo is $6\pi \text{ cm}^2$.



- (a) Find, in radians, the measure of the angle AOB. [3]
- (b) Find the total length of the perimeter of the logo. [2]


[Maximum mark: 6] 

The following diagram shows part of a circle with centre O and radius 5 cm.

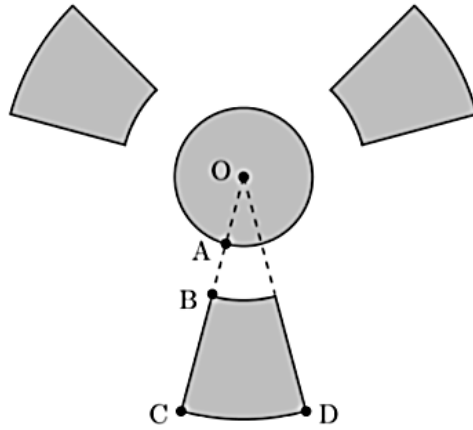


Points A, B lie on the circle, chord AB has a length of 8 cm and $\hat{AOB} = \theta$.


- (a) Find the value of θ , giving your answer in radians. [3]
- (b) Find the area of the shaded region. [3]

[Maximum mark: 5] 

The following diagram shows a radioactivity warning symbol made out of a circle in the centre and three equal blades.

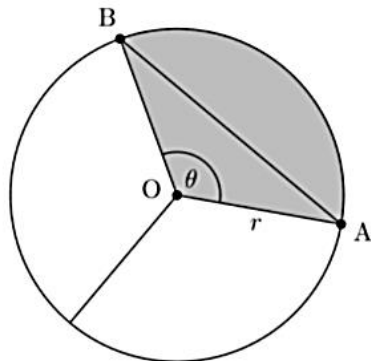


Given that $OA = 2$ cm, $AB = 1$ cm, $BC = 4$ cm, and $\widehat{COD} = 30^\circ$, find the area of the symbol.

[Maximum mark: 8] 

The following diagram shows a circle with centre O and radius r cm.

The circle is divided into three equal sectors.




Points A, B lie on the circle and $\widehat{AOB} = \theta$ radians.

(a) Find the exact value of θ , giving your answer in terms of π . [2]

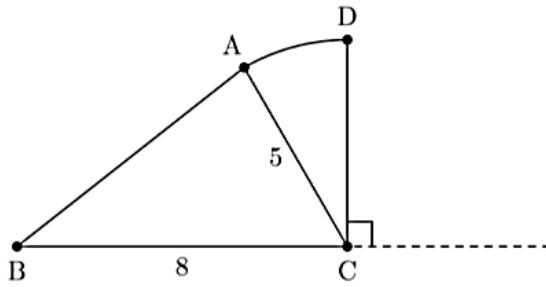
The area of the shaded sector AOB is 3π cm².

(b) Find the radius of the circle, r . [3]

(c) Find the length of the chord AB . [3]


[Maximum mark: 7] 

The following diagram shows triangle ABC and sector ACD of a circle with centre C.

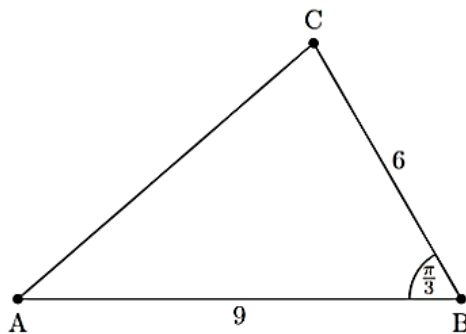


$AC = 5$ cm, $BC = 8$ cm, the area of triangle $ABC = 10\sqrt{3}$ cm².

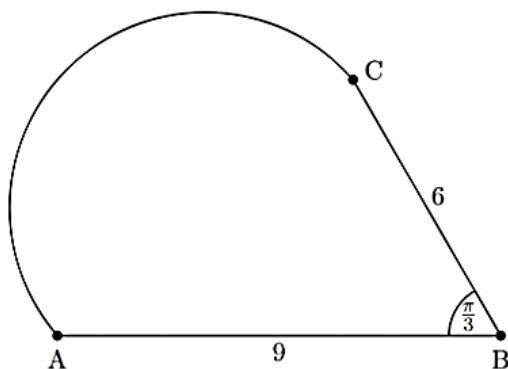
- (a) Find \hat{ACB} . [4]
 (b) Find the exact area of sector ACD. [3]

[Maximum mark: 7] 


The following diagram shows triangle ABC, with $AB = 9$ cm, $BC = 6$ cm, and $\hat{ABC} = \frac{\pi}{3}$.



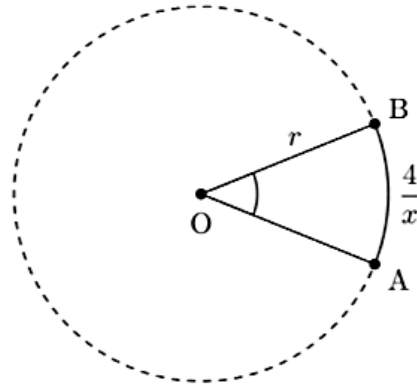
- (a) Show that $AC = 3\sqrt{7}$ cm. [4]
 (b) The shape in the following diagram is formed by adding a semicircle with diameter [AC] to the triangle.




Find the exact perimeter of this shape. [3]

[Maximum mark: 5] 

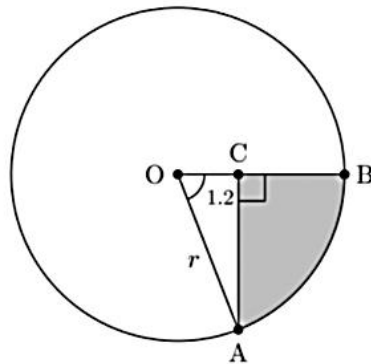
The diagram below shows a sector of a circle with radius r where $\widehat{AOB} = x$ radians and the length of the arc AB is $\frac{4}{x}$ cm.



Given that the area of the sector is 27 cm^2 , find the length of the arc AB.


[Maximum mark: 7] 

The following diagram shows a circle with centre O and radius r cm.

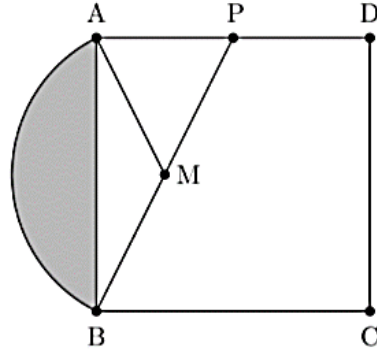


Points A, B lie on the circle and $\widehat{AOB} = 1.2$ radians.

- (a) Show that $OC = r \cos 1.2$. [1]
- (b) The area of the shaded region is 35 cm^2 . Find the value of r . [6]


[Maximum mark: 8] 

Consider the following diagram.

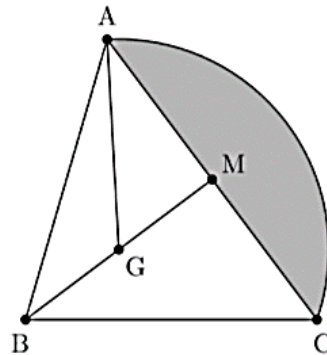


The sides of square ABCD have lengths 4 cm. The midpoint of [AD] is denoted by P. The circular arc AB has centre, M, the midpoint of [BP].

- (a) (i) Find AM. [5]
 (ii) Find \widehat{AMB} in radians. [5]
- (b) Find the area of the shaded region. [3]


[Maximum mark: 8] 

Consider the following diagram.

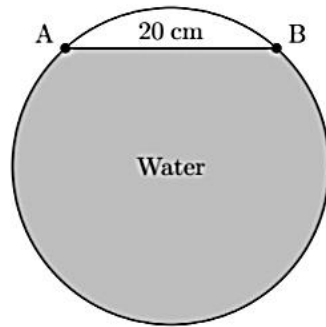


The sides [AB] and [BC] of the isosceles triangle ABC have lengths 5 cm and the third side [AC] has length 6 cm. The midpoint of [AC] is denoted by M. The circular arc AC has centre, G, the midpoint of [BM].


- (a) (i) Find AG. [5]
 (ii) Find \widehat{MGA} in radians. [5]
- (b) Find the area of the shaded region. [3]

[Maximum mark: 7] 

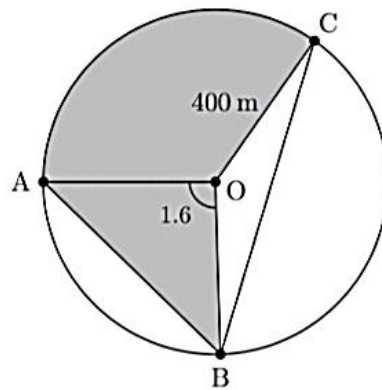
The diagram below shows the cross section of a cylindrical pipe, 80 cm in length, carrying water. The pipe has a radius of 15 cm.



The pipe is not at full capacity, such that the chord length of the water level [AB] is 20 cm. Find the volume of water in the pipe.

[Maximum mark: 15] 

The following diagram shows a circular crop field.



The circle has centre O and a radius of 400 m, and the points A, B, C and D lie on the circle. The angle AOB is 1.6 radians.

(a) Find the length of chord AB. [3]

(b) Find the area of triangle AOB. [2]

The angle BOC is 2.5 radians.

(c) Find the length of the minor arc AC. [3]

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

The shaded region is to be planted with corn. Corn seeds are sold in bags which cost \$140 each. One bag is enough for seeding 8960 m^2 .

(e) Find the cost of the corn seeds. [4]