

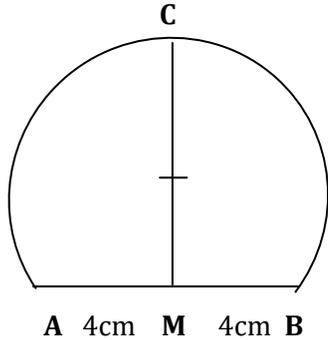
CIRCLES, CHORDS AND TANGENTS

KCSE 1989 – 2012 Form 3 Mathematics

1.

1989 Q24 P2

The figure below represents the cross section of a metal bar.



The cross section is in the form of a major segment of a circle. M is the midpoint of AB and CM is perpendicular to AB. Given that $AB = CM = 8\text{cm}$. Calculate the area of the cross section (8 marks)

2.

1990 Q20 P1

Two solid spherical balls with centres P and Q touch each other. The balls lie inside and in contact with a hemispherical bowl of centre R. Given that

$PQ = 13\text{cm}$, $QR = 16\text{cm}$ and $PR = 19\text{cm}$, calculate the radii of the bowl and the two spherical balls.

(8 marks)

3.

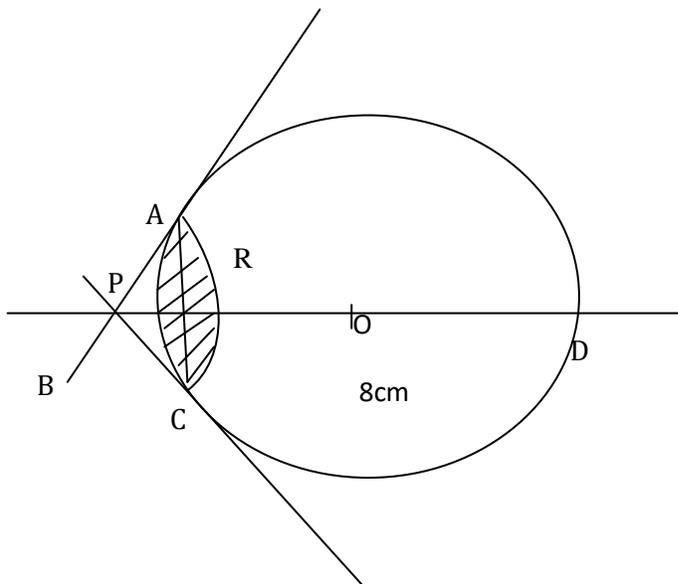
1992 Q8 P2

A chord AB of length 13cm subtends an angle of 67° at the circumference of a circle centre O. Find the radius of the circle. (4marks)

4.

1993 Q24 P1

In the figure below O is the centre of a circle whose radius is 8cm. BA and BC are tangents to the circle. PD is a diameter of the circle and AC is a chord of length 8cm. Angle $ABC = 120^\circ$. ARC is of a circle centre B and radius 4.6 cm.

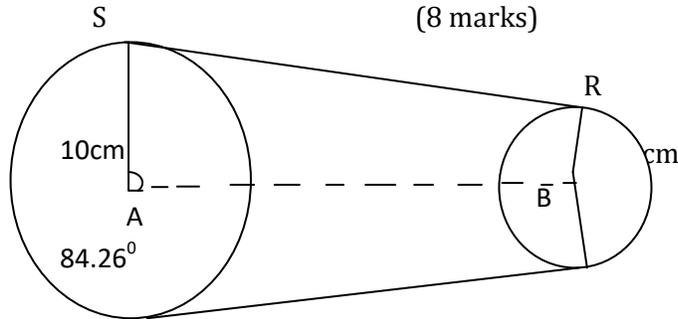


Calculate the area of the shaded region R (8 marks)

5. **1994 Q21 P1**

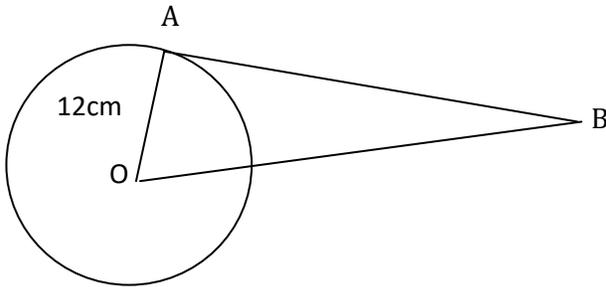
The figure below shows two pulleys with centres A and B and of radii 10cm and 5cm respectively. S and R are contacts points of the belt with the pulleys.

The distance between the centres of the two pulleys is 50cm, and $\angle SAB = 84.26^\circ$. A belt is tied around the two pulleys as shown. Calculate the total length of the belt



1994 Q11 P2

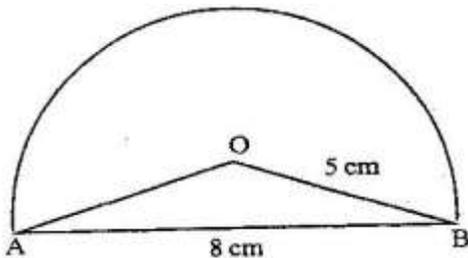
6. In the figure below AB is a tangent to the circle centre O and radius 12cm. The area of the triangle AOB is 120cm^2 . OXB is a straight line.



Calculate XB (4marks)

1995 Q 19

7. (a) In the figure below O is the centre of a circle whose radius is 5 cm $AB = 8$ cm and $\angle AOB$ is obtuse.



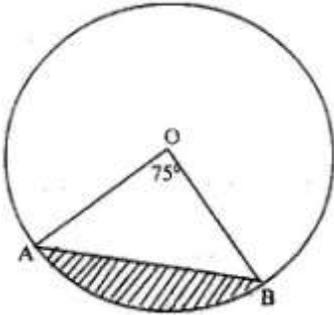
Calculate the area of the major segment (6 marks)

(b) A wheel rotates at 300 revolutions per minute. Calculate the angle in radians through which a point on the wheel turns in one second.

8.

1997 Q 5 P2

The figure below represents a circle a diameter 28 cm with a sector subtending an angle of 75° at the centre.

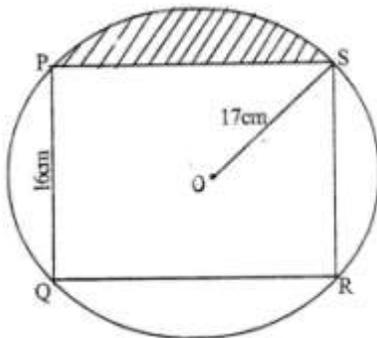


Find the area of the shaded segment to 4 significant figures

9

1998 Q 23 P2

The figure below represents a rectangle PQRS inscribed in a circle centre O and radius 17cm . PQ = 16cm.



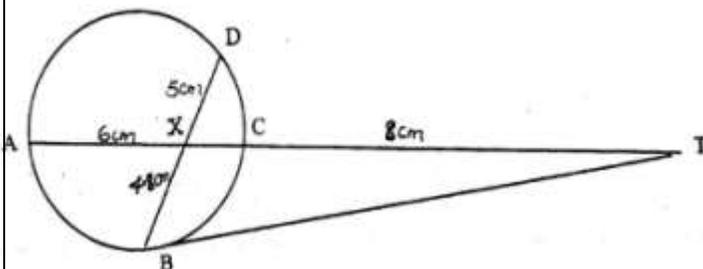
Calculate

- The length PS of the rectangle
- The angle POS
- The area of the shaded region

10 **2000 Q 14 P2**

In the figure below, BT is a tangent to the circle at B. AXCT and BXD are straight lines AX = 6cm, CT = 8cm, BX = 4.8 cm and XD = 5cm. Find the length of

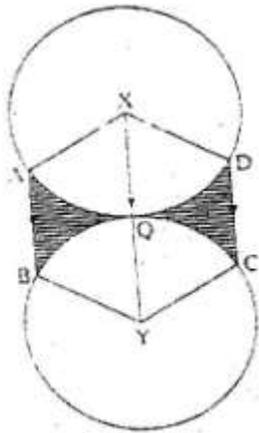
- XC
- BT



11 **2002 Q 12 P1**
 Chords XY and PQ of a circle intersect at a point M inside the circle. Given that $MX = 8\text{cm}$, $XY = 14\text{cm}$ and $MP = 4\text{cm}$, calculate the length of MQ. (2mks)

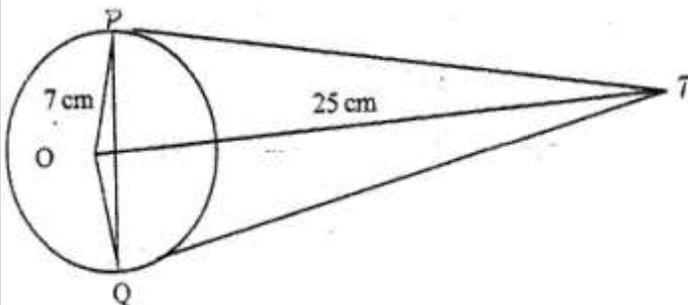
12 **2002 Q 23 P1**
 A minor sector of a circle of radius 28cm includes an angle of 135° at the center.
 a) (i) Convert 135° into radians. Hence or otherwise find the area of the sector.
 ii) Find the length of the minor arc.
 b) The sector is folded to form a right circular cone. Calculate the :
 i) Radius of the cone
 ii) Height of the cone. (Take the value of π to be $\frac{22}{7}$)
 (8mks)

13 **2003 Q 19 P1**
 The figure below shows two circles each of radius 7cm, with centers at X and Y. The circles touch each other at point Q.



Given that $\angle AXD = \angle BYC = 120^\circ$ and lines AB, XQY and DC are parallel, Calculate the area of:
 a) Minor sector XAQD (Take $\pi \frac{22}{7}$)
 b) The shaded regions.

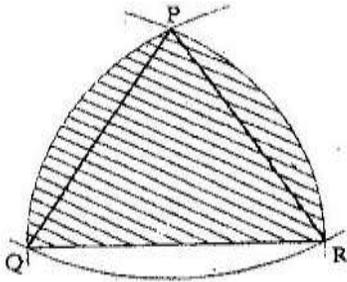
14 **2004 Q 14 P1**
 The figure below shows a circle, centre, O of radius 7cm. TP and TQ are tangents to the circle at points P and Q respectively. $OT = 25\text{cm}$.



Calculate the length of the chord PQ

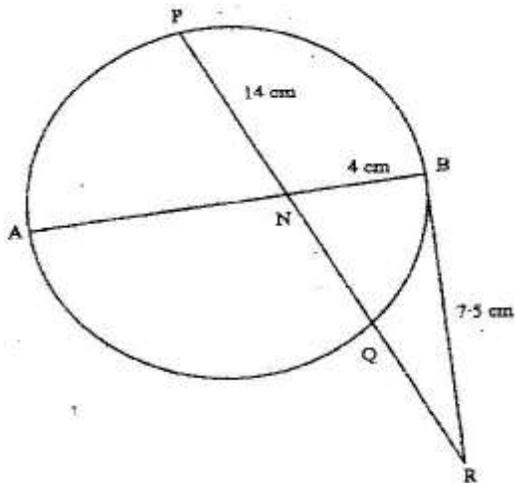
15 **2005 Q 6 P1**
 A point R divides a line PQ internally in the ration 3:4.
 Another point S, divides the line PR externally in the
 ratio 5:2. Given that PQ = 8cm, calculate the length of
 RS,correct to 2 decimal places. (3 marks)

16 **2007 Q 14 P1**
 In the figure below, PQR is an equilateral triangle of side 6 cm. Arcs QR, PR and PQ arcs of circles with
 centers at P, Q and R respectively.



Calculate the area of the shaded region to 4 significant figures (4 marks)

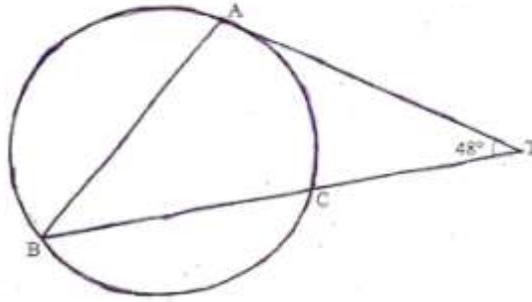
17 **2007 Q 11 P2**
 In the figure below AB is a diameter of the circle. Chord PQ intersects AB at N. A tangent to the circle
 at B meets PQ produced at R.



Given that PN = 14cm, NB = 4 cm and BR = 7.5 cm, calculate the length of:
 (a) NR (1 mark)
 (b) AN (3 marks)

18 **2009 Q 15 P2**
 In the figure below, AT is a tangent to the circle at A.

Angle $ATB = 48^\circ$, $BC = 5\text{cm}$ and $CT = 4\text{cm}$

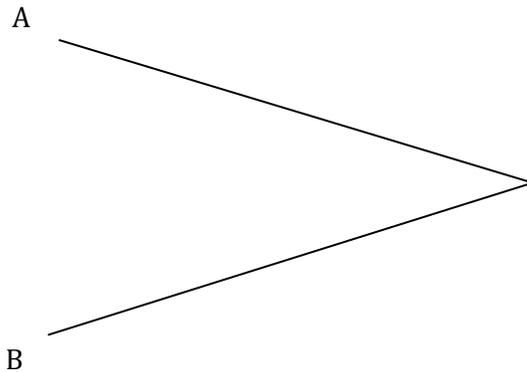


Calculate the length of AT (2 marks)

19 **2011 Q 10 P2**

(a) In the figure below, lines NA and NB represent tangents to a circle at points A and B. Use a pair of compasses and ruler only to construct the circle.

(2 mks)

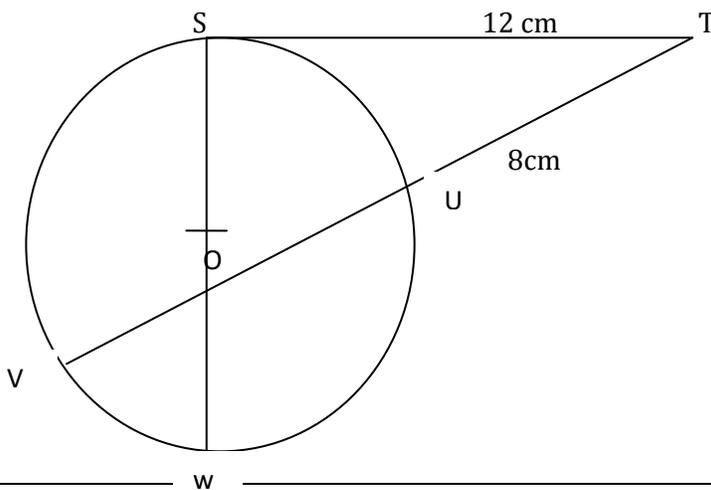


(b) Measure the radius of the circle. (1 mk)

20 **2012 Q14 P2**

In the figure below, the tangent ST meets chord VU produced at T. Chord SW passes through the centre, O, of the circle and intersects chord VU at X. Line

$ST = 12\text{cm}$ and $UT = 8\text{cm}$.



(a) Calculate the length of chord VU. (2 marks)

If $WX = 3\text{cm}$ and $VX: XU = 2:3$, find SX . (2 marks)