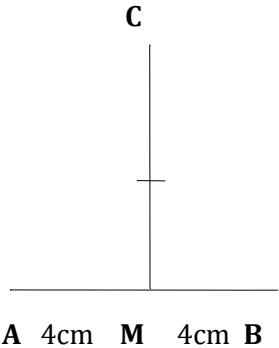


NAME _____ INDEX NUMBER _____

SCHOOL _____ DATE _____

CIRCLES, CHORDS AND TANGENTS

<i>KCSE 1989 – 2012 Form 3 Mathematics</i>	Working Space
<p>1. 1989 Q24 P2</p> <p>The figure below represents the cross section of a metal bar.</p>  <p>A 4cm M 4cm B</p> <p>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)</p>	
<p>2. 1990 Q20 P1</p> <p>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)</p>	

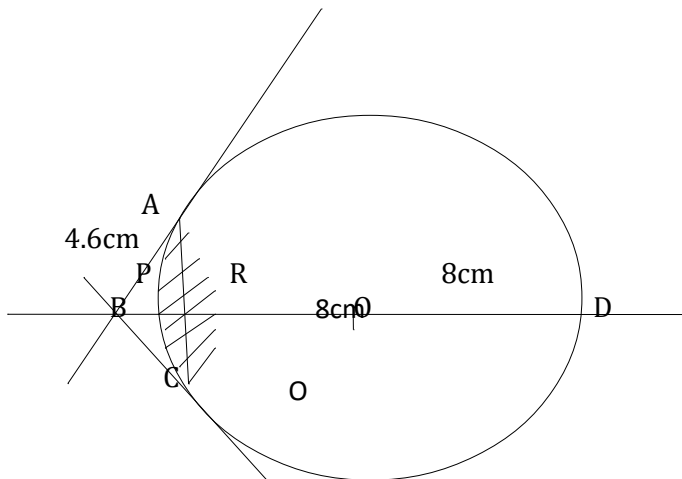
Working Space

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. (4 marks)

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° . ARC is of a circle centre B and radius 4.6 cm.



Calculate the area of the shaded region (8 marks)

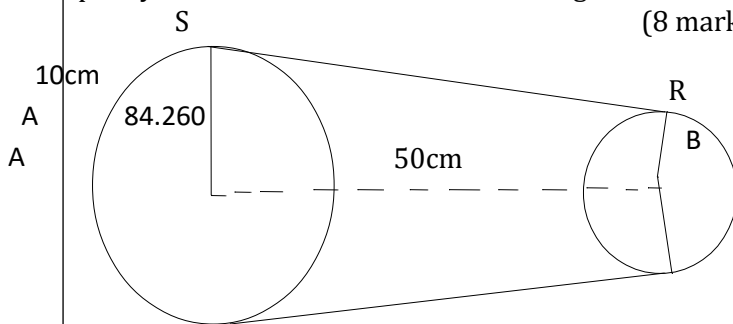
Working Space

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.

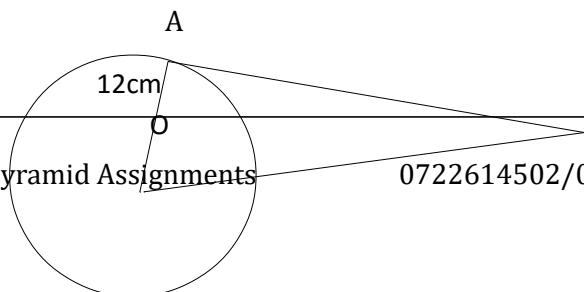
The distance between the centres of the two pulleys is 50cm, and $\angle SAB = 84.260$. A belt is tied around the two pulleys as shown. Calculate the total length of the belt

(8 marks)



19
6. **1994 Q11 P2**

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.



B

X

Calculate XB

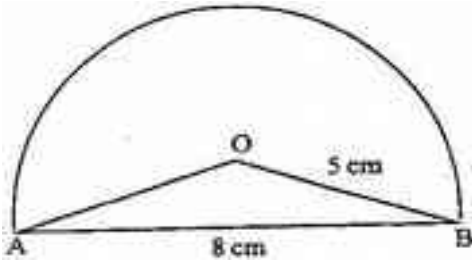
(4 marks)

Working Space

7.

1995 Q 19

(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.



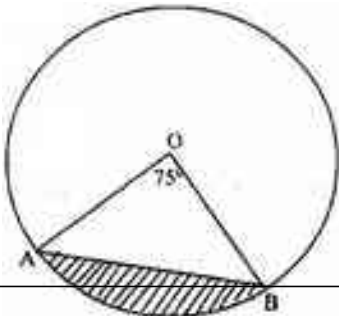
Calculate the area of the major segment (6 marks)

(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.



4

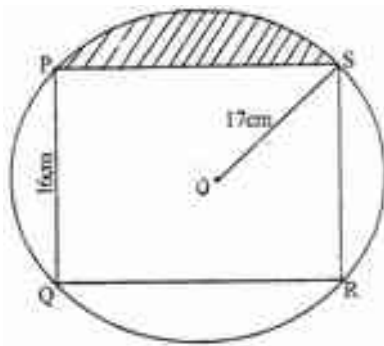
Find the area of the shaded segment to 4 significant figures

Working Space

9

1998 Q 23 P2

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



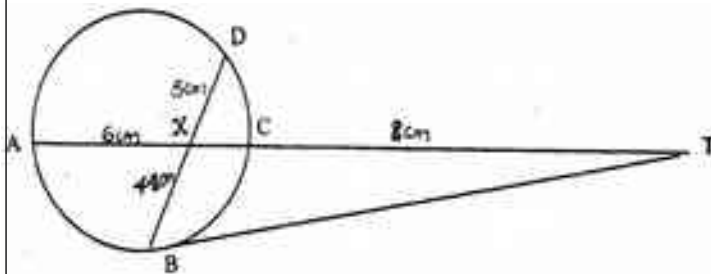
Calculate

- (a) The length PS of the rectangle (2 marks)
- (b) The angle POS (2 marks)
- (c) The area of the shaded region (4 marks)

Working Space

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
(a) XC (b) BT



11 **2002 Q 12 P1**

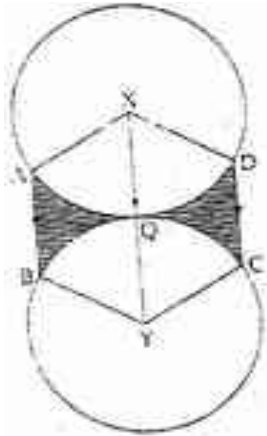
Chords XY and PQ of a circle intersect at a point M inside the circle. Given that MX = 8cm, XY = 14cm and

	<p>MP = 4cm, calculate the length of MQ. (2 marks)</p> <p>.</p>	<p>Working Space</p>
<p>12</p>	<p>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 of 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 $\frac{22}{7}$) (8 marks)</p>	

Working Space

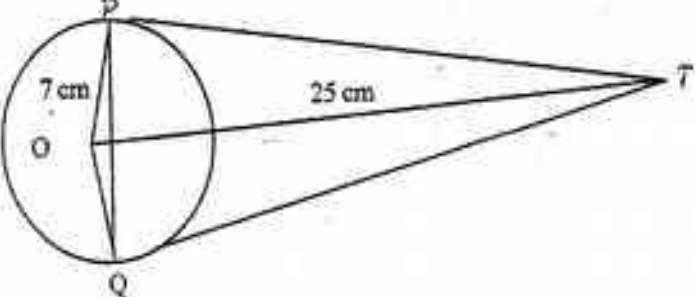
13 **2003 Q 19 P1**

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



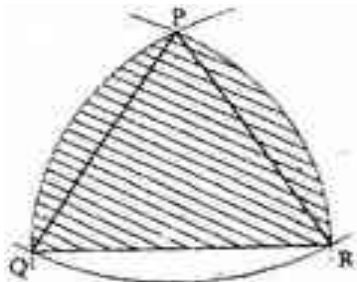
Given that $\angle AXD = \angle BYC = 120^\circ$ and lines AB, XQY and DC are parallel, Calculate the area of:

- Minor sector XAQD (Take $\pi = \frac{22}{7}$)
- The shaded regions.

	<p style="text-align: right;">(8 marks)</p>	
14	<p>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 = 25cm.</p>  <p>Calculate the length of the chord PQ (3 marks)</p>	Working Space
15	<p>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)</p>	

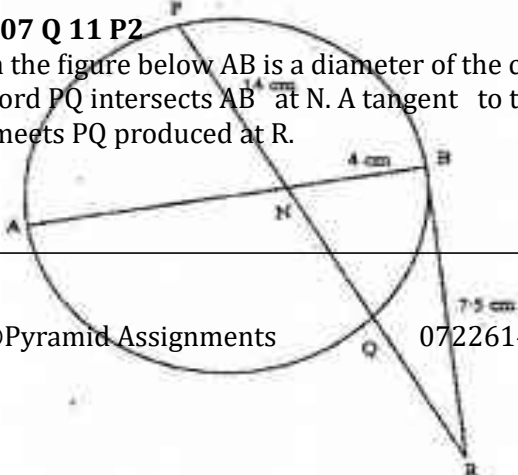
Working Space

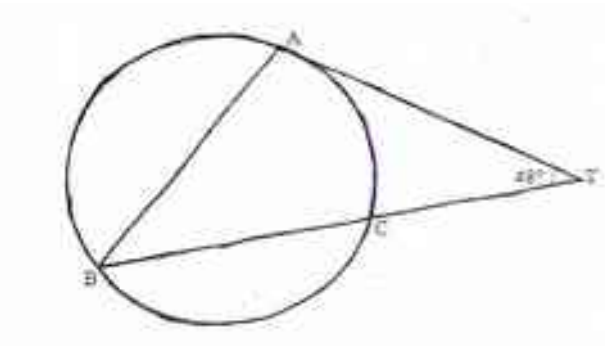
16 **2007 Q 14 P1**
 In the figure below, PQR is an equilateral triangle of side 6 cm. Arcs QR, PR and PQ arcs of circles with centers at P, Q and R respectively.

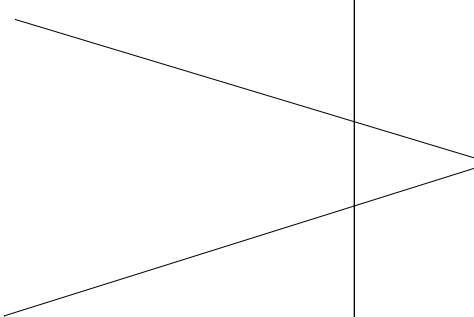


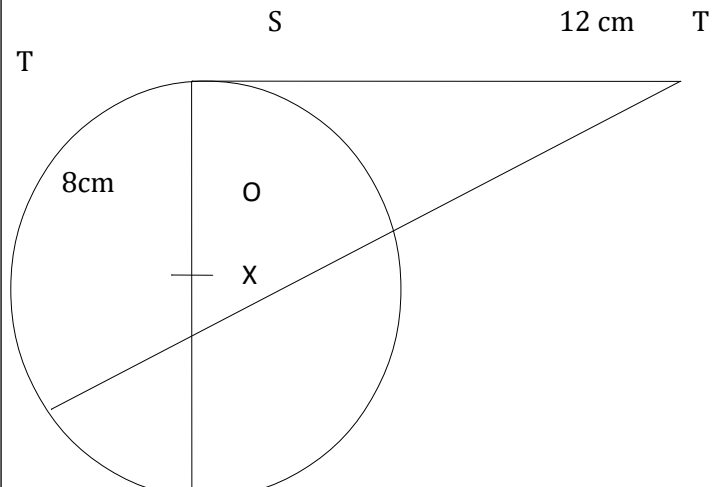
Calculate the area of the shaded region to 4 significant figures (4 marks)

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.



	<p>Given that $PN = 14\text{cm}$, $NB = 4\text{ cm}$ and $BR = 7.5\text{ cm}$, calculate the length of:</p> <p>(a) NR (1 mark) (b) AN (3 marks)</p>	<p>Working Space</p>
<p>18</p>	<p>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 $CT = 4\text{cm}$</p>  <p>Calculate the length of AT (2 marks)</p>	
<p>19</p>	<p>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.</p>	

	<p style="text-align: right;">(2 marks)</p> <p style="text-align: center;">A</p> <p style="text-align: center;">B</p> <p>(b) Measure the radius of the circle. (1 mark)</p>	 <p style="text-align: center;">Working Space</p>
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20	<p>2012 Q14 P2</p> <p>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 $UT = 8\text{cm}$.</p> <div style="text-align: center;">  </div> <p>(a) Calculate the length of chord VU. (2 marks) (b) If $WX = 3\text{cm}$ and $VX: XU = 2:3$, find SX. (2 marks)</p>	
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