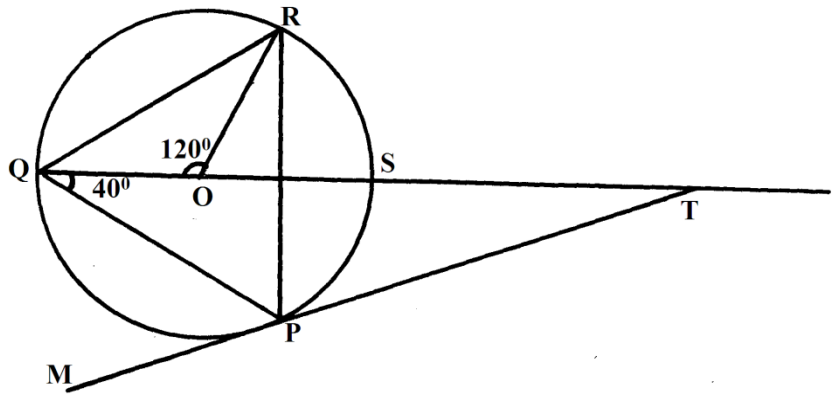
1. Angle Properties of Circles

1. In the figure below PQR and S are points on the circumference of a circle centre O. The point TSO and Q lie on a straight line MPT is a tangent to the circle at P.



Find the values of the following angles stating reasons in each case.

(a) ∠SRP (2mks)

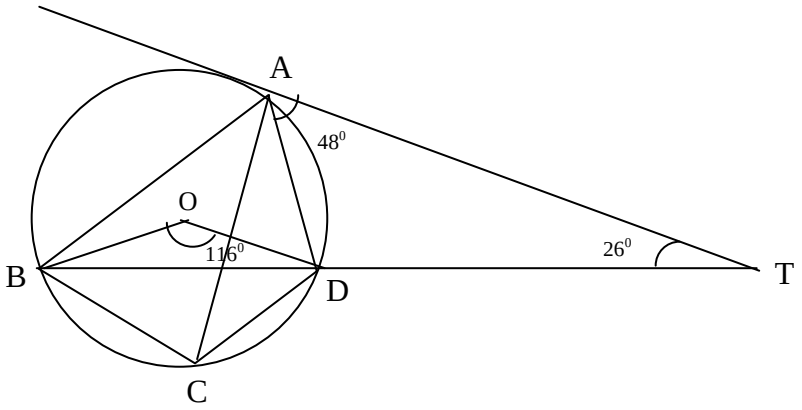
(b) ∠ORP (2mks)

(c) ∠RPT (2mks)

(d) ∠STP (2mks)

(e) ∠QPM (2mks)

2. In the figure below, TA is a tangent to the circle ABCD with centre O. ∠TAD = 48^0 and ∠BOD = 116^0



Giving reasons calculate:

a) ∠ACD (2mks)

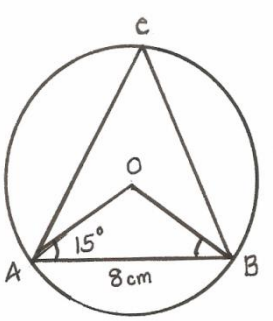
b) ∠ABO (2mks)

c) ∠ADO (2mks)

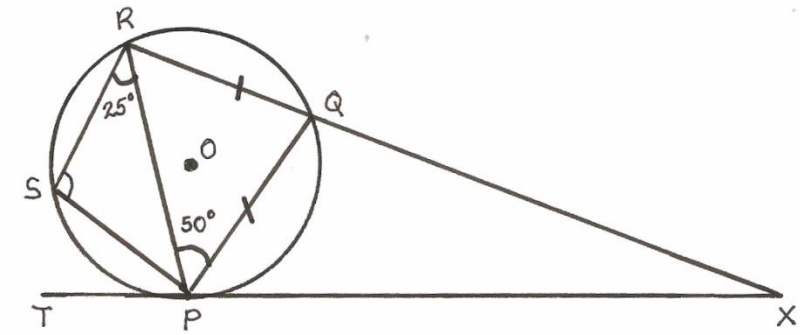
d) ∠ACB (2mks)

e) ∠ATB (2mks)

3. In the figure below AB = 8cm and O is the centre of the circle. Determine the area of the circle if ∠OAB = 15^o (3mks)



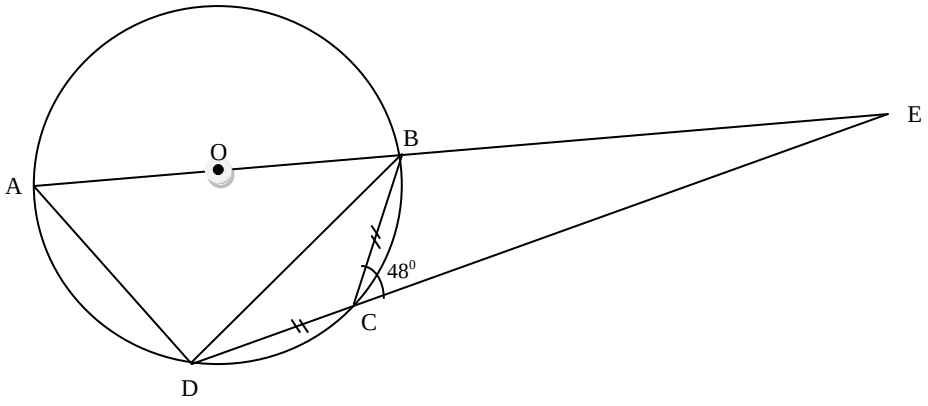
4.



The figure above is a cyclic quadrilateral PQRS. Given that TPX is a tangent at P and O is the centre of the circle and that RQX is a straight line with $\angle RPQ = 50^o$ and $\angle PRS = 25^o$, giving reason in each case find:

(a) angle PRQ (2mks)
(b) angle PSR (2mks)
(c) angle PXQ (2mks)
(d) angle TPS (2mks)
(e) angle POS (2mks)

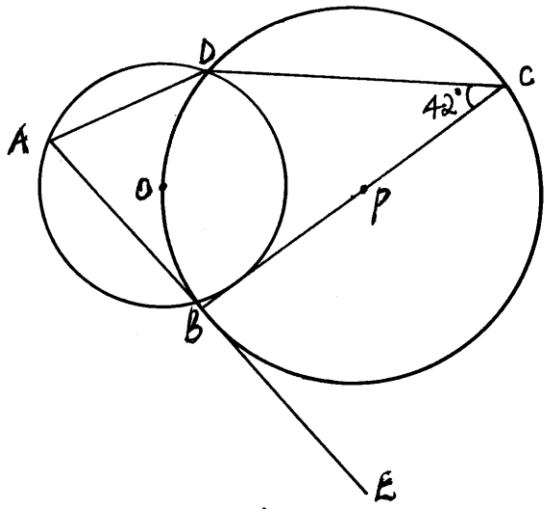
5. In the figure below ABCD is a circle with centre O. AB and DC meet at a point E outside the circle. DC = BC and $\angle BCE = 48^0$



Find the angles

a) BAD (1mk)
b) BDC (1mk)
c) BEC (1mk)

6. In the figure O and P are centres of intersecting circles ABD and DBC respectively. Line ABE is a tangent to circle BCD at B and angle BCD = 42^0.



Giving reasons determine the size of:

(a) Angle CBD. (2mks)

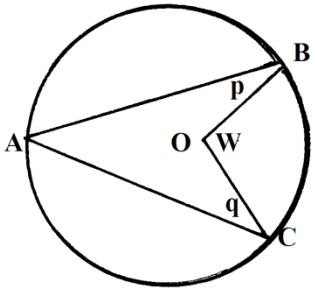
(b) Angle ODB. (2mks)

(c) Angle BAD. (2mks)

(d) Angle ABD (2mks)

(e) Angle ODA. (2mks)

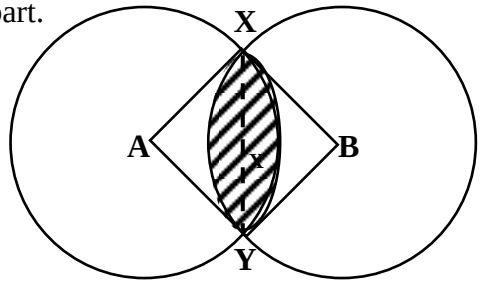
7. In the figure below, O is the centre of the circle. Express the angle W in terms of angles p and q. (2mks)



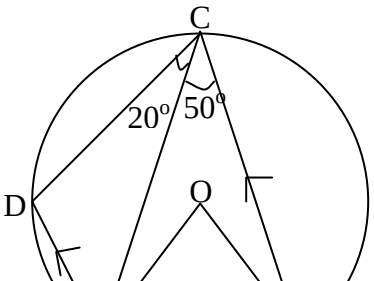
8. Two circles of radii 4cm and 6cm intersect as shown below. If angle XBY = 30^o and angle XAY = 97.2^o.

Find the area of the shaded part.

(Take = $\pi \frac{22}{7}$)



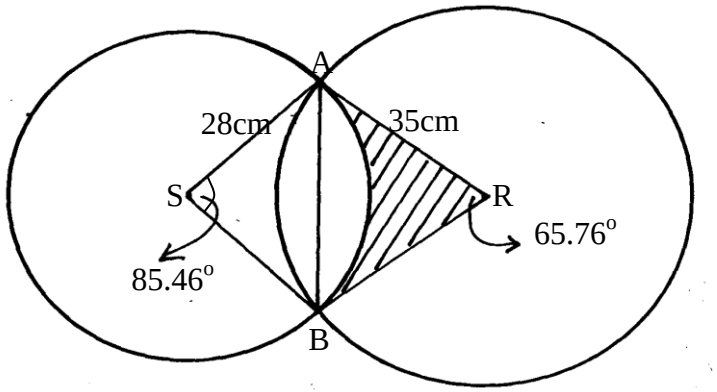
9. In the diagram, O is the centre of the circle and AD is parallel to BC. If angle ACB =50^o and angle ACD = 20^o.



Calculate; (i) ∠OAB

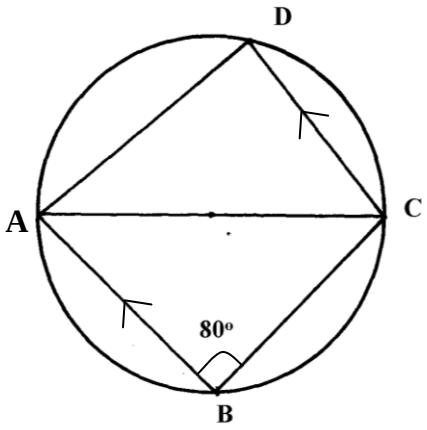
(ii) ∠ADC

10. Two intersecting circles have centres S and R. Given that their two radii are 28cm and 35cm, their common chord AB = 38cm and angles ASB = 85.46° and ARB = 65.76°,



Calculate the shaded area

11. In the figure below ABCD is a cyclic quadrilateral in which AD = DC and AB is parallel to CD. Given that angle ABC = 80°, Find the size of:



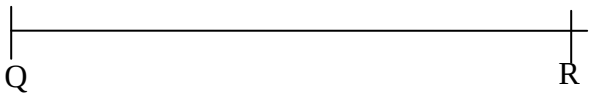
a) ∠DAC

b) ∠BAC

c) ∠BCD

12. Line QR = 6.5cm is given below:-(***Do not use a protractor for this question***)

(a) Draw triangle PQR such that **p** lies above line QR, ∠ PQR = 30° and PQ = 7cm



(b) By accurate construction on the diagram above, show the locus of a point which lies within the triangle such that:-

(i) T is more than 2.5cm from line PQ
and

(ii) T is not more than 4.5cm from Q
Shade the region in which **T** lies

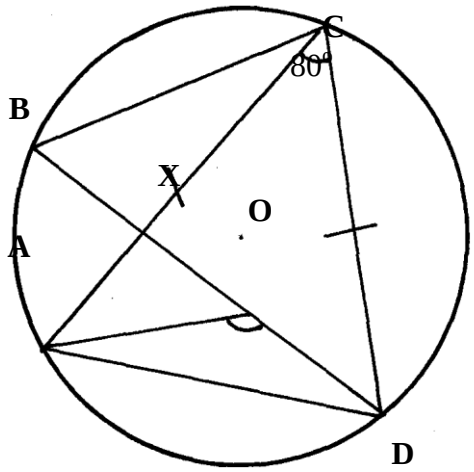
(c) Lines QP and QR are produced to K and M respectively

(i) Show by construction on the diagram above, the locus of a point C which is equidistant from each of the lines PK, PR and RM

(ii) With centre C and an appropriate radius, draw a circle to touch each of the lines PK, PR and RM only once
Measure the radius

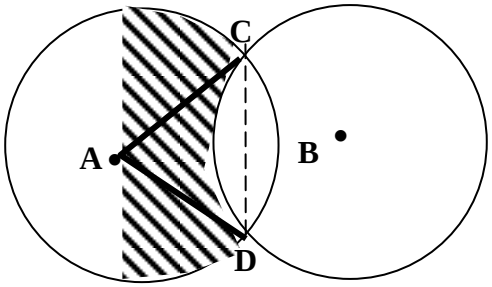
What name is given to the circle drawn in **(c) (ii)** with respect to triangle QPR

13. The figure below shows a circle centre **O** and a cyclic quadrilateral ABCD. AC = CD, angle ACD is 80^o and BOD is a straight line. Giving reasons for your answer, find the size of :-



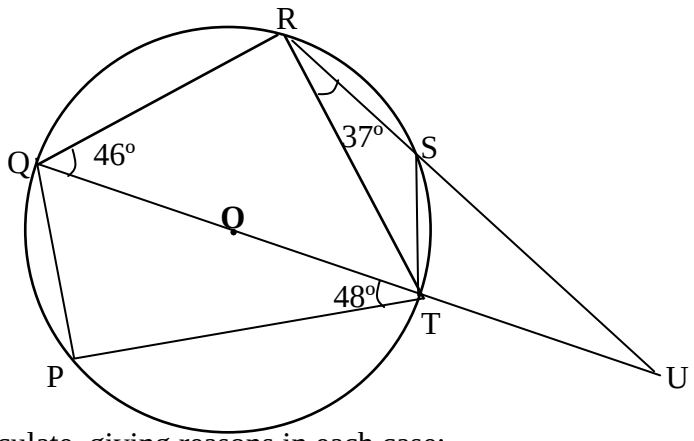
(i) Angle ACB
(ii) Angle AOD
(iii) Angle CAB
(iv) Angle ABC
(v) Angle AXB

14. The figure below shows two circles of equal radius of 9 cm with centres A and B. Angle CAD = 80^o



a) Calculate the area of:-
i) The sector CAD.
ii) The triangle CAD.
iii) The shaded region.

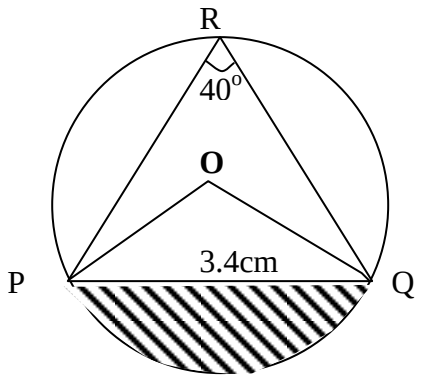
15. In the diagram below, ∠QOT is a diameter. ∠QTP = 48^o, ∠TQR = 46^o and ∠SRT = 37^o



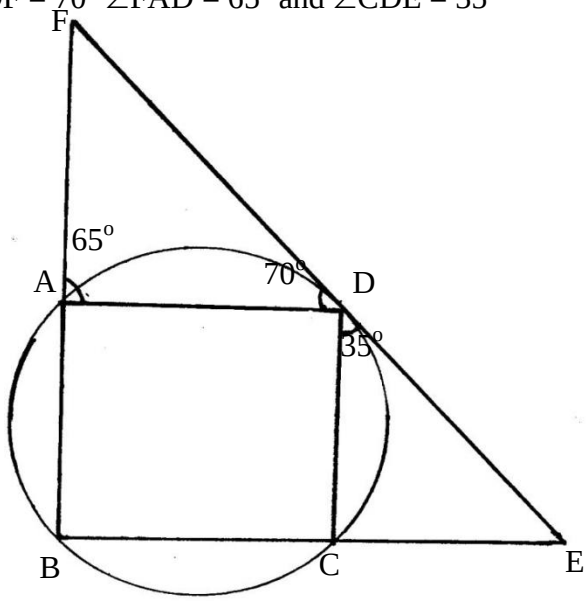
Calculate, giving reasons in each case:-
(a) ∠RST

(b) ∠SUT
(c) ∠ROT
(d) ∠PST
(e) Reflex ∠SOP

16. The diagram below shows a circle with a chord PQ= 3.4cm and angle PRQ=40°. Calculate the area of the shaded segment.

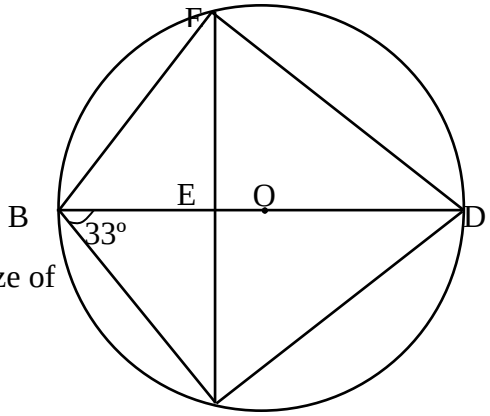


17. The figure below shows circle ABCD. The line EDF is a tangent to the circle at D. ∠ADF = 70° ∠FAD = 65° and ∠CDE = 35°



Find the values of the following angles, stating your reasons in each case
(a) ∠ABC
(b) ∠BCD
(c) ∠DCE
(d) ∠ACD

18. In the figure below BD is the diameter of the circle and O is the centre.



Find the size of

(a) $\angle ADC$

(b) $\angle AEB$