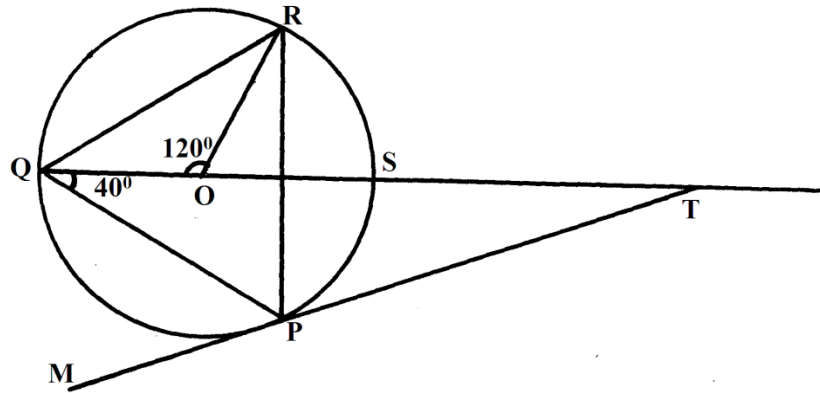


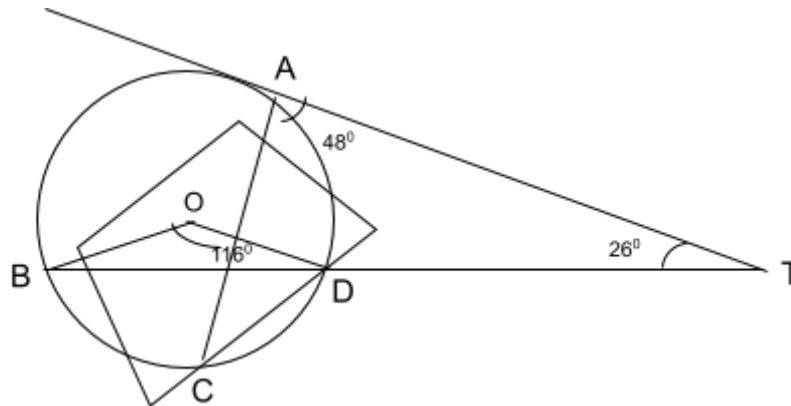
1. Angle Properties of Circles

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.

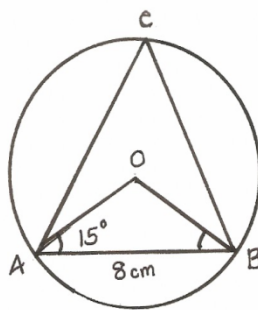
- (a) $\angle SRP$ (2mks)
 - (b) $\angle ORP$ (2mks)
 - (c) $\angle RPT$ (2mks)
 - (d) $\angle STP$ (2mks)
 - (e) $\angle QPM$ (2mks)
2. In the figure below, TA is a tangent to the circle ABCD with centre O. $\angle TAD = 48^\circ$ and $\angle BOD = 116^\circ$



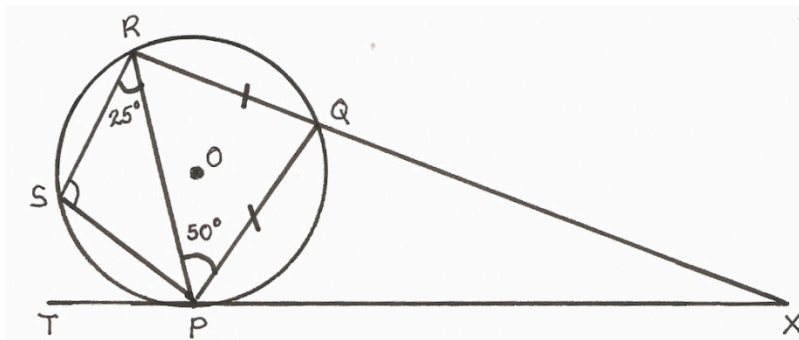
Giving reasons calculate:

- a) $\angle ACD$ (2mks)
- b) $\angle ABO$ (2mks)
- c) $\angle ADO$ (2mks)
- d) $\angle ACB$ (2mks)
- e) $\angle ATB$ (2mks)

3. In the figure below $AB = 8\text{cm}$ and O is the centre of the circle. Determine the area of the circle if $\angle OAB = 15^\circ$ (3mks)



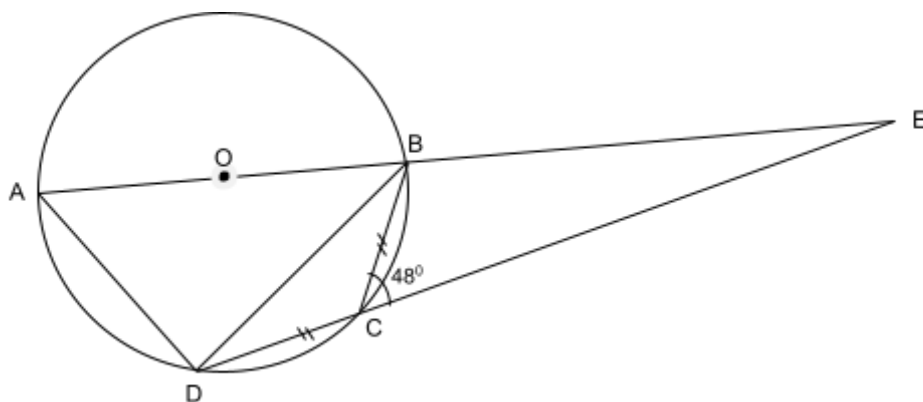
4.



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 $\angle RPQ = 50^\circ$ and $\angle PRS = 25^\circ$, giving reason in each case find:

- angle PRQ (2mks)
 - angle PSR (2mks)
 - angle PXQ (2mks)
 - angle TPS (2mks)
 - angle POS (2mks)
5. In the figure below ABCD is a circle with centre O. AB and DC meet at a point E

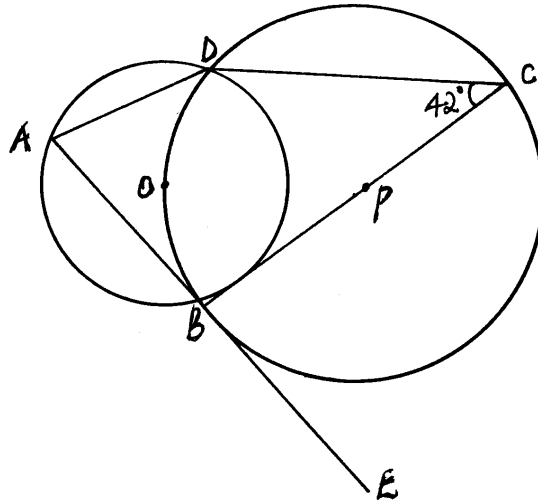
outside the circle. $DC = BC$ and $\angle BCE = 48^\circ$



Find the angles

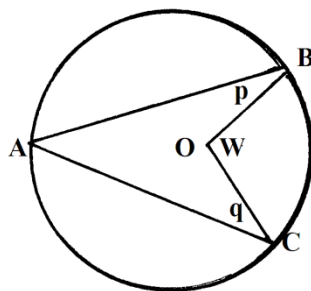
- BAD (1mk)
- BDC (1mk)
- BEC (1mk)

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° .



Giving reasons determine the size of:

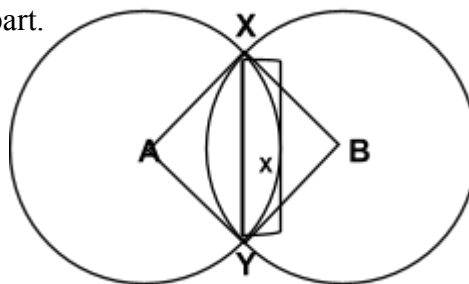
- (a) Angle CBD. (2mks)
 - (b) Angle ODB. (2mks)
 - (c) Angle BAD. (2mks)
 - (d) Angle ABD (2mks)
 - (e) Angle ODA. (2mks)
7. In the figure below, O is the centre of the circle. Express the angle W in terms of angles p and q. (2mks)



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

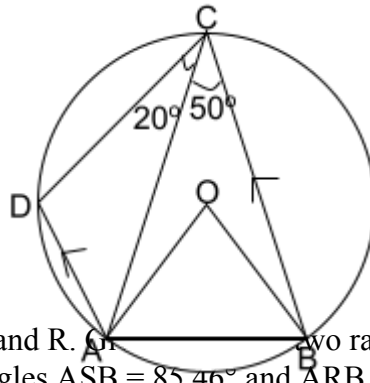
Find the area of the shaded part.

(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°

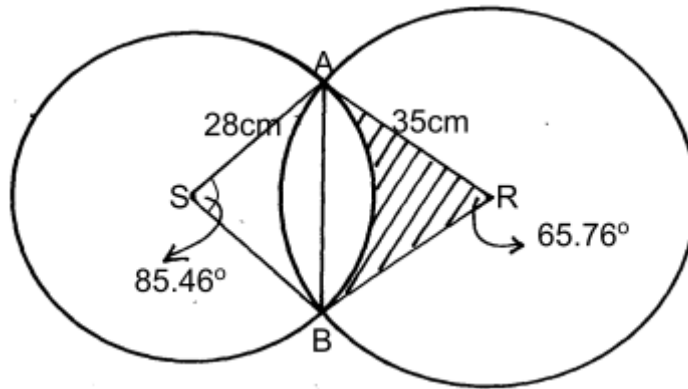
and angle $\angle ACD = 20^\circ$.



Calculate; (i) $\angle OAB$

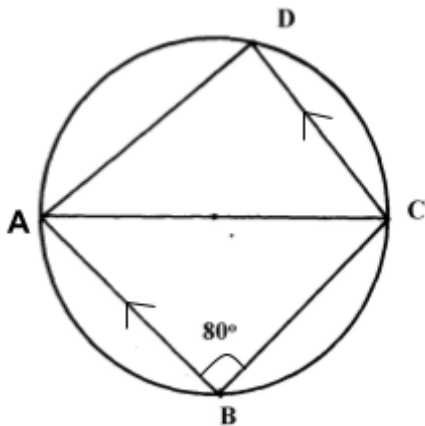
(ii) $\angle ADC$

10. Two intersecting circles have centres S and R. Two radii are 28cm and 35cm, their common chord $AB = 38\text{cm}$ and angles $\angle ASB = 85.46^\circ$ and $\angle ARB = 65.76^\circ$,



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 $\angle ABC = 80^\circ$, Find the size of:



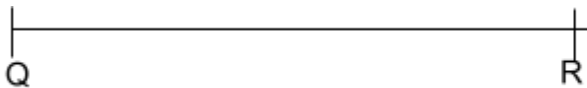
a) $\angle DAC$

b) $\angle BAC$

c) $\angle BCD$

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

(a) Draw triangle PQR such that P lies above line QR, $\angle PQR = 30^\circ$ and $PQ = 7\text{cm}$



(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

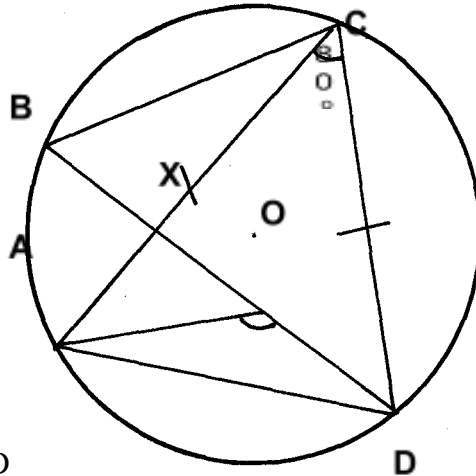
Shade the region in which T lies

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

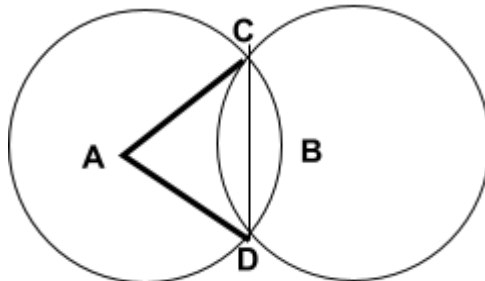
- (i) Show by construction on the diagram above, the locus of a point C which is equidistant from each of the lines PK, PR and RM
 - (ii) With centre C and an appropriate radius, draw a circle to touch each of the lines PK, PR and RM only once
- Measure the radius

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° and BOD is a straight line. Giving reasons for your answer, find the size of :-

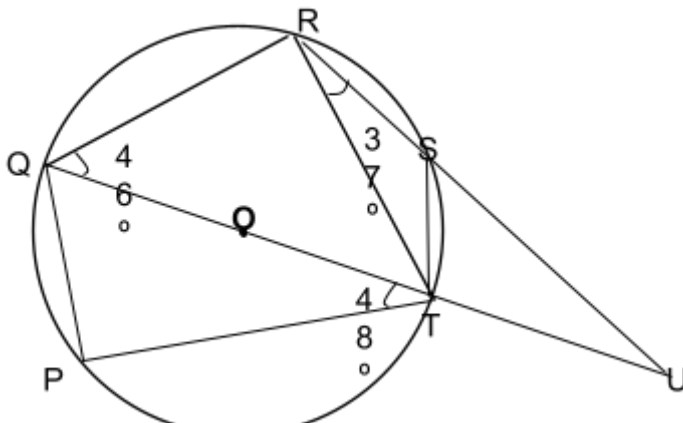


- (i) Angle ACB
 - (ii) Angle AOD
 - (iii) Angle CAB
 - (iv) Angle ABC
 - (v) Angle AXB
14. The figure below shows two circles of equal radius of 9 cm with centres A and B. Angle CAD = 80°



a) Calculate the area of:-

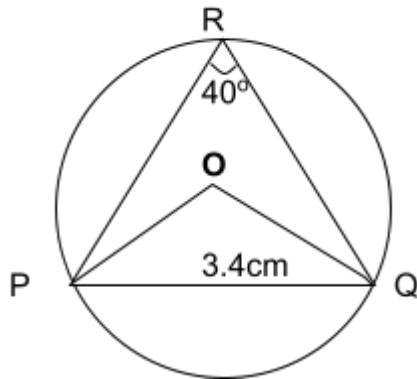
- i) The sector CAD.
 - ii) The triangle CAD.
 - iii) The shaded region.
15. In the diagram below, $\angle QOT$ is a diameter. $\angle QTP = 48^\circ$, $\angle TQR = 46^\circ$ and $\angle SRT = 37^\circ$



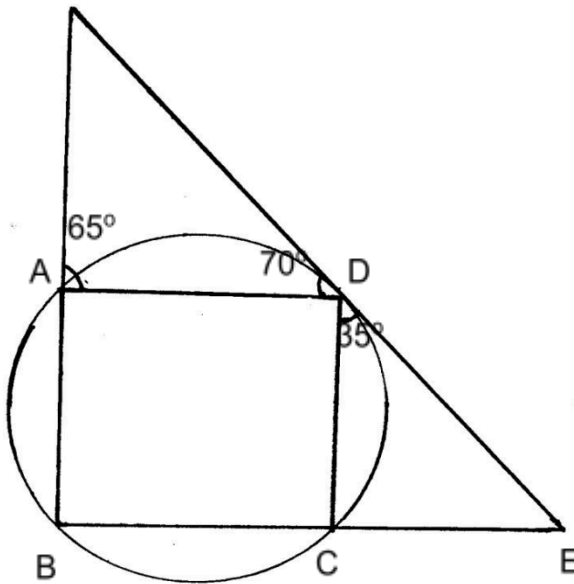
Calculate, giving reasons in each case:-

- (a) $\angle RST$
- (b) $\angle SUT$
- (c) $\angle ROT$
- (d) $\angle PST$
- (e) Reflex $\angle SOP$

16. The diagram below shows a circle with a chord $PQ = 3.4\text{cm}$ and angle $PRQ = 40^\circ$. Calculate the area of the shaded segment.



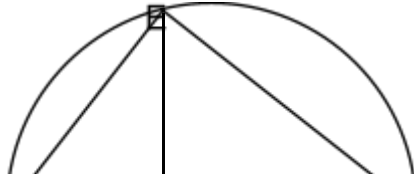
17. The figure below shows circle ABCD. The line EDF is a tangent to the circle at D. $\angle ADF = 70^\circ$, $\angle FAD = 65^\circ$ and $\angle CDE = 35^\circ$



Find the values of the following angles, stating your reasons in each case

- (a) $\angle ABC$
- (b) $\angle BCD$
- (c) $\angle DCE$
- (d) $\angle ACD$

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) $\angle AEB$

