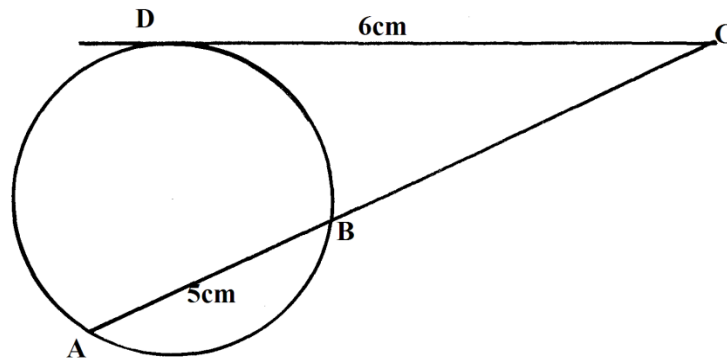
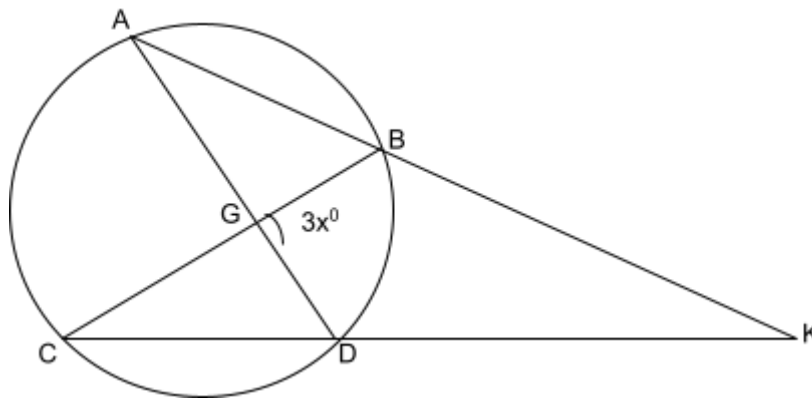


1. Circles –chords and tangents

1. In the figure below not drawn to scale. DC is a tangent to the circle. $DC = 6\text{cm}$, $AB = 5\text{cm}$. Calculate BC. (3mks)

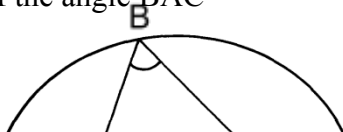


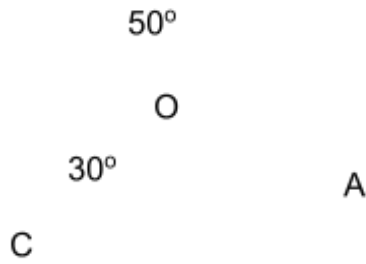
2.



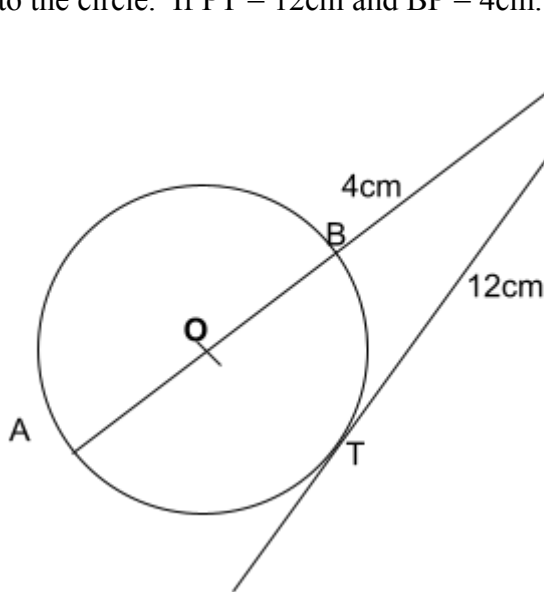
The figure above shows a circle in which chords AD and BC intersect at G. chords AB and CD produced meet at K.

- If $\angle BGD = 3x^\circ$ and $\angle CGD = 2x$, determine the size of $\angle BGA$ (2 mks)
 - Given that $KB = 5\text{ cm}$, $KC = 15\text{ cm}$ and $KD = 7\text{ cm}$, determine the length of KA (3 mks)
 - Giving reasons for your answer, show that triangle KDA and KBC are similar (5 mks)
3. The figure below shows a circle with secants ABE and CDE, If $AB = 4\text{cm}$ and $BE = 6\text{ cm}$ and $DE = 4\text{ cm}$. Find the length of CD. (2mks)

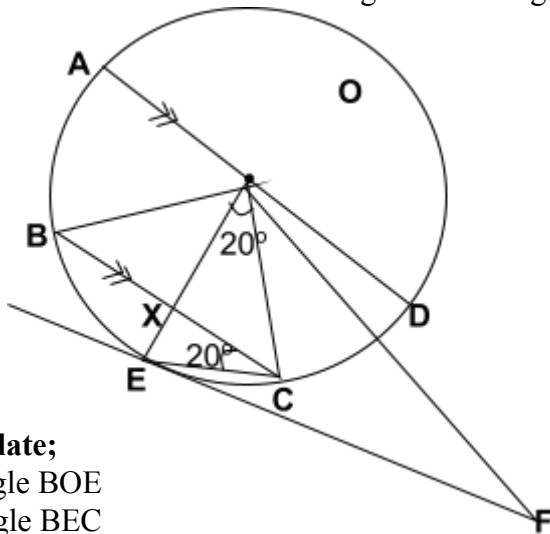




7. In the given figure, O is the centre of the circle and AOBP is a straight line. PT is a tangent to the circle. If $PT = 12\text{cm}$ and $BP = 4\text{cm}$. find the radius of the circle

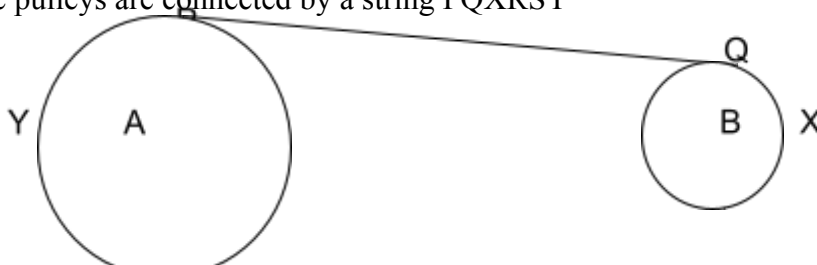


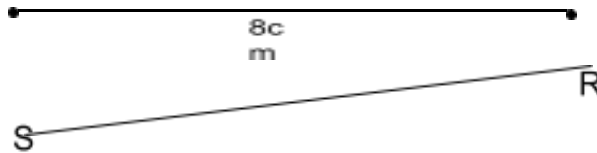
8. In the figure below AOD is a diameter of the circle centre O. BC is a chord parallel to AD. FE is a tangent to the circle. OF bisects angle COD. Angle $BCE = \text{angle } COE = 20^\circ$ BC cuts OE at X



Calculate;

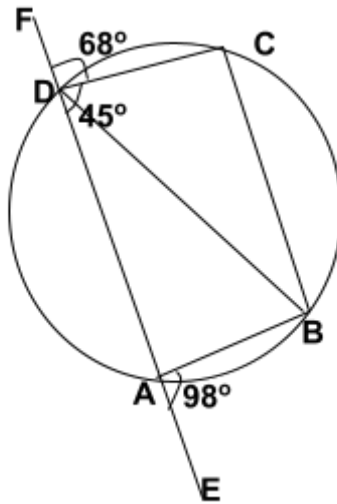
- angle BOE
 - angle BEC
 - angle CEF
 - angle OXC
 - angle OFE
9. The figure below shows two pulleys of radii 6cm and 4cm with centres A and B respectively. $AB = 8\text{cm}$. The pulleys are connected by a string PQXRSY





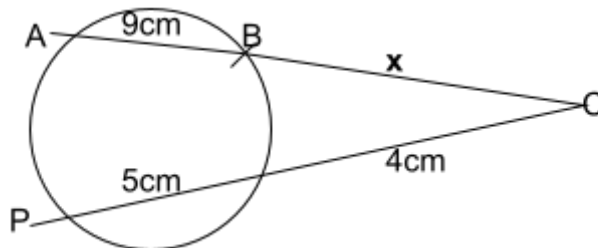
Calculate:

- (a) Length PQ
 - (b) $\angle PAS$ reflex
 - (c) Length of arc PYS and QXR
 - (d) The total length of the string PQXRSY
10. a) Two pipes **A** and **B** can fill a tank in 3hrs and 4 hrs respectively. Pipe **C** can empty the full tank in 6 hrs.
- i) How long would it take pipes **A** and **B** to fill the tank if pipe **C** is closed?
 - ii) Starting with an empty tank, how long would it take to fill the tank with all pipes running?
- b) The high quality Kencoffee is a mixture of pure Arabica coffee and pure Robusta coffee in the ratio 1 : 3 by mass. Pure Arabica coffee costs shs. 180 per kg and pure Robusta coffee costs sh 120 per kg. Calculate the percentage profit when the coffee is sold at sh 162 per kg.
11. In the figure below, ABCD is a cyclic quadrilateral and BD is a diagonal. EADF is a straight line, $\angle CDF = 68^\circ$, $\angle BDC = 45^\circ$ and $\angle BAE = 98^\circ$.

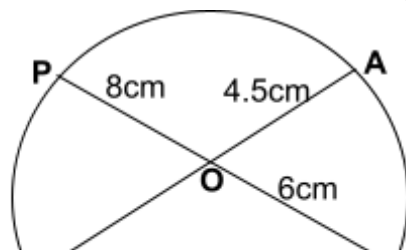


Calculate the size of:

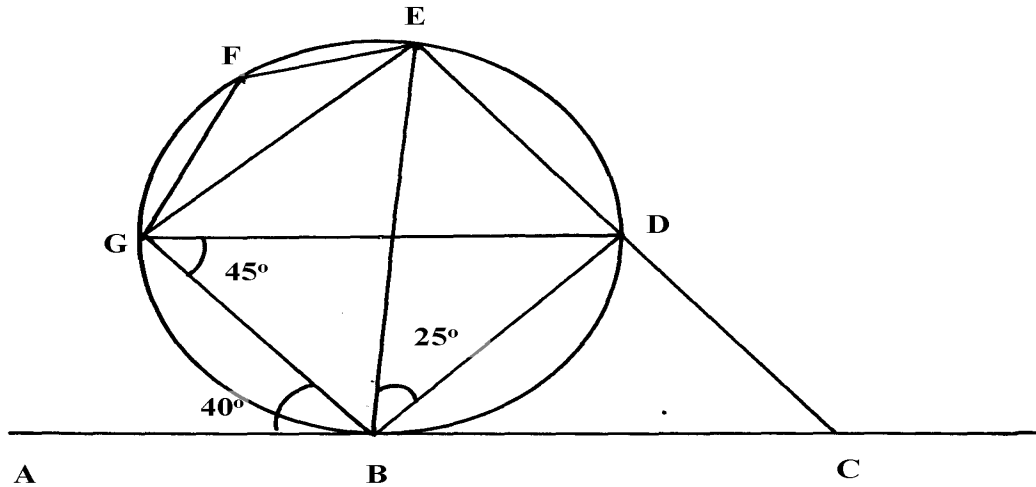
- a) $\angle ABD$.
 - b) $\angle CBD$
12. The figure below shows a circle centre O. AB and PQ are chords intersecting externally at a point C. AB = 9cm, PQ = 5cm and QC = 4cm. Find the value of x



13. The chords AB and PQ intersect internally at O. Given that the length of OP=8cm, OA= 4.5cm and OQ=6cm. Calculate the length of OB

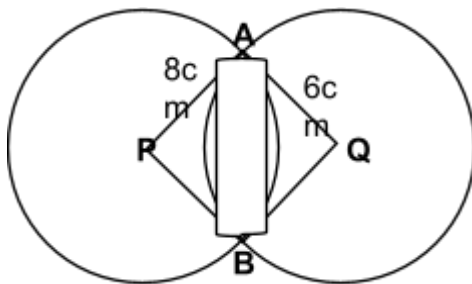


14. In the figure below ABC is a tangent to the circle at B. given that $\angle ABG = 40^\circ$, $\angle BGD = 45^\circ$, and $\angle DBE = 25^\circ$ as shown below.

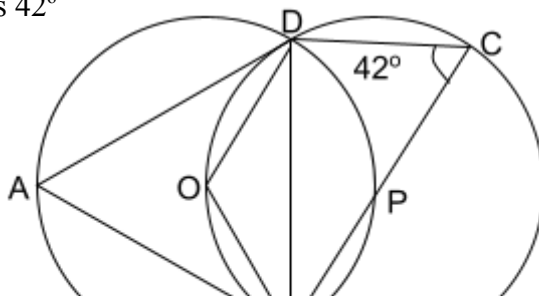


Find the sizes of the following angles giving reasons in each case:

- $\angle BDG$
 - $\angle DGE$
 - $\angle EFG$
 - $\angle CBD$
 - $\angle BCD$
15. The figure below shows two intersecting circles radii 8 cm and 6 cm respectively. The common chord AB = 9 cm and P and Q are the centres as shown:



- Calculate the size of angles:-
 - $\angle APB$
 - $\angle AQB$
 - Calculate the area of the shaded region
16. The figure O and P are centres of two intersecting circles. ABE is tangent to circle BCD at B angle BCD is 42°

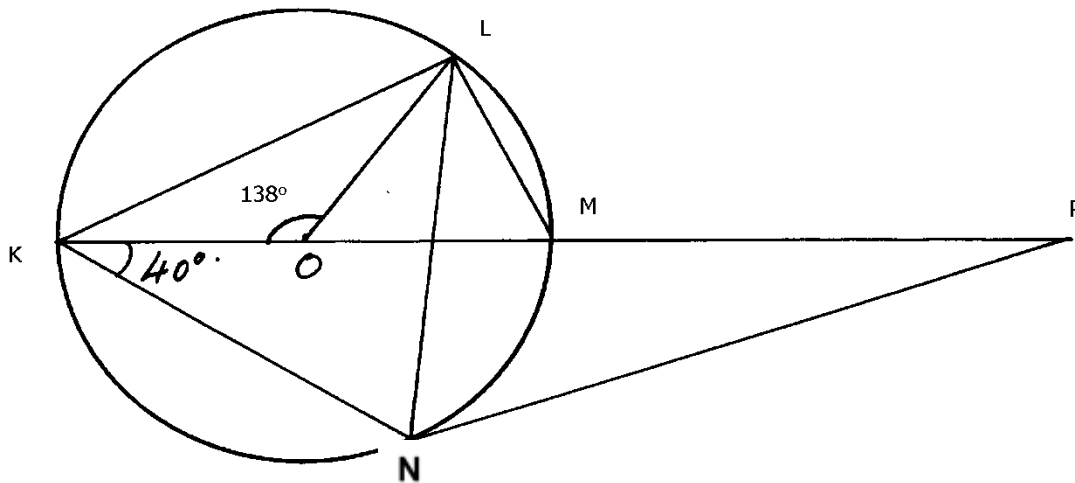


(a) Giving reasons for your answer, find:-

- (i) CBD
- (ii) DOB
- (iii) DAB
- (iv) CDA

b) Show that $\triangle ADB$ is isosceles

17.

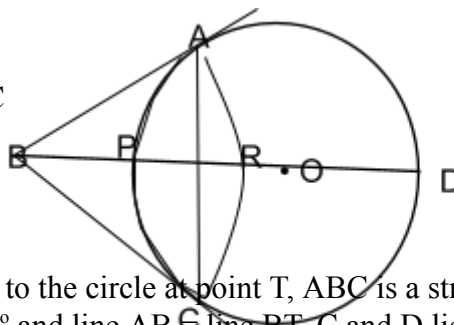


In the figure above K, M & P are points on a straight line. PN is a tangent of the circle centre O. Angle KOL = 130° and angle MKN = 40° . Find, giving reasons, the values of angles.

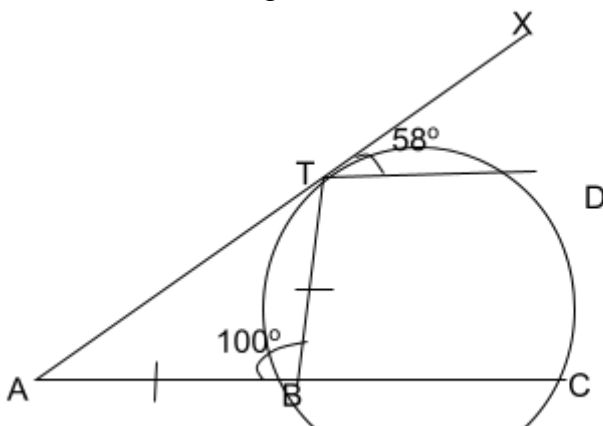
- (i) $\angle MLN$
- (ii) $\angle OLN$
- (iii) $\angle LNP$
- (iv) $\angle MPN$
- (v) $\angle LMO$

18. In the diagram below, O is the centre of the circle of radius 8cm. BA and BC are tangents to the circle at A and C respectively. PD is the diameter and AC is a chord of length 8cm. Angle ADC = 120° . ARC is an arc of the circle, Centre B and radius 4.6cm
Calculate correct to 2 decimal places

- (a) Angle ABR
- (b) Area of sectors ABCR and OAPC
- (c) Area of the shaded part



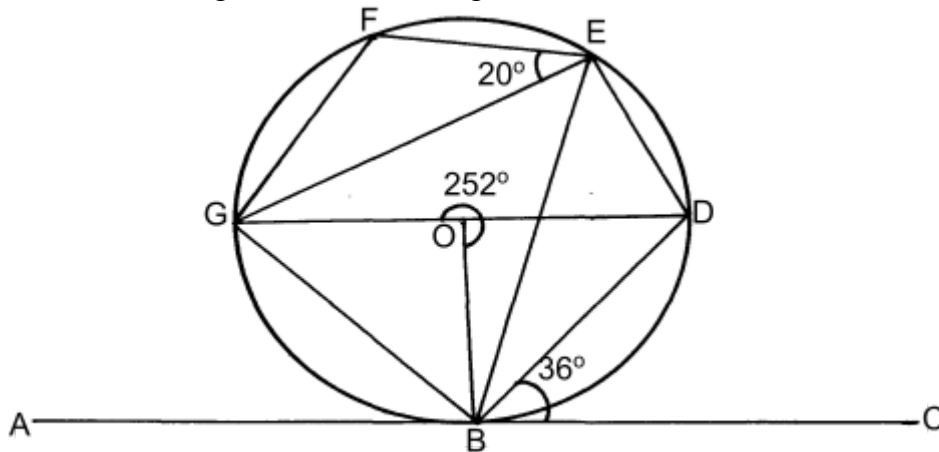
19. In the figure below, ATX is a tangent to the circle at point T, ABC is a straight line, angle ABT = 100° , angle XTD = 58° and line AB is line BT. C and D lie on the circle



Find by giving reasons, the value of angle:

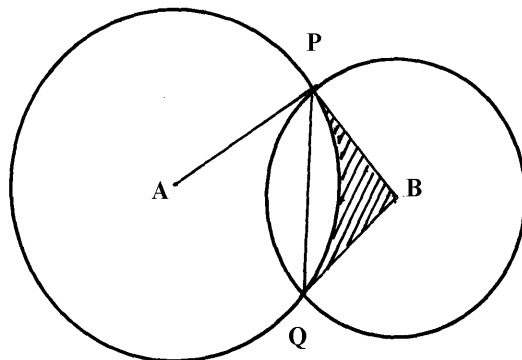
- (a) TDC
- (b) TCB
- (c) TCD
- (d) BTC
- (e) DTC

20. In the figure below, B, D, E, F and G are on the circumference of the circle centre O. A, B and C form a tangent to the circle at point B. GD is the diameter of the circle. Given that $FG = DE$, reflex angle $GOB = 252^\circ$, angles $DBC = 36^\circ$ and $FEG = 20^\circ$



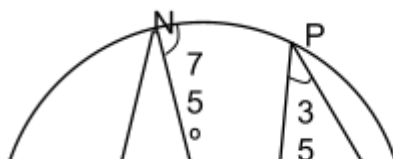
Giving reasons in each case find the angles:

- a) GEB
 - b) BED
 - c) OBE
 - d) BGE
 - e) GFE
21. XYZ is a triangle in which $x = 13.4\text{cm}$, $Z = 5\text{cm}$ and $\angle XYZ = 57.7^\circ$. Find:
- (i) Length of XZ
 - (ii) The circum radius of the triangle
22. In the figure shown below, the centers of the two circles are A and B. PQ is a common chord to the two circles. $AP = 6\text{cm}$, $BP = 4\text{cm}$ and $PQ = 5\text{cm}$



Calculate the area of the shaded region (take π as 3.142)

23. In the figure below NR is a diameter of the circle centre O. Angle $PNR = 75^\circ$, $\angle NRM = 50^\circ$ and $\angle RPQ = 35^\circ$. MRS and PQS are straight lines.



Giving reasons for every statement you write, find the following angles

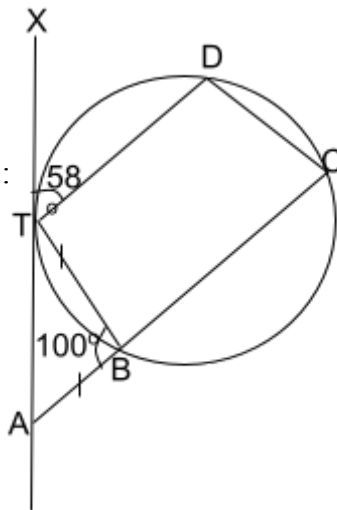
- (a) $\angle PQR$
- (b) $\angle QSR$
- (c) Reflex $\angle POR$
- (d) $\angle MQR$
- (e) $\angle PON$

*

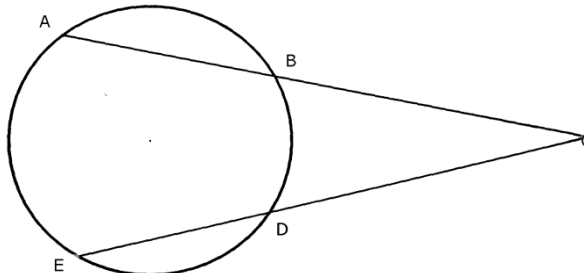
24. In the diagram below, ATX is a tangent to the circle at point T , ABC is a straight line, $\angle ABT = 100^\circ$, $\angle XTD = 58^\circ$ and the line $AB = BT$

Find giving reasons the value of :

- (a) $\angle TDC$
- (b) $\angle TCB$
- (c) $\angle TCD$
- (d) $\angle BTC$
- (e) $\angle DTC$



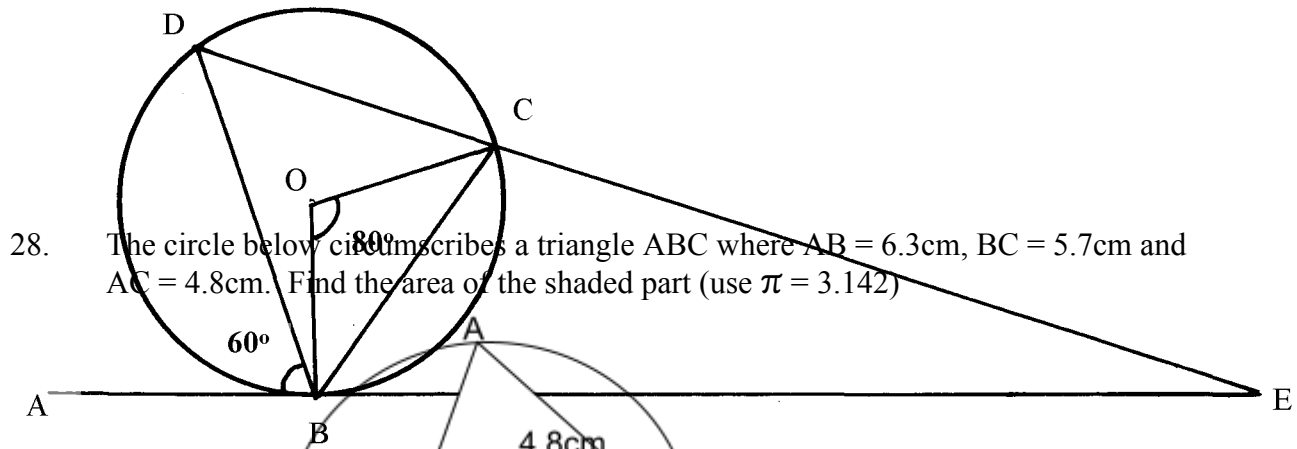
25.



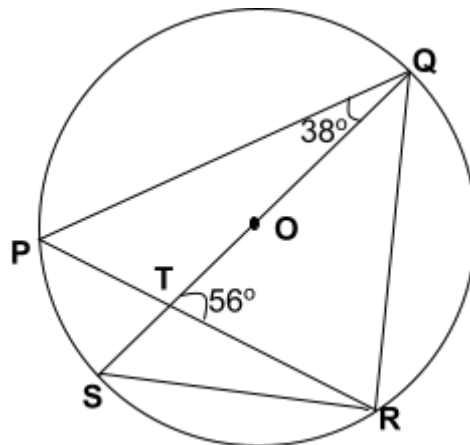
In the figure above $AB = 6$ cm, $BC = 4$ cm $DC = 5$ cm. Find the length DE .

- 26. The eleventh term of an AP is four times the second term. If the sum of the first seven terms of the AP is 175, find the first term and the common difference
- 27. In the diagram below ABE is a tangent to a circle at B and DCE is a straight line.

If $\angle ABD = 60^\circ$, $\angle BOC = 80^\circ$ and O is the centre of the circle, find with reasons $\angle BEC$



29.



(a) O is the centre of the circle and $QOTS$ is a diameter. P , Q , R and S are points on the circumference of the circle. Angle $PQS = 38^\circ$ and angle $QTR = 56^\circ$.

Calculate the size of ;

(i) $\angle PRQ$

(ii) $\angle RSQ$

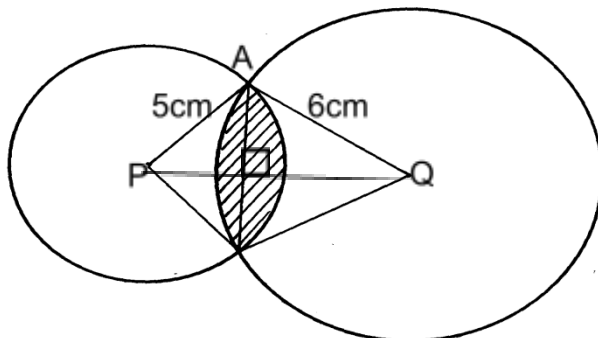
(b) Given that A varies directly as B and inversely as the cube of C and that;

$A = 12$ when $B = 3$ and $C = 2$. Find B when $A = 10$ and $C = 1.5$

(c) A quantity y is partly constant and partly varies inversely as the square of x .

The quantity $y=7$ when $x=10$ and $y=5\frac{1}{2}$ when $x=20$. Find the value of y when $x=18$

30. The figure below shows two intersecting circles with centres P and Q and radius 5cm and 6cm respectively. AB is a common chord of length 8cm . Calculate;



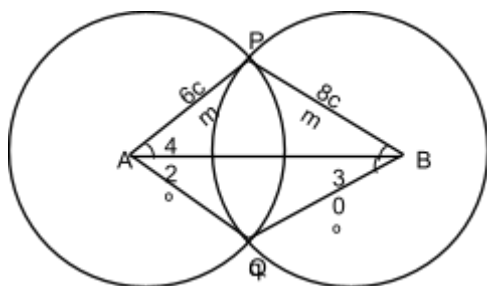
B

- (a) the length of PQ
- (b) the size of;
 - (i) angle APB
 - (ii) angle AQB
- (c) the area of the shaded region

31. Triangle ABC is inscribed in the circle. AB= 7.8cm, AC 6.6cm and BC= 5.9cm. Find:

- (a) The radius of the circle correct to one decimal place
- (b) The area of the shaded region

32. The figure below shows two circles centres A and B and radii 6 cm and 8 cm respectively. The circles intersect at P and Q. Angle PAB = 42° and angle ABQ = 30° .



- (a) Find the size of $\angle PAQ$ and $\angle PBQ$.
- (b) Calculate, to one decimal place the area of:
 - (i) Sector APQ and PBQ.
 - (ii) Triangle APQ and PBQ.
 - (iii) The shaded area (take $\pi = 22$)

33. The minute hand of a clock is 6.5 cm long. Calculate the distance in cm moved by its tip between 10.30 am. and 10.45 a.m. to 2 dpl.