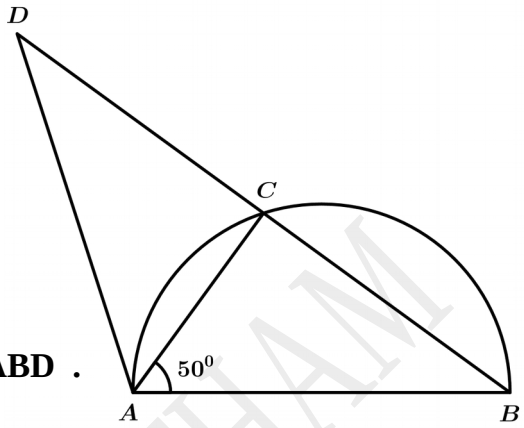
WANDOOR GANITHAM SSLC MATHEMATICS STUDY MATERIAL : 2023

CIRCLES

QUESTION – 1

In the figure AB is the diameter of the semicircle and C is a point on it . D is a point on the line BC extended . $\angle BAC = 50^0$. Also AB = AD .

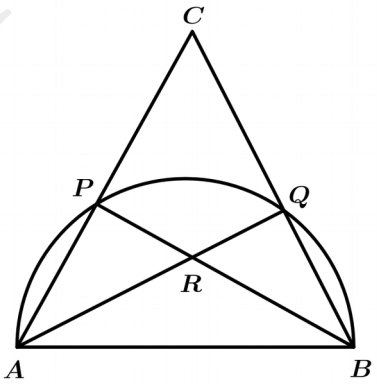


a) What is the measure of $\angle ACB$?

b) Find the measures of the angles of the triangle ABD .

QUESTION - 2

In the figure AB is the diameter of the semicircle and P , Q are two points on it . Both lines AP and BQ extended meet at the point C . The lines AQ and BP intersect at R .



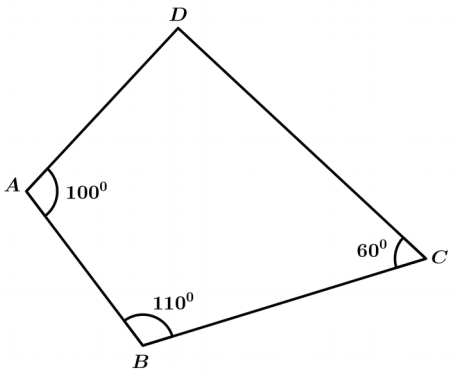
a) What are the measures of the angles $\angle APB$ and $\angle AQC$?

b) If $\angle PRQ = x^0$, what is the measure of $\angle ARB$?

c) Prove that $\angle ACB + \angle ARB = 180^0$.

QUESTION - 3

In the figure , in quadrilateral ABCD , $\angle A = 100^0$, $\angle B = 110^0$, $\angle C = 60^0$.



a) What is the measure of $\angle D$?

b) Check whether the vertex D is inside , on or outside the circle with AC as diameter.

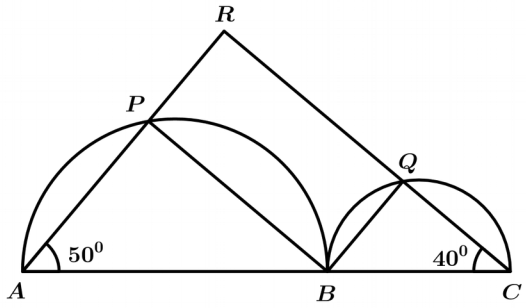
c) Check whether the vertices A and C are inside , on or outside the circle with BD as diameter.

QUESTION - 4

In the figure B is a point on the line AC . P is a point on the semicircle with AB as diameter.

Q is a point on the semicircle with BC as diameter .

Both the lines AP and CQ are extended to meet at R .



a) Complete the following table .

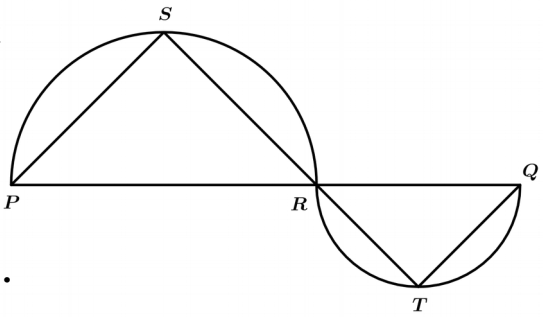
Angle	Measure
∠ APB	
∠ BQR	
∠ ABP	
∠ PBQ	

b) Prove that the quadrilateral PBQR is a rectangle .

QUESTION - 5

In the figure R is a point on the line PQ . S is a point on the semicircle with PR as diameter.T is a point on the semicircle with RQ as diameter .

The lines PQ and ST meet at R .Also SP = SR .



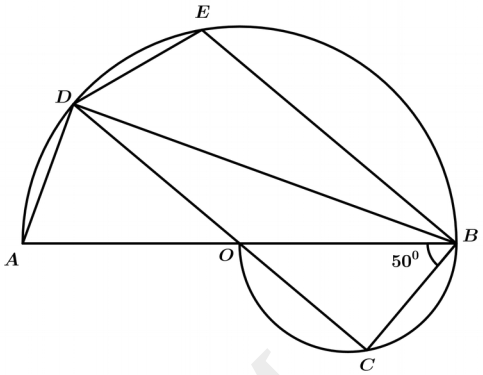
a) Complete the following table .

Angle	Measure
∠ PSR	
∠ QTR	
∠ SPR	
∠ RQT	

b) Prove that QTR is an isosceles triangle .

QUESTION - 6

In the figure , D is a point on the semicircle with centre O and diameter AB . OB is the diameter of the smaller semicircle . The line DO is extended to meet the smaller semicircle at C. A line drawn parallel to CD through B meets the larger semicircle at E .∠ OBC = 50^0 .



a) Complete the following table .

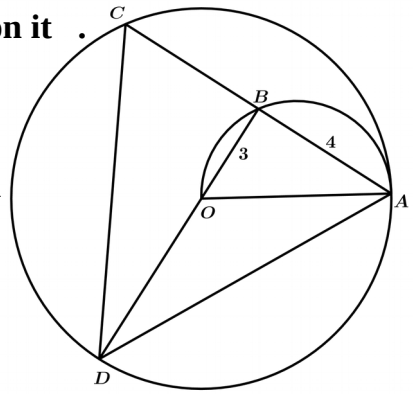
Angle	Measure
∠ OCB	
∠ AOD	
∠ ADO	
∠ OBD	

b) Prove that BD is the bisector of ∠ ABE .

c) Check whether the vertex B is inside , on or outside the circle with CE as diameter.

QUESTION - 7

In the figure O is the centre of the circle and A is a point on it . B is a point on the semicircle with OA as diameter . AB is extended to meet the circle at C and BO is extended to meet the circle at D . OB = 3 centimetres , AB = 4 centimetres .



a) What is the measure of ∠ OBA ?

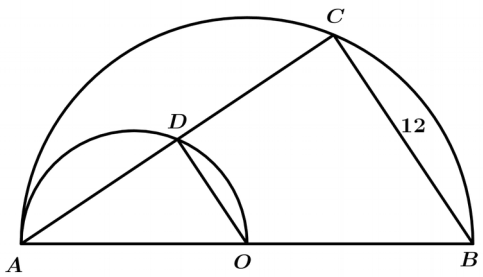
b) What is the length of AC ?

c) What is the radius of the circle ?

d) Calculate the area of the triangle DAC .

QUESTION - 8

In the figure O is the centre of the larger semicircle . OA is the diameter of the smaller semicircle and D is a point on it . AD is extended to meet the larger semicircle at C . Radius of the larger semicircle is 10 centimetres and BC = 12 centimetres .



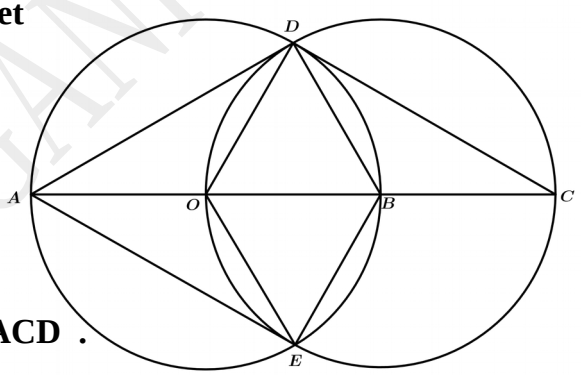
a) What are the measures of ∠ ACB and ∠ ADO ?

b) What are the lengths of the lines AC and DC ?

c) Calculate the perimeter of the triangle AOD .

QUESTION - 9

In the figure , two circles centred at O and B meet at D and E .



a) What are the measures of ∠ ADB , ∠ AEB ?

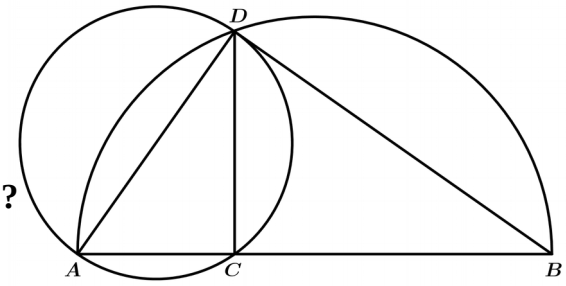
b) Prove OBD is an equilateral triangle .

c) Find the measures of the angles of the triangle ACD .

d) Prove that AB is the bisector of ∠ DAE .

QUESTION - 10

In the figure , D is a point on the semicircle with diameter AB . The circle drawn with diameter AD cuts AB at C .



a) What are the measures of ∠ ADB and ∠ ACD ?

b) Does the circle with diameter BD pass through C? Why ?

c) If $\angle ADC = x^0$, what is the measure of ∠ CBD ?

d) Check whether the angles of the triangles ACD and BCD are equal or not .

e) Prove that $AC \times CB = CD^2$.

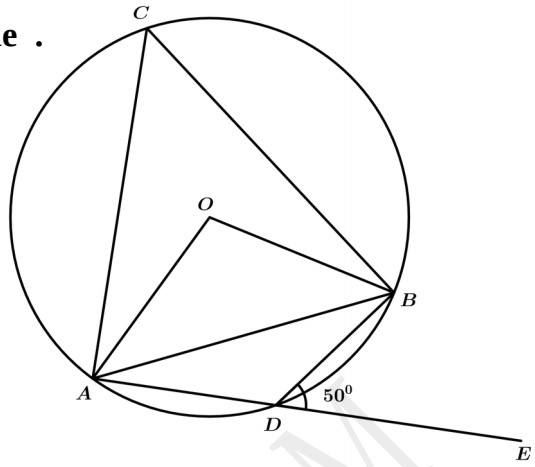
QUESTION - 11

In the figure A , B , C , D are the points on the circle .

The line AD is extended to E .

$\angle$ BDE = 50^0 , AD = BD .

Find the measures of the following angles .



a) $\angle$ ADB

b) $\angle$ ACB

c) Angle made by the small arc AB at the centre of the circle .

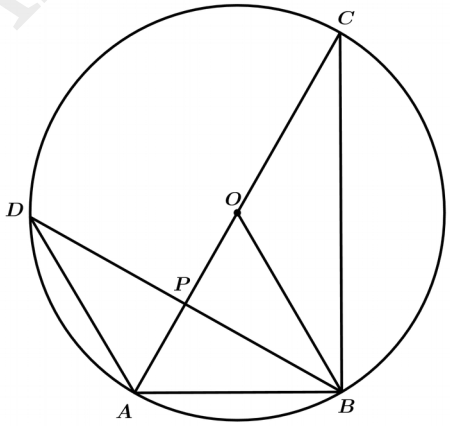
d) $\angle$ OAB

e) $\angle$ OBD

QUESTION – 12

In the figure A , B , C , D are the point on the circle with centre O . OA = AB = AD

The lines AC and BD meet at P .



a) Prove that OAB is an equilateral triangle .

b) Find the mesures of the following angles .

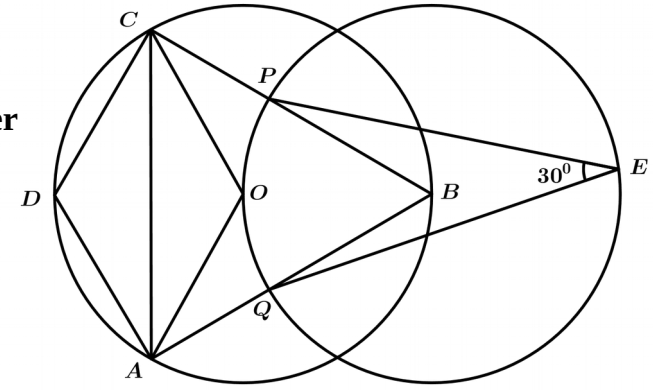
$\angle$ AOB , $\angle$ ACB , $\angle$ ADB

c) Prove that BD is the bisector of $\angle$ OBA .

d) Check whether the point P is inside , on or outside the circle with AD as diameter. Give reason .

QUESTION - 13

In the figure A , B , C , D are the points on a circle with centre O . CD = AD . Another circle is drawn with B as centre passes through O and E is a point on it .



This circle cuts the lines BC and BA at P and Q respectively . ∠ PEQ = 30^0 .

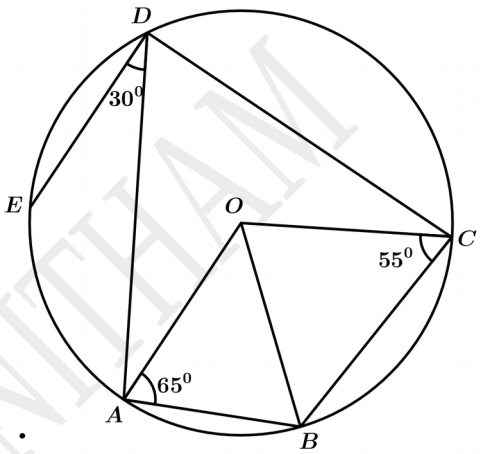
a) Find the measures of the following angles .

∠ PBQ , ∠ AOC , ∠ ADC , ∠ OAD

b) Prove that the quadrilateral DAOC is a rhombus .

QUESTION - 14

In the figure A , B , C , D , E are the points on a circle with centre O ED is parallel to OA . ∠ OAB = 65^0 , ∠ OCB = 55^0 , ∠ ADE = 30^0 .



Find the measures of the following angles .

a) ∠ OBA

b) Angle made by the arc ABC at the centre of the circle .

c) ∠ ADC

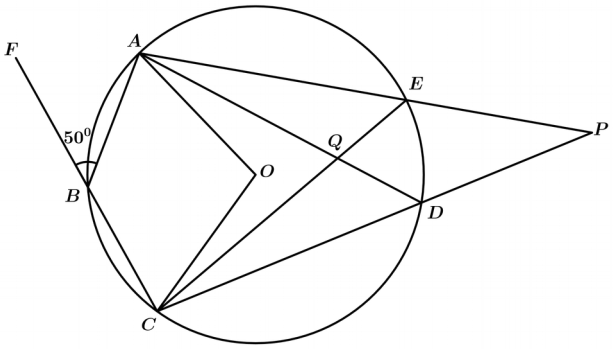
d) ∠ BAD

e) ∠ OCD

QUESTION - 15

In the figure A , B , C , D , E are the points on a circle with centre O . The lines AE and CD are extended to meet at P . The lines AD and CE intersect at Q . The line CB is extended to F .

∠ ABF = 50^0 .



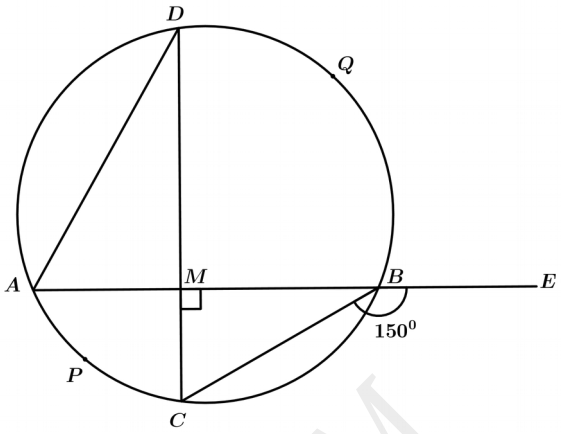
a) Find the measures of the following angles .

∠ ABC , ∠ AEC , ∠ AOC , ∠ ADP .

b) Prove that ∠ *APC* + ∠ *AQC* = ∠ *AOC* .

QUESTION - 16

In the figure , AB and CD are mutually perpendicular chords of the circle AB and CD intersect at M . E is a point on the line AB extended . P and Q are the other two points on the circle . ∠ CBE = 150^0 .



a) What is the measure of ∠ CBA ?

b) What are the measures of the angles of the triangle AMD ?

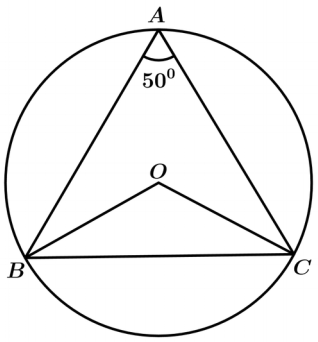
c) What is the measure of the central angle of the arc APC ?

d) What is the sum of the central angles of the arcs APC and BQD ?

e) Prove that the arcs APC and BQD joined together would make half the circle .

QUESTION - 17

In the figure , A , B , C are the points on the circle with centre O . ∠ BAC = 50^0



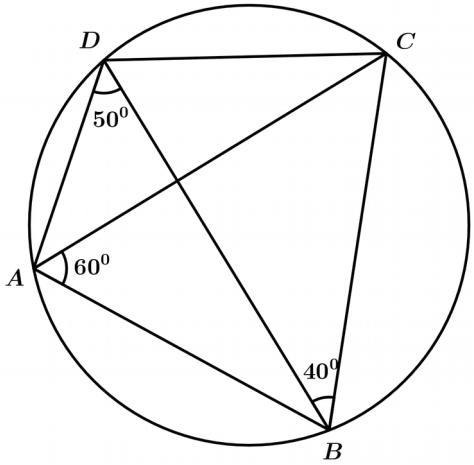
a) What is the central angle of the small arc BC ?

b) Draw a circle of radius 3 centimetres and a triangle of angles 50^0 , 60^0 , 70^0 with all the three vertices on this circle .

QUESTION - 18

In the figure A , B , C , D are the points on the circle .

∠ ADB = 50^0 , ∠ BAC = 60 , ∠ CBD = 40^0 .



Find the measures of the following .

a) ∠ ACB

b) ∠ BDC

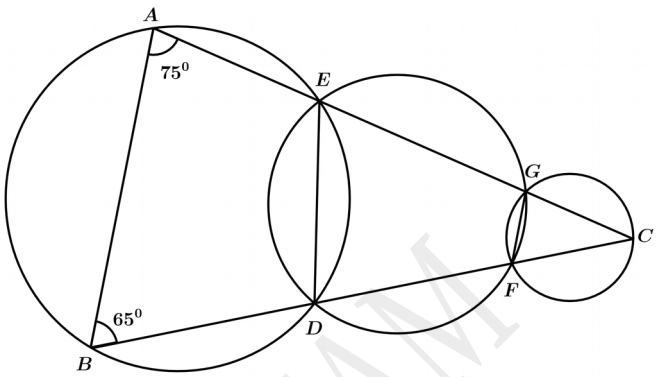
c) ∠ CAD

d) ∠ ABD

e) Central angle of the arc DAB .

QUESTION - 19

In the figure , the circles on the left and right intersect the middle circle at D , E , F , G . and the lines joining them meet the left and right circles at A , B , C . $\angle A = 75^0$, $\angle B = 65^0$



a) What is the measure of $\angle AED$?

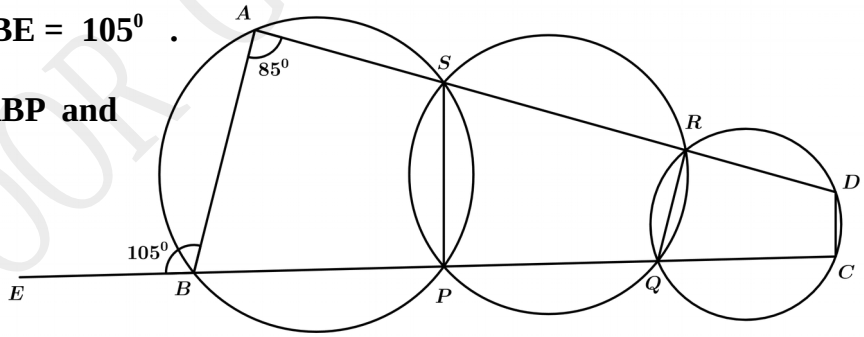
b) Find the measures of the angles of the quadrilateral DFGE .

c) Find three triangles with same angles from the figure .

d) Prove that $\frac{CF}{BC} = \frac{CG}{AC}$.

QUESTION - 20

In the figure , the circles on the left and right intersect the middle circle at P , Q , R , S . and the lines joining them meet the left and right circles at A , B , C , D . The line CB is extended to E . $\angle A = 85^0$, $\angle ABE = 105^0$.



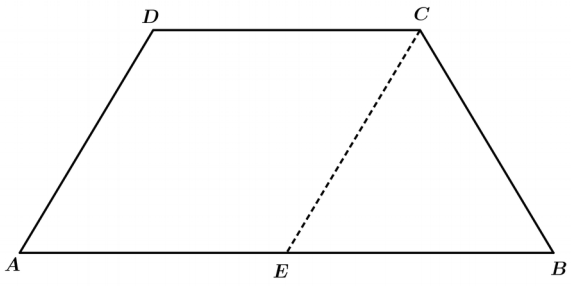
a) What are the measures of $\angle ABP$ and $\angle BPS$?

b) Find the measures of the angles of the quadrilateral PQRS .

c) Prove that ABCD is a cyclic quadrilateral .

QUESTION - 21

In the figure ABCD is a trapezium . AD = BC . A line drawn parallel to AD through C meets AB at E .



a) If $\angle BAD = x^0$, what is the measure of $\angle BEC$?

b) Prove that AECD is a parallelogram .

c) If $\angle BAD = x^0$, what is the measure of $\angle$ CBE ?

d) Prove that an isosceles trapezium is cyclic .

QUESTION - 22

In quadrilateral ABCD , $\angle A : \angle B : \angle C : \angle D = 1 : 2 : 5 : 4$.

a) If $\angle A = x^0$, what are the measures of other angles of ABCD ?

b) What is the sum of the angles of a quadrilateral ?

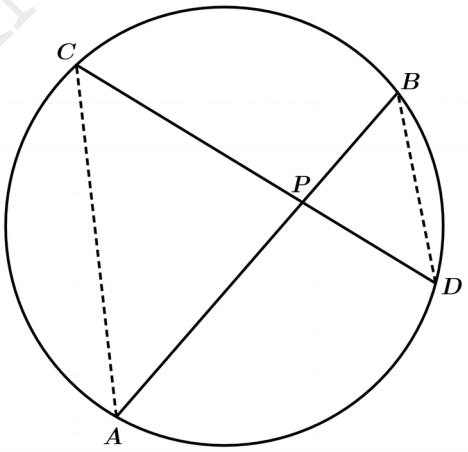
c) Prove that ABCD is cyclic .

d) Which of the following is not a cyclic quadrilateral ?

Rectangle , square , parallelogram , isosceles trapezium .

QUESTION - 23

In the figure two chords AB and CD of a circle are intersect at P .



a) If $\angle ACD = x^0$,what is the value of $\angle ABD$?

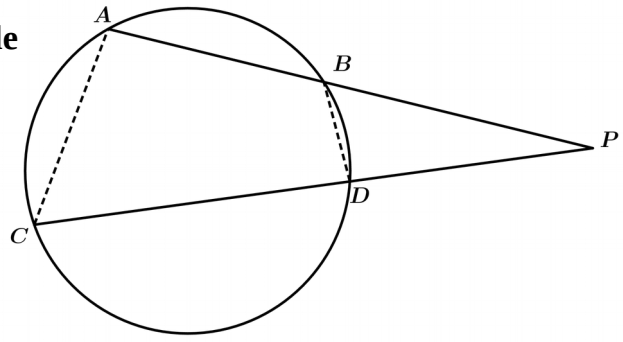
b) Check whether the angles of the triangles APC and BPD are equal or not .

c) Prove that $PA \times PB = PC \times PD$.

d) If AB = 11 centimetres , PB = 3 centimetres and PD = 4 centimetres , what is the length of the chord CD ?

QUESTION - 24

In the figure two chords AB and CD of the circle are extended to meet at P .



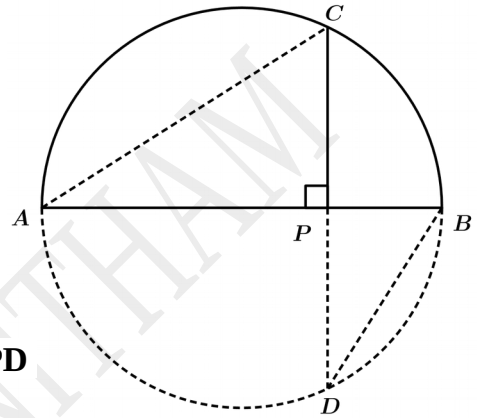
a) If $\angle ACD = 60^0$, what is the value of $\angle ABD$?

b) Check whether the angles of the triangles APC and BPD are equal or not .

c) Prove that $PA \times PB = PC \times PD$.

d) If AB = 9 centimetres , PB = 6 centimetres and PD = 5 centimetres , what is the length of the chord CD ?

QUESTION - 25



In the figure , AB is the diameter of the circle and P is a point on it . CD is a chord perpendicular to AB through P .

a) If $\angle ABD = x^0$, what is the value of $\angle ACD$?

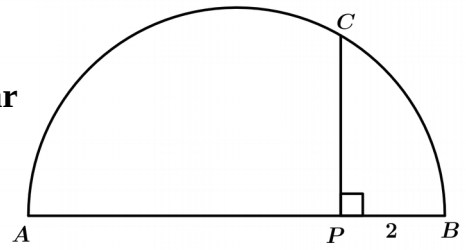
b) Check whether the angles of the triangles APC and BPD are equal or not .

c) " *P is the midpoint of CD* " - Is this statement correct ? Justify your answer .

d) Prove that $PA \times PB = PC^2$

e) If AB = 13 centimetres and PA = 9 centimetres , what is the length of the chord CD ?

QUESTION - 26



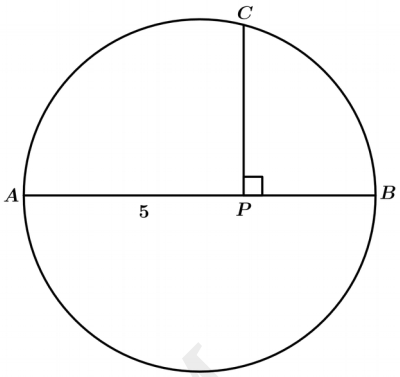
In the figure , AB is the diameter of the semicircle and P is a point on it . A line drawn through P perpendicular to AB meets the semicircle at C . AB = 10 centimetres , PB = 2 centimetres .

a) What is the length of PA ?

b) If a square is drawn with PC as side , what is its area ?

c) Draw a rectangle of length 5 centimetres and breadth 3 centimetres and draw a square of the same area .

QUESTION – 27

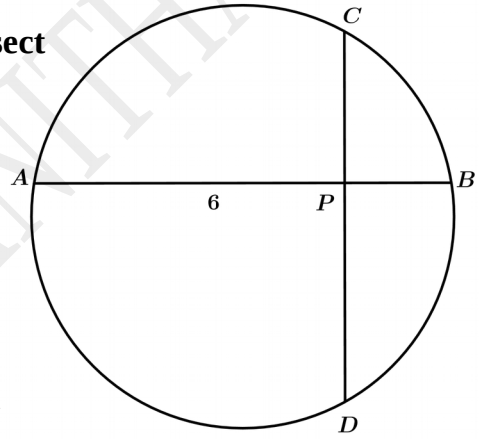


In the figure , AB is the diameter of the circle and P is a point on it . A line drawn through P perpendicular to AB meets the circle at C . AB = 8 centimetres , PA = 5 centimetres .

a) What are the lengths of PB and PC ?

b) Draw an equilateral triangle with a side $\sqrt{60}$ centimetres .

QUESTION - 28



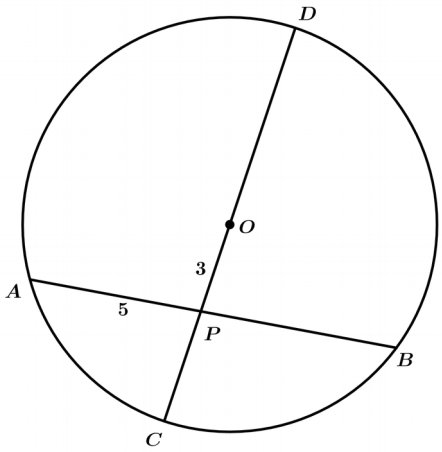
In the figure , two chords AB and CD of the circle intersect at P . AB = 8 centimetres , PA = 6 centimetres

a) What is the length of PB ?

b) What is the area of the rectangle with length PD and breadth PC ?

c) Draw a rectangle of length 5 centimetres and breadth 3 centimetres . Draw another rectangle of the same area with a side 7 centimetres .

QUESTION - 29



In the figure O is the centre of the circle .

The diameter CD cuts the chord AB at P .

AB = 13 centimetres , PA = 5 centimetres ,

OP = 3 centimetres .

a) What is the length of PB ?

b) If the radius of the circle is taken as r centimetres , what is the length of PD ?

c) What is the relation among the lengths of the lines PA , PB , PC and PD ?

d) What is the radius of the circle ?