D.T.CLASSES

Class 09 - Mathematics

Section A

1. Angle inscribed in a semicircle is : **[1]**

   a) 90^o b) 75^o

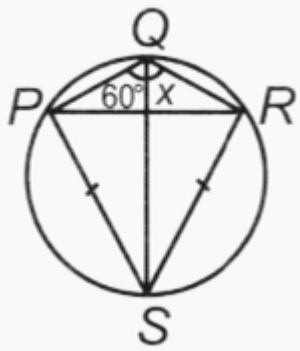
   c) 60^o d) 120^o

2. In a circle of radius 17 cm, two parallel chords are drawn on opposite side of a diameter. The distance between the chords is 23 cm. If the length of one chord is 16 cm, then the length of the other is **[1]**

   a) 23 cm b) 34 cm

   c) 15 cm d) 30 cm

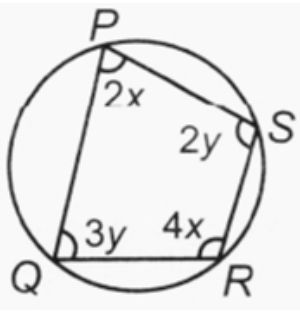
3. In the given figure, PQRS is a cyclic quadrilateral in which PS = RS, ∠SQR = x and ∠PQS = 60°. The value of x is_____. **[1]**



   a) 60° b) 75°

   c) 30° d) 80°

4. In the given figure, if PQRS is a cyclic quadrilateral with respective angles. Then, the ratio of x and y is _____. **[1]**



   a) 3 : 2 b) 5 : 6

   c) 2 : 3 d) 1 : 2

5. An equilateral triangle ABC is inscribed in a circle with centre O. The measures of ∠BOC is **[1]**

a) 90^o b) 60^o

c) 120^o d) 30^o

6. AB and CD are two parallel chords of a circle with centre O such that AB = 6 cm and CD = 12 cm. The chords are on the same side of the centre and the distance between them is 3 cm. The radius of the circle, is **[1]**

a) $5\sqrt{2}$ cm b) 6 cm

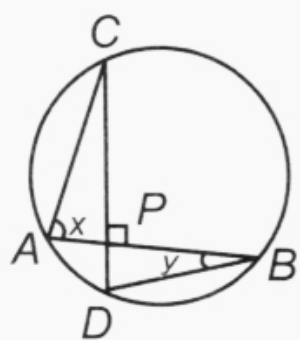
c) 7 cm d) $3\sqrt{5}$ cm

7. Two equal circles of radius r intersect such that each passes through the centre of the other. The length of the common chord of the circles, is **[1]**

a) $\sqrt{r}$ b) $\frac{\sqrt{3}}{2}$r

c) $\sqrt{3}$r d) $\sqrt{2}$rAB

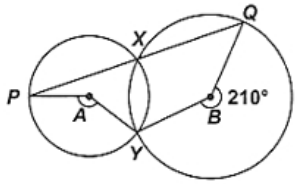
8. In the given figure, if chords and CD of the circle intersect each other at right angles, then x + y = _____. **[1]**



a) 90° b) 45°

c) 75° d) 60°

9. In the given figure, A and B are the centres of two circles that intersect at X and Y. PXQ is a straight line. If reflex angle QBY = 210^o, then find obtuse angle PAY. **[1]**



a) 150^o b) 210^o

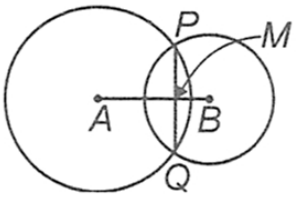
c) 160^o d) 120^o

10. If two diameters of a circle intersect each other at right angles, then quadrilateral formed by joining their end points is a **[1]**

a) rhombus b) parallelogram

c) rectangle d) square

11. In the given figure, AB and PQ intersect at M. If A and B are centres of circles, then _____. **[1]**



a) PQ ⊥ AB

b) PQ = AB

c) PM = MQ

d) Both PM = MQ and PQ ⊥ AB

12. If O is the centre of a circle of radius r and AB is a chord of the circle at a distance $\frac{r}{2}$ from O, then ∠BAO = **[1]**

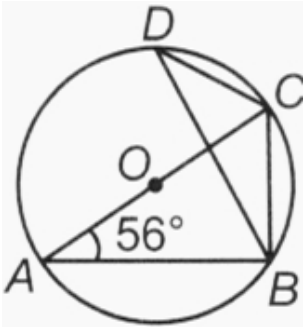
a) 15^o

b) 60^o

c) 45^o

d) 30^o

13. In the given figure, O is the centre of the circle and ∠BAC = 56°. The measure of ∠BDC is _____. **[1]**



a) 50°

b) 40°

c) 56°

d) 46°

14. AD is a diameter of a circle and AB is a chord. If AD = 34 cm, AB = 30 cm, then the distance of AB from the centre of the circle is _____. **[1]**

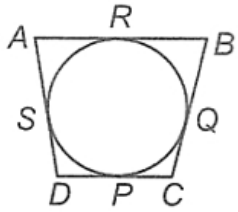
a) 8 cm

b) 15 cm

c) 4 cm

d) 17 cm

15. In the given figure, a circle touches all the four sides of a quadrilateral ABCD whose three sides are AB = 6 cm, BC = 7 cm, CD = 4 cm, then AD equals _____. **[1]**



a) 13 cm

b) 11 cm

c) 10 cm

d) 3 cm

16. If AB, BC and CD are equal chords of a circle with O as centre and AD diameter, than ∠AOB = **[1]**

a) 90^o

b) 120^o

c) 130^o

d) 60^o

17. If ABC is an arc of a circle and ∠ABC = 135°, then the ratio of arc $\widehat{ABC}$ to the circumference, is **[1]**

a) 3 : 4

b) 1 : 4

c) 3 : 8 d) 1 : 2

18. ABCD is a cyclic quadrilateral such that AB is a diameter of the circle circumscribing it and $\angle ADC = 140^o$, then $\angle BAC$ is equal to **[1]**

a) 30^o b) 75^o

c) 50^o d) 40^o

19. A chord of length 14 cm is at a distance of 6 cm from the centre of a circle. The length of another chord at a distance of 2 cm from the centre of the circle is **[1]**

a) 12 cm b) 14 cm

c) 18 cm d) 16 cm

20. The region between chord and either of the arc is called **[1]**

a) a segment b) a semicircle

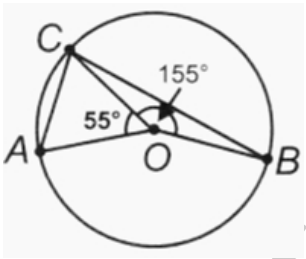
c) a sector d) a quarter circle

21. AD is diameter (50 cm) of a circle, O being the centre and AB is a chord (48 cm). Let the centre of AB be denoted by M, then find OM **[1]**

a) 6 cm b) 8 cm

c) 7 cm d) 5 cm

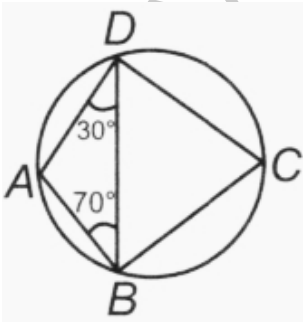
22. In the given figure, angles subtended by chords AC and BC at the centre O of the circle are 55° and 155° respectively. Find ∠ACB. **[1]**



a) 150° b) 60°

c) 62° d) 75°

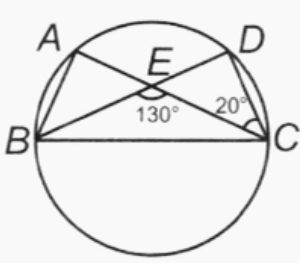
23. In the given figure, ∠ABD = 70°, ∠ADB = 30°. Then, ∠BCD is _____. **[1]**



a) 80° b) 120°

c) 100° d) 90°

24. A, B, C and D are four points on a circle. AC and BD intersect at a point E such that ∠BEC = 130° and ∠ECD = 20°, then ∠BAC is _____. **[1]**



a) 120° b) 9°

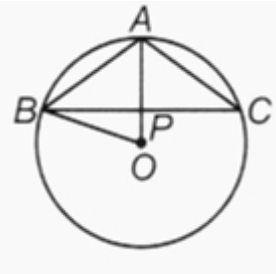
c) 100° d) 110°

25. ABCD is a cyclic quadrilateral such that ∠ADB = 30° and ∠DCA = 80°, then ∠DAB = **[1]**

a) 70^o b) 150^o

c) 100^o d) 125^o

26. O is the centre of the circle having radius 5 cm. AB and AC are two chords such that AB = 6 cm. If OA meets BC at P, then OP = _____. **[1]**



a) 2 cm b) 3.6 cm

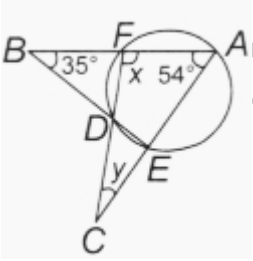
c) 3 cm d) 1.4 cm

27. In a circle with centre O, AB and CD are two diameters perpendicular to each other. The length of chord AC, is **[1]**

a) 2AB b) $\frac{1}{2}$AB

c) $\sqrt{2}$ d) $\frac{1}{\sqrt{2}}$AB

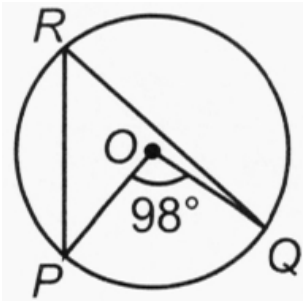
28. In the given figure, AEDF is a cyclic quadrilateral. The values of x and y respectively are **[1]**



a) 89°, 37° b) 89°, 47°

c) 79°, 37° d) 79°, 47°

29. O is the centre of the circle. If ∠POQ = 98°, then ∠PRQ is _____. **[1]**



a) 49° b) 98°

c) 80° d) 196°

30. A chord is at a distance of 8 cm from the centre of a circle of radius 17 cm. The length of the chord is **[1]**

a) 30 cm b) 9 cm

c) 12.5 cm d) 25 cm

31. The angle in a semicircle measures **[1]**

a) 60^o b) 90^o

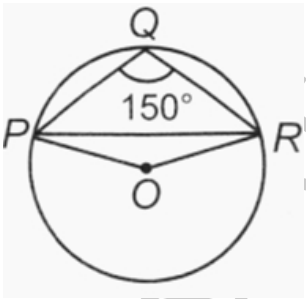
c) 36^o d) 45°

32. OACB is a quadrant of a circle with centre O and radius 7 cm where ACB is the arc. Then the perimeter of the quadrant is: **[1]**

a) 50 cm b) 15 cm

c) 44 cm d) 25 cm

33. In the given figure, ∠PQR = 150°, where P, Q and R are points on a circle with centre O. Then ∠OPR is _____. **[1]**



a) 60° b) 50°

c) 40° d) 80°

34. The radius of a circle is 6 cm. The perpendicular distance from the centre of the circle to the chord which is 8 cm in length, is **[1]**

a) $2\sqrt{5}$ cm b) $\sqrt{7}$ cm

c) $2\sqrt{7}$ cm d) $\sqrt{5}$ cm

35. PQRS is a cyclic quadrilateral such that PR is a diameter of the circle. If ∠QPR = 67° and ∠SPR = 72°, then ∠QRS = **[1]**

a) 18^o b) 41^o

c) 67^o d) 23^o

36. ABC is a triangle with B as right angle, AC = 5 cm and AB = 4 cm. A circle is drawn with A as centre and AC as radius. The length of the chord of this circle passing through C and B is **[1]**

a) 4 cm b) 5 cm

c) 6 cm d) 3 cm

37. Which of the following pair of lines in a circle cannot be parallel? **[1]**

a) a chord and a tangent b) two chords

c) two diameters d) two tangents

38. If AB = 12 cm, BC = 16 and AB is perpendicular to BC, then the radius of the circle passing through the points A, B and C is **[1]**

a) 12 cm b) 6 cm

c) 10 cm d) 8 cm

39. In a circle, the major arc is 3 times the minor arc. The corresponding central angles and the degree measures of two arcs are **[1]**

a) 270^o and 90^o b) 90^o and 27^o

c) 90^o and 90^o d) 60^o and 210^o

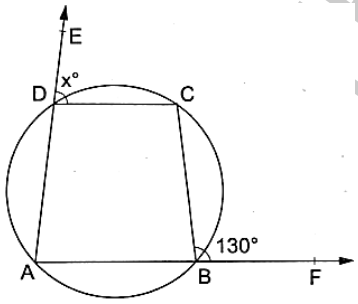
40. AD is a diameter of a circle and AB is a chord. If AD = 34 cm, AB = 30 cm the distance of AB from the center of the circle is: **[1]**

a) 17 cm b) 4 cm

c) 8 cm d) 15 cm

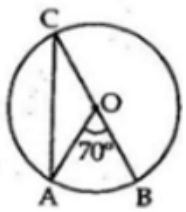
Section B

41. In the given figure, sides AD and AB of cyclic quadrilateral ABCD are produced to E and F respectively. If ∠CBF = 130° and ∠CDE = x°, find the value of x. **[2]**

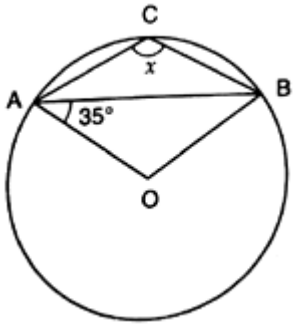


42. Draw different pairs of circles. How many points does each pair have in common? What is a maximum number of common points? **[2]**

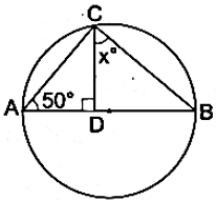
43. In the given figure, O is the centre of the circle and ∠AOB = 70°, then find ∠OCA. **[2]**



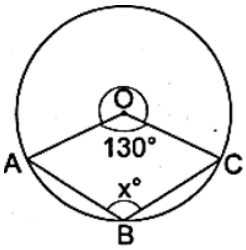
44. If O is the centre of the given circle, find the value of x in figure: **[2]**



45. If O is the centre of the circle, find the value of x in given figure: **[2]**



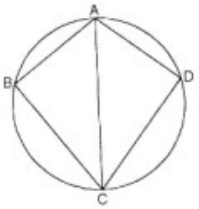
46. If O is the centre of the circle, find the value of x in given figure: **[2]**



47. In the figure, **[2]**

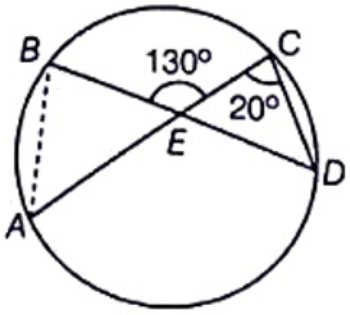
i. $\angle BAC = 70^o$ and $\angle DAC = 40^o$, then find $\angle BCD$

ii. $\angle BAC = 60^o$ and $\angle BCA = 60^o$, then find $\angle ADC$

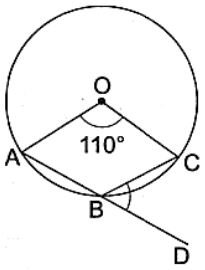


48. Suppose you are given a circle. Give the construction to find its centre. **[2]**

49. In the given figure, A, B, C, and D are four points on a circle. AC and BD intersect at point E such that $\angle BEC = 130°$ and $\angle ECD = 20°$. Find $\angle BAC$. **[2]**

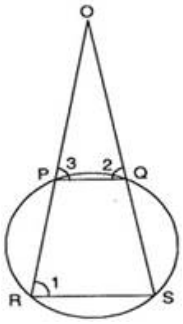


50. In the given figure, O is the centre of a circle, $\angle AOC = 110°$ and side AB has been produced to a point D. Find $\angle CBD$. **[2]**



Section C

51. PQ and RS are two parallel chords of a circle and lines RP and SQ intersect each other at O. Prove that OP = OQ. **[3]**



52. Two circles with centre O and O' intersect at two points A and B. A line PQ is drawn parallel to OO' through B intersecting the circles at P and Q. Prove that PQ = 2OO'. **[3]**

53. Prove that the circles described on the four sides of a rhombus as diameters, pass through the point of intersection of its diagonals. **[3]**

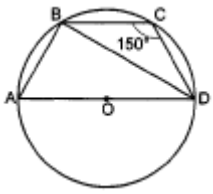
54. Prove that the circle drawn on any one of the equal sides of an isosceles triangle as diameter bisects the base. **[3]**

55. Recall that two circles are congruent if they have a same radii. Prove that equal chords of congruent circles subtend equal angles at their centres. **[3]**

56. In given figure, AD is a diameter of the circle. If $\angle BCD = 150^{o}$, calculate **[3]**

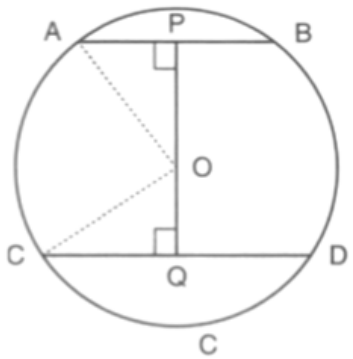
i. $\angle BAD$

ii. $\angle ADB$

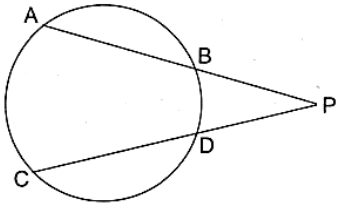


57. Two chords AB and AC of a circle subtends angles equal to 90° and 150°, respectively at the centre. Find $\angle BAC$, if AB and AC lie on the opposite sides of the centre. **[3]**

58. In Given fig. O is the centre of the circle of radius 5 cm. OP $\perp$ AB, OQ $\perp$ CD, AB$\|$CD. AB = 6 cm and CD = 8 cm, Determine PQ. **[3]**



59. Two chords AB and CD of a circle intersect each other at P outside the circle. If AB = 6 cm, BP = 2 cm and PD = 2.5 cm, find CD. **[3]**



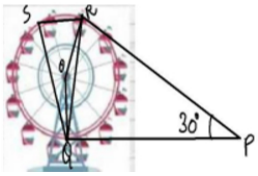
60. AB and AC are the equal chords of a circle whose centre is O. Prove that AO bisects ∠ BAC. **[3]**

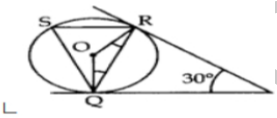
Section D

61. **Read the following text carefully and answer the questions that follow:** **[4]**

A Ferris wheel (or a big wheel in the United Kingdom) is an amusement ride consisting of a rotating upright wheel with multiple passenger-carrying components (commonly referred to as passenger cars, cabins, tubs, capsules, gondolas, or pods) attached to the rim in such a way that as the wheel turns, they are kept upright, usually by gravity.

After taking a ride in Ferris wheel, Aarti came out from the crowd and was observing her friends who were enjoying the ride . She was curious about the different angles and measures that the wheel will form. She forms the figure as given below





i. Find ∠ROQ. (1)

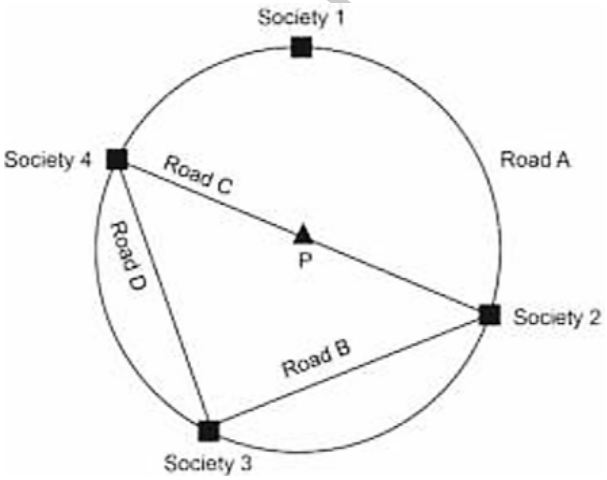
ii. Find ∠RQP. (1)

iii. Find ∠RSQ. (2)

OR

Find ∠ORP. (2)

62. Given below is the map giving the position of four housing societies in a township connected by a circular road A. **[4]**



Society 2 and 3 are connected by straight road B, society 4 and 2 are connected by straight road C and society 4 and 3 are connected by road D. Point P denotes the position of a park. The park is equidistant to all four societies.

Rubina claims that it is not possible to construct another circular road connecting all four societies.

i. Which of the following options justifies Rubina's claim?

a. Equal chords of congruent circles subtend equal angles at the centre.
b. The perpendicular from the centre of a circle to a chord bisects the chord.
c. There is a unique circle passing through three non-collinear points.
d. Points equidistant from a given point will lie on a circle.

ii. What is the position of the park P with respect to road A?

a. Chord
b. Centre
c. Sector
d. Segment

iii. The length of Road B is equal to the length of Road D.
Which of the following options can be true for the roads in the township?

a. Road B bisects Road D.
b. Road B and Road make an acute angle.
c. Road B, Road C and Road D are of equal length.
d. Road B and Road D subtend equal angles at society 1.

iv. Alex says, "The angle made by road B on road D is a right angle". Jai and Angad give different justifications to support Alex's claim. Jai says, Angles in the same segment of a circle are equal. Angad says, The angle in a semicircle is a right angle. Who has given the correct justification?

63. **Read the following text carefully and answer the questions that follow:** **[4]**

The principal of a school decided to give badges to students who are chosen for the post of Head boy, Head girl, Prefect and Vice Prefect. Badges are circular in shape with two colour area, red and silver, as shown in figure. The diameter of the region representing red colour is 22 cm and the silver colour is filled in 10.5 cm wide ring.

i. Find the radius of circle representing the red region. (1)
ii. Find the area of the red region. (1)
iii. Find the radius of the circle formed by combining the red and silver region. (2)

OR

Find the area of the silver region. (2)

64. **Read the following text carefully and answer the questions that follow:** **[4]**

There is a race competition between all students of a sports academy, so that the sports committee can choose better students for a marathon. The race track in the academy is in the form of a ring whose inner most circumference is 264 m and the outer most circumference is 308

m.

i. Find the radius of the outer most circle. (1)

ii. Find the radius of the inner most circle. (1)

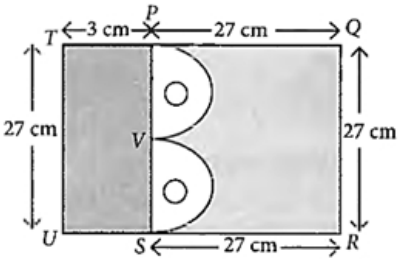
iii. Find the width of the track. (2)

OR

Find the area of the racetrack. (2)

65. **Read the following text carefully and answer the questions that follow:** **[4]**

Mr. Vivekananda purchased a plot QRUT to build his house. He leaves space of two congruent semicircles for gardening and a rectangular area of breadth 3 cm for car parking.



i. Find the total area of Garden. (1)

ii. Find the area of rectangle left for car parking. (1)

iii. Find the radius of semi-circle. (2)

OR

Find the area of a semi-circle. (2)

Section E

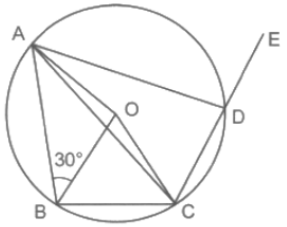
66. A circular park of radius 40 m is situated in a colony. Three boys Ankur, Amit and Anand are sitting at equal distance on its boundary each having a toy telephone in his hands to talk to each other. Find the length of the string of each phone. **[5]**

67. D is the mid point of side BC of an isosceles triangle ABC with AB = AC. Prove that the circle drawn with either of the equal sides as a diameter passes through the point D. **[5]**

68. A, B and C are three points on a circle. Prove that the perpendicular bisectors of AB, BC and CA are concurrent. **[5]**

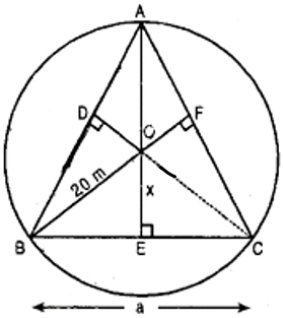
69. A chord of length 30 cm is drawn at a distance of 8 cm from the centre of a circle. Find out the radius of the circle. **[5]**

70. In a given figure, ABCD is a quadrilateral inscribed in a circle with centre O. CD is produced to E such that $\angle AED = 95°$ and $\angle OBA = 30°$. Find $\angle OAC$. **[5]**



71. The radius of a circle is 8 cm and the length of one of its chords is 12 cm. Find the distance of the chord from the centre. **[5]**

72. A circular park of radius 20 m is situated in the colony. Three boys Ankur, Syed and David are sitting at equal distance on its boundary each having a toy telephone in his hands to talk each other. Find the length of the string of each phone. **[5]**



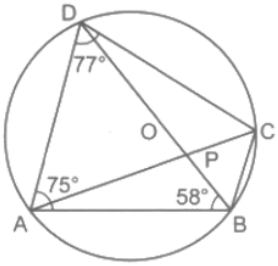
73. ABCD is a cyclic quadrilateral whose diagonal AC and BD intersect at P. If AB = DC, Prove that: **[5]**

i. $\triangle PAB \cong \triangle PDC$

ii. PA = PD and PC = PB

iii. AD || BC.

74. In a given figure, ABCD is a cyclic quadrilateral in which ∠BAD = 75°, ∠ABD = 58° and ∠ADC = 77°, AC and BD intersect at P. Then, find ∠DPC. **[5]**



75. If two equal chords of a circle intersect within the circle, prove that the segments of one chord are equal to corresponding segments of the other chord. **[5]**