CIRCLES

Class :- X	Subject :- Maths

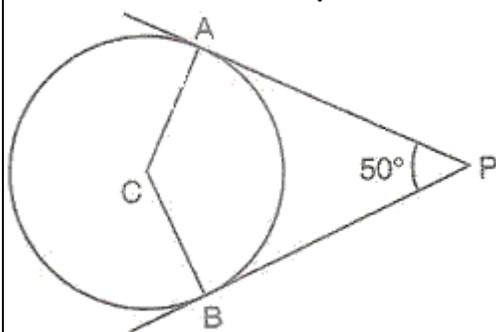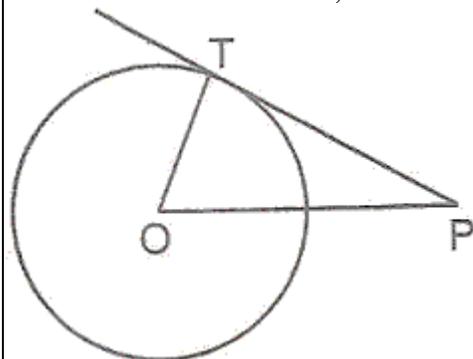### General Instructions

| QNo.	Questions
1	In the adjoining figures, PQ is a tangent to a circle whose centre is C. If CP = 17 cm and the radius of the circle is 8 cm, then find the length of the tangent PQ.
2	In the adjoining figures, PA and PB are tangents from P to a circle with centre C. If $\angle APB = 50°$, find $\angle ACB$.
3	In the adjoining figures, PT is a tangent to a circle whose centre is 0. If PT = 12 cm and radius of circle is 5 cm, then how far is P from O?
4	In the adjoining figures, PT is a tangent to a circle whose centre is O. If OP = 5cm and PT = 4cm, find the radius of the circle.
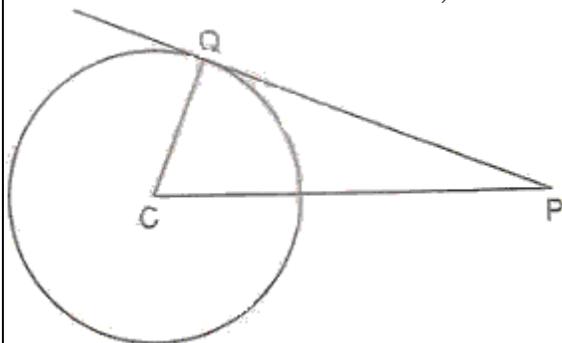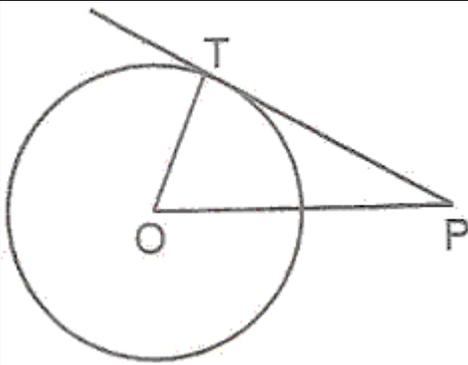
5   In the adjoining figure, PA and PB are tangents from Q to a circle with centre O. If $\angle APB = 88°$, find $\angle APO$.
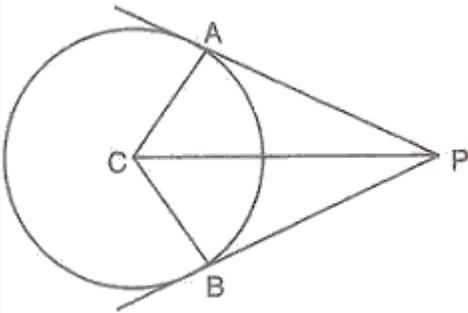
6   In the adjoining figure, PA and PB are tangents from Q to a circle with centre C, If the radius of the circle is 4 cm and $PA \perp PB$, then find the length of each tangent.
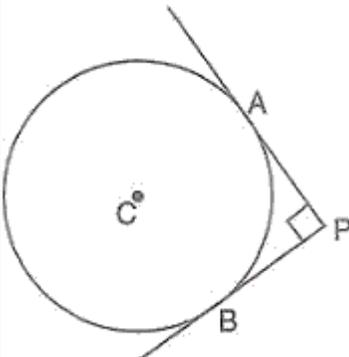
7   In the adjoining figure, PQ and PR are tangents from P to a circle with centre O, If $\angle PQR = 55°$, find$\angle PQR$.
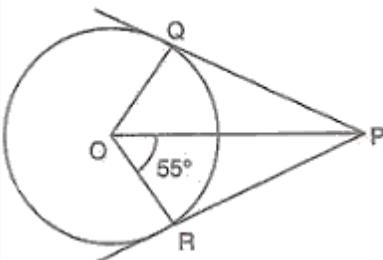
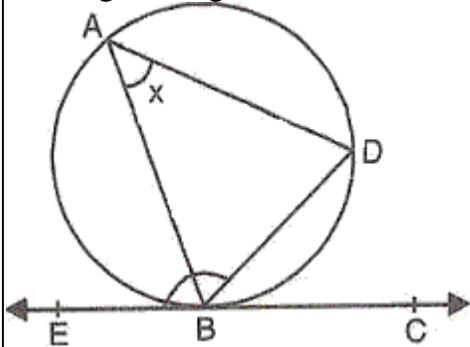8   In the given figure, ABC is a right-angled triangle, right angled at A, with AB =6cm and AC = 8cm. A circle with centre O has been inscribed inside the triangle. Calculate the value of r, the radius of the inscribed circle.
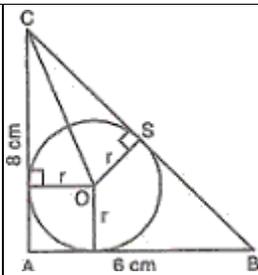
9 In the given figure find x if $\angle EBD = 146°$

10 In figure, XP and XQ are two tangents to a circle with centre O from a point X outside the circle. ARB is tangents to a circle at R. Prove that XA + AR = XB + BR.
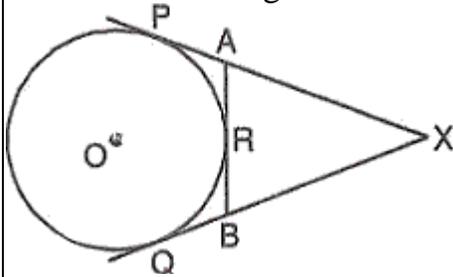
11 In the given figure, O is the centre of the circle. Determine $\angle AQB$ and $\angle AMB$, if PA and PB are tangents.
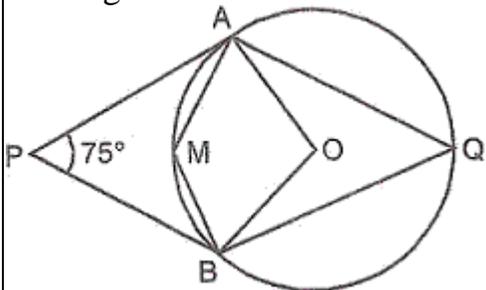
12 A tangent PT is drawn parallel to a chord AB as shown in figure. Prove that APB is an isosceles triangle.

13 PAQ is a tangent to the circle with centre O at a point A as shown in figure. If $\angle OBA = 35°$, find the value of $\angle BAQ$ and $\angle ACB$.

14	In the figure, AB is diameter of a circle with centre O and QC is a tangent of the circle at C. If $\angle CAB = 30°$, find (i)$\angle CQA$ (ii) $\angle CBA$.

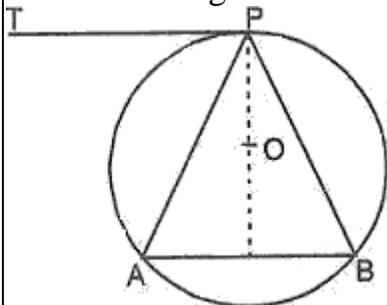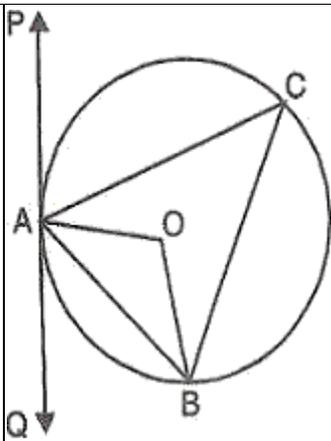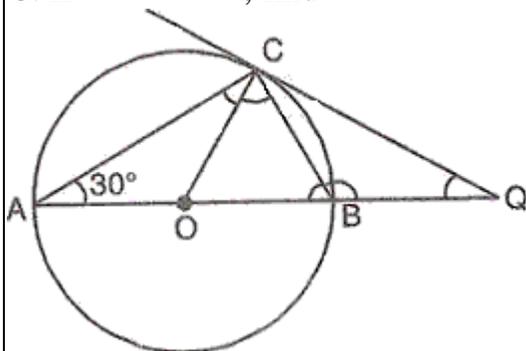| 15	The length of tangent drawn from an external point to circle are equal. Prove it. In the figure, AB and AC are two tangents to a circle with centre O from a point A outside the circle. PRQ is a tangent to circle at R. Prove that AP +PR = AQ + QR.
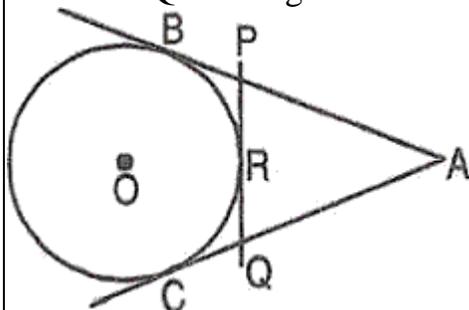
16	Prove that the right bisector of a chord of a circle bisects the corresponding minor arc of
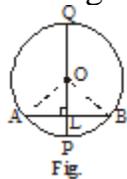
the circle.   Fig.

17	The given figure shows two concentric circles whose common centre is O. l is a line
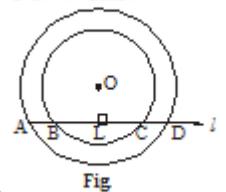
intersecting these circles at the points A, B, C and D. Show that AB = CD.   Fig

18	In the given figure, the diameter CD of a circle with centre O is perpendicular to chord

AB. If AB = 12 cm and CE = 3cm, calculate the radius of the circle.

19	In the given figure, a circle with centre O is given in which a diameter AB bisects the chord CD at a point E such that CE = ED = 8 cm and EB = 4 cm. Find the radius of the circle.

20	O is the centre of the circle. $\angle$OAB = 20º, $\angle$OCB = 55º, find $\angle$BOC and $\angle$AOC.

21	If a pair of opposite sides of a cyclic quadrilateral are equal, prove that the other two sides are parallel.

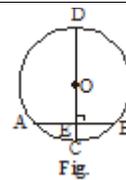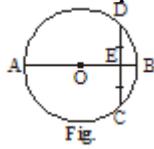| 22	In the given figure, ABC is an isosceles triangle and O is the centre of its circumcircle. Prove that AP bisects angle BPC.

23	ABCD is a cyclic quadrilateral. If AC bisects both $\angle$A and $\angle$C, prove that $\angle$ABC = 90º.

24	ABCD is a parallelogram. The circle through A, B and C intersects CD produced at E. Prove that AE = AD.

25	Inscribe any six-sided figure ABCDEF in a given circle. Prove that the sum of its alternate angles, i.e., $\angle$A, $\angle$C and $\angle$E is equal to four right angles.

26	ABCD is a cyclic quadrilateral in which AB and DC when produced meet in E and EA is equal to ED. Prove that (i) AD || BC (ii) EB = EC.

27	Prove that the opposite angles of a quadrilateral which is not cyclic at all cannot be supplementary.

28	In the given figure, ABC, AEG and HEC are straight lines. Prove that $\angle$AHE and $\angle$EGC are supplementary.

29	In figure, CD = CE = AD = AB and $\angle$ACB = 58º. Find $\angle$ACD and $\angle$CED. Also, prove that DE || AC.

30	In the given figure, PQ is a diameter. Chord SR is parallel to PQ. Given that $\triangle$ PQR = 50º, calculate: (i) $\angle$RPQ (ii) $\angle$STP

	[T is a point on minor arc SP.]
31	In the given figure, two equal chords AB and CD of a circle C (O, r) when produced meet at a point E. Prove that (i) BE = DE (ii) AE = CE.
32	Prove that the line joining the midpoints of two equal chords of a circle subtends equal angles with the chords.
33	In the given figure, equal chords AB and CD of a circle C (O, r) cut at right angles at E. If M and N are the midpoints of AB and CD respectively, prove that OMEN is a square.
34	In the adjoining figure, OD is perpendicular to the chord AB of a circle with centre O. If BC is a diameter show that AC ∥ CD and AC = 2 × OD.
35	Two equal circles intersect in P and Q. A straight line through P meets the circles in A and B. Prove that QA = QB.
36	In the given figure, O is the centre of a circle. Prove that $\angle$x + $\angle$y = $\angle$z.
37	In the given figure, O is the centre of the circle. Prove that $\angle$XOZ = 2($\angle$XZY + $\angle$YXZ).
38	Prove that any four vertices of a regular pentagon are concyclic.
39	Prove that the sum of the angles in the four segments exterior to a cyclic quadrilateral is equal to 6 right angles.
40	gure, $\triangle$ABC is an isosceles triangle with AB = AC and m $\angle$ABC = 50°. Find m $\angle$BDC and m $\angle$BEC.
41	In figure, A, B, C and D, E, F are two sets of collinear points. Prove that AD ∥ CF.
42	In figure, ABCD is a cyclic quadrilateral. A circle passing through A and B meets AD and BC in the points E and F respectively. Prove that EF ∥ DC.
43	In figure, AB is a diameter of a circle C (O, r). Chord CD is equal to radius OC. If AC and BD when produced intersect at P, prove that ÐAPB is constant.
44	PQ and RS are two parallel chords of a circle and lines RP and SQ intersect each other at O as shown in figure. Prove that OP = OQ.
45	P is a point on the side BC of a triangle ABC such that AB = AP. Through A and C, lines are drawn parallel to BC and PA, respectively, so as to intersect at D as shown in figure. Show that ABCD is a cyclic quadrilateral.
46	Prove that the lengths of tangents drawn from an external point to a circle are equal.

Use the above result in the following :
A circle is inscribed in a ∆ABC , touching AB, BC and AC at P, Q and R respectively, as shown in fig. If AB = 10 cm, AR = 7 cm and RC = 5 cm, then find the length of BC. **(2010)**

47	In fig. a triangle ABC is drawn to circumscribe a circle of radius 2 cm such that the segments BD and DC into which BC is divided by the point of contact D are of lengths 4 cm and 3 cm respectively. If area of ∆ABC = 21 cm^2, then find the lengths of sides AB and AC. **(2011)**
48	In fig. PQ and PR are two tangents from an external point P to the circle with centre O. If $\angle RPQ = 120°$, prove that OP = 2PQ. **(2010)**
49	In fig. two tangents PQ and PR are drawn to a circle with centre O from an external point P. Prove that $\angle QPR = 2\angle OQR$. OR Prove that the parallelogram circumscribing a circle is a rhombus. **(2010)**
50	Prove that the lengths of tangents drawn from an external point to a circle are equal. **(2010)**
51	In fig, if AB = AC, prove that BE = EC.
52	In fig, OP is equal to diameter of the circle. Prove that ABP is an equilateral triangle.
53	In fig, AB is a chord of length 9.6 cm, of a circle with centre O and radius 6 cm. The tangents at A and B intersect at P. Find the length of PA.
54	In fig, a circle is inscribed in a quadrilateral ABCD in which $\angle B = 90°$. If AD = 23 cm, AB = 29 cm and DS = 5 cm, find the radius (r) of the circle.
55	A circle is inscribed in a ∆ABC, touching AB, BC and AC at P, Q and R respectively, as shown in Fig. If AB = 10 cm, AR = 7 cm and RC = 5 cm, then find the length of BC.
56	From an external point P, two tangents PA and PB are drawn to a circle with centre O as shown in fig. Show that OP is the perpendicular bisector of AB.
57	In fig, PA and PB are two tangents drawn to a circle with centre O, from an external point

P such that PA = 5 cm and $\angle APB = 60°$. Find the length of chord AB.

58 | Two tangents TP and TQ are drawn from an external point T to a circle with centre at O, as shown in fig. If they are inclined to each other at an angle of 100° then what is the value of $\angle POQ$.

59 | In fig, a circle touches all the four sides of a quadrilateral ABCD whose sides are AB = 6 cm, BC = 7 cm and CD = 4 cm. Find AD.

60 | In fig, the incircle of ΔABC touches the sides BC, CA and AB at D, E and F respectively. If AB = AC, prove that BD = CD.

61 | In fig, ABC is a right-angled triangle with AB = 6 cm and AC = 8 cm. A circle with centre O has been inscribed inside the triangle. Calculate the value of r, the radius of the inscribed circle.

62 | In fig, if $\angle ACD = 40°$ find $\angle AOB$.

63 | Using the above:
Prove that PP' = QQ' in fig.

64 | Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact.
Using the above, do the following:
(i) In fig, O is the centre of the two concentric circles. AB is a chord of the larger circle touching the smaller circle at C. Prove that AC = BC.