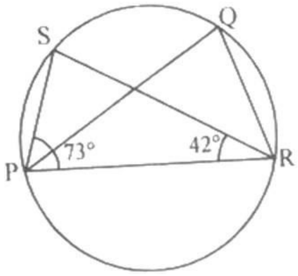
**CBSE Test Paper 05**

**CH-10 Circles**

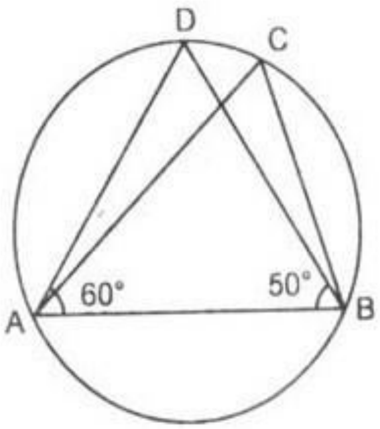
1. In the figure, if ∠SPR = 73°, ∠SRP = 42° then ∠PQR is equal to :




   a. 74°
   b. 76°
   c. 70°
   d. 65°

2. Greatest chord of a circle is called its
   a. chord
   b. diameter
   c. secant
   d. radius

3. In the figure, if $\angle DAB = 60^o$, $\angle ABD = 50^o$, then $\angle ACB$ is equal to :



a. $80^o$

b. $60^o$

c. $50^o$

d. $70^o$

4. The sum of either pair of opposite angle of cyclic quadrilateral is

a. $270^\circ$

b. $360^\circ$

c. $90^\circ$

d. $180^\circ$

5. Two point on a circle makes the

a. diameters

b. Diameter

c. chord

d. secant

6. Fill in the blanks:

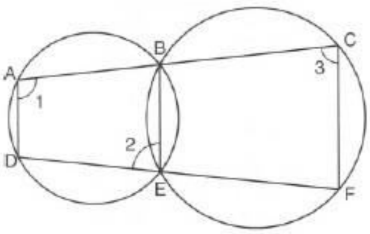
A line segment joining two points on the circumference of the circle is called a ________.

7. Fill in the blanks:

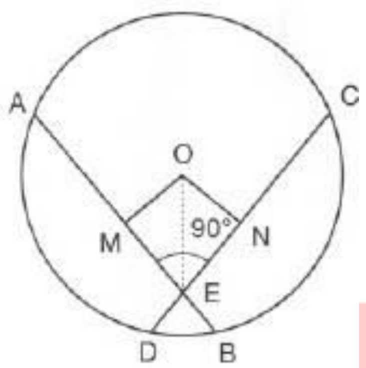
A point whose distance from the centre of a circle is less than its radius, lies on_________ of the circle

8. Two circles intersect in A and B and AC and AD are respectively the diameters of the circles. Prove that C, B, D are collinear.

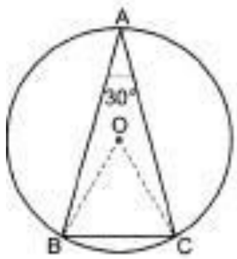
9. In the figure, A, B, C, and D, E, F are two sets of collinear points. Prove that AD II CF.



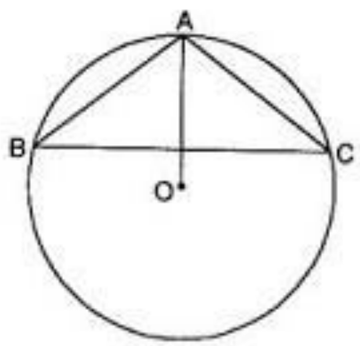

10. In the figure, equal chords AB and CD of a circle with centre O, cut at right angles at E. If M and N are the mid-points of AB and CD respectively, prove that OMEN is a square.



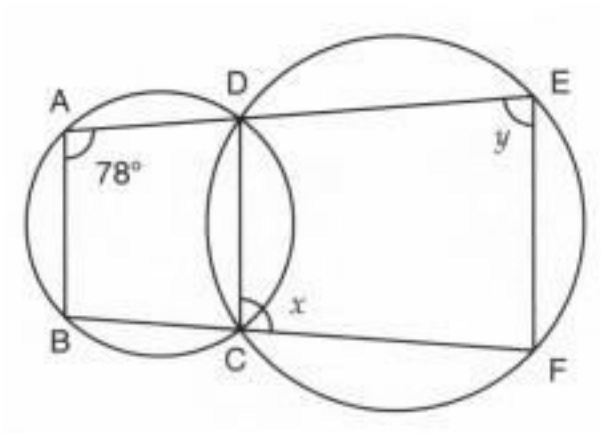

11. In given figure, ∠BAC = 30. Show that BC is equal to the radius of the circumcircle of △ABC whose centre is O.




12. In figure $\overline{AB} \cong \overline{AC}$ and O is the centre of the circle. Prove that OA is the perpendicular bisector of BC.




13. In Fig., ∠BAD = 78°, ∠DCF = x° and ∠DEF = y°. Find the values of x and y.




14. AB and CD are two parallel chords of a circle whose diameter is AC. Prove that AB = CD.

15. AC and BD are chords of a circle which bisect each other. Prove that

    i. AC and BD are diameters,
    ii. ABCD is a rectangle.

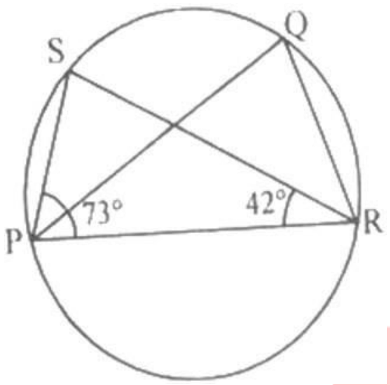
# CBSE Test Paper 05

## CH-10 Circles

### Solution

1. (d) 65°

   **Explanation:**

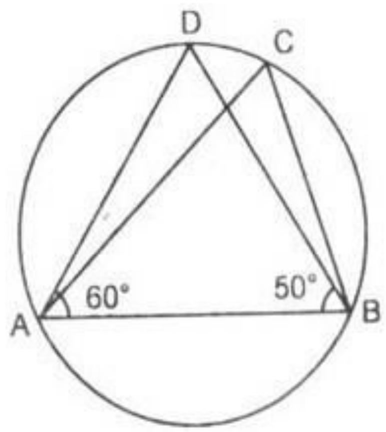
   $\angle$PQR = $\angle$PSR = 180° - 73° - 42° = 65°

2. (b) diameter

   **Explanation:** Since diameter is the longest segment that can be drawn in a circle(touching the circle at both ends), therefore it is the longest possible chord also.

3. (d) $70^o$

   **Explanation:**

   In, $\triangle$ABD

   $\angle D = 180^o - \angle A - \angle B$

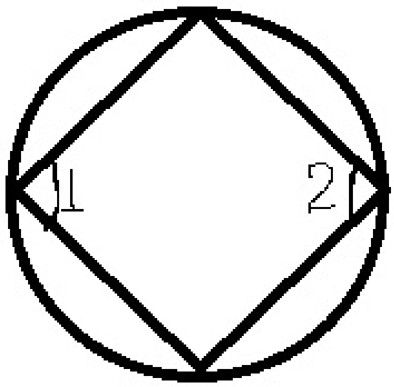
   $=180^o - 110^o = 70^o$

Since angles made by same chord at any point of circumference are equal so,

$\angle ACB = \angle ADB = 70^0$

4. (d) $180^\circ$

**Explanation:**




As per theorem,

The sum of either pair of opposite angles of a cyclic quadrilateral is $180^\circ$.

Here, $\angle 1 + \angle 2 = 180^\circ$

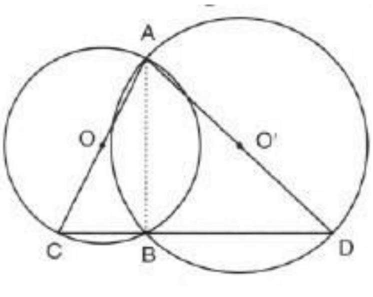
5. (c) chord

**Explanation:** A chord is the line joining any two points on the circle.

6. chord

7. interior

8. Join CB, BD and AB. Since the angle in a semi-circle is a right angle.




Therefore, AC is a diameter of the circle with the centre at O.

$\therefore \angle ABC = 90^o$

Also, AD is a diameter of the circle with centre at O'

$\therefore \angle ABD = 90^o$

Adding (i) and (ii), we get

$\angle$ABC + $\angle$ABD = 90°+ 90°

$\Rightarrow$ $\angle$ABC + $\angle$ABD = 180°

$\Rightarrow$ CBD is a straight line.

Hence, C, B, D are collinear.

9. In order to prove that AD || CF, it is sufficient to prove that

   $\angle$1 + $\angle$3 = 180°

   Since ABED is a cyclic quadrilateral

   $\therefore$ $\angle$1 + $\angle$2 = 180°.....(i)

   Now, BCFE is a cyclic quadrilateral and in a cyclic quadrilateral, an exterior angle is equal to the opposite interior angle.

   $\therefore$ $\angle$2 = $\angle$3......(ii)

   From (i) and (ii), we get

   $\angle$1 + $\angle$3 = 180°

   Hence, AD || CF

10. Since M and N are the mid-points of AB and CD respectively

    $\therefore$ $\angle$OMB = $\angle$OND = $90^o$

    $\Rightarrow$ $\angle$OME = $\angle$ONE = $90^o$

    Since equal chords of a circle are equidistant from the centre.

    $\therefore$ OM = ON

    Thus, in $\triangle$ OME and $\triangle$ ONE, we have

    OM = ON

    $\angle$OME = $\angle$ONE [Each equal to 90°]

    and, OE = OE [Common]

    $\therefore$ $\triangle$OME $\cong$ $\triangle$ONE

    $\Rightarrow$ ME = NE

    Thus, in quadrilateral OMEN, we have

    OM = ON, ME = NE and $\angle$OME = $\angle$ONE = 90°

    Hence, it is a square.

11. From the given figure, we have

    $\angle$BOC = 2 $\angle$BAC [because angle subtended by chord at center = 2 (angle subtended by it on the circumference)]

$\angle$BOC = 2 $\times$ 30° = 60°

Also, OC = OB (Radii of the same circle)

$\therefore \angle$OCB = $\angle$OBC

In $\triangle$OBC, we have

$\angle$OBC + $\angle$OCB + $\angle$BOC = 180°

$\angle$OBC + $\angle$OBC + 60° = 180°

$\Rightarrow$ 2 $\angle$OBC = 120° $\Rightarrow$ $\angle$OBC = 60°

So, $\angle$OBC = $\angle$OCB = $\angle$BOC = 60°

$\therefore$ $\triangle$BOC is an equilateral triangle.

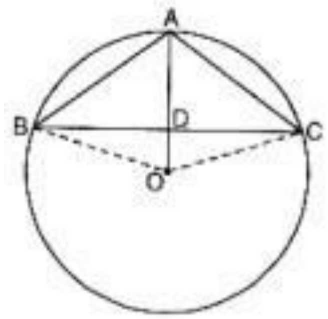
$\therefore$ OB = BC = OC

Hence, BC is equal to the radius of the circumcircle.

12. Given: In figure, $\overline{AB} \cong \overline{AC}$ and O is the centre of the circle.

To prove: OA is the perpendicular bisector of BC.

Construction : Join OB and OC.




Proof : $\because$ $\overline{AB} \cong \overline{AC}$ |Given

$\therefore$ chord AB = chord AC |$\because$ If two arcs of a circle are congruent, then their corresponding chords are equal

$\therefore$ $\angle AOB = \angle AOC$ ..... (1) |$\because$ Equal chords of a circle subtend equal angles at the centre

In $\triangle OBD$ and $\triangle OCD$

$\angle DOB = \angle DOC$ |From (1)

OB = OC |Radii of the same circle

OD = OD |Common

$\therefore$ $\triangle OBD \cong \triangle OCD$ |SAS

$\therefore$ $\angle ODB = \angle ODC$ ....... (2) |c.p.c.t

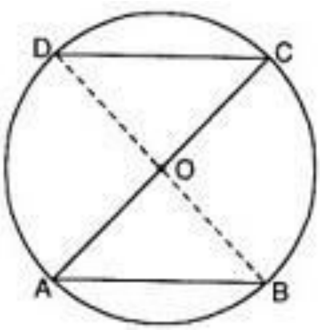
and BD = CD ........(3) |c.p.c.t

But $\angle BDC = 180^\circ$ | $\because$ BC is a line

$\therefore \angle ODB + \angle ODC = 180^\circ$
$\Rightarrow \angle ODB + \angle ODB = 180^\circ$
$\Rightarrow 2\angle ODB = 180^\circ$ |From (2)
$\Rightarrow \angle ODB = 90^\circ$
$\therefore$ From (2),
$\angle ODB = \angle ODC = 90^\circ$....... (4)
In view of (3) and (4), OA is the perpendicular bisector of BC.

13. We have, $\angle$BAD = 78$^o$, $\angle$DCF = x$^o$, and $\angle$DEF = y$^o$
Since, ABCD is a cyclic quadrilateral.
Then, $\angle$BAD + $\angle$BCD = 180$^o$
$\Rightarrow$ 78$^o$ + $\angle$BCD = 180$^o$
$\Rightarrow$BCD = 180$^o$ - 78$^o$ = 102$^o$
Now, $\angle$BCD + $\angle$DCF = 180$^o$ [Linear pair of angles]
$\Rightarrow$ 102$^o$ + x$^o$ = 180$^o$
$\Rightarrow$ x = 180$^o$ - 102$^o$ = 78$^o$
Since, DCFE is a cyclic quadrilateral
Then, x + y = 180$^o$
$\Rightarrow$ 78$^o$ + y = 180$^o$
$\Rightarrow$ y = 180$^o$ - 78$^o$ = 102$^o$

14. Given: AB and CD are two parallel chords of a circle whose diameter is AC.
To prove: AB = CD




Construction: Join BD
Proof: In $\triangle$OAB and $\triangle$ OCD
OA = OC [Radii of the same circle]

OB = OD [Radii of the same circle]

$\angle$AOB = $\angle$COD [Vert. opp. angles]

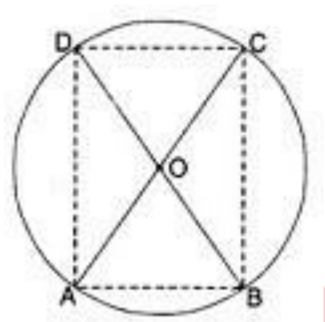
$\therefore$ $\triangle$OAB $\cong$ $\triangle$OAB [SAS]

AB = CD [c.p.c.t]

15. AC and BD are chords of a circle that bisect each other.

To prove :

Construction: Join AB, BC, CD and DA.




Proof :

i. AC and BD are diameters
ii. ABCD is a rectangle
iii. $\because$ $\angle$A = $90^o$ [$\because$ Angle in a semi-circle is $90^o$]

$\therefore$BD is a diameter

$\because$ $\angle$D = $90^o$

AC is a diameter [$\because$ Angle in a semi-circle is $90^o$]

Thus AC and BD are diameters

iv. Let the chords AC and BD intersect each other at O. Join AB, BC, CD and DA.

In $\triangle$OAB and $\triangle$OCD

OA = OC [Given]

OB = OD [Given]

$\angle$AOB = $\angle$COD [Vert. opp. $\angle$s]

$\therefore$ $\triangle$OAB $\cong$ $\triangle$OCD [SAS]

$\therefore$ AB = CD [c.p.c.t]

$\Rightarrow$ AB $\cong$ CD --- (1)

Similarly, we can show that

$\overline{AD} \cong \overline{CB}$ --- (2)

Adding (1) and (2), we get

$\overline{AB} + \overline{AD} \cong \overline{CD} + \overline{CB}$

$\Rightarrow \overline{BAD} \cong \overline{BCD}$

$\Rightarrow$ BD divides the circle into two equal parts (each a semi-circle) and the angle of a semi-circle is $90^o$.

$\therefore \angle A = 90^o$ and $\angle C = 90^o$

Similarly, we can show that

$\angle B = 90^o$ and $\angle D = 90^o$

$\therefore \angle A = \angle B = \angle C = \angle D = 90^o$

$\Rightarrow$ ABCD is a rectangle.