

STD 9 Maths [Manjari]

I am up and down

*** Choose the right answer from the given options. [1 Marks Each]**

[15]

1. A circle is the set of all points in a plane that are at a fixed distance from a:
(A) Diameter (B) Chord (C) Centre (D) Arc
2. The longest chord of a circle is:
(A) Radius (B) Diameter (C) Arc (D) Tangent
3. If two chords of a circle are equal, then they subtend:
(A) Unequal angles at the centre
(B) Equal angles at the centre
(C) Right angles at the centre
(D) Supplementary angles at the centre
4. If two chords of a circle subtend equal angles at the centre, then the chords are:
(A) Parallel (B) Equal (C) Perpendicular (D) Unequal
5. The perpendicular drawn from the centre of a circle to a chord:
(A) Divides the circle into two equal parts
(B) Bisects the chord
(C) Is parallel to the chord
(D) Forms a tangent
6. If the radius of a circle is 13 cm and the perpendicular distance from the centre to a chord is 5 cm, then the length of the chord is:
(A) 10 cm (B) 12 cm (C) 24 cm (D) 26 cm
7. The angle subtended by a diameter at any point on the circle is:
(A) 45° (B) 60° (C) 90° (D) 180°
8. If an arc subtends an angle of 100° at the centre, then the angle subtended by the same arc at a point on the remaining circle is:
(A) 25° (B) 50° (C) 100° (D) 200°
9. A quadrilateral is called cyclic if:
(A) All its sides are equal
(B) Opposite sides are parallel
(C) Its vertices lie on the same circle
(D) Diagonals bisect each other
10. The sum of opposite angles of a cyclic quadrilateral is:

(A) 90°

(B) 180°

(C) 270°

(D) 360°

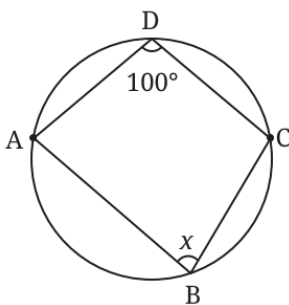
11. In a cyclic quadrilateral, if one angle measures 75° , then its opposite angle measures:
- (A) 75° (B) 90° (C) 105° (D) 115°
12. If two chords of a circle are equidistant from the centre, then the chords are:
- (A) Equal (B) Parallel (C) Perpendicular (D) Diameters
13. If two distinct points are given on a plane, the number of circles passing through them is:
- (A) One (B) Two (C) Three (D) Infinitely many
14. Three non-collinear points determine:
- (A) No circle (B) Exactly one circle
(C) Exactly two circles (D) Infinitely many circles
15. If one chord of a circle is longer than another chord, then the longer chord is:
- (A) Farther from the centre
(B) Closer to the centre
(C) Equal distance from the centre
(D) A diameter

*** Answer the following short questions. [2 Marks Each] [2]**

16. What is the least possible radius of a circle through two points A and B?

*** Answer the following questions. [3 Marks Each] [18]**

17. Find x in following figure



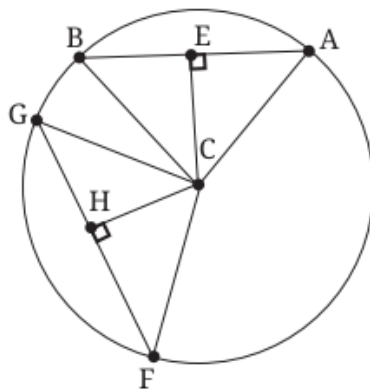
18. An arc of a circle subtends an angle of 70° at the centre. What is the measure of the angle subtended by the arc at a point on the circle?
19. A cyclic quadrilateral has sides 5,5,12,12 units. Find its area.
20. Consider a cyclic quadrilateral. Without drawing its circumcircle, how can we find out whether the centre of the circumcircle lies inside the quadrilateral or outside? What is the best way of finding out?

21. Consider all chords of a circle of a fixed length. What is the shape formed by the midpoints of all these chords?
22. In a circle, two chords CC' and DD' are drawn perpendicular to a diameter AB . Prove that the segment MM' joining the midpoints of the chords CD and $C'D'$ is perpendicular to AB .

*** Questions with calculation. [4 Marks Each]**

[24]

23. Show that the triangle formed by a chord and the centre of the circle is isosceles.
24. Consider Fig If CE is perpendicular to AB , CH is perpendicular to GH , and $CE = CH$, show that $AB = GF$.



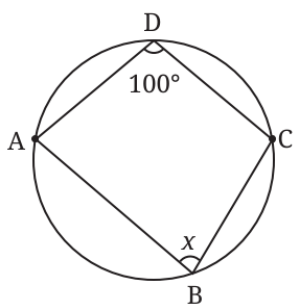
25. The diameter of a circle is AB . Point C is on the circumference. What is the measure of the $\angle ACB$? Explain your reasoning.
26. $ABCD$ is a cyclic quadrilateral inscribed in a circle. If $\angle A$ measures 75° , what is the measure of $\angle C$? If $\angle B$ measures 110° , what is the measure of $\angle D$?
27. A quadrilateral $MNOP$ is inscribed in a circle. If MN is a diameter, what can you say about $\angle MOP$ and $\angle MNP$? Explain your reasoning.
28. There is no chord of a circle that is longer than its diameter. How do you justify this statement?

*** Answer the following questions. [5 Marks Each]**

[155]

29. Draw $\triangle ABC$ with $AB = 5\text{cm}$, $\angle A = 70^\circ$ and $\angle B = 60^\circ$. Draw the circumcircle of $\triangle ABC$. Is the centre inside or outside the triangle?
30. Draw $\triangle ABC$ with $AB = 5\text{cm}$, $\angle A = 100^\circ$, $AC = 4\text{cm}$. Draw the circumcircle of $\triangle ABC$. Is the centre inside or outside the triangle?
31. Draw $\triangle ABC$, with $AB = 6\text{cm}$, $BC = 7\text{cm}$ and $CA = 7\text{cm}$. Draw the circumcircle of $\triangle ABC$. Let the circumcentre be O . Measure OA , OB , OC .
32. Show that if two such isosceles triangles (occurring in the previous question) have equal base length, they are congruent to each other.

33. Can you explain why the converse to Theorem 4 is true, i.e., why does the perpendicular from the centre of a circle to a chord of the circle bisect the chord?
(Hint: Use Fig. You are told that $\angle CMA = \angle CMB = 90^\circ$. You need to show that $AM = BM$.)
34. An isosceles triangle ABC is inscribed in a circle, with $AB = AC$. Show that the altitude from A to BC passes through the centre of the circle.
35. Two parallel chords of lengths 6 cm and 8 cm are on opposite sides of the centre of a circle. If the radius of the circle is 5 cm, find the distance between the midpoints of the chords.
36. Use the Baudhāyana-Pythagoras theorem to show why Theorem 6 must be true.
37. Consider Fig. If CE is perpendicular to AB, CH is perpendicular to GF, and $CE = CH$, show that $AB = GF$. Solve this using the Baudhāyana-Pythagoras theorem.
38. Find the length of the chord of a circle where the radius is 7 cm and perpendicular distance is 6 cm.
39. Explain why the following statement is true: If the perpendicular distance of a chord from the centre is d and the radius is r , then the chord length is $2\sqrt{r^2 - d^2}$.
40. In a circle, if the distance of chord AB from the centre is twice the distance of another chord CD from the centre, then can we conclude that $CD = 2 AB$? Give reasons for your answer.
41. In a circle with centre O, the central angle AOB is 60° . If the radius of the circle is 12 cm, what is the length of the chord AB?
42. Let A and B be two points on a circle with centre O.



- (i) Are there points X, Y on the circle, on the same side of AB , such that $\angle AXB$ is different from $\angle AYB$?
- (ii) Is it true that if $\angle AXB = \angle AYB$, then X and Y lie on the same side of the circle?
- (iii) If $\angle AXB = \angle AYB$, and X and Y do not lie on the circle, does the circle through A, B and X also pass through Y ?
43. In a circle, a chord is 5 cm away from the centre. If the radius of the circle is 13 cm, what is the length of the chord?

44. The diameter of a circle is 26 cm . A chord of length 24 cm is drawn in the circle. Find the distance from the centre of the circle to the chord.
45. A circle has a radius of 15 cm . A chord is drawn. The distance from the centre of the circle to the chord is 9 cm . What is the length of the chord?
46. Prove that the perpendicular bisector of a chord passes through the centre of the circle.
47. Quadrilateral PQRS is inscribed in a circle. If $\angle P = (2x + 10)^\circ$ and $\angle R = (3x - 20)^\circ$, find the value of x and the measures of $\angle P$ and $\angle R$.
48. The distance of a chord of length 16 cm from the centre of a circle is 6 cm . Find the radius of the circle.
49. When two chords intersect, each of them is divided into two line segments. Show that if the intersecting chords are of equal length, then the line segments of one chord are equal to the corresponding line segments of the other chord.
50. Draw a circle in which a chord of 6 cm length stands at a distance of 3 cm from the centre.
(Hint: Is it a circumcircle of a suitable triangle?)
51. Show that rectangle is the only parallelogram that can be inscribed in a circle.
52. Show that if a rectangle is inscribed in a circle, then the point of intersection of its diagonals must lie at the centre of the circle.
53. In a circle with centre O, chords AB and AC are congruent. Explain why this statement is true: "The centre of the circle lies on the angle bisector of $\angle BAC$ ".
54. Two parallel chords of lengths 10 cm and 24 cm are on the same side of the centre of a circle. The distance between the chords is 7 cm. Find the radius of the circle.
55. A regular hexagon is inscribed in a circle of radius r . Find the length of the sides of the hexagon and the distance of each side from the centre of the circle.
56. Let ABCD be a cyclic quadrilateral. Explain why the exterior angle at any vertex is equal to the interior opposite angle (e.g., $\angle CDE = \angle ABC$, where E is a point on the extension of side CD).
57. Let A be any point within a given circle with centre O. Show that the shortest chord of the circle that passes through point A is the one that is perpendicular to OA.
58. How would you use the following figure to justify the statement that the angle in a semicircle is 90° ?
59. How would you use the following figure to justify the statement that the sum of the opposite angles of a cyclic quadrilateral is 180° ?

