MATHS

BOOKS - RD SHARMA MATHS (HINGLISH)

CIRCLE

Others

1. Equal chords of a circle subtend equal angles at the centre.

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2. Chords of congruent circles which are equidistant from the corresponding centres, are equal.

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3. Equal chords of congruent circles subtend equal angles at the centre.

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4. If the angles subtended by two chords of a circle at the centre are equal, the chords are equal.

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5. Of any two chords of a circle show that one which is larger is nearer to the centre.

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6. If the angles subtended by two chords of congruent circles at the corresponding centres are equal, the chords are equal.

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7. If two equal chords of a circle in intersect within the circle, prove that : the segments of the chord are equal to the corresponding segments of the other chord. the line joining the point of intersection to the centre makes equal angles with the chords.

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8. Of any two chords of a circle show that the one which is nearer to the centre is larger.

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9. Chords of a circle which are equidistant from the centre are equal.

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10. Equal chords of congruent circles are equidistant from the corresponding centres.

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11. The length of two parallel chords of a circle are $6cm$ and $8cm$. If the smaller chord is at a distance of $4cm$ from the centre, what is the distance of the other chord from the centre?

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12. Equal chords of a circle are equidistant from the centre.

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13. Two circle with centres A and B intersect at C and D. Prove that $\angle ACB = \angle ADB$.

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14. Prove that the line joining the mid-points of two parallel chords of a circle passes through the centre.

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15. Prove that the right bisector of a chord of a circle, bisects the corresponding arc or the circle.

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16. Prove that the perpendicular bisector of a chord of a circle always passes through the centre.

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17. Prove that the line joining the mid-points of two parallel chords of a circle passes through the centre.

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18. Two circles of radil $5cm$ and $3cm$ intersect at two points and the distance between their centres is $4cm$. Find the length of the common chord.

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19. Two circles are drawn with sides AB, AC of a triangle ABC as diameters. The circles intersect at a point D. Prove that D lies on BC.

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20. Two circle intersect in $AandBandACandAD$ are respectively the diameters of the circles. Prove that C, B, D are collinear.

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21. Any angle subtended by a minor arc in the alternate segment is acute and any angle subtended by a major arc in the alternate segment is obtuse.

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22. The arc of a circle subtending a right angle at any point of the circle in its alternate segment is a semi-circle.

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23. The angle in a semi-circle is a right angle.

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24. Angle in the same segment of a circle are equal.

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25. Prove that the circle drawn on any one of the equal sides of an isosceles triangle as diameter bisects the base.

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26. A chord of a circle is equal to the radius of the circle find the angle subtended by the chord at a point on the monor arc and also at a point on the major arc.

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27. Theorem:-7 If the line segment joining two points subtends equal angles at two other points lying on the same side of the line segment; the four points are concyclic. i.e lie on the same circle.

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28. Draw the graph of the fuction $4x+3y=12$,at what pt it cut the coordinate axis

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29. If two equal chords of a circle in intersect within the circle, prove that: the segments of the chord are equal to the corresponding segments of the other chord. the line joining the point of intersection to the centre makes equal angles with the chords.

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30. prove that the line joining the mid-point of two equal chords of a circle subtends equal angles with the chord.

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31. Show that if two chords of a circle bisect one another they must be diameters.

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32. Two equal circles intersect in P and Q . A straight line through P meets the circles in A and B . Prove that $QA = QB$.

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33. Prove that all the chords of a circle through a given point within it, the least is one which is bisected at that point.

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34. Prove that the diameter is the greatest chord in a circle.

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35. Bisector AD of $\angle BAC$ of ABC passes through the centre O of the circumcircle of ABC as shown in figure. Prove that $AB = AC$.

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36. If two sides of a cyclic quadrilateral are parallel, prove that the remaining two sides are equal and the diagonals are also equal. OR A cyclic trapezium is isosceles and its diagonals are equal.

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37. The quadrilateral formed by angle bisectors of a cyclic quadrilateral is also cyclic.

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38. If two non-parallel sides of a trapezium are equal, it is cyclic. OR An isosceles trapezium is always cyclic.

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39. If two opposite sides of a cyclic quadrilateral are equal, then the other two sides are parallel.

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40. The sum of either pair of opposite angles of a cyclic quadrilateral is 180^0 OR The opposite angles of a cyclic quadrilateral are supplementary.

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41. If the chord of a circle is equal to the radius of the circle, then the angle subtended by the chord at a point on the minor arc is:

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42. If one side of a cyclic quadrilateral is produced, then the exterior angle is equal to the interior opposite angle.

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43. If the sum of any pair of opposite angles of a quadrilateral is 180°; then the quadrilateral is cyclic.

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44. The sum of the angles in the four segments exterior to a cyclic quadrilateral is equal to 6 right angles.

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45. If the bisectors of the opposite angles $\angle P and \angle R$ of a cyclic quadrilateral $PQRS$ intersect the corresponding cicle at $A and B$ respectively, then AB is a diameter of the circle.

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46. If O is the circumcentre of a ABC and $OD \perp BC,$ prove that $\angle BOD = \angle A.$

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47. Two diameters of a circle intersect each other at right angles. Prove that the quadrilateral formed by joining their end-points is a square.

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48. ABC and ADC are two right triangles with common hypotenuse AC. Prove that $\angle CAD = \angle CBD$.

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49. In a circle with centre O, chords $ABandCD$ intersect inside the circumference at E. Prove that $\angle AOC + \angle BOD = 2\angle AEC$.

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50. $\triangle ABC$ AND $\triangle ADC$ are two right triangles with common hypotenuse AC. Prove that $\angle CAD = \angle CBD$.

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51. Bisectors of angles A, B and C of a triangle ABC intersect its circumcircle at D, E and F respectively. Prove that the angles of the triangle DEF are $90o - \frac{1}{2}A$,$90o - \frac{1}{2}B$ and $90o - \frac{1}{2}C$

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52. Prove that the circle drawn with any side of a rhombus as a diameter, posses through the point of intersection of its diagonals.

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53. Two chords AB and CD of a circle are parallel and a line l is the perpendicular bisector of AB . Show that l bisects CD.

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54. In the Figure, OD is perpendicular to the chord AB of a circle whose centre is O. If BC is a diameter, show that $CA = 2OD$

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55. AB and CD are two parallel chords of a circle such that $AB = 10cm$ and $CD = 24cm$. If the chords are on the opposite sides of the centre and the distance between them is $17cm$, find the radius of the circle.

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56. PQ and RS are two parallel chords of a circle whose centre is O and radius is $10cm$. If $PQ = 16cm$ and $RS = 12cm$, find the distance between PQ and RS, if they lie: on the same side of the centre O. on opposite side of the centre O.

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

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58. If a diameter of a circle bisects each of the two chords of a circle, prove that the chords are parallel.

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59. Prove that the angle in a segment greater than a semi-circle is less than a right angle.

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60. Prove that the angle in a segment greater than a semi-circle is less than a right angle.

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61. $ABCD$ is a parallelogram. AB is produced to E so that $BE = AB$. Prove that ED bisects BC.

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62. In any triangle ABC, if the angle bisector of $\angle A$and perpendicular bisector of BCintersect, prove that they intersect on the circumcircle of the triangle ABC

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63. $ABCD$ is a cyclic quadrilateral whose diagonals $ACandBD$ intersect at P . If $AB = DC,$ Prove that : $PAB \cong PDC$ $PA = PDandPC = PB\ ADBC$

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64. (Converse of Theorem 3) The line joining the centre of a circle to the mid-point of a chord is perpendicular to the chord.

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65. .The equation of the circle passing through three non-collinear points P(x_1, y_1) Q(x_2, y_2) and R(x_3, y_3) is

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66. Two chords AB and AC of a circle are equal. Prove that the centre of the circle lies on the angle bisector of $\angle BAC$.

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67. If two chords AB and AC of a circle with centre O are such that the centre O lies on the bisector of $\angle BAC$, prove that $AB = AC$, i.e. the chords are equal.

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68. If two arcs of a circle (or of congruent circles) are congruent, then corresponding chords are equal.

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69. If two chord of a circle (or of congruent circles) are equal, then their corresponding arcs. (minor, major or semi-circular) are congruent.

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70. The perpendicular from the centre of a circle to a chord bisects the chord.

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71. If two circles intersect in two points, prove that the line through the centres is the perpendicular bisector of the common chord.

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72. Find the length of the chord which is at 12 cm distance from center and radius of circle is 13cm.

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73. In an isosceles triangle ABC with $AB = AC$, a circle passing through B and C intersects the sides $ABandAC$ at$DandE$ respectively. Prove that $DECB$.

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74. ABC is an isosceles triangle in which $AB = AC$. If $DandE$ are the mid-points of $ABandAC$ respectively, prove that the points $B, C, DandE$ are concylic.

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75. $DandE$ are points on equal sides $ABandAC$ of an isosceles triangle ABC such that $AD = AE$. Prove that B, C, D, E are concyclic.

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76. $D\ and\ E$ are, respectively, the points on equal sides $AB\ and\ AC$ of an isosceles triangle ABC such that $B,\ C,\ E,\ and\ D$ are concyclic as shown in Figure. If O is the point of intersection of $CD\ and\ BE,$ prove that AO is the bisector of line segment DE

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77. $ABCD$ is a cyclic quadrilateral. $ABandDC$ are produced to meet in E. Prove that $EBC - EDA$.

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78. In Figure, $PQRS$ is a cyclic quadrilateral. Find the measure of each of its angles.

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79. Prove that any cyclic parallelogram is a rectangle.

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80. $ACandBD$ are chords of a circle which bisect each other. Prove that (i) $ACandBD$ are diameters (ii) $ABCD$ is a rectangle.

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

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82. Fill in the blanks: All point lying inside/outside a circle are called ... points/ ... points. Circle having the same centre and different radii are called ... circles. A point whose distance from the centre of a circle is greater than its radius lies in .... of the circle. A continuous piece of a circle is .... of the circle. The longest chord of a circle is a .....of the circle. An arc is a ..... when its ends are the ends of a diameter. Segment of a circle is the region between an arc and ... of the circle. A circle divides the plane, on which it lies, in .... parts.

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83. Write the truth value (T/F) of the following with suitable reasons: A circle is a plane figure. Line segment joining the centre to any point on the circle is a radius of the circle. If a circle is divided into three equal arcs each is a major arc. A circle has only finite number

of equal chords. A chord of a circle, which is twice as long is its radius is a diameter of the circle. Sector is the region between the chord and its corresponding arc. The degree measure of an arc is the complement of the central angle containing the arc. The degree measure of a semi-circle is 180^0

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84. The radius of a circle is 13 cm and the length of one of its chords is 10 cm. Find the distance of the chord from the centre.

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85. Find the length of a chord which is at a distance of 5 cm from the centre of a circle of radius 13 cm.

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86. In Figure, O is the centre of the circle of radius $5\ cm\dot{O}P\ \perp AB,\ OQ\ \perp CD,\ ABCD,\ AB = 6\ cm\ and\ CD = 8\ cm.$ Determine $PQ.$

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87. In Figure, O is the centre of the circle of radius $5\ cm\dot{O}P \perp AB,\ OQ \perp CD,\ ABCD,\ AB = 6\ cm\ and\ CD = 8\ cm.$ Determine PQ

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88. $PQ\ and\ RS$ are two parallel chords of a circle whose centre is O and radius is $10\ cm.$ If $PQ = 16\ cm\ and\ RS = 12\ cm,$ find the distance between $PQ\ and\ RS,$ if they lie: on the same side of centre O

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89. $PQ \text{ and } RS$ are two parallel chords of a circle whose centre is O and radius is $10\,cm$. If $PQ = 16\,cm \text{ and } RS = 12\,cm$, find the distance between $PQ \text{ and } RS$, if they lie: on opposite side of the centre O

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90. $AB \text{ and } CD$ are two parallel chords of a circle such that $AB = 10\,cm \text{ and } CD = 24\,cm$. If the chords are on the opposite sides of the centre and the distance between them is $17\,cm$, find the radius of the circle.

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91. $AB \text{ and } CD$ are two chords of a circle such that $AB = 6\,cm,\ CD = 12\,cm \text{ and } ABCD$. If the distance between $AB \text{ and } CD$ is $3\,cm,$ find the radius of the circle.

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92. In the figure, OD is perpendicular to the chord AB of a circle whose centre is O. If BC is a diameter, show that $CA = 2OD$.

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93. In Figure, l is a line intersecting the two concentric circles, whose common centre is $O,$ at the points $A,\ B,\ C \text{ and } D$. Show that $AB = CD$.

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94. In a circle of radius $5\,cm,\ AB\ and\ AC$ are two chords such that $AB = AC = 6cm$. Find the length of the chord BC

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95. In an equilateral triangle, prove that the centroid and centre of the circum-circle (circum centre) coincide) Given : An equilateral triangle ABC in which $D,\ E\ and\ F$ are the mid-points of sides $BC,\ CA\ and\ AB$ respectively. To Prove: The centroid and circum centre are coincident. Construction : Draw medians $AD,\ BE\ and\ CF$

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96. A circular park of radius $20m$ is situated in a 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 to each other. Find the length of the string of each phone.

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97. Two chords $AB \; and \; CD$ of a circle are parallel and a line l is the perpendicular bisector of AB. Show that l bisects CD

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98. If a diameter of a circle bisects each of the two chords of a circle, prove that the chords are parallel.

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99. $AB \; and \; CD$ are two parallel chords of a circle whose diameter is AC. Prove that $AB = CD$

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100. Two concentric circle with centre O have A, B, C, D as the points of intersection with the line l as shown in Figure. If $AD = 12cm \text{ and } BC = 8cm$, find the lengths of AB, CD, $AC \text{ and } BD$

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101. Two circles whose centres are O and O' intersect at P. Through P, a line l parallel to OO' intersecting the circles at $C \text{ and } D$ is drawn. Prove that $CD = 2\,OO'$

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102. Prove that the line joining the mid-points of two parallel chords of a circle passes through the centre.

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103. Two circles of radii $10\ cm\ and\ 8\ cm$ intersect and the length of the common chord is $12cm.$ Find the distance between their centres.

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104. Two circles of radii $5\ cm\ and\ 3cm$ intersect at two points and the distance between their centres is $4cm.$ Find the length of the common chord.

Let the common chord be AB and P and Q be the centers of the two circles.

$AP = 5cm$ and $AQ = 3cm.$

$PQ = 4cm$ ...given

Now, seg$PQ \perp ch$ or dAB

$AR = RB = \frac{1}{2}AB$....perpendicular from center to the chord, bisects the chord

Let $PR = xcm$

so $RQ = (4 - x)cm$

In $\triangle ARP$, $AP^2 = AR^2 + PR^2$

$AR^2 = 5^2 - x^2$...(1)

In $\triangle ARQ$, $AQ^2 = AR^2 + QR^2$

$AR^2 = 3^2 - (4 - x)^2$...(2)

$5^2 - x^2 = 3^2 - (4 - x)^2$...from (1) & (2)

$25 - x^2 = 9 - \left(16 - 8x + x^2\right)$

$25 - x^2 = \ -7 + 8x - x^2$

$32 = 8x$

$x = 4$ substituting in equation(1) we get , $AR^2 = 25 - 16 = 9$

$AR = 3cm$

$AB = 2 \times AR = 2 \times 3 = 6$

$AB = 6cm$So length of common chord is6 cm.

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105. In Figure, two circles with centres $A\ and\ B$ and of radii $5\ cm\ and\ 3\ cm$ touch each other internally. If the perpendicular bisector of segment AB meets the bigger circle in $P\ and\ Q$, find the length of PQ

A and B are the centres of the circles with radii 5cm and 3cm respectively.

C is the mid-point of AB.

Extend AB upto O point on circumference of outer circle.

$AB = AO - BO = 5 - 3 = 2cm$ (since AO and BO are radii of larger and smaller circles)

$AC = A\frac{B}{2} = \frac{2}{2} = 1cm$

now in right angled triangle AMP,$AC = 1cm$, $AP = 5cm$

by pythagoras therom , $AP^2 = PC^2 + AC^2$

$PC^2 = \sqrt{AP^2 - AC^2}$

$PC^2 = \sqrt{5^2 - 1^2}$

Therefore, $PQ = 2PC = 2\sqrt{24}$

$= 4\sqrt{6}cm(CP = CQ)$

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106. In Figure, $\hat{A}B \cong \hat{A}C$ and O is the centre of the circle. Prove that OA is the perpendicular bisector of BC

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107. Prove that the right bisector of a chord of a circle, bisects the corresponding arc or the circle.

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108. Prove that the perpendicular bisector of a chord of a circle always passes through the centre.

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109. In Figure, $AB = CB \, and \, O$ is the centre of the circle. Prove that BO bisects $\angle ABC$.

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110. Two circle with centres A and B intersect at C and D. Prove that $\angle ACB = \angle ADB$.

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111. Prove that the line of centres of two interesting circles subtends equal angles at the two points of intersection.

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112. The radius of a circle is 8cm and the length of one of its chords is 12cm. Find the distance of the chord from the centre.

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113. Find the length of a chord which is at a distance of 5 cm from the centre of a circle of radius 10 cm.

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114. Find the length of a chord which is at a distance of 4 cm from the centre of the circle of radius 6 cm.

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115. Two chords AB and CD of lengths 5 cm and 11 cm respectively of a circle are parallel to each other and are on opposite sides of its centre. If the distance between AB and CD is 6 cm, find the radius of the circle.

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116. Suppose you are given a circle. Give a construction to find its centre.

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117. Prove that the line joining the mid-point of a chord to the centre of the circle passes through the mid-point of the corresponding minor arc.

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118. Prove that a diameter of a circle which bisects a chord of the circle also bisects the angle subtended by the chord at the centre of the circle.

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119. Prove that two different circles cannot intersect each other at more than two points.

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120. A line segment AB is of length 5 cm. Draw a circle of radius 4 cm passing through $A \, and \, B$? Give reason in support of your answer.

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121. An equilateral triangle of side 9 cm is inscribed in a circle. Find the radius of the circle.

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122. Given an arc of a circle, complete the circle.

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123. Draw different pairs of circles. How many points does each pair have in common? What is the maximum number of common points?

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124. Suppose you are given a circle. Give a construction to find its centre.

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125. Two chords AB and CD of lengths 5 cm and 11 cm respectively of a circle are parallel to each other and are on opposite sides of its centre. If the distance between AB and CD is 6 cm, find the radius of the circle.

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126. The lengths of two parallel chords of a circle are 6 cm and 8 cm. If the smaller chord is at a distance of 4 cm from the centre, what is the distance of the other chord from the centre?

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127. If two chords of a circle are equally inclined to the diameter through their point of intersection, prove that the chords are equal.

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128. If two equal chords of a circle in intersect within the circle, prove that: the segments of the chord are equal to the corresponding segments of the other chord. the line joining the point of intersection to the centre makes equal angles with the chords.

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129. If two equal chords of a circle in intersect within the circle, prove that: the segments of the chord are equal to the corresponding segments of the other chord. the line joining the point of intersection to the centre makes equal angles with the chords.

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130. prove that the line joining the mid-point of two equal chords of a circle subtends equal angles with the chord.

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131. $L\ and\ M$ are mid-point of two equal chords $AB\ and\ CD$ of a circle with centre O . Prove that $\angle OLM = \angle OML$ (ii) $\angle ALM = \angle CML$

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132. PQ and RQ are chords of a circle equidistant from the centre. Prove that the diameter passing through Q bisects ∠PQR and ∠PSR

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133. $A,\ B,\ C,\ D$ are four consecutive points on a circle such that $AB = CD$. Prove that $AC = BD$

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134. Show that if two chords of a circle bisect one another they must be diameters.

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135. Two equal circles intersect in P and Q . A straight line through P meets the circles in A and B . Prove that $QA = QB$.

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136. Prove that all the chords of a circle through a given point within it, the least is one which is bisected at that point.

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137. Prove that the diameter is the greatest chord in a circle.

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138. Three girls Reshma, Salma and Mandip are playing a game by standing on a circle of radius 5m drawn in a park. Reshma throws a ball to Salma, Salma to Mandip, Mandip to Reshma. If the distance between Reshma and Salma and between Salma and Mandip is 6m each, what is the distance between Reshma and Mandip?

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139. A circular park of radius 20m is situated in a 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.

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140. A, B and C are three points on a circle such that the angles subtended by the chords AB and AC at the centre O are 90° a n d 110°, respectively. Determine $\angle BAC$

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141. A chord of a circle is equal to the radius of the circle find the angle subtended by the chord at a point on the monor arc and also at a point on the major arc.

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142. BC is a chord with centre O. A is a point on an arc BC . Prove that: $\angle BAC + \angle OBC = 90$, if A is the point on the major arc.

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143. BC is a chord with centre O. A is a point on an arc BC . Prove that: $\angle BAC - \angle OBC = 90^\circ$, if A is the point on the minor arc

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144. Prove that the circle drawn on any one of the equal sides of an isosceles triangle as diameter bisects the base. Given: A ABC in which $AB = AC$ and a circle is drawn by taking AB as diameter which intersects the side BC of triangle at D To Prove: $BD = DC$ Construction : Join AD

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145. Two circle intersect in $AandBandACandAD$ are respectively the diameters of the circles. Prove that C, B, D are collinear.

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146. Two circles are drawn with sides AB, AC of a triangle ABC as diameters. The circles intersect at a point D. Prove that D lies on BC.

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147. ABC and ADC are two right triangles with common hypotenuse AC. Prove that $\angle CAD = \angle CBD$.

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148. In a circle with centre O, chords $AB\ and\ CD$ intersect inside the circumference at E. Prove that $\angle AOC + \angle BOD = 2\angle AEC$

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149. C is a point on the minor arc AB of the circle, with centre O. Given $\angle ACB = x^0$ and Calculate x, if ACBO is a parallelogram.

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150. If O is the circumcentre of a ABC and $OD \perp BC$, prove that $\angle BOD = \angle A$.

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151. Two diameters of a circle intersect each other at right angles. Prove that the quadrilateral formed by joining their end-points is a square.

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152. Prove that the circle drawn with any side of a rhombus as a diameter, posses through the point of intersection of its diagonals.

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153. $ACandBD$ are chords of a circle that bisect each other. Prove that: $ACandBD$ are diameters $ABCD$ is a rectangle .

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154. $ACandBD$ are chords of a circle that bisect each other. Prove that: $ACandBD$ are diameters ABCD is a rectangle.

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155. ABC and ADC are two right triangles with common hypotenuse AC. Prove that $\angle CAD = \angle CBD$.

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156. D is a point on the circumcircle of ABC in which $AB = AC$ such that $B\,and\,D$ are on the opposite side of line AC. If CD is produced to a point E such that $CE = BD,$ prove that $AD = AE$

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157. The bisector of $\angle B$ of an isosceles triangle ABC with $AB = AC$ meets the circumcircle of ABC at P as shown in Figure. If $AP\ and\ BC$ produced meet at Q, . prove that $CQ = CA$

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158. Bisectors of angles A, B and C of a triangle ABC intersect its circumcircle at D, E andF respectively. Prove that the angles of the triangle DEF are $90^\circ - \frac{1}{2}A, 90^\circ - \frac{1}{2}B$and $90^\circ - \frac{1}{2}C$

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159. Prove that the mid-point of the hypotenuse of a right triangle is equidistant from its vertices.

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160. AB is a diameter of a circle with centre O and radius OD is perpendicular to AB. If C is any point on arc DB, find $\angle BAD$ and $\angle ACD$

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161. If O is the circumcentre of a ABC and $OD \perp BC$, prove that $\angle BOD = \angle A$.

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162. A chord of a circle is equal to the radius of the circle. Find the angle subtended by the chord at a point on the minor arc and also at a point on the major arc.

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163. Prove that any cyclic parallelogram is a rectangle.

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164. If diagonals of a cyclic quadrilateral are diameters of the circle through the vertices of the quadrilateral, prove that it is a rectangle.

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165. Two circles intersect at two points B and C. Through B, two line segments ABD and PBQ are drawn to intersect the circles at A, D and P, Q respectively (see Fig. 10.40). Prove that $\angle ACP = \angle QCD$.

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166. $AC\ and\ BD$ are chords of a circle which bisect each other. Prove that (i) $AC\ and\ BD$ are diameters (ii) $ABCD$ is a rectangle

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167. $ABCD$ is a parallelogram. The circle through $A, BandC$ intersects CD produced at $E,$ prove that $AE = AD.$

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168. ABC is an isosceles triangle in which $AB = AC.$ If $D\ and\ E$ are the mid-points of $AB\ and\ AC$ respectively, prove that the points $B,\ C,\ D\ and\ E$ are concyclic.

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169. $D\ and\ E$ are points on equal sides $AB\ and\ AC$ of an isosceles triangle ABC such that $AD = AE.$ Prove that $B,\ C,\ D,\ E$ are concyclic.

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170. $D \text{ and } E$ are, respectively, the points on equal sides $AB \text{ and } AC$ of an isosceles triangle ABC such that $B,\ C,\ E, \text{ and } D$ are concyclic as shown in Figure. If O is the point of intersection of $CD \text{ and } BE,$ prove that AO is the bisector of line segment DE

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171. $ABCD$ is a cyclic quadrilateral. $ABandDC$ are produced to meet in $E.$ Prove that $EBC \cong EDA.$

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172. In an isosceles triangle ABC with $AB = AC,$ a circle passing through $B \text{ and } C$ intersects the sides $AB \text{ and } AC$ at $D \text{ and } E$

respectively. Prove that $DEBC$

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173. $PQ\ and\ RS$ are two parallel chords of a circle and lines $RP\ and\ SQ$ intersect each other at O as shown in Figure. Prove that $OP = OQ$

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174. $ABCD$ is a cyclic quadrilateral whose diagonals $AC\ and\ BD$ intersect at P. If $AB = DC,$ prove that:

(i)$PAB \cong PDC$

(ii)$PA = PD\ and\ PC = PB$ (iii) $AD \mid\mid BC$

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175. 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.`

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176. ABC is a triangle in which $AB = AC \, and \, P$ is a point on AC. Through C a line is drawn to intersect BP produced at Q such that $\angle ABQ = \angle ACQ$. Prove that: $\angle AQC = 90^0 + \frac{1}{2}\angle BAC$

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177. In any triangle ABC, if the angle bisector of $\angle A$and perpendicular bisector of BCintersect, prove that they intersect on the circumcircle of the triangle ABC

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178. Let the vertex of an angle ABC be located outside a circle and let the sides of the angle intersect equal chords AD and CE with the circle. Prove that $\angle ABC$ is equal to half the difference of the angles subtended by the chords AC and DE at

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179. If $ABCD$ is a cyclic quadrilateral in which $AD \mid\mid BC$. Prove that $\angle B = \angle C$ oved.

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180. $AB\ and\ CD$ are diameters of a circle with centre O. If $\angle OBD = 50^\circ$, find $\angle AOC$

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181. On a semi-circle with AB as diameter, a point C is taken, so that $m\,(\angle CAB) = 30^\circ$. Find $m\,(\angle ACB) and\, m(\angle ABC)$

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182. In a cyclic quadrilateral $ABCD$, if $AB \,||\, CD\, and \angle B = 70^\circ$, find the remaining angles.

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183. In a cyclic quadrilateral $ABCD$, if $\angle A = 3\angle C)$. Find $\angle A$

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184. In Figure, O is the centre of the circle and $\angle DAB = 50^0$. Calculate the values of x and y

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185. In Figure, if $\angle BAC = 60^0$ and $\angle BCA = 20^0$, find $\angle ADC$

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186. In Figure, if ABC is an equilateral triangle. Find $\angle BDC$ and $\angle BEC$

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187. In Figure, O is the centre of the circle. If $\angle CEA = 30^0$, find the values of x, y and z

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188. In Figure, $\angle BAD = 78^0$, $\angle DCF = x^0 and \angle DEF = y^0$. Find the value of $x \ and \ y$

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189. In a cyclic quadrilateral $ABCD$, if $\angle A - \angle C = 60^0$, prove that the smaller of two is 60^0

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190. In Figure, $ABCD$ is a cyclic quadrilateral. Find the value of x

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191. $ABCD$ is a cyclic quadrilateral in which: $BCAD,\ \angle ADC = 110^0\ and\ \angle BAC = 50^0.$ Find $\angle DAC$

$\angle DBC = 80^0\ and\ \angle BAC = 40^0.$ Find $\angle BCD$

$\angle BCD = 100^0 and\ \angle ABD = 70^0$ find $\angle ADB$

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192. Prove that the perpendicular bisectors of the sides of a cyclic quadrilateral are concurrent.

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193. Prove that the centre of the circle circumscribing the cyclic rectangle $ABCD$ is the point of intersection of its diagonals.

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194. Prove that the circle drawn with any side of a rhombus as diameter, passes through the point of intersection of its diagonals

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195. If the two sides of a pair of opposite sides of a cyclic quadrilateral are equal, prove that its diagonals are equal.

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196. $ABCD$ is a cyclic quadrilateral in which $BA \text{ and } CD$ when produced meet in $E \text{ and } EA = ED$. Prove that: $ADBC$ (ii) $EB = EC$

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197. Prove that the angle in a segment greater than a semi-circle is less than a right angle.

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198. $ABCD$ is a cyclic trapezium with $ADBC$. If $\angle B = 70^0$, determine other three angles of the trapezium.

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199. Prove that the line segment joining the mid-point of the hypotenuse of a right triangle to its opposite vertex is half of the hypotenuse.

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200. $ABCD$ is a cyclic quadrilateral in which $AC\ and\ BD$ are its diagonals. If $\angle DBC = 55^0\ and\ \angle BAC = 45^0,$ find $\angle BCD$

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201. In Figure, two circles intersect at $A\ and\ B$. The centre of the smaller circle is O and it lies on the circumference of the larger circle. If $\angle APB = 70^0,$ find $\angle ACB$

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202. In Figure, two congruent circles with centers $O\ and\ O'$ intersect at $A\ and\ B.$ If $\angle AO'B = 50^0,$ then find $\angle APB$

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203. $ABCD$ is a cyclic quadrilateral in which $\angle BAD = 75^0,\ \angle ABD = 58^0 and\ \angle ADC = 77^0,\ AC\ and\ BD$ intersect at P. then, find $\angle DPC$

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204. In Figure, if $\angle AOB = 80^0 and\ \angle ABC = 30^0,$ then find $\angle CAO$

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205. If O is the circumcentre of $ABC,$ then find the value of $\angle OBC + \angle BAC$

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206. If Figure, AOC is a diameter of the circle and are $AXB = \frac{1}{2}$ arc BYC. Find $\angle BOC$

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207. In Figure, A is the centre of the circle. $ABCD$ is a parallelogram and CDE is a straight line. Find $\angle BCD : \angle ABE$.

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208. In Figure, AB is a diameter of the circle such that $\angle A = 35^0 and \angle Q = 25^0$, find $\angle PBR$

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209. In Figure, $P\ and\ Q$ are centres of two circles intersecting at $B\ and\ C\dot{A}CD$ is a straight line. Then, $\angle BQD =$

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210. In Figure, $ABCD$ is quadrilateral inscribed in a circle with centre $O\dot{C}D$ is produced to E such that $\angle ADE = 95^0 and\ \angle OBA = 30^0 \cdot$ Find $\angle OAC$

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211. If the length of a chord of a circle is 16 cm and is at a distance of 15 cm from the centre of the circle, then the radius of the circle is 15 cm (b) 16 cm (c) 17 cm (d) 34 cm

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212. 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

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

Let AB be chord, OL is the perpendicular distance.

In right $\triangle OAL, OA^2 = AL^2 + OL^2$

$(6)^2 = (82)^2 + OL^2$

$AL = 12AB$

$36 = 16 + OL^2$

$OL^2 = 36 - 16 = 20$

$OL = \sqrt{20} = \sqrt{4 \times 5} = 2\sqrt{5}cm$

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213. If O is the centre of a circle with radius r and AB is a chord of the circle at a distance $\frac{r}{2}$ from O, then $\angle BAO =$

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214. $ABCD$ is a cyclic quadrilateral such that $\angle ADB = 30^0 and \angle DCA = 80^0$, the $\angle DAB =$ 70^0 (b) 100^0 (c) 125^0 (d) 150^0

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215. A chord of length 14cm is at a distance of 6 cm from the center of the circle. The length of another chord at a distance of 2cm from the center of the circle is (a) 12cm (b)14cm (c)16cm (d)18cm

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216. One chord of a circle is known to be 10 cm. The radius of this circle must be 5 cm (b) greater than 5 cm (c) greater than or equal to 5 cm (d) less than 5 cm

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217. 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 3 cm (b) 4 cm (c) 5 cm (d) 6 cm

In right , $\triangle ABC, \angle B = 90^0$

$AC = 5cm, AB = 4cm$

$BC^2 = AC^2 - AB^2$

$5^2 - 4^2 = 25 - 16 = 9$

$BC^2 = 9, BC = 3cm$

Length of chord,$BC = 3cm$

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218. If $AB,\ BC\ and\ CD$ are equal chords of a circle with O as centre and AD diameter, then $\angle AOB =$ 60^0 (b) 90^0 (c) 120^0 (d) none of these

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219. Let C be the mid-point of an arc AB of a circle such that $m\,\widehat{AB} = 183^0$. If the region bounded by the arc ACB and line segment AB is denoted by S, then the centre O of the circle lies in the interior of S (b) in the exterior of S on the segment AB (d) on AB and bisects AB

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220. In a circle, the major arc is 3 times the minor arc. The corresponding central angles and the degree measures of two arcs are $90^\circ\, and\, 270^\circ$ (b) $90^\circ\, and\, 90^\circ$ $270^\circ\, and\, 90^\circ$ (d) $60^\circ\, and\, 210^\circ$

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221. If $A\ and\ B$ are two points on a circle such that $m\left(\widehat{AB}\right) = 260^\circ$. A possible value for the angle subtended by arc BA at a point on the circle is

(a)100° (b) 75° (c) 50° (d) 25°

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222. An equilateral triangle ABC is inscribed in a circle with centre O. The measures of $\angle BOC$ is 30° (b) 60° (c) 90° (d) 120°

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223. In a circle with centre O, AB and C D $aretwodiameters perpendicar \to eachother. The \leq n > hofch$ or d A C$is(a)$2A B(b)sqrt(2)AB(c)1/2A B(d)1/(sqrt(2))\ A B`

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224. 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 $\sqrt{r}$ (b) $\sqrt{2}\,r\ AB$ (c) $\sqrt{3}\,r$ (d) $\frac{\sqrt{3}}{2}\,r$Let the two circles have their centres at A and C.

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225. If AB is a chord of a circle, $P$and Q are the two points on the circle different from A and B, then $\angle APB = \angle AQB$ $\angle APB + \angle AQB = 180^\circ$ or$\angle APB = \angle AQB$

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226. If two diameters of a circle intersect each other at right angles, then quadrilateral formed by joining their end points is a

rhombus (b) rectangle (c) parallelogram (d) square

Let AB and CD be the diagonals of a circle such that $AB \perp CD$

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227. If ABC is an arc of a circle and $\angle ABC = 135^\circ$, then the ratio of arc $\hat{A}BC$ to circumference is 1:4 (b) 3:4 (c) 3:8 (d) 1:2

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228. The chord of a circle is equal to its radius. The angle subtended by this chord at the minor arc of the circle is (a) 60° (b) 75° (c) 120° (d) 150°

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229. $PQRS$ is a cyclic quadrilateral such that PR is a diameter of the circle. If $\angle QPR = 67^\circ$ and $\angle SPR = 72^\circ$, then $\angle QRS =$

(a)41° (b) 23° (c) 67° (d) 18°

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230. If A, B, C are three points on a circle with centre O such that $\angle AOB = 90^\circ$ and $\angle BOC = 120^\circ$, then $\angle ABC =$ 60° (b) 75° (c) 90° (d) 135°

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231. 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 $6\,cm$

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232. In a circle of radious 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 34 cm (b) 15 cm (c) 23 cm (d) 30 cm

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233. The greatest chord of a circle is called its

(a)radius (b) secant (c) diameter (d) none of these

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234. Angle formed in minor segment of a circle is acute (b) obtuse (c) right angle (d) none of these

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235. Number of circles that can be drawn through three non-collinear points is 1 (b) 0 (c) 2 (d) 3

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