



MATHS

BOOKS - RD SHARMA MATHS (ENGLISH)

CIRCLES

Others

1. If radii of the two concentric circles are 15cm and 17cm, then the length of each chord of one circle which is tangent to other is: 8cm (b) 16cm (c) 30cm (d) 17cm



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2. In Figure, if PR is tangent to the circle at P and Q is the centre of the circle, then $\angle POQ =$

A. 110°

B. 100°

C. 120°

D. 90°

Answer: C



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3. If from a point P , tangents PQ and PR are drawn to the ellipse $\frac{x^2}{2} + y^2 = 1$ so that the equation of QR is $x + 3y = 1$, then find the coordinates of P .

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4. In Figure, if tangents PA and PB are drawn to a circle such that $\angle APB = 30^\circ$ and chord AC is drawn parallel to the tangent PB , then $\angle ABC =$ (a) 60° (b) 90° (c) 30° (d) None of these

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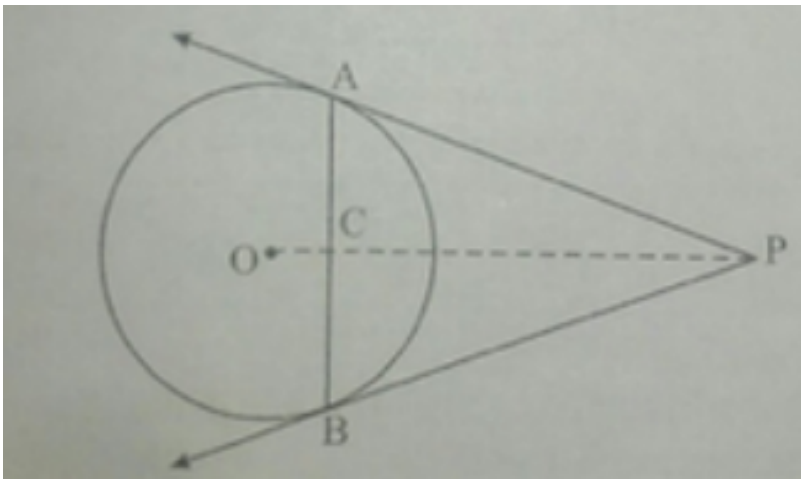
5. In two concentric circles, a chord of length 24cm of larger circle becomes a tangent to the smaller circle whose radius is 5cm. Find the radius of the larger circle.

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6. In two concentric circle, prove that a chord of larger circle which is tangent to smaller circle is bisected at the point of contact.

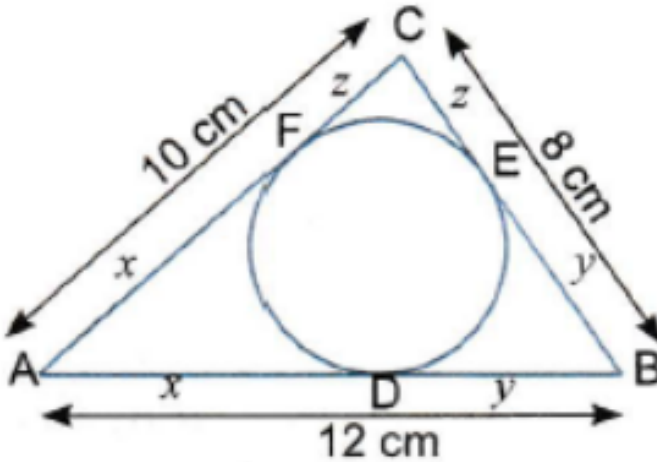
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7. From an external point P , two tangents PA and PB are drawn to the circle with centre O . Prove that OP is the perpendicular bisector of AB .



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8. A circle is inscribed in a $\triangle ABC$ having side 8 cm , 10 cm and 12 cm as shown in Figure. Find AD , BE and CF .



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9. $ABCD$ is a quadrilateral such that $\angle D = 90^\circ$. A circle $C(O, r)$ touches the sides AB , BC , CD and DA at P , Q , R and S respectively. If $BC = 38\text{ cm}$, $CD = 25\text{ cm}$ and $BP = 27\text{ cm}$, find r .



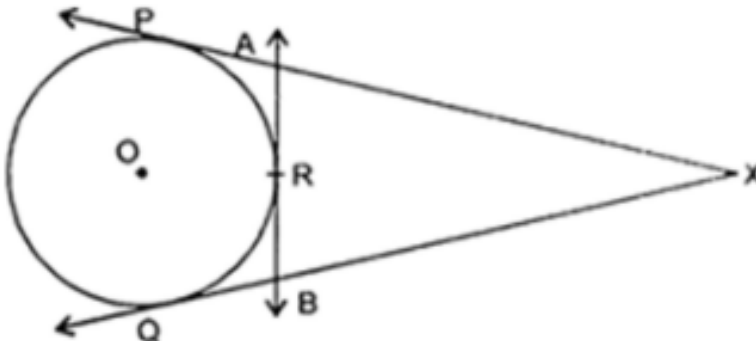
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10. PA and PB are tangents from P to the circle with centre O . At point M , a tangent is drawn cutting PA at K and PB at N . Prove that $KN = AK + BN$.



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11. In Figure, XP and XQ are tangents from X to the circle with centre O . R is a point on the circle. Prove that,
 $XA + AR = XB + BR$





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12. In figure, sides QP and RQ of PQR are produced to point S and T respectively. If $\angle SPR = 135^\circ$ and $\angle PQT = 110^\circ$, find $\angle PRQ$. Figure



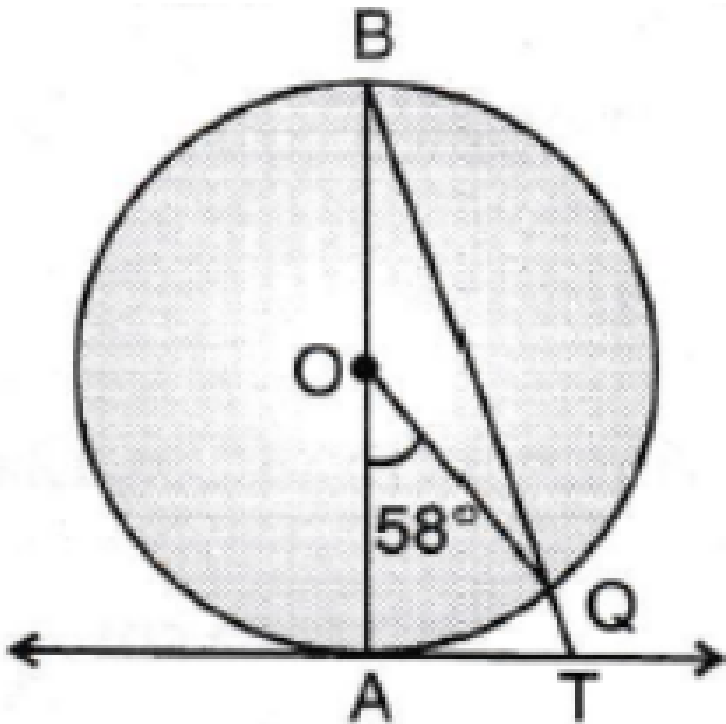
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13. Two concentric circles are of diameters 30cm and 18cm. Find the length of the chord of the larger circle which touches the smaller circle.



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14. In the given figure, AB is diameter of a circle with centre O and AT is a tangent at A and $\angle AOQ = 58^\circ$, find $\angle ATQ$.



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15. In Figure, triangle ABC is drawn to circumscribe a circle of radius 4cm such that the segments BD and DC are of lengths

8cm and 6cm respectively. Find the lengths of sides

AB and AC , when area of ABC is 84cm^2 .



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16. In Figure, BC is a tangent to the circle with centre O . OE

bisects AP . Prove that $\triangle AEO \sim \triangle ABC$.



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17. In Figure, two tangents AB and AC are drawn to a circle

with centre O such that $\angle BAC = 120^\circ$. Prove that $OA = 2AB$



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18. In the given figure, O is the centre of the circle and OLM is perpendicular to AOB. Prove that (i) A, O, P and M are concyclic (ii) $\angle OAP = \angle OMB$ (iii) P, L, O and B are concyclic



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19. In Figure, common tangents P Q and RS to two circle intersect at A. Prove that $PQ=RS$



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20. Circles $C(O, r)$ and $C(O', r')$, ($r > r'$) touch internally at P. PQ is a chord of circle $C(O, r)$ which intersects $C(O', r')$ at R. Show that OO'RQ is a trapezium



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21. Two concentric circles of radii 3cm and 5cm are given. Then length of chord BC which touches the inner circle at P is equal to (a) 4 cm (b) 6cm (c) 8 cm (d) 10 cm

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22. In Figure, a circle with centre O is inscribed in a quadrilateral $ABCD$ such that, it touches sides BC , AB , AD and C D at points P , Q , R and S respectively. If $AB = 29\text{cm}$, $AD = 23\text{cm}$, $\angle B = 90^\circ$ and $DS = 5\text{cm}$, then the radius of the circle (in cm) is (a) 11 (b) 18 (c) 6 (d) 15

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23. In Figure, O is the centre of the circle and BCD is tangent to it at C . Prove that $\angle BAC + \angle ACD = 90^\circ$.



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24. In Figure, there are two concentric circles with centre O of radii 5cm and 3cm . From an external point P , tangents PA and PB are drawn to these circles. If $AP = 12\text{cm}$, find the length of BP .



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25. In the given figure, two equal circles, with centres O and O' , touch each other at X . OO' produced meets the circle with centre

O' at A. AC is tangent to the circle with centre O, at the point C.

O'D is perpendicular to AC. Find the value of $\frac{DO'}{CO}$.



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26. Prove that the line segment joining the points of contact of two parallel tangents passes through the centre.



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28. In two concentric circles prove that all chords of the outer circle which touch the inner circle are of equal length.



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29. In Figure, O and O' are centres of two circles intersecting at B and C . ACD is a straight line, find x .



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30. Two circles with centres A and B of radii 3cm and 4cm respectively intersect at two points C and D such that AC and BC are tangents to the two circles. Find the length of the common chord CD .



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31. If an isosceles $\triangle ABC$ in which $AB=AC=6\text{cm}$, is inscribed in a circle of radius 9cm , find the area of the triangle.



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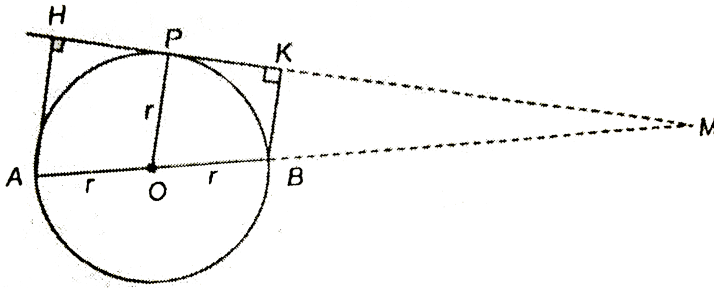
32. O is the centre of a circle of radius 5cm . T is a point such that $OT=13\text{cm}$ and OT intersects the circle at E . If AB is the tangent to the circle at E , find length of AB .



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33. AB is a diameter of a circle with centre O , AH and BK are perpendiculars from A and B to the tangent at a point P on the

circle, Prove that $AH+BK=AB$.



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34. A tangent PQ at a point P of a circle of radius 5 cm meets a line through the centre O at a point Q so that $OQ = 13\text{cm}$. Find the length of PQ .

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35. A line through the centre O of a circle of radius 7 cm cuts the tangent, at a point P on the circle, at Q such that

$PQ = 24\text{cm}$. Find OQ .



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36. Fill in the blanks: The common point of a tangent and the circle is called..... A circle may have parallel tangents. A tangent to a circle intersects it in point(s). A line intersecting a circle in two points is called a (v) The angle between tangent at a point on a circle and the radius through the point is



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37. How many tangents can a circle have?



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38. O is the centre of a circle of radius 8 cm. The tangent at a point A on the circle cuts a line through O at B such that $AB = 15\text{cm}$. Find OB .



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39. If the tangent at a point P to a circle with centre O cuts a line through O at Q such that $PQ = 24\text{cm}$ and $OQ = 25\text{cm}$. Find the radius of the circle.



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40. A point P is 13cm from the centre of the circle. The length of the tangent drawn from P to the circle is 12 cm. Find the radius of the circle.

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41. Find the length of the tangent drawn from a point whose distance from the centre of a circle is 25 cm. Given that the radius of the circle is 7 cm.

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42. A circle is touching the side BC of ABC at P and touching AB and AC produced at Q and R respectively. Prove that $AQ = \frac{1}{2}(\text{Perimeter of } ABC)$.

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43. In Figure, the incircle of ABC touches the sides BC , CA and AB at D , E and F respectively. Show that $AF + BD + CE = AE + BF + CD = \frac{1}{2}(\text{Perimeter of } ABC)$.

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44. In Fig. 10.20, the sides AB , BC and CA of triangle ABC touch a circle with centre O and radius r at P , Q and R respectively. (FIGURE) Prove that: 1) $AB + CQ = AC + BQ$

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45. In Figure, two circles touch each other at the point C . Prove that the common tangent to the circles at C , bisects the

common tangent at P and Q .



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46. A circle touches all the four sides of a quadrilateral $ABCD$.

Prove that: $AB + CD = BC + DA$.



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47. If all the side of a parallelogram touch a circle, show that the

parallelogram is a rhombus.

OR Prove that a parallelogram

circumscribing a circle is a rhombus.



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48. The radius of the incircle of a triangle is 4 cm and the segments into which one side is divided by the point of contact are 6 cm and 8 cm. Determine the other two sides of the triangle.

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49. Prove that the tangents at the extremities of any chord make equal angles with the chord.

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50. Two tangents TP and TQ are drawn to a circle with centre O from an external point T . Prove that $\angle PTQ = 2\angle OPQ$.

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51. PQ is a chord of length 8 cm of a circle of radius 5 cm. The tangents at P and Q intersect at a point T . Find the length TP .

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52. In Figure, n and m are two parallel tangents at A and B . The tangent at C makes an intercept DE between n and m . Prove that $\angle DFE = 90^\circ$.

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53. Prove that the angle between two tangents drawn from an external point to a circle is supplementary to the angle

subtended by the line segments joining the points of contact at the centre.

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54. Show that tangent lines at the end points of a diameter of a circle are parallel.

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55. Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.

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56. A circle touches the sides of a quadrilateral $ABCD$ at P, Q, R, S respectively. Show that the angles subtended at the centre by a pair of opposite sides are supplementary.



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57. Find the locus of centres of circles which touch two intersecting lines.



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58. Find the locus of centres of circles which touch two intersecting lines.



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59. If PT is a tangent at T to a circle whose centre is O and $OP = 17\text{cm}$, $OT = 8\text{cm}$, Find the length of the tangent segment PT .



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60. Find the length of a tangent drawn to a circle with radius 5 cm, from a point 13 cm from the centre of the circle.



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61. A point is 26 cm away from the centre O of a circle and the length PT of the tangent drawn from P to the circle is 10 cm. Find the radius of the circle.



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62. If from any point on the common chord of two intersecting circles, tangents be drawn to the circles, prove that they are equal.

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63. If the sides of a quadrilateral touch a circle, prove that the sum of a pair of opposite sides is equal to the sum of the other pair.

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64. If AB , AC , PQ are tangents in Fig. 10.51 and $AB = 5\text{cm}$, find the perimeter of APQ . (FIGURE)

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65. Prove that the intercept of a tangent between two parallel tangents to a circle subtends a right angle at the centre.

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66. In Fig. PQ is tangent at a point R of the circle with centre O . If $\angle TRQ = 30^\circ$, find $\angle PRS$. (FIGURE)

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67. If PA and PB are tangents from an outside point P such that $PA = 10\text{cm}$ and $\angle APB = 60^\circ$. Find the length of chord AB .

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68. From an external point P , tangents PA and PB drawn to a circle with centre O . If CD is the tangent to the circle at a point E and $PA = 14\text{cm}$, find the perimeter of PCD .

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69. In Fig. 10.53, ABC is a right triangle right-angled at B such that $BC = 6\text{cm}$ and $AB = 8\text{cm}$. Find the radius of its incircle.
(FIGURE)

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70. From a point P , two tangents PA and PB are drawn to a circle with centre O . If $OP =$ diameter of the circle, show that

$\triangle APB$ is equilateral.

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71. Two tangent segments PA and PB are drawn to a circle with centre O such that $\angle APB = 120^\circ$. Prove that $OP = 2 AP$.

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72. If ABC is isosceles with $AB = AC$ and $C(O, r)$ is the incircle of the ABC touching BC at L , prove that L bisects BC .

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73. In Fig. 10.54, a circle touches all the four sides of a quadrilateral $ABCD$ with $AB = 6\text{cm}$, $BC = 7\text{cm}$ and $CD = 4\text{cm}$. Find AD . (FIGURE)



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74. Prove that the perpendicular at the point of contact to the tangent to a circle passes through the centre.



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75. Two circles touch externally at a point P . From an external point T on the tangent at P , tangents TQ and TR are drawn to the circles with points of contact Q and R respectively. Prove that $TQ = TR$.

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76. In Fig. 10.57, a circle is inscribed in a quadrilateral $ABCD$ in which $\angle B = 90^\circ$. If $AD = 23\text{cm}$, $AB = 29\text{cm}$ and $DS = 5\text{cm}$, find the radius r of the circle. (FIGURE)

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77. AB is a chord of length 16cm of a circle of radius 10cm . The tangents at A and B intersect at a point P . Find the length of PA .

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78. In Figure, PA and PB are tangents from an external point P to a circle with centre O . LN touches the circle at M . Prove that $PL + LM = PN + MN$.



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79. In Figure, BDC is a tangent to the given circle at point D such that $BD = 30\text{cm}$ and $CD = 7\text{cm}$. The other tangents BE and CF are drawn respectively from B and C to the circle and meet when produced at A making BAC a right angle triangle. Calculate (i) AF (ii) radius of the circle.



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80. In Fig. 10.62, $PO \perp QO$. The tangents to the circle at P and Q intersect at a point T . Prove that PQ and OT are right bisectors of each other. (FIGURE)

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81. The lengths of three consecutive sides of a quadrilateral circumscribing a circle are 4 cm, 5cm, and 7cm respectively. Determine the length of the fourth side.

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82. In Fig. 10.67, $OQ:PQ = 3:4$ and perimeter of $POQ = 60\text{cm}$. Determine PQ , QR and OP . (FIGURE)

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83. In Fig. 10.72, PA and PB are tangents to the circle drawn from an external point P . CD is a third tangent touching the circle at Q . If $PB = 10\text{cm}$ and $CQ = 2\text{cm}$, what is the length PC ? (FIGURE)



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84. What is the distance between two parallel tangents of a circle of radius 4 cm?



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85. The length of a tangent from a point A at distance 5 cm from the centre of the circle is 4cm. Find the radius of the circle.



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86. Two tangents TP and TQ are drawn from an external point T to a circle with centre O as shown in Fig. 10.73. If they are inclined to each other at an angle of 100° , then what is the value of $\angle POQ$?

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87. What is the distance between two parallel tangents to a circle of radius 5 cm?

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88. In Q. No. 1, if $PB = 10\text{cm}$, what is the perimeter of PCD ?

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89. In Fig. 10.74, CP and CQ are tangents to a circle with centre O . ARB is another tangent touching the circle at R . If $CP = 11\text{cm}$ and $BC = 7\text{cm}$, then find the length of BR .
(FIGURE)

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90. In figure $\triangle ABC$ is circumscribing a circle. Find the length of BC

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91. In Fig. 10.76, CP and CQ are tangents from an external point C to a circle with centre O . AB is another tangent which

touches the circle at R . If $CP = 11\text{cm}$ and $BR = 4\text{cm}$, find the length of BC .(FIGURE)

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92. Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.

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93. In Figure, PA and PB are tangents to the circle with centre O such that $\angle APB = 50^\circ$. Write the measure of $\angle OAB$.

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94. A tangent PQ at a point P of a circle of radius 5 cm meets a line through the centre O at a point Q such that $OQ = 12\text{cm}$.

Length PQ is

A. (a) 12cm

B. (b) 13cm

C. (c) 8.5cm

D. (d) $\sqrt{119}\text{cm}$

Answer: null



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95. From a point Q , the length of the tangent to a circle is 24cm and the distance of Q from the centre is 25cm. The radius of the circle is

A. (a) 7cm

B. (b) 12cm

C. (c) 15cm

D. (d) 24.5cm

Answer: null



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96. The length of the tangent from a point A to a circle, of radius 3cm, is 4cm. The distance of A from the centre of the circle is

A. $\sqrt{7}cm$

B. $7cm$

C. $5cm$

D. 25cm

Answer: null



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97. If tangents PA and PB from a point P to a circle with centre O are inclined to each other at an angle of 80° then $\angle POA$ is equal to :

A. 50°

B. 60°

C. 70°

D. 80°

Answer: null



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98. In figure, sides QP and RQ of PQR are produced to point S and T respectively. If $\angle SPR = 135^\circ$ and $\angle PQT = 110^\circ$, find $\angle PRQ$. Figure

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99. PQ is a tangent to a circle with centre O at the point P . If $\triangle OPQ$ is an isosceles triangle, then $\angle OQP$ is equal to :

A. 30°

B. 45°

C. 60°

D. 90°

Answer: null



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100. Two equal circles touch each other externally at C and AB is a common tangent to the circles. Then, $\angle ACB = 60^\circ$ (b) 45° (c) 30° (d) 90°



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101. ABC is a right angled triangle, right angled at B such that $BC = 6\text{cm}$ and $AB = 8\text{cm}$. A circle with centre O is inscribed in ABC . The radius of the circle is (a) 1cm (b) 2cm (c) 3cm (d) 4cm



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102. PQ is a tangent drawn from a point P to a circle with centre O and QOR is a diameter of the circle such that $\angle POR = 120^\circ$, then $\angle OPQ$ is 60° (b) 45° (c) 30° (d) 90°



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103. If four sides of a quadrilateral $ABCD$ are tangential to a circle, then $AC + AD = BD + CD$ (b) $AB + CD = BC + AD$ (c) $AB + CD = AC + BC$ (d) $AC + AD = BC + DB$



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104. The length of the tangent drawn from a point 8cm away from the centre of a circle of radius 6cm is (a) $\sqrt{7}cm$ (b) $2\sqrt{7}cm$

(c) 10cm (d) 5cm



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105. AB and CD are two common tangents to circles which touch each other at C . If D lies on AB such that $CD = 4\text{cm}$, then AB is equal to (a) 4cm (b) 6cm (c) 8cm (d) 12cm



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106. In Fig, if AD , AE and BC are tangents to the circle at D , E and F respectively. Then, (a) $AD = AB + BC + CA$
(b) $2AD = AB + BC + CA$ (c) $3AD = AB + BC + CA$
(d) $4AD = AB + BC + CA$



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107. In Figure, RQ is a tangent to the circle with centre O . If $SQ = 6\text{cm}$ and $QR = 4\text{cm}$, then $OR =$ (a) 8cm (b) 3cm (c) 2.5cm (d) 5cm



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108. In Figure, the perimeter of ABC is (a) 30cm (b) 60cm (c) 45cm (d) 15cm



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109. In Figure, AP is a tangent to the circle with centre O such that $OP = 4\text{cm}$ and $\angle OPA = 30^\circ$. Then, $AP =$ (a) $2\sqrt{2}\text{cm}$ (b) 2cm (c) $2\sqrt{3}\text{cm}$ (d) $3\sqrt{2}\text{cm}$



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110. AP and AQ are tangents drawn from a point A to a circle with centre O and radius 9cm . If $OA = 15\text{cm}$, then $AP + AQ =$ (a) 12cm (b) 18cm (c) 24cm (d) 36cm



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111. At one end A of a diameter AB of a circle of radius 5cm , tangent XAY is drawn to the circle. The length of chord CD parallel to XY and at a distance of 8cm from A is

A. 5cm

B. 6cm

C. 7cm

D. 8cm

Answer: D



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112. If PT is tangent drawn from a point P to a circle touching it at T and O is the centre of the circle, then $\angle OPT + \angle POT = (a)30^\circ (b)60^\circ (c)90^\circ (d)180^\circ$



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113. In the adjacent figure, if $AB = 12cm$, $BC = 8cm$ and $AC = 10cm$, then $AD = (a) 5cm (b) 4cm (c) 6cm (d) 7cm$



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114. In Figure, if $AP = PB$, then (a) $AC = AB$ (b) $AC = BC$
(c) $AQ = QC$ (d) $AB = BC$



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115. In Figure, if $AP = 10\text{cm}$, then $BP =$ (a) $\sqrt{91}\text{cm}$ (b)
 $\sqrt{127}\text{cm}$ (c) $\sqrt{119}\text{cm}$ (d) $\sqrt{109}\text{cm}$



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116. In Figure, if quadrilateral $PQRS$ circumscribes a circle, then
 $PD + QB =$ (a) PQ (b) QR (c) PR (d) PS



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117. In Figure, two equal circles touch each other at T , if $QP = 4.5\text{cm}$, then $QR =$ (a) 9cm (b) 18cm (c) 15cm (d) 13.5cm



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118. In Figure, APB is a tangent to a circle with centre O at point P . If $\angle QPB = 50^\circ$, then the measure of $\angle POQ$ is (a) 100° (b) 120° (c) 140° (d) 150°



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119. In Figure, $PR =$ (a) 20cm (b) 26cm (c) 24cm (d) 28cm



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120. In Figure, there are two concentric circles with centre O .
 PR and PQS are tangents to the inner circle from point P lying on the outer circle. If $PR = 7.5\text{cm}$, then PS is equal to (a) 10cm (b) 12cm (c) 15cm (d) 18cm

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121. In Fig. 10.94, if $AB = 8\text{cm}$ and $PE = 3\text{cm}$, then $AE =$ (FIGURE) (a) 11cm (b) 7cm (c) 5cm (d) 3cm

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122. In Fig. 10.95, PQ and PR are tangents drawn from P to a circle with centre O . If $\angle OPQ = 35^\circ$, then (FIGURE)

$a = 30^\circ$, $b = 60^\circ$ (b) $a = 35^\circ$, $b = 55^\circ$ (c) $a = 40^\circ$, $b = 50^\circ$

(d) $a = 45^\circ$, $b = 45^\circ$



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123. In Fig. 10.96, if TP and TQ are tangents drawn from an external point T to a circle with centre O such that $\angle TQP = 60^\circ$, then $\angle OPQ =$ (FIGURE) 25° (b) 30° (c) 40° (d) 60°



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124. In Fig. 10.97, the sides AB , BC and CA of triangle ABC , touch a circle at P , Q and R respectively. If $PA = 4\text{cm}$, $BP = 3\text{cm}$ and $AC = 11\text{cm}$, then length of BC is (FIGURE) (a) 11cm (b) 10cm (c) 14cm (d) 15cm

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125. In Fig. 10.98, a circle touches the side DF of EDF at H and touches ED and EF produced at K and M respectively. If $EK = 9\text{cm}$, then the perimeter of EDF is (FIGURE) (a) 18cm (b) 13.5cm (c) 12cm (d) 9cm

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126. In Fig. 10.99, DE and DF are tangents from an external point D to a circle with centre A . If $DE = 5\text{cm}$ and $DE \perp DF$, then the radius of the circle is (FIGURE) (a) 3cm (b) 5cm (c) 4cm (d) 6cm

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127. In a right angled triangle ABC , right angled at B , $BC = 12\text{cm}$ and $AB = 5\text{cm}$. The radius of the circle inscribed in the triangle (in cm) is :

A. 4

B. 3

C. 2

D. 1

Answer: null



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128. Two circles touch each other externally at P . AB is a common tangent to the circle touching them at A and B . The value of $\angle APB$ is (a) 30° (b) 45° (c) 60° (d) 90°

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129. In Fig. 10.101, PQ and PR are two tangents to a circle with centre O . If $\angle QPR = 46^\circ$, then $\angle QOR$ equals (a) 67° (b) 134° (c) 44° (d) 46°

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130. In Figure, QR is a common tangent to the given circles touching externally at the point T . The tangent at T meets QR at P . If $PT = 3.8\text{ cm}$, then the length of QR (in cm) is (a) 3.8 (b) 7.6 (c) 5.7 (d) 1.9

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131. In Figure, a quadrilateral $ABCD$ is drawn to circumscribe a circle such that its sides AB , BC , CD and AD touch the circle at P , Q , R and S respectively. If $AB = x \text{ cm}$, $BC = 7 \text{ cm}$, $CR = 3 \text{ cm}$ and $AS = 5 \text{ cm}$, then $x =$ (a) 10 (b) 9 (c) 8 (d) 7



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