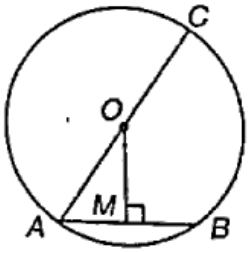
GEOMETRY

(Ref: FM-QAH2022012)

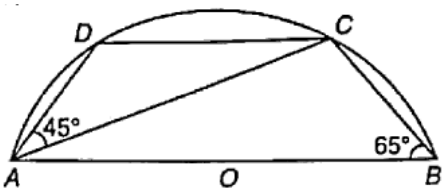
Circle

1. In the adjoining figure, O is the centre of circle and diameter AC = 26 cm. If chord AB = 10 cm, then the distance AB = 10 cm, then the distance between chord AB and centre O of the circle is:



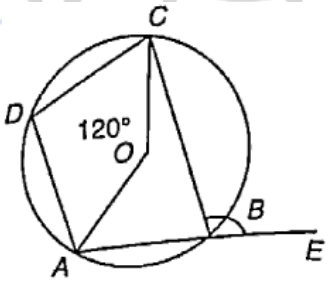
a) 24 cm b) 16 cm
c) 12 cm d) none of these

2. In the given figure, AB is diameter of the circle. C and D lie on the semicircle. ∠ABC = 65° and ∠CAD = 45°. Find the m ∠DCA:



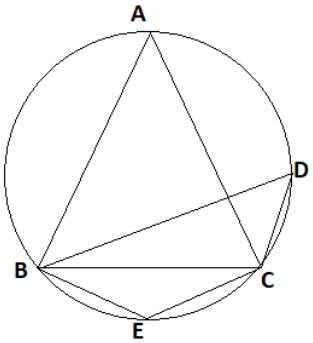
a) 45° b) 25°
c) 20° d) none of these

3. In the given figure ∠AOC = 120°, find m ∠CBE, where O is the centre:



a) 60° b) 100°
c) 120° d) 150°

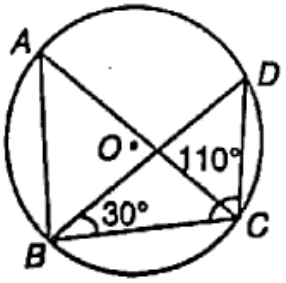
4. In the given figure, ΔABC is an equilateral triangle. Find m ∠BE:



a) 120° b) 60°
c) 80° d) None of these

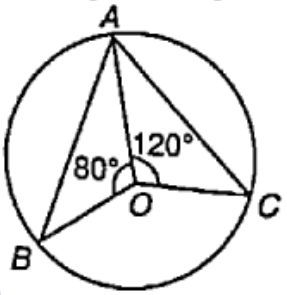
5. The quadrilateral formed by angle bisector of a cyclic quadrilateral is a:
a) rectangle b) square
c) parallelogram d) cyclic quadrilateral

6. In the given figure, ∠BAC and ∠BDC are the angles of same segments, ∠DBC = 30° and ∠BCD = 110°. Find m ∠BAC is:



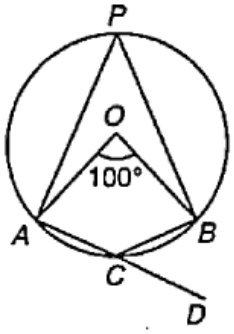
a) 35° b) 40°
c) 55° d) 60°

7. In the given figure, O is the centre of circle. ∠AOB = 80° and ∠AOC = 120°. Find m ∠BAC :



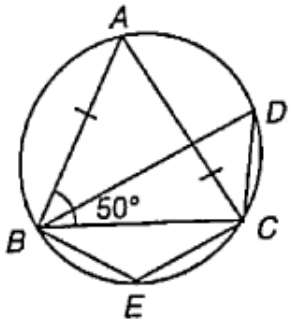
a) 120° b) 80°
c) 100° d) none of these

8. In the given figure, O is the centre of circle, ∠AOB = 100°. Find m ∠BCD:



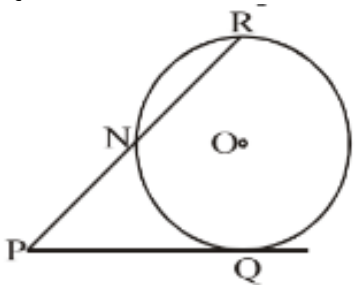
a) 80° b) 60°
c) 50° d) 40°

9. In the given figure, ABC is an isosceles triangle in which AB = AC and m ∠ABC = 50°, m ∠BDC:



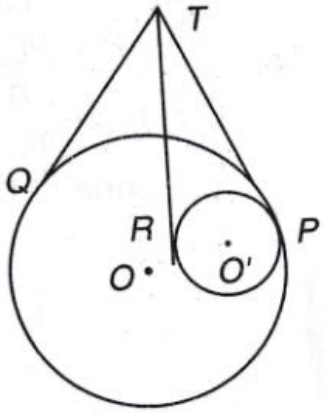
a) 80° b) 60°
c) 65° d) 100°

10. In the given figure, PQ is the tangent of the circle. Line segment PR intersects the circle at N and R. PQ = 15 cm, PR = 25 cm, find PN:



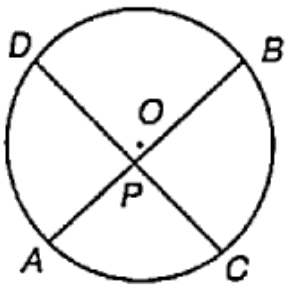
a) 15 cm b) 10 cm
c) 9 cm d) 6 cm

11. In the given figure, there are two circles with the centres O and O' touching each other internally at P. Tangents TQ and TP are drawn to the larger circle and tangents TP and TR are drawn to the smaller circle. Find TQ : TR:



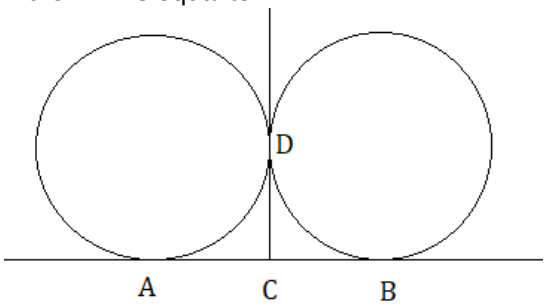
a) 8 : 7 b) 7 : 8
c) 5 : 4 d) 1 : 1

12. In the given figure, AP = 2 cm, BP = 6 cm and CP = 3 cm. Find DP:



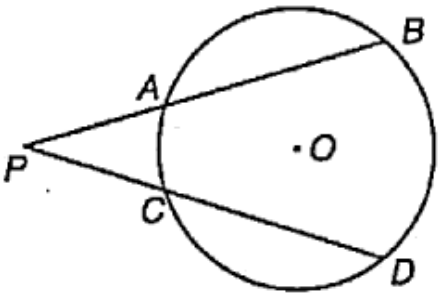
a) 6 cm b) 4 cm
c) 2 cm d) 3 cm

13. In the given figure, AB and CD are two common tangents to the two identical circle. If CD = 6 cm, then AB is equal to:



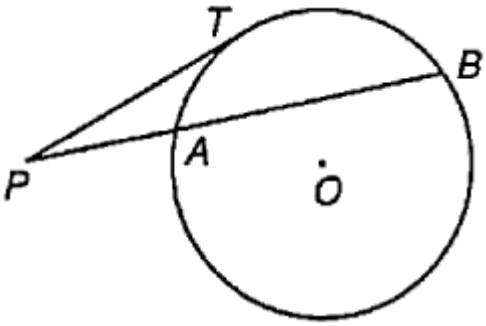
a) 9 cm b) 15 cm
c) 12 cm d) None of these

14. In the given figure, AP = 3 cm, BA = 5 cm and CP = 2 cm. Find CD:



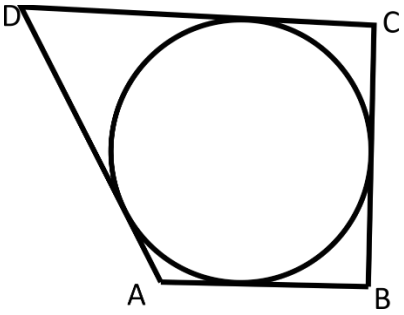
a) 12 cm b) 10 cm
c) 9 cm d) 6 cm

15. In the given figure, tangent PT = 5 cm, PA = 4 cm, find AB :



a) 7/4 cm b) 11/4 cm
c) 9/4 cm d) can't be determined

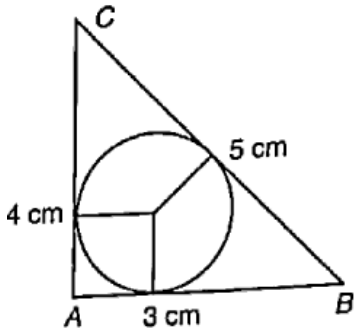
16. A circle touches a quadrilateral ABCD. Find the true statement:



a) AB + BC = CD + AD
b) AB + CD = BC + AD
c) BD = AC
d) None of these

17. In a circle of radius 17 cm, two parallel chords are drawn on opposite sides 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:
a) 23 cm b) 30 cm
c) 15 cm d) none of these

18. ABC is a right angled triangle AB = 3 cm, BC = 5 cm and AC = 4 cm, then the inradius of the circle is:



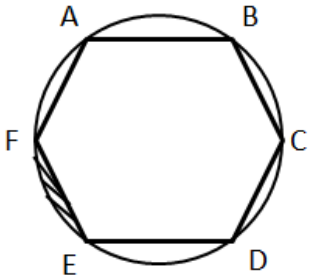
a) 1 cm b) 1.25 cm
c) 1.5 cm d) none of these

19. The distance between the centres of equal circles each of radius 3 cm is 10 cm. The length of a transverse tangent is:
a) 4 cm b) 6 cm
c) 8 cm d) 10 cm

20. Line AB is 24 metres in length and is tangent to the inner one of the two concentric circles at point C. Points A and B lie on the circumference of the outer circle. It is known that the radii of the two circles are integers. The radius of the outer circle is.
a) 13 metres b)5 metres
c) 7 metres d) 4 metres

21. PQ and RS are common tangents to two circles intersecting at A and B. AB, when produced both sides, meet the tangents PQ and RS at X and Y, respectively. If AB = 3 cm, XY = 5 cm, then PQ (in cm) will be
a) 3 cm b) 4 cm
c) 5 cm d) 2 cm

22. ABCDEF is a regular hexagon inscribed inside a circle. If the shortest diagonal of the hexagon is of length 3 units, what is the area of the shaded region

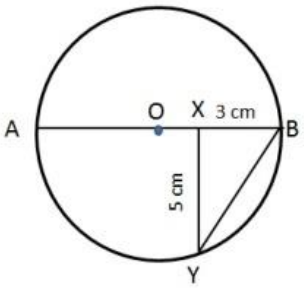


a) $\frac{1}{6}\left(3\Pi - \frac{9\sqrt{3}}{2}\right)$
b) $\frac{1}{6}\left(2\Pi - \frac{6\sqrt{3}}{2}\right)$
c) $\frac{1}{6}\left(3\Pi - \frac{8\sqrt{3}}{2}\right)$
d) $\frac{1}{6}\left(6\Pi - \frac{15\sqrt{3}}{2}\right)$

23. Circle with center O and radius 25 cms has a chord AB of length of 14 cms in it. Find the area of triangle AOB.
a) 144 cm^2 b) 156 cm^2
c) 121 cm^2 d) 168 cm^2

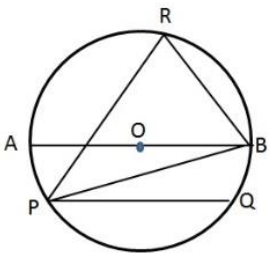
24. Two mutually perpendicular chords AB and CD intersect at P. AP = 4, PB = 6, CP = 3. Find radius of the circle.
a) $\sqrt{31.25}$ b) $1\sqrt{24}$
c) $\sqrt{52}$ d) $\sqrt{26}$

25. What is the circumference of the below circle given that AB is the diameter and XY is perpendicular to AB?



a) 8π cm c) π √34 cm
c) 34π/3 cm d) π √31/3 cm

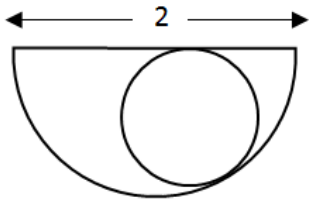
26. Find ∠PRB. Given
I. ∠BPQ = 22∘ and O is the centre of the circle
II. ∠RBP = 54∘ and chord PQ is parallel to AB



a) Either I or II individually is sufficient
b) Both I and II together are required
c) One of the statements alone is sufficient
d) Need more data

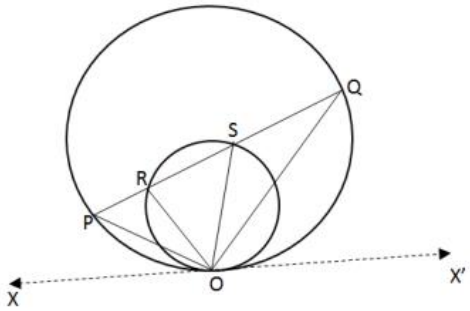
27. There are 2 concentric circles, one big and one small. A square ABCD is inscribed inside the big circle while the same square circumscribes the small circle. The square touches the small circle at points P, Q, R and S. Determine the ratio of circumference of big circle to the polygon PQRS.
a) π : 2 b) 2 : π c) 2 : √2 d) π : √2

28. A circle is inscribed in a semi-circle as shown:-
The radius of the circle is:-



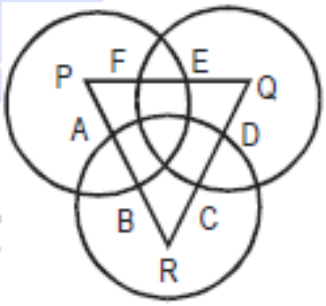
a) $\sqrt{2}+1/2$ b) $\sqrt{2}-1/2$
c) $1-\sqrt{2}$ d) $\sqrt{2}-1$

29. Two circles of radius 5 cm have a direct tangent PQ and an indirect tangent RS. Find the length of PQ if RS = 24 cm.



a) 29 cm b) 13 cm
c) 26 cm d) CBD

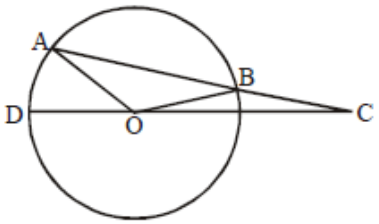
30. Three circles, each of radius 20, have centres at P, Q and R. Further, AB = 5, CD = 10 and EF = 12.What is the perimeter of ΔPQR?



a) 120 b) 66 c) 93 d) 87

31. The length of the common chord of two circles of radii 15 cm and 20 cm, whose centres are 25 cm apart, is (in cm)
a) 24 b) 25 c) 15 d) 20

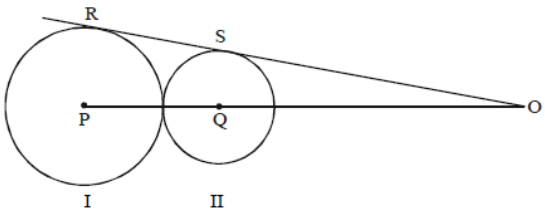
32. In the figure given below, AB is the chord of a circle with centre O. AB is extended to C such that BC=OB. The straight line CO is produced to meet the circle at D. If ∠ACD =y degrees and ∠AOD =x degrees such that x=ky, then the value of k is



a) 3 b) 2 c) 1 d) None

Directions for Questions 33 to 35: **Answer the questions on the basis of the information given below.**

In the adjoining figure, I and II are circles with centers P and Q respectively. The two circle touch each other and have a common tangent that touches them at points R and S respectively. This common tangent meets the line joining P and Q at O. The diameters of I and II are in the rartio 4:3. It is also known that the length of PO is 28 cm.

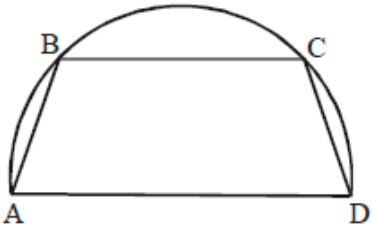


33. What is the ratio of the length of PQ to that of QO?
a) 1 : 4 b) 1 : 3
d) 3 : 8 d) 3 : 4

34. What is the radius of the circle II?
a) 2 cm b) 3 cm
c) 4 cm d) 5 cm

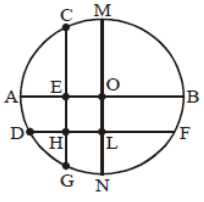
35. The length of SO is
a) $8\sqrt{3}$ cm b) $10\sqrt{3}$ cm
c) $12\sqrt{3}$ cm d) $14\sqrt{3}$ cm

36. On a semicircle with diameter AD, chord BC is parallel to the diameter. Further, each of the chords AB and CD has length 2, while AD has length 8. What is the length of BC?



a) 7.5 b) 7 c) 7.75 d) None

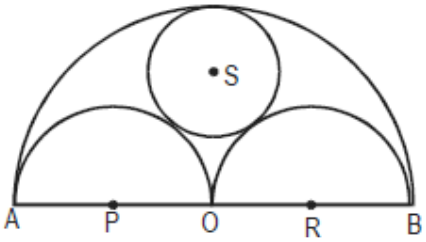
37. In the following figure, the diameter of the circle is 3 cm. AB and MN are two diameters such that MN is perpendicular to AB. In addition, CG is perpendicular to AB such that AE : EB = 1 : 2, and DF is perpendicular to MN such that NL : LM = 1 : 2. The length of DH in cm is



a) $2\sqrt{2}-1$ b) $\frac{2\sqrt{2}-1}{2}$
c) $\frac{3\sqrt{2}-1}{2}$ d) $\frac{2\sqrt{2}-1}{3}$

38. Three horses are grazing within a semi-circular field. In the diagram given below, AB is the diameter of the semi-circular field with center at O. Horses are tied up at P, R and S such that PO and

RO are the radii of semi-circles with centers at P and R respectively, and S is the center of the circle touching the two semi-circles with diameters AO and OB. The horses tied at P and R can graze within the respective semi-circles and the horse tied at S can graze within the circle centred at S. The percentage of the area of the semi-circle with diameter AB that cannot be grazed by the horses is nearest to



a) 20 b) 28 c) 36 d) 40

39. PQ and RS are common tangents to two circles intersecting at A and B. AB, when produced both sides, meet the tangents PQ and RS at X and Y, respectively. If AB = 3 cm, XY = 5 cm, then PQ (in cm) will be

a) 3 cm b) 4 cm c) 5 cm d)2 cm

40. The centre of a circle inside a triangle is at a distance of 625 cm from each of the vertices of the triangle. If the diameter of the circle is 350 cm and the circle is touching only two sides of the triangle, then find the area of the triangle.

a) 240000 b) 387072
c) 480000 d) none

41. If a chord of a circle subtends and angle of 30° at the circumference of the circle, then what is the ratio of the radius of the circle and the length of the chord respectively?

a) 1:1 b) 2:1
c) 3:1 d) √2:1

42. A circle of radius 5 cm has chord RS at a distance of 3 units from it. Chord PQ intersects with chord RS at T such that TS = 1/3 of RT. Find minimum value of PQ

a) $6\sqrt{3}$ b) $4\sqrt{3}$
c) $8\sqrt{3}$ d) $2\sqrt{3}$

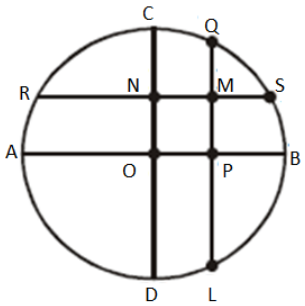
43. Two circles with centres O1 and O2 touch each other externally at a point R. AB is a tangent to both the circles passing through R. P'Q' is another tangent to the circles touching them at P and Q respectively and also cutting AB at S. PQ measures 6 cm and the point S is at distance of 5 cms and 4 cms from the centres of the circles. What is the area of the triangle SO1O2?

a) 9 cm² b) 27/2 cm²
c) $3(4 + \sqrt{7})/2$ cm² d) $(3\sqrt{41})/2$ cm²

44. Consider a circle with unit radius. There are seven adjacent sectors, S_1, S_2, S_3, ..., S_7, in the circle Such that their total area is $\frac{1}{8}$ of the area of the circle. Further, the area of the j th sector is twice that of the (j – 1)th sector, for j = 2, ..., 7. What is the angle, in radians, subtended by the arc of S_1 at the centre of the circle?

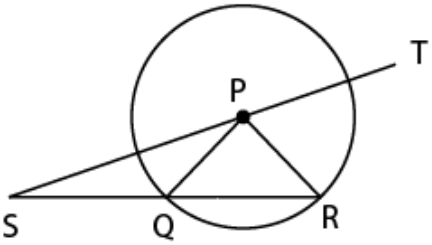
a) $\frac{\pi}{508}$ b) $\frac{\pi}{2040}$
c) $\frac{\pi}{1016}$ d) $\frac{\pi}{1524}$

45. In the given figure, CD and AB are diameters of circle and AB and CD are perpendicular to each other. LQ and SR are perpendiculars to AB and CD respectively. Radius of circle is 5 cm, PB : PA = 2:3 and CN : ND = 2 : 3. What is the length (in cm.) of SM?



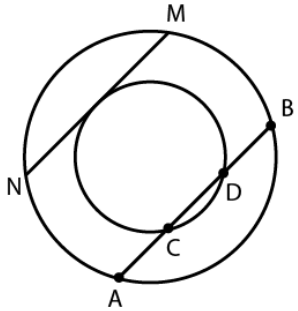
a) $[5\sqrt{3} - 3]$ b) $[4\sqrt{3} - 2]$
c) $[2\sqrt{5} - 1]$ d) $[2\sqrt{6} - 1]$

46. In the given figure, P is the centre of the circle. If Qs = PR, then what is the ratio of ∠RSP to the ∠TPR?



a) 1 : 4 b) 2 : 5
c) 1 : 3 d) 2 : 7

47. In the given figure, AB = 30 cm. and CD = 24 cm. what is the value (in cm.) of MN?



a) 18 b) 9
c) 12 d) 15

48. XY and XZ are tangents to a circle, ST is another tangent to the circle at the point R on the circle at the point R on the circle, which intersects XY and XZ at S and T respectively. If XY = 15 cm and TX = 9 cm, then RT is

a) 4.5 cm b) 7.5 cm
c) 6 cm d) 3 cm

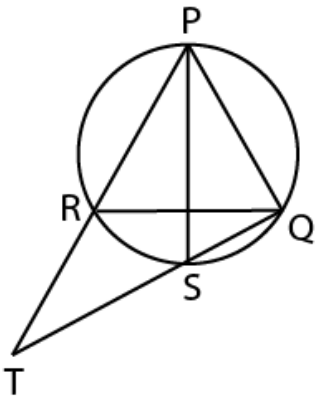
49. AC is transverse common tangent to two circles with centers P and Q and radii 6 cm and 3 cm at the point A and C respectively. If AC cuts PQ at the point B and AB = 8 cm then the length of PQ is:
a) 13 cm b) 12 cm
c) 10 cm d) 15 cm

50. The radii of two concentric circles are 17 cm and 25 cm. A straight line PQRS intersects the larger circle at the points P and S and intersects the smaller circle at the points Q and R. if QR = 16 cm, then the length (in cm) of PS is
a) 41 b) 32
c) 33 d) 40

51. PQ is a diameter of a circle with centre O. RS is a chord parallel to PQ that subtends and angle of 40° at the centre of the circle. If PR and QS are produced to meet at T, then what will be the measure (in degrees) of ∠PTQ?
a) 55 b) 60
c) 70 d) 90

52. A circle (with centre at O) is touching two intersecting lines AX and BY. The two points of contact A and B subtend an angle of 65° at any point C on the circumference of the circle. If P is the point of intersection of the two lines, then the measure of ∠APO is
a) 25° b) 65°
c) 90° d) 40°

53. In the given figure, PQR is equilateral triangle and PS is the angle bisector of ∠P. what is the value of RT:RQ?



a) 1 : 2 b) 1 : 1
c) 2 : 1 d) 1 : 3

Answer Key

1. C	2. C	3. C	4. A	5. D	6. B	7. B	8. C	9. A	10. C
11. D	12. B	13. C	14. A	15. C	16. B	17. B	18. A	19. C	20. A
21. B	22. A	23. D	24. A	25. C	26. B	27. A	28. D	29. C	30. C
31. B	32. A	33. B	34. B	35. C	36. B	37. B	38. B	39. B	40. B
41. A	42. B	43. C	44. C	45. D	46. C	47. A	48. C	49. D	50. D
51. C	52. A	53. B							