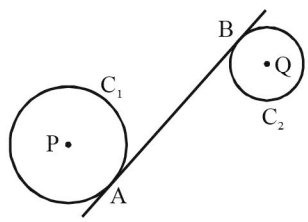
1. In the figure shown, radius of circle C_1 be r and that of C_2 be $\frac{r}{2}$, where $r = \frac{1}{3}PQ$, then length of AB is (where P and Q being centres of C_1 & C_2 respectively)



(1) $2\sqrt{3}r$ (2) $\frac{3\sqrt{3}r}{4}$ (3) $3\sqrt{3}r$ (4) $\frac{3\sqrt{3}r}{2}$

2. Three parallel chords of a circle have lengths 2, 3, 4 & subtend angles α, β, $\alpha + \beta$ at the centre respectively ($\alpha + \beta < \pi$), then $\cos\alpha$ is equal to -

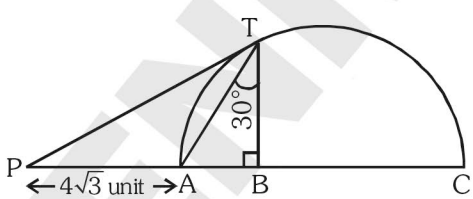
(1) $\frac{15}{21}$ (2) $\frac{17}{32}$ (3) $\frac{17}{35}$ (4) $\frac{15}{32}$

3. Inside the unit circle $S = \{(x,y) \mid x^2 + y^2 = 1\}$ there are three smaller circles of equal radius 'a' tangent to each other externally and to S internally. Then the value of a is equal to -

(1) $\sqrt{2}\left(\sqrt{2}-1\right)$ (2) $\sqrt{3}\left(2-\sqrt{3}\right)$

(3) $\sqrt{2}\left(2-\sqrt{3}\right)$ (4) $\sqrt{3}\left(\sqrt{3}-1\right)$

4. If in the adjacent figure PT is tangent to semicircle, then radius of circle is -



(1) $4\sqrt{3}$ unit (2) 4 unit

(3) 6 unit (4) $2\sqrt{3}$ unit

5. The equation of the circle having the lines $x^2 + 2xy + 3x + 6y = 0$ as its normals and having the size just sufficient to contain the circle $x(x - 4) + y(y - 3) = 0$ is:-

(1) $x^2 + y^2 + 6x - 3y + 45 = 0$

(2) $x^2 + y^2 + 6x - 3y - 45 = 0$

(3) $x^2 + y^2 + 18x + 2y + 32 = 0$

(4) $x^2 + y^2 + 18x - 2y - 32 = 0$

6. Two parallel chords of a circle of radius 2 are at a distance $\sqrt{3} + 1$ apart. If the chords subtend at the center, angles of $\frac{\pi}{K}$ and $\frac{2\pi}{K}$, where $K > 0$, then the value of [K] is:-

(Where [K] denotes the greatest integer less than or equal to K)

(1) 2 (2) 3 (3) 4 (4) 5

7. Equation of the circle passing through origin whose centre lie in the first quadrant and length of intercept on x and y-axis is 6 and 4 respectively, is-

(1) $x^2 + y^2 - 4x - 6y = 0$ (2) $x^2 + y^2 - 6x - 4y = 0$

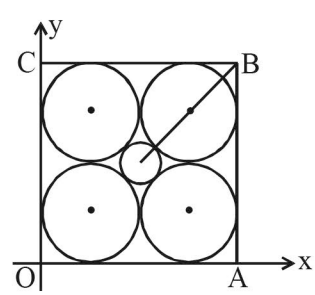
(3) $x^2 + y^2 - 3x - 2y = 0$ (4) None of these

8. If p and q be the longest distance and the shortest distance respectively of the point (–7, 2) from any point (α, β) on the curve whose equation is $x^2 + y^2 - 10x - 14y - 51 = 0$ then G.M. of p and q is equal to :-

(1) $2\sqrt{11}$ (2) $5\sqrt{5}$

(3) 13 (4) None of these

9. In the figure, OABC is a square of side 6 cm, then the equation of the smallest circle is :-



(1) $(x - 3)^2 + (y - 3)^2 = \left(\frac{3\sqrt{2}-3}{2}\right)^2$

(2) $(x - 3)^2 + (y - 3)^2 = \left(\frac{3\sqrt{2}+3}{2}\right)^2$

(3) $(x - 3)^2 + (y - 3)^2 = 1$

(4) $(x - 3)^2 + (y - 3)^2 = \frac{1}{4}$

10. What is the length of shortest path by which one can go from (–2, 0) to (2, 0) without entering the interior of circle, $x^2 + y^2 = 1$

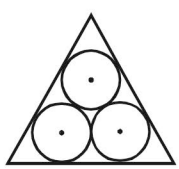
(1) $2\sqrt{3}$ (2) $\sqrt{3} + \frac{2\pi}{3}$

(3) $2\sqrt{3} + \frac{\pi}{3}$ (4) None of these

11. A circle is inscribed in an equilateral triangle of side a. The area of any square inscribed in this circle is:-

(1) $\frac{a^2}{2}$ (2) $\frac{a^2}{6}$ (3) $\frac{a^2}{4}$ (4) $\frac{a^2}{3}$

12. In an equilateral triangle 3 coins of radii 1 unit each are kept so that they touch each other and also the sides of the triangle. Area of the triangle is :-



(1) $4 + 2\sqrt{3}$ (2) $6 + 4\sqrt{3}$

(3) $12 + \frac{7\sqrt{3}}{4}$ (4) $3 + \frac{7\sqrt{3}}{4}$

13. A square and an equilateral triangle have the same perimeter. Let A be the area of the circle circumscribed about the square and B be the area of the circle cirumscribed about the triangle then the ratio $\frac{A}{B}$ is :-

(1) $\frac{9}{16}$ (2) $\frac{3}{4}$ (3) $\frac{27}{32}$ (4) $\frac{3\sqrt{6}}{8}$

14. $y - 1 = m_1(x - 3)$ and $y - 3 = m_2(x - 1)$ are two family of straight lines, at right angled to each other. The locus of their point of intersection is

(1) $x^2 + y^2 - 2x - 6y + 10 = 0$

(2) $x^2 + y^2 - 4x - 4y + 6 = 0$

(3) $x^2 + y^2 - 2x - 6y + 6 = 0$

(4) $x^2 + y^2 - 4x - 4y - 6 = 0$

15. The equation of the image of the circle $x^2 + y^2 + 16x - 24y + 183 = 0$ by the line mirror $4x + 7y + 13 = 0$ is

(1) $x^2 + y^2 + 32x - 4y + 235 = 0$

(2) $x^2 + y^2 + 32x + 4y - 235 = 0$

(3) $x^2 + y^2 + 32x - 4y - 235 = 0$

(4) $x^2 + y^2 + 32x + 4y + 235 = 0$

16. The smallest distance between the circle $(x - 5)^2 + (y + 3)^2 = 1$ and the line $5x + 12y - 4 = 0$, is

(1) 1/13 (2) 2/13 (3) 3/15 (4) 4/15

17. The angle between the two tangents from the origin to the circle $(x - 7)^2 + (y + 1)^2 = 25$ equals

(1) $\frac{\pi}{6}$ (2) $\frac{\pi}{3}$ (3) $\frac{\pi}{2}$ (4) $\frac{\pi}{4}$

18. The area of the quadrilateral formed by the tangents from the point (4, 5) to the circle $x^2 + y^2 - 4x - 2y - 11 = 0$ with the pair of radii through the points of contact of the tangents is :

(1) 4 sq. units (2) 8 sq. units

(3) 6 sq. units (4) none

19. Two circles whose radii are equal to 4 and 8 intersect at right angles. The length of their common chord is-

(1) $\frac{16}{\sqrt{5}}$ (2) 8 (3) $4\sqrt{6}$ (4) $\frac{8\sqrt{5}}{5}$

20. The angle at which the circle $(x-1)^2 + y^2 = 10$ and $x^2 + (y - 2)^2 = 5$ intersect is -

(1) $\frac{\pi}{6}$ (2) $\frac{\pi}{4}$ (3) $\frac{\pi}{3}$ (4) $\frac{\pi}{2}$

21. The equation of a circle which touches the line $x + y = 5$ at N(–2,7) and cuts the circle $x^2 + y^2 + 4x - 6y + 9 = 0$ orthogonally, is -

(1) $x^2 + y^2 + 7x - 11y + 38 = 0$

(2) $x^2 + y^2 = 53$

(3) $x^2 + y^2 + x - y - 44 = 0$

(4) $x^2 + y^2 - x + y - 62 = 0$

22. Tangents PA and PB are drawn to the circle $x^2 + y^2 = 4$, then the locus of the point P if the triangle PAB is equilateral, is equal to-

(1) $x^2 + y^2 = 16$ (2) $x^2 + y^2 = 8$

(3) $x^2 + y^2 = 64$ (4) $x^2 + y^2 = 32$

23. B and C are fixed points having co-ordinates (3, 0) and (–3, 0) respectively. If the vertical angle BAC is 90°, then the locus of the centroid of the ΔABC has the equation :

(1) $x^2 + y^2 = 1$ (2) $x^2 + y^2 = 2$

(3) $9(x^2 + y^2) = 1$ (4) $9(x^2 + y^2) = 4$

24. Suppose that the equation of the circle having (–3, 5) and (5, –1) as end points of a diameter is $(x - a)^2 + (y - b)^2 = r^2$. Then $a + b + r$, $(r > 0)$ is

(1) 8 (2) 9 (3) 10 (4) 11

25. Equation of the circle of radius $\sqrt{2}$ containing the point (3, 1) and touching the line $|x - 1| = |y - 1|$ is :-

(1) $x^2 + y^2 - 3x + 4y + 11 = 0$

(2) $x^2 + y^2 - 6x + 2y + 8 = 0$

(3) $x^2 + y^2 - 6x - 2y + 8 = 0$

(4) None

26. The locus of the middle points of chords of the curve $x^2 + y^2 = 9$ which has gradient 3 is :-

(1) $2x - y = 7$

(2) $2x + y = 0$

(3) $x + 3y = 0$

(4) $3x - 4y + 5 = 0$

27. If the radius of the circle $(x - 1)^2 + (y - 2)^2 = 1$ and $(x - 7)^2 + (y - 10)^2 = 4$ are increasing uniformly w.r.t. time as 0.3 and 0.4 unit/sec, then they will touch each other at t equal to-

(1) 45 sec (2) 90 sec

(3) 11 sec (4) None of these

28. Tangents are drawn to the circle $x^2 + y^2 = 10$ at the point where it meet by the circle $x^2 + y^2 + 4x - 3y + 2 = 0$. The point of intersection of these tangent is-

(1) $\left(\frac{5}{2}, -\frac{10}{3}\right)$ (2) $\left(-\frac{10}{3}, -\frac{5}{2}\right)$

(3) $\left(-\frac{10}{3}, \frac{5}{2}\right)$ (4) None of these

29. Two circles intersects at the point P(2, 3) and the line joining the other extremity of the two diameter through P makes an angle $\pi/6$ with x-axis, then the equation of the common chord of the two circles is-

(1) $x + \sqrt{3}y - (2 + 3\sqrt{3}) = 0$

(2) $x + \sqrt{3}y - (2\sqrt{3} + 2) = 0$

(3) $\sqrt{3}x + y - (2\sqrt{3} + 3) = 0$

(4) $\sqrt{3}x + y - (2 + 3\sqrt{3}) = 0$

30. Any circle through the points of intersection of the lines $x + \sqrt{3}y = 1$ and $\sqrt{3}x - y = 2$ if intersects these lines at points P and Q, then the angle subtended by the arc PQ at its centre is-

(1) 180°

(2) 90°

(3) 120°

(4) Depends on centre and radius

ANSWER KEY Exercise-I

Que.	1	2	3	4	5	6	7	8	9	10
Ans.	**4**	**2**	**2**	**1**	**2**	**2**	**2**	**1**	**1**	**3**
Que.	11	12	13	14	15	16	17	18	19	20
Ans.	**2**	**2**	**3**	**2**	**4**	**2**	**3**	**2**	**1**	**2**
Que.	21	22	23	24	25	26	27	28	29	30
Ans.	**1**	**1**	**1**	**1**	**3**	**3**	**2**	**3**	**3**	**1**