MATHS

BOOKS - PATHFINDER MATHS (BENGALI ENGLISH)

CIRCLE

Question Bank

1. Prove that the radii of circles $x^2 + y^2 = 1, x^2 + y^2 - 2x - 6y = 6$ and $x^2 + y^2 - 4x - 12y = 9$ are in A.p.

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2. Find the equation of the circle whose centre is the point of intersection of the line 2x - 3y + 4 = 0 and 3x + 4y - 5 = 0 and passes through the origin.

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3. A circle has radius 3 units and its centre lies on the line y = x - 1. Find the equation of the circle if it passes through (7, 3)

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4. Find the area of an equilateral triangle inscribed in the circle $x^2 + y^2 + 2gx + 2fy + c = 0$

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5. Find the equation of the circle which passes through the point (2, -2) and (3, 4) and whose centre lies on the $x + y = 2$

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6. Find the equation of the circle whose diameter is the line joining the points (-4, 3) and (12, -1). Find also the intercept made by it on y-axis

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7. A circle of radius 2 lies in the first quadrant and touches both the axes of co-ordinates. Find the equation of the circle with centre at (6, 5) and touching the above circle externally.

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8. A circle of radius 5 units touches co-ordinates axes the first quadrant. If the circle makes one complete roll on axis along the positive direction of x-axis along the positive direction of x-axis, find its equation in the new position.

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9. Find the length of tangents drawn from the point (3, -4) to the circle $2x^2 + 2y^2 - 7x - 9y - 13 = 0$

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10. The chord of contact of tangents drawn from a point on the circle $x^2 + y^2 = a^2$ to the circle $x^2 + y^2 = b^2$ touches the circle $x^2 + y^2 = c^2$ Show that a, b, c are in G.P.

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11. Find the equation of the circle which touches the positive y-axis at a distance of 4 units from the origin cuts off an intercept 6 units from the x-axis.

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12. Find the equation of the circle which passes through the origin and cut off intercept 3 and 4 from the positive parts of the axes respectively.

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13. Find the point(s) of intersection of the line 2x + 3y = 18 and the circle $x^2 + y^2 = 25$

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14. Obtain the locus of the point of intersection of the tangent to the circle $x^2 + y^2 = a^2$ which include an angle α.

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15. A and B are two points in xy-plane, which are $2\sqrt{2}$ units distance apart and subtend and angle of 90° at the point C(1, 2) on the x - y + 1= 0 which is larger than any angle subtended by the line segment AB at any other point on the line. Find the equation(s) of the circle through the points A, B and C

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16. Two circles each of radius 5 units touch each at (1, 2) If the equation of their common tangent is 4x + 3y = 10, find the

equations of the two circles.

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17. One of the diameters of the circle circumscribing the rectangle ABCD is 4y = x + 7. If A and B are (-3, 4), (5, 4) then find the area of the rectangle.

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18. Find the locus of the mid points of the chords of the circle $x^2 + y^2 - 2x - 6y - 10 = 0$ which pass through the origin.

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19. The centre of the circle S = 0 lies on the line 2x -2y + 9 = 0 and S = 0 cuts orthogonally the circle $x^2 + y^2 = 4$. Show that S = 0 passes through two fixed points and also find the co-ordinates of these two points.

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20. The tangents to $x^2 + y^2 = a^2$ having inclinations α and β intersect at P. If $\cot \alpha + \cot \beta = 0$, then the locus of P is :

A. x+y=0

B. x-y=0

C. xy=0

D. xy=1

Answer: C

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21. The chord of contact of tangents from a point P to a circle passes through Q, If l_1 and l_2 are the lengths of tangents from P and Q to the circle, then PQ is equal to :

A. $\frac{l_1 + l_2}{2}$

B. $\frac{l_1 - l_2}{2}$

C. $\sqrt{(l_1^2 + l_2^2)}$

D. $\sqrt{(l_1^2 - l_2^2)}$

Answer: C

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22. If the chord of contact of tangents from a point (x_1, y_1) to the circle $x^2 + y^2 = a^2$ touches the circle $(x - a)^2 + y^2 = a^2$, then the locus of (x_1, y_1) is :

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23. The number of common tangents that can be drawn to the circles $x^2 + y^2 - 4x - 6y - 3 = 0$ and $x^2 + y^2 + 2x + 2y + 1 = 0$ is :

A. 1

B. 2

C. 3

D. 4

Answer: C

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24. The circles whose equations are $x^2 + y^2 + c^2 = 2ax$ and $x^2 + y^2 + c^2 - 2by = 0$ will touch one another externally, if :

A. $\frac{1}{b^2} + \frac{1}{c^2} = \frac{1}{a^2}$

B. $\frac{1}{c^2} + \frac{1}{a^2} = \frac{1}{b^2}$

C. $\frac{1}{a^2} + \frac{1}{b^2} = \frac{1}{c^2}$

D. $\frac{1}{b^2} + \frac{1}{c^2} = \frac{2}{a^2}$

Answer: C

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25. The pole of a straight line with respect to the circle $x^2 + y^2 = a^2$ lies on the circle $x^2 + y^2 = 9a^2$. If the straight line

touches the circle $x^2 + y^2 = r^2$, then :

A. $9a^2 = r^2$

B. $9r^2 = a^2$

C. $r^2 = a^2$

D. $3r^2 = a^2$

Answer: B

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26. If one of the circles $x^2 + y^2 + 2ax + c = 0$ and $x^2 + y^2 + 2bx + c = 0$ lies within the other, then :

A. $ab > 0, c > 0$

B. $ab > 0, c < 0$

C. $ab < 0, c > 0$

D. $ab < 0, c < 0$

Answer: A

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27. The circle $x^2 + y^2 + x + y = 0$ and $x^2 + y^2 + x - y = 0$ intersect at an angle of :

A. $\frac{\pi}{6}$

B. $\frac{\pi}{4}$

C. $\frac{\pi}{3}$

D. $\frac{\pi}{2}$

Answer: D

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28. The locus of the centre of the circle which cuts orthogonally the circle $x^2 + y^2 - 20x + 4 = 0$ and which touches x=2 is :

A. $x^2 = 16y$

B. $x^2 = 16y + 4$

C. $y^2 = 16x$

D. $y^2 = 16x + 4$

Answer: C

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29. If one of the diameters of the circle $x^2 + y^2 - 2x - 6y + 6 = 0$ is a chord to the circle with centre (2,1), then the radius of the circle is

A. $\sqrt{3}$

B. $\sqrt{2}$

C. 3

D. 4

Answer: C

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30. The equation of the circle passing through (2, 0) & (0, 4) and having the minimum radius is

A. $x^2 + y^2 = 20$

B. $x^2 + y^2 - 2x - 4y = 0$

C. $\left(x^2 + y^2 - 4\right) + \lambda\left(x^2 + y^2 - 16\right) = 0$

D. None of these

Answer: B

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31. If the lines 2x-3y-5=0 and 3x-4y=7 are diameters of a circle of area 154 sq. units, then the equation of the circle is

A. $x^2 + y^2 + 2x - 2y - 62 = 0$

B. $x^2 + y^2 + 2x - 2y - 47 = 0$

C. $x^2 + y^2 - 2x + 2y - 47 = 0$

D. $x^2 + y^2 - 2x + 2y - 62 = 0$

Answer: C

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32. If P(2,8) is an interior point of the circle $x^2 + y^2 - 2x + 4y - p = 0$, which neither touches nor intersects

the axes, then set of value of p, is

A. $p < -1$

B. $p < -2$

C. $p > 96$

D. ϕ

Answer: D

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33. A,B,C,D are the points of intersection with the coordinate axes of the line ax+by=ab and bx+ay=ab. Then

A. A,B,C,D are concyclic

B. A,B,C,D forms a parallelogram

C. A,B,C,D forms a rhombus

D. None of these

Answer: A

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34. If a circle passes through the point (a, b) and cuts the circle $x^2 + y^2 = K^2$ orthogonally then the equation of the locus of its centre is

A. $2ax + 2by - \left(a^2 + b^2 + K^2\right) = 0$

B. $2ax + 2by - \left(a^2 - b^2 + K^2\right) = 0$

C. $x^2 + y^2 - 3ax - 4by + \left(a^2 + b^2 - K^2\right) = 0$

D. $x^2 + y^2 - 2ax - 2by + \left(a^2 - b^2 - K^2\right) = 0$

Answer: A

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35. Equation of chord AB of circle $x^2 + y^2 = 2$ passing through P(2,2) such that PB/PA = 3, is given by

A. x=3y

B. x=y

C. $y - 2 = \sqrt{3}(x - 2)$

D. none of these

Answer: B

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36. Two circles with radii a and b touch each other externally such that θ is the angle between the direct common tangents $(a > b \geq 2)$, then

A. $\theta = 2\cos^{-1}\left(\frac{a-b}{a+b}\right)$

B. $\theta = 2\tan^{-1}\left(\frac{a+b}{a-b}\right)$

C. $\theta = 2\sin^{-1}\left(\frac{a+b}{a-b}\right)$

D. $\theta = 2\sin^{-1}\left(\frac{a-b}{a+b}\right)$

Answer: D

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37. If the tangent at the point P on the circle $x^2 + y^2 + 6x + 6y = 2$ meets the straight line 5x - 2y + 6 = 0 at a point on the y-axis, then the length of PQ is

A. 4

B. $2\sqrt{5}$

C. 5

D. $3\sqrt{5}$

Answer: C

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38. The number of common tangents that can be drawn to the circles $x^2 + y^2 - 4x - 6y - 3 = 0$ and $x^2 + y^2 + 2x + 2y + 1 = 0$ is :

A. 1

B. 2

C. 3

D. 4

Answer: C

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39. Equation of a circle with centre (4, 3) touching the circle $x^2 + y^2 = 1$ is

A. $x^2 + y^2 - 8x - 6y - 9 = 0$

B. $x^2 + y^2 - 8x - 6y + 11 = 0$

C. $x^2 + y^2 - 8x - 6y - 11 = 0$

D. $x^2 + y^2 - 8x - 6y + 9 = 0$

Answer: C

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40. If two circles $(x-1)^2 + (y-3)^2 = r^2$ and $x^2 + y^2 - 8x + 2y + 8 = 0$ intersect in two distinct points then

A. $2 < r < 8$

B. $r < 2$

C. r=2

D. $r > 2$

Answer: A

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41. The common chord of $x^2 + y^2 - 4x - 4y = 0$ and $x^2 + y^2 = 16$ subtends at the origin an angle equal to

A. $\frac{\pi}{6}$

B. $\frac{\pi}{4}$

C. $\frac{\pi}{3}$

D. $\frac{\pi}{2}$

Answer: D

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42. The angle between a pair of tangents drawn from a point P to the circle

$x^2 + y^2 + 4x - 6y + 9\sin^2\alpha + 13\cos^2\alpha = 0$ is 2α

The equation of the locus of the point P is

A. $x^2 + y^2 + 4x - 6y + 4 = 0$

B. $x^2 + y^2 + 4x - 6y - 9 = 0$

C. $x^2 + y^2 + 4x - 6y - 4 = 0$

D. $x^2 + y^2 + 4x - 6y + 9 = 0$

Answer: D

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43. The equation of a circle which has a tangent 3x + 4y = 6 and two normals given by (x-1) (y-2) = 0 is

A. $(x-3)^2+(y-4)^2=5^2$

B. $x^2+y^2-4x-2y+4=0$

C. $x^2+y^2-2x-4y+4=0$

D. $x^2+y^2-2x-4y+5=0$

Answer: C

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44. The tangents drawn from the origin to the circle $x^2+y^2-2rx-2hy+h^2=0$ are perpendicular if

A. $h=\pm 2r$

B. $h = \pm r$

C. $r^2 + h^2 = 1$

D. None of these

Answer: B

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45. If the chord y = mx + 1 subtends an angle of measure 45^0 at the major segment of the circle $x^2 + y^2 = 1$ then value of 'm' is

A. $1 \pm \sqrt{2}$

B. $-2 \pm \sqrt{2}$

C. $-1 \pm \sqrt{2}$

D. ± 1

Answer: D

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46. If one of the circles $x^2 + y^2 + 2ax + c = 0$ and $x^2 + y^2 + 2bx + c = 0$ lies within the other, then :

A. $b > 0$

B. $b < 0$

C. b = 0

D. None of these

Answer: C

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47. The equation of the circle whose diameter is the common chord of the circles $x^2 + y^2 + 3x + 2y + 1 = 0$ and

$x^2 + y^2 + 3x + 4y + 2 = 0$ is

A. $x^2 + y^2 + 8x + 10y + 2 = 0$

B. $x^2 + y^2 - 5x + 4y + 7 = 0$

C. $2x^2 + 2y^2 + 6x + 2y + 1 = 0$

D. None of these

Answer: C

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48. A circle of the coaxial system with limiting points (0, 0) & (1, 0) is

A. $x^2 + y^2 - 2x = 0$

B. $x^2 + y^2 - 6x + 3 = 0$

C. $x^2 + y^2 = 1$

D. $x^2 + y^2 - 2x + 1 = 0$

Answer: D

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49. If the circle $x^2 + y^2 + 2a_1x + c = 0$ lies completely inside the circle $x^2 + y^2 + 2a_2x + c = 0$ then

A. $a_1a_2 > 0, c < 0$

B. $a_1a_2 > 0, c > 0$

C. $a_1a_2 < 0, c < 0$

D. $a_1a_2 < 0, c > 0$

Answer: B

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50. The triangle PQR is inscribed in the circle $x^2 + y^2 = 25$. If Q and R have coordinates (3,4) and (-4,3) respectively, then $\angle QPR$ is equal to

A. $\frac{\pi}{2}$

B. $\frac{\pi}{3}$

C. $\frac{\pi}{4}$

D. $\frac{\pi}{6}$

Answer: C

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51. If the straight line y = mx is outside the circle $x^2 + y^2 - 20y + 90 = 0$, then

A. $m < 3$

B. $|m| < 3$

C. $m > 3$

D. $|m| > 3$

Answer: B

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52. The locus of the centre of the circle which passes through the origin and cuts off a length 2b from the line x = c is

A. $y^2 + 2cx = b^2 + c^2$

B. $x^2 + cx = b^2 + c^2$

C. $y^2 + 2cy = b^2 + c^2$

D. None of these

Answer: C

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53. Let $A_0A_1A_2A_3A_4A_5$ be a regular hexagon inscribed in a circle of unit radius. Then the product of the lengths of the line segments A_0A_1, A_0A_2 and A_0A_4 is

A. 44289

B. $3\sqrt{3}$

C. 3

D. $3\frac{\sqrt{3}}{2}$

Answer: C

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54. In a triangle ABC, right angled at A, on the leg AC as diameter, semicircle is described. If a chord joins A with the point of intersection D of the hypotenuse and the semicircle, then the length of AC equals to

A. $\frac{AB.\ AD}{\sqrt{AB^2 + AD^2}}$

B. $\frac{AB.\ AD}{AB + AD}$

C. $\sqrt{AB.\ AD}$

D. $\frac{AB.\ AD}{\sqrt{AB^2 - AD^2}}$

Answer: D

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55. The area of the triangle formed by joining the origin to the points of intersection of the line $\sqrt{5}x + 2y = 3\sqrt{5}$ and circle

$x^2 + y^2 = 10$ is

A. 6

B. 5

C. 4

D. 3

Answer: B

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56. The value of 'c' for which the set $\{(x, y) \mid x^2 + y^2 + 2x \leq 1\} \bigcap \{(x, y) \mid x - y + c \geq 0)\}$ contains only one point in common is

A. $(-\infty, -1] \bigcup [3, \infty)$

B. {-1, 3}

C. {-3}

D. {-1}

Answer: D

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57. A pair of tangents are drawn to a unit circle with centre at the origin and these tangents intersect at A enclosing an angle of 60^0. The area enclosed by these tangents and the arc of the circle is

A. $\frac{2}{\sqrt{3}} - \frac{\pi}{6}$

B. $\sqrt{3} - \frac{\pi}{3}$

C. $\frac{\pi}{3} - \frac{\sqrt{3}}{6}$

D. $\sqrt{3}\left(1 - \frac{\pi}{6}\right)$

Answer: B

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58. A line meets the co-ordinate axes in A and B. A circle is circumscribed about the triangle OAB. If d_1 and d_2 are the distance of the tangent to the circle at the origin O from the points A and B, respectively, then the diameter of the circle is

A. $\frac{2d_1 + d_2}{2}$

B. $\frac{d_1 + 2d_2}{2}$

C. $d_1 + d_2$

D. $\frac{d_1 d_2}{d_1 + d_2}$

Answer: C

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59. If the curves $ax^2 + 4xy + 2y^2 + x + y + 5 = 0$ and $ax^2 + 6xy + 5y^2 + 2x + 3y + 8 = 0$ intersect at four concyclic points then the value of a is

A. 4

B. -4

C. 6

D. -6

Answer: B

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60. The distance between the chords of contact of the tangent to the circle $x^2 + y^2 + 2gx + 2fy + c = 0$ from the origin and the point (g, f) is

A. $g^2 + f^2$

B. $\frac{1}{2}(g^2 + f^2 + c)$

C. $\frac{1}{2}\frac{g^2 + f^2 + c}{\sqrt{g^2 + f^2}}$

D. $\frac{1}{2}\frac{g^2 + f^2 - c}{\sqrt{g^2 + f^2}}$

Answer: D

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61. The locus of the centre of a circle radius 2 which rolls on the outside of the circle $x^2 + y^2 + 3x - 6y - 9 = 0$ is

A. $x^2 + y^2 + 3x - 6y + 5 = 0$

B. $x^2 + y^2 + 3x - 6y + 5 = 0$

C. $x^2 + y^2 + 3x - 6y + \frac{29}{4} = 0$

D. None of these

Answer: B

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62. If in a $\triangle ABC$ (whose circumcentre is at origin), $a \leq \sin A$, then for any point (x, y) inside the circumcircle of $\triangle ABC$

A. $|xy| < \frac{1}{8}$

B. $|xy| > \frac{1}{8}$

C. $\frac{1}{8} < xy < \frac{1}{2}$

D. None of these

Answer: A

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63. The point ([P + 1], [P]), (where [.] denotes the greatest integer function) lying inside the region bounded by the circle $x^2 + y^2 - 2x - 15 = 0$ and $x^2 + y^2 - 2x - 7 = 0$, then

A. $P \in [-1, 0) \cup [0, 2)$

B. $P \in [-1, 2) - \{0, 1\}$

C. $P \in (-1, 2)$

D. None of these

Answer: D

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64. Find the equation of the circle whose diameter is the line joining the points (-4, 3) and (12, -1). Find also the intercept made by it on y-axis

A. $2\sqrt{13}$

B. $4\sqrt{13}$

C. $\sqrt{2562}$

D. None of these

Answer: B

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65. The circle $x^2 + y^2 - 8x + 4y + 4 = 0$ touches

A. x-axis

B. y-axis

C. both axis

D. Neither x-axis nor y-axis

Answer: B

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66. The intercept on the line y = x by the circle $x^2 + y^2 - 2x = 0$ is $\overline{AB}$ Equation of the circle on $\overline{AB}$ as a

A. $x^2 + y^2 + x + y = 0$

B. $x^2 + y^2 - x + y = 0$

C. $x^2 + y^2 - x - y = 0$

D. $x^2 + y^2 + x - y = 0$

Answer: C

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67. If the equation of a circle is $3x^2 + 3y^2 + kxy + 9x + (k-6)y + 3 = 0$ then its radius is

A. 3/2

B. $\frac{\sqrt{17}}{2}$

C. 2/3

D. None of these

Answer: A

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68. Let AB be a chord of the circle $x^2 + y^2 = r^2$ Subtending a right angle at the centre, then the locus of the centroid of the $\triangle PAB$ as P moves on the circle is

A. a parabola

B. a circle

C. an ellipse

D. None of these

Answer: B

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69. If the circle $x^2 + y^2 + 6x + 8y + a = 0$ bisects the circumference of the circle $x^2 + y^2 + 2x - 6y - b = 0$ then (a + b) is equal to

A. 38

B. -38

C. 42

D. None of these

Answer: B

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70. If a chord of a circle $x^2 + y^2 = 32$ makes equal intercepts of length l of the co-ordinates axes, then

A. $|l| < 8$

B. $|l| < 16$

C. $|l| > 8$

D. None of these

Answer: A

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71. The lngth of the tangent from the point (1, 1) to the circle $x^2 + y^2 + 4x + 6y + 1 = 0$ is

A. $\sqrt{13}$

B. $2\sqrt{3}$

C. $\sqrt{14}$

D. None of these

Answer: A

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72. The equations of the tangents to the circle $x^2 + y^2 = 25$ which are inclined at an angle of 30° to the x- axis are

A. $y = x\sqrt{3} \pm 5$

B. $\sqrt{3}y = x \pm 10$

C. $\pm\sqrt{3}y = x + 10$

D. None of these

Answer: B

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73. The number of tangents to the circle $x^2 + y^2 - 8x - 6y + 9 = 0$ which pass through the point (3, -2) are

A. 2

B. 1

C. 0

D. None of these

Answer: A

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74. Let x, y be real variable satisfying the $x^2 + y^2 + 8x - 10y - 40 = 0$ Let $a = \max\left\{(x+2)^2 + (y-3)^2\right\}$ and $b = \min\left\{(x+2)^2 + (y-3)^2\right\}$, then

A. a + b = 18

B. $a + b = \sqrt{2}$

C. $a - b = 4\sqrt{2}$

D. $a \cdot b = 73$

Answer: A::C::D

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75. The circle $x^2 + y^2 - 2x - 4y + 1 = 0$ and $x^2 + y^2 + 4x + 4y - 1 = 0$

A. touches internally

B. touch externally

C. have 3x + 4y - 1 = 0 the common tangent at the point of contact

D. have 3x + 4y + 1 = 0 as the common tangent at the point of contact

Answer: B::C

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76. Point M moved on the circle $(x-4)^2 + (y-8)^2 = 20$ Then it broke away from it and moving along a tangent to the circle, cuts

the x-axis at the point(-2, 0) The co-ordinates of a point on the circle at which the moving point broke away is

A. $\left(\frac{42}{5}, \frac{36}{5}\right)$

B. $\left(-\frac{2}{5}, \frac{44}{5}\right)$

C. (6, 4)

D. (2, 4)

Answer: B::C

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77. The equation of the tangents drawn from the origin to the circle $x^2 + y^2 - 2rx + 2hy + h^2 = 0$ are

A. x = 1

B. y = 0

C. $\left(h^2 - r^2\right)x - 2rhy = 0$,x=0

D. $\left(h^2 - r^2\right)x + 2rhy = 0$

Answer: A::C

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78. The equation of a circle of radius 1 touching the circle $x^2 + y^2 - 2|x| = 0$ is

A. $x^2 + y^2 + 2\sqrt{2}x + 1 = 0$

B. $x^2 + y^2 - 2\sqrt{3}y + 2 = 0$

C. x^2 + y^2 + 2 sqrt3 y + 2 = 0`

D. $x^2 + y^2 - 2\sqrt{2} + 1 = 0$

Answer: B::C

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79. The range of value of 'a' such that angle θ between the pair of tangent drawn from (a, 0) to the circle $x^2 + y^2 = 1$ satisfies $\frac{\pi}{2} < \theta < \pi$, lies in

A. (1, 2)

B. $(1, \sqrt{2})$

C. $(-\sqrt{2}, -1)$

D. (-2, -1)

Answer: B::C

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80. The centre of a circle passing through the points (0,0),(1,0)and touching the circle $x^2 + y^2 = 9$is

A. $\left(\frac{3}{2}, \frac{1}{2}\right)$

B. $\left(\frac{1}{2}, \frac{3}{2}\right)$

C. $\left(\frac{1}{2}, 2^{\frac{1}{2}}\right)$

D. $\left(\frac{1}{2}, -2^{\frac{1}{2}}\right)$

Answer: C::D

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81. Let L_1 be a straight line passing through the origin and L_2 be the straight line $x + y = 1$. If the intercepts made by the circle $x^2 + y^2 - x + 3y = 0$ on L_1 and L_2 are equal then which of the following equations can representL_1 ?

A. x + y = 0

B. x - y = 0

C. x + 7y = 0

D. x - 7y = 0

Answer: B::C

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82. Three sides of a triangle have the equation $L_i = y - m_i x = 0$, I = 1, 2, 3. Then $L_1 L_2 + \lambda L_2 L_3 +_\mu L_3 L_1 = 0$ (where $\lambda \neq 0, \mu \neq 0$). Is the equation of the circumcircle of the triangle if

A. $1 + \lambda + \mu = m_1 m_2 + \lambda m_2 m_3 + \lambda m_3 m_1$

B. $m_1(1 + \mu) + m_2(1 + \lambda) + m_3(\mu + \lambda) = 0$

C. $\frac{1}{m_3} + \frac{1}{m_1} + \frac{1}{m_2} = 1 + \lambda + \mu$

D. None of these

Answer: A::B

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83. Consider the circle $x^2 + y^2 - 10x - 6y + 30 = 0$ Let O be the centre of the circle and tangent at A(7, 3) and passing through A and B,then

A. area of quadrilateral OACB = 4

B. the radical axis for the family of circles S = O is x + y = 10

C. the smallest possible circle of the family S = 0 is

$$x^2 + y^2 - 12x - 4y + 38 = 0$$

D. the coordinates of point C are (7, 1)

Answer: A::C::D

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84. From a point $P(\alpha, \beta)$ a pair of tangents PQ and PR drawn to circle $x^2 + y^2 - 2x - 2y - 2 = 0$ such that QR is chord of contact. Considering PQ and PR as adjacent sides a parallelogram PQRS is formed. Equation of chord of contact QR is x = 0, S_1 and S_2 be the circles circumscribing the triangle PQR and QRS. Now answer the following questions on the basis of above informations.

Answer the following question based on above passage :

Co-ordinate of point $P(\alpha, \beta)$ is equal to

A. (3, 2)

B. (2, 3)

C. (3, -1)

D. None of these

Answer: 3

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85. From a point $P(\alpha, \beta)$ a pair of tangents PQ and PR drawn to circle $x^2 + y^2 - 2x - 2y - 2 = 0$ such that QR is chord of contact. Considering PQ and PR as adjacent sides a parallelogram PQRS is formed. Equation of chord of contact QR is x = 0, S_1 and S_2 be the circles circumscribing the triangle PQR and QRS. Now answer the following questions on the basis of above informations.

Answer the following question based on above passage :

Equation of circle $S_1 = 0$ is

A. $x^2 + y^2 + 4x - 2y - 2 = 0$

B. $x^2 + y^2 - 2x + 2y - 2 = 0$

C. $x^2 + y^2 + 2x - 2y - 2 = 0$

D. None of these

Answer: 3

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86. If $7l^2 - 9m^2 + 8l + 1 = 0$ and we have to find equation of circle having lx + my + 1 = 0 is a tangent and we can adjust given condition as $16l^2 + 8l + 1 = 9\left(l^2 + m^2\right)$

or $\left(4l^2 + 1\right)^2 = 9\left(l^2 + m^2\right) \Rightarrow \frac{|4l + 1|}{\sqrt{(l^2 + m^2)}} = 3$

Centre of circle = (4, 0) and radius = 3 when any two non parallel lines touching a circle, then centre of circle lies on angle bisector of lines.

Answer the following question based on above passage :

If $16m^2 - 8l - 1 = 0$, then equation of the circle having lx + my + 1 = 0 is a tangent is

A. $x^2 + y^2 + 8x = 0$

B. $x^2 + y^2 - 8x = 0$

C. $x^2 + y^2 + 8y = 0$

D. $x^2 + y^2 - 8y = 0$

Answer: B

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87. If $7l^2 - 9m^2 + 8l + 1 = 0$ and we have to find equation of circle having lx + my + 1 = 0 is a tangent and we can adjust given condition as $16l^2 + 8l + 1 = 9\left(l^2 + m^2\right)$

or $\left(4l^2 + 1\right)^2 = 9\left(l^2 + m^2\right) \Rightarrow \frac{|4l + 1|}{\sqrt{(l^2 + m^2)}} = 3$

Centre of circle = (4, 0) and radius = 3 when any two non parallel lines touching a circle, then centre of circle lies on angle bisector of lines.

Answer the following question based on above passage :

If $16m^2 - 8l - 1 = 0$, then equation of the circle having lx + my + 1 = 0 is a tangent is

A. $\left(\frac{5}{3}, 0\right), (3-1)$

B. $\left(\frac{5}{7}, \frac{5}{7}\right), \left(4, -\frac{3}{4}\right)$

C. $\left(\frac{5}{3}, 0\right), \left(4, -\frac{3}{4}\right)$

D. $\left(\frac{5}{7}, \frac{5}{7}\right), (3, -1)$

Answer: D

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88. Match List - I with List-II

List - I		List - II	
(1)	Circular plate is expanded by heat from radius 5 cm to 5.06 cm. Approximate increase in area is	(P)	4
(2)	If an edge of a cube increases by 1%, then percentage increase in volume is	(Q)	0.6π
(3)	If the rate of decrease of $\frac{x^2}{2}-2x+5$ is twice the rate of decrease of x, then x is equal to (rate of decreases is non-zero)	(R)	3
(4)	Rate of increase in area of equilateral triangle of side 15 cm, when each side is increasing at the rate of 0.1 cm/s, is	(S)	$\frac{3\sqrt{3}}{4}$

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89. Match List - I with List-II

List - I		List - II	
(1)	Circular plate is expanded by heat from radius 5 cm to 5.06 cm. Approximate increase in area is	(P)	4
(2)	If an edge of a cube increases by 1%, then percentage increase in volume is	(Q)	0.6π
(3)	If the rate of decrease of $\frac{x^2}{2}-2x+5$ is twice the rate of decrease of x, then x is equal to (rate of decreases is non-zero)	(R)	3
(4)	Rate of increase in area of equilateral triangle of side 15 cm, when each side is increasing at the rate of 0.1 cm/s, is	(S)	$\frac{3\sqrt{3}}{4}$

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90. The line joining (5, 0) to $(10\cos\theta, 10\sin\theta)$ is divided internally in the ratio 2 : 3 at P. If θ varies, then locus of P is

$(x-3)^2+y^2=m^2$, then the value of m is :

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91. C_1 is a circle with centre at the origin and radius equal to 'r' and C_2 is a circle with centre at (3r, 0) and radius equal to 2r. The number of common tangents that can be drawn to the two circle are :

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92. The area of the triangle formed by joining the origin to the points of intersection of the line $\sqrt{5}x+2y=3\sqrt{5}$ and circle $x^2+y^2=10$ is

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93. A circle touches the X-axis and also touches the circle with centre (0, 3) and radius 2. The locus of the centre of the circle is $x^2 = 10y + k$, then k = ?

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94. The polar equation of the circle with centre $\left(2, \frac{\pi}{2}\right)$ and radius 3, is : $r^2 - 4r\sin\theta = k$, then k = ?

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95. Two straight lines rotate about two fixed points. If they start from their position of coincidence such that one rotates at the rate double that of the other. Prove that the locus of their point of intersection is a circle.

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96. The side of a square are x = 1, x = 3, y = 2 and y = 4. Find the equation of the circle drawn on the diagonals of the square as its diameter

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97. The circle $x^2 + y^2 - 4x - 8y + 16 = 0$ rolls up along the tangent to it at $\left(2 + \sqrt{3}, 3\right)$ by 2 units. Assuming the x-axis as horizontal, find the equation of the circle in the new position.

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98. If lx + my = 1 touches the circle $x^2 + y^2 = a^2$, prove that the point (l, m) lies on the circle $x^2 + y^2 = a^{-2}$

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99. Find the equations of the tangents drawn from the point A(3, 2) to the circle $x^2 + y^2 + 4x + 6y + 8 = 0$

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100. Find the value of α for which the point $(\alpha, \alpha + 2)$ is an interior point of the smaller segment of the circle $x^2 + y^2 - 4 = 0$ made by the chord whose equation is 3x + 4y + 12 = 0

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101. Prove that the tangent to the circle $x^2 + y^2 - 8x + 6y + 20 = 0$ and find its point of contact.`

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102. Find the equation of the circle which passes through (1, 1) and cuts orthogonally each of the circles $x^2 + y^2 - 8x - 2y + 16 = 0$ and $x^2 + y^2 - 4x - 4y - 1 = 0$

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103. A variable circle passes through the point A(a, b) and touches the x-axis. Show that the locus of the other end of the diameter through A is $(x - a)^2 = 4by$

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104. If the two lines $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ cut the co-ordinates axes in concyclic points. Prove that $a_1a_2 = b_1b_2$

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105. The locus of the centre of the circle of radius 2 which rolls on the inside of the circle

$x^2 + y^2 + 3x - 6y - 9 = 0$ is

A. $x^2 + y^2 + 3x - 6y + 5 = 0$

B. $x^2 + y^2 + 3x - 6y - 31 = 0$

C. $x^2 + y^2 + 3x - 6y + \frac{22}{4} = 0$

D. none of these

Answer:

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106. Four distinct points (2k,3k),(1,0),(0,1)and(0,0) lie on a circle for

A. all integral values of k

B. $0 < k < 1$

C. $k < 0$

D. two values of k

Answer:

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107. The circle described on the line joining the points (0,1),(a,b) as diameter cuts x-axis at points whose abscissa are roots of the equation

A. $x^2 + ax + b = 0$

B. $x^2 - ax + b = 0$

C. $x^2 + ax - b = 0$

D. $x^2 - ax - b = 0$

Answer:

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108. The centre of a circle passing through the points (0,0),(1,0)and touching the circle $x^2 + y^2 = 9$is

A. $\left(\frac{3}{2}, \frac{1}{2}\right)$

B. $\left(\frac{1}{2}, \frac{3}{2}\right)$

C. $\left(\frac{1}{2}, \frac{1}{2}\right)$

D. $\left(\frac{1}{2}, -\sqrt{2}\right)$

Answer:

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109. One of the diameter of the circle $x^2 + y^2 - 12x + 4y + 6 = 0$ is given by

A. x+y=0

B. x+3y=0

C. x=y

D. 3x+2y=0

Answer:

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110. The coordinates of middle point of the chord 2x-5y+18=0 cut of by the circle

$x^2 + y^2 - 6x + 2y - 54 = 0$ is

A. (1,4)

B. (2,4)

C. (4,1)

D. (1,1)

Answer:

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111. If a circle passes through the point intersection of the co-ordinate axes with the line $\lambda x - y + 1 = 0$ and x-2y+3=0 then the value of $\lambda$is

A. 3

B. 1//3

C. 6

D. none of these

Answer:

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112. The co-ordinates of the point on the circle $x^2 + y^2 - 12x + 30 = 0$ which is farthest from the origin are

A. (9,3)

B. (8,5)

C. (12,4)

D. none of these

Answer:

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113. If (2,5) is an interior point of the circle $x^2 + y^2 - 8x - 12y + P = 0$ and the circle neither cuts nor touches any one of the co-ordinate axes then :

A. $P \in (36, 47)$

B. $P \in (16, 47)$

C. $P \in (16, 36)$

D. none of these

Answer:

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114. The range of values of r for which the point $\left(-5 + \frac{r}{\sqrt{2}}, -3 + \frac{r}{\sqrt{2}} \right)$ is an interior point of the major segment of the circle $x^2 + y^2 = 16$,cut-off by the line x+y=2,is

A. $(-\infty, 5\sqrt{2})$

B. $(4\sqrt{2}-\sqrt{14}, 5\sqrt{2})$

C. $(4\sqrt{2}-\sqrt{14}, 4\sqrt{2}+\sqrt{14})$

D. none of these

Answer:

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115. P is a point(a,b) in the first quadrant. If the two circles which pass through P and touch both the co-ordinates axes cut at right angles , then

A. $a^2-6ab+b^2=0$

B. $a^2+2ab-b^2=0$

C. $a^2-4ab+b^2=0$

D. $a^2 - 8ab + b^2 = 0$

Answer:

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116. The circles having radii r_1 and r_2 intersect orthogonally. Length of their common chord is

A. $\frac{2r_1r_2}{\sqrt{r_1^2 + r_2^2}}$

B. $\frac{\sqrt{r_1^2 + r_2^2}}{2r_1r_2}$

C. $\frac{r_1r_2}{\sqrt{r_1^2 + r_2^2}}$

D. $\frac{\sqrt{r_1^2 + r_2^2}}{r_1r_2}$

Answer:

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117. The straight line y=mx+c cuts the circle $x^2 + y^2 = a^2$ at real points if

A. $\sqrt{a^2(1+m^2)} \leq |c|$

B. $\sqrt{a^2(1-m^2)} \leq |c|$

C. $\sqrt{a^2(1+m^2)} > |c|$

D. $\sqrt{a^2(1-m^2)} > |c|$

Answer:

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118. A line is drawn through a fixed point $P(\alpha, \beta)$ to cut the circle $x^2 + y^2 = r^2$ at A and B. Then PA.PB i equal to

A. $(\alpha+\beta)^2-r^2$

B. $\alpha^2+\beta^2-r^2$

C. $(\alpha-\beta)^2+r^2$

D. none of these

Answer:

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119. The condition that the chord $x\cos\alpha+y\sin\alpha-p=0$ of $x^2+y^2-a^2=0$ may subtend a right angle at the centre of the circle is

A. $a^2=2p^2$

B. $p^2=2a^2$

C. a=2p

D. p=2a

Answer:

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120. The circles $x^2 + y^2 + x + y = 0$and $x^2 + y^2 + x - y = 0$ intersect at an angle of

A. $\frac{\pi}{6}$

B. $\frac{\pi}{4}$

C. $\frac{\pi}{3}$

D. $\frac{\pi}{2}$

Answer:

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121. The length of the tangent of the circle $x^2 + y^2 - 2x - y - 7 = 0$ from the point (-1,-3) is

A. 8

B. $\sqrt{8}$

C. $\sqrt{12}$

D. none of these

Answer:

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122. The locus of the mid points of the chords of the circle $x^2 + y^2 + 4x - 6y - 12 = 0$ which subtends of angle of $\frac{\pi}{3}$ radians at its centre is

A. $(x + 2)^2 + (y - 3)^2 = 6.25$

B. $(x-2)^2+(y+3)^2=6.25$

C. $(x+2)^2+(y-3)^2=18.75$

D. $(x+2)^2+(y+3)^2=18.75$

Answer:

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123. The straight line $x\cos\theta+y\sin\theta=2$ will touch the circle $x^2+y^2-2x=0$,if

A. $\theta=n\pi, n\in I$

B. $A=(2n+1)\pi, n\in I$

C. $\theta=2n\pi, n\in I$

D. none of these

Answer:

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124. The chord of contact of tangents from a point P to a circle passes through Q. If l_1 and l_2 are the lengths of the tangents from P and Q to the circle ,then PQ is equal to

A. $\frac{l_1 + l_2}{2}$

B. $\frac{l_1 - l_2}{2}$

C. $\sqrt{l_1^2 + l_2^2}$

D. $2\sqrt{l_1^2 + l_2^2}$

Answer:

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125. The co-ordinates of two points P and Q are (x_1, y_1) and (x_2, y_2) and O is the origin. If circles be described on OP and OQ as diameters then length of their common chord is

A. $\frac{|x_1y_2 + x_2y_1|}{PQ}$

B. $\frac{|x_1y_2 - x_2y_1|}{PQ}$

C. $\frac{|x_1x_2 + y_1y_2|}{PQ}$

D. $\frac{|x_1x_2 + y_1y_2|}{PQ}$

Answer:

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126. Consider a family of circle which are passing through the point (-1,1) and are tangent to x-axis .If (h,k) are the coordinates of the

centre of the circles, then the set of values of k is given by the interval

A. $k \geq \frac{1}{2}$

B. $k \geq \frac{1}{2}$

C. $k \leq \frac{1}{2}$

D. $0 < k < \frac{1}{2}$

Answer:

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127. If $r_1$and r_2 are the radii of smallest and largest circles which passes through (5,6) and touches the circle $(x-2)^2 + y^2 = 4$, then r_1, r_2 is

A. $\frac{4}{41}$

B. $\frac{41}{4}$

C. $\frac{5}{41}$

D. $\frac{41}{6}$

Answer:

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128. The two circles which passes through (0,a) and (0,-a) and touch the line$y = mx + c$ will intersect each other at right angle ,if

A. $a^2 = c^2(2m + 1)$

B. $a^2 = c^2\left(2 + m^2\right)$

C. $c^2 = a^2\left(2 + m^2\right)$

D. $c^2 = a^2(2m + 1)$

Answer:

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129. Area of the triangle formed by the positive x-axis and the normal and tangent to the circle $x^2 + y^2 = 4$ at the point is $(1, \sqrt{3})$ is

A. $4\sqrt{3}$

B. $2\sqrt{3}$

C. $\sqrt{3}$

D. none of these

Answer:

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130. if the distances from the origin to the centre of three circles $x^2 + y^2 + 2\lambda_i x - c^2 = 0 (i = 1, 2, 3)$ are in G.P. ,then the lengths of the tangents drawn to them from any point on the circle $x^2 + y^2 = c^2$ are in

A. A.P.

B. G..P.

C. H.P.

D. none of these

Answer:

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131. AB is a diameter of a circle and 'C' is any point on the circumference of the circle .Then

A. The area of $\triangle ABC$ is maximum when it is isosceles

B. The area of $\triangle ABC$ is minimum when it is equilateral

C. The perimeter of $\triangle ABC$ is maximum when it is right angled

D. none of these

Answer:

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132. The centres of a set of circles, each of radius 3 , lie on the circle $x^2 + y^2 = 25$. The locus of any point in the set is

A. $4 \leq x^2 + y^2 \leq 64$

B. $x^2 + y^2 \leq 25$

C. $x^2 + y^2 \geq 25$

D. $3 \leq x^2 + y^2 \leq 9$

Answer:

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133. A circle touches the x-axis and also touches the circle with centre (0,3) and radius2. The locus of the centre of the circle is

A. A circle

B. A parabola

C. An ellipse

D. A hyperbola

Answer:

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134. A square is inscribed in the circle $x^2 + y^2 - 2x + 4y - 93 = 0$ with its sides parallel to the coordinate axis. The coordinates of its vertices are

A. $(-6, -9), (-6, 5), (8, -9), (8, 5)$

B. $(-6, -9), (-6, -5), (8, -9), (8, 5)$

C. $(-6, -9), (-6, 5), (8, 9), (8, 5)$

D. $(-6, -9), (-6, 5), (8, -9), (8, -5)$

Answer:

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135. The difference between the radii of the largest and the smallest circles which have their centre on the circumference of

the circle $x^2 + y^2 + 2x + 4y - 4 = 0$ and pass through the point (a,b) lying outside the given circle,is

A. 6

B. $\sqrt{(a+1)^2 + (b+2)^2}$

C. 3

D. $\sqrt{(a+1)^2 + (b+2)^2} - 3$

Answer:

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136. An isosceles triangle ABC inscribed in a circle $x^2 + y^2 = a^2$ with the vertex A at (a,0) and the base angle B and C each equal to 75° , then coordinates of an point of the base are

A. $\left(-\sqrt{3}\frac{a}{2}, \frac{a}{2} \right)$

B. $\left(-\frac{\sqrt{3a}}{2}, a\right)$

C. $\left(\frac{a}{2}, \frac{\sqrt{3a}}{2}\right)$

D. $\left(-\frac{\sqrt{3a}}{2}, -\frac{a}{2}\right)$

Answer:

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137. The equation of circumcircle of an equilateral triangle is $x^2 + y^2 + 2gx + 2fy + c = 0$ and one vertex of the triangle is (1,1).The equation of incircle of the triangle is

A. $4\left(x^2 + y^2\right) = g^2 + f^2$

B. $4\left(x^2 + y^2\right) + 8gx + 8fy = (1 - g)(1 + 3g) + (1 - f)(1 + 3f)$

C. $4\left(x^2 + y^2\right) + 8gx + 8fy = g^2 + f^2$

D. none of these

Answer:

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138. The number of common tangents to the circles $x^2 + y^2 = 4$ and $x^2 + y^2 - 6x - 8y - 24 = 0$ is

A. 0

B. 1

C. 3

D. 4

Answer:

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139. If the points (0,0),(1,0),(0,1) and (t,t) are concyclic, then t=

A. -1

B. 1

C. 2

D. -2

Answer:

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140. If a circle of constant radius 3K passes through the origin and meets the axes at A&B.the locus of the centroid of $\triangle OAB$ is

A. $x^2 + y^2 = k^2$

B. $x^2 + y^2 = 2k^2$

C. $x^2 + y^2 = 3k^2$

D. none of these

Answer:

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141. The equation of the circle which touches the axis of y at the origin and passes through (3,4) is

A. $2\left(x^2 + y^2\right) - 3x = 0$

B. $3\left(x^2 + y^2\right) - 25x = 0$

C. $4\left(x^2 + y^2\right) - 25x = 0$

D. $4\left(x^2 + y^2\right) - 25x + 10 = 0$

Answer:

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142. Area of the circle in which a chord of length $\sqrt{2}$ makes an angle $\frac{\pi}{2}$ at the centre is

A. $\frac{\pi}{2} sq.\ units$

B. $2\pi sq.\ units$

C. $\pi.\ sq.\ unit$

D. $\frac{\pi}{4} sq.\ units$

Answer:

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143. The greatest distance of the point P (10,7) from the circle $x^2 + y^2 - 4x - 2y - 20 = 0$ is

A. 10 units

B. 15 units

C. 5 units

D. None of these

Answer:

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144. The length of the chord cut off by $y = 2x + 1$ from the circle $x^2 + y^2 = 2$ is

A. $\frac{5}{6}$

B. $\frac{6}{5}$

C. $\frac{6}{\sqrt{5}}$

D. $\frac{\sqrt{5}}{6}$

Answer:

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145. The common chord of $x^2 + y^2 - 4x - 4y = 0$ and $x^2 + y^2 = 16$ subtends at the origin an angle equal to

A. $\frac{\pi}{6}$

B. $\frac{\pi}{4}$

C. $\frac{\pi}{3}$

D. $\frac{\pi}{2}$

Answer:

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146. If the line $hx + ky = 1$ touches $x^2 + y^2 = a^2$, then the locus of the point (h,k) is a circle of radius

A. a

B. $\frac{1}{a}$

C. $\sqrt{a}$

D. $\frac{1}{\sqrt{a}}$

Answer:

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147. The number of tangents that can be drawn from the point (8,6) to the circle $x^2 + y^2 - 100 = 0$ is

A. 0

B. 1

C. 2

D. None of these

Answer:

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148. If the point (k+1,k) lies inside the region bound by the curve $x = \sqrt{25 - y^2}$ and the y-axis, then the integral value of k is/are

A. 0

B. 1

C. 2

D. 3

Answer:

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149. The tangents drawn from the origin $x^2 + y^2 + 2gx + 2fy + f^2 = 0$ are perpendicular if

A. g=f

B. g=-f

C. g=2f

D. 2g=f

Answer:

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150. Two circles with radii a and b touch each other externally such that θ is the angle between the direct common tangents

$(a > b \geq 2)$, then

A. $\theta = \sin^{-1}\left(\frac{r_1 + r_2}{r_1 - r_2}\right)$

B. $\theta = 2\sin^{-1}\left(\frac{r_1 - r_2}{r_1 + r_2}\right)$

C. $\theta = 2\cos^{-1}\left(\frac{2\sqrt{r_1 r_2}}{r_1 + r_2}\right)$

D. none of these

Answer:

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151. If (a,0) is a point on a diameter of the circle $x^2 + y^2 = 4$, then $x^2 - 4x - a^2 = 0$ has

A. exactly one real root in (-1,0]

B. exactly one real root in [2,5]

C. distinct roots greater than -1

D. distinct roots less than 5

Answer:

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152. If (α, β) is a point on the circle whose centre is on the x-axis and which touches the line $x + y = 0$at (2,-2), then the greatest value of α is :

A. $4 - \sqrt{2}$

B. 6

C. $4 + 2\sqrt{2}$

D. $4 + \sqrt{2}$

Answer:

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153. Three concentrict circles of which the biggest is $x^2 + y^2 = 1$, have their radii in A.P. If the line $y = x + 1$ cuts all the circles in real and distinct points. The interval in which the common difference of the A.P. will lie is :

A. $\left(0, \frac{1}{4}\right)$

B. $\left(0, \frac{1}{2}\sqrt{2}\right)$

C. $\left(0, \frac{2-\sqrt{2}}{4}\right)$

D. none of these

Answer:

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154. A circle of constant radius 'r' passes through origin O and cuts the axes of coordinates in points P and Q, then the equation of the locus of the foot of perpendicular from O to PQ is

A. $\left(x^2+y^2\right)\left(x^{-2}+y^{-2}\right)=4r^2$

B. $\left(x^2+y^2\right)^2\left(x^{-2}+y^{-2}\right)=r^2$

C. $\left(x^2+y^2\right)^2\left(x^{-2}+y^{-2}\right)=4r^2$

D. $\left(x^2+y^2\right)\left(x^{-2}+y^{-2}\right)=r^2$

Answer:

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155. For each natural number k, let C_k denotes the circle with radius k units and centre at the origin. On the circle C_k, a particle moves k units in the counter clockwise direction. After completing

its motion on C_k, the particles moves to C_{k+l} , in some well defined manner, where $l > 0$. The motion of the particle continues in this manner.

Answer the following question based on above passage :

Let l= 1, the particles starts at (1, 0), if the particles crossing the positive direction of the x-axis for the first time on the circle C_n then n is equal to

A. 3

B. 5

C. 7

D. 8

Answer:

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156. For each natural number k, let C_k denotes the circle with radius k units and centre at the origin. On the circle C_k, a particle moves k units in the counter clockwise direction. After completing its motion on C_k, the particles moves to C_{k+l} , in some well defined manner, where $l > 0$. The motion of the particle continues in this manner.

Answer the following question based on above passage :

Let l= 1, the particles starts at (1, 0),If $k \in N$ and l = 1, the particles cross x-axis again at

A. (3, 0)

B. (1, 0)

C. (4, 0)

D. (2, 0)

Answer:

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157. P is a variable point on the line L = 0. Tangents are drawn to the circle $x^2 + y^2 = 4$ from P to touch it at Q and R

Answer the following question based on above passage :

If L = 2x + y = 6, then the focus of circumcentre of $\triangle PQR$ is

A. 2x - y = 4

B. x - 2 = 3

C. x - 2y = 4

D. x + 2y = 3

Answer:

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158. P is a variable point on the line L = 0. Tangents are drawn to the circle $x^2 + y^2 = 4$ from P to touch it at Q and R

Answer the following question based on above passage :

If L = y = 4, then the locus of the circumcentre of $\triangle PQR$ is

A. y - 2 = 0

B. x - 2 = 0

C. y + 2 = 0

D. x + 2 = 0

Answer:

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159. Match List - I with List-II

List - I		List - II	
(1)	Circular plate is expanded by heat from radius 5 cm to 5.06 cm. Approximate increase in area is	(P)	4
(2)	If an edge of a cube increases by 1%, then percentage increase in volume is	(Q)	0.6π
(3)	If the rate of decrease of $\frac{x^2}{2}-2x+5$ is twice the rate of decrease of x, then x is equal to (rate of decreases is non-zero)	(R)	3
(4)	Rate of increase in area of equilateral triangle of side 15 cm, when each side is increasing at the rate of 0.1 cm/s, is	(S)	$\frac{3\sqrt{3}}{4}$

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160. Match List - I with List-II

Let the functions defined in List - I have domain $(-\pi/2, \pi/2)$

List - I		List - II	
(1)	$x + \sin x$	(P)	increasing
(2)	$\sec x$	(Q)	decreasing
(3)	e^{-x}	(R)	neither increasing nor decreasing

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161. If two circles $(x-1)^2 + (y-3)^2 = r^2$ and $x^2 + y^2 - 8x + 2y + 8 = 0$ intersect in two distinct points then

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162. Radius of a circle cuts the x-axis at two points at distance 4 units from the origin and its centre iS at (0, k), then k^2 = ____

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163. Let PQ and RS be tangents at the extremities of one diameter PR of a circle of radius r. If PS and RQ intersect at a point X on the circumference of the circle, than $\frac{2r}{\sqrt{PQ \cdot RS}}$ equals____

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164. If the circles $x^2 + y^2 + 2x + 2ky + 6 = 0$ and $x^2 + y^2 + 2ky + k = 0$ intersect orthogonally, then k is equal to _____

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165. The equation of the circle which touches the axis of y at a distance +4 from the origin and cuts off an intercept 6 from the axis of x is

$x^2 + y^2 - 10x - 8y + k = 0$, then k - 10 = _____

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166. The circle $x^2 + y^2 - 4x - 4y + 4 = 0$ is inscribed in a triangle which has two of its sides along the co-ordinate axes. The locus of the circumcenter of the triangle is $x + y - xy + k\left(x^2 + y^2\right)^{\frac{1}{2}} = 0$. Find k.

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167. Find the intervals of the values of 'a' for which the line y + x = 0 bisects two chords drawn from a point $\left(\frac{1+\sqrt{2}a}{2}, \frac{1-\sqrt{2}a}{2}\right)$ to the circle

$2x^2 + 2y^2 - \left(1 + \sqrt{2}a\right)x - \left(1 - \sqrt{2}a\right)y = 0$

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168. If the two lines $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ cut the co-ordinates axes in concyclic points. Prove that $a_1a_2 = b_1b_2$

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169. If y = mx is the equation of a chord of the circle $x^2 + y^2 - 2ax = 0$ with radius a, prove that the equation of the circle on this chord as a diameter is $(1 + m^2)(x^2 + y^2) - 2a(x + my) = 0.$

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170. Find the locus of the mid point of the chord of the circle $x^2 + y^2 = a^2$ which subtend a right angle at the point (0,0).

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171. Tangents are drawn to the circle $x^2 + y^2 = 4$ from P(3,4) to touch it at A and B. The parallelogram PAQB is completed. Find the locus of f the point Q.

A. $-\frac{46}{25}, \frac{63}{25}$

B. $-\frac{46}{25}, \frac{68}{25}$

C. $-\frac{51}{25}, -\frac{68}{25}$

D. $-\frac{68}{25}, \frac{51}{25},$

Answer:

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172. Show that the common tangents to the circles $x^2 + y^2 - 6x = 0$ and $x^2 + y^2 + 2x = 0$ from an equilateral triangle.

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173. Two straight lines rotate about two fixed points. If they start from their position of coincidence such that one rotates at the rate double that of the other. Then find the locus of their point of intersection of two straight lines

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174. If two curves, whose equations are $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ and $a'x^2 + 2h'xy + b'y^2 + 2g'x + 2f'y + c' = 0$ intersect in four concyclic points, prove that

$$\frac{a-b}{h} = \frac{a'-b'}{h'}$$

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175. Find the equation of the circle of minimum radius which contains the three circles

$x^2 - y^2 - 4y - 5 = 0$

$x^2 + y^2 + 12x + 4y + 31 = 0$ and

$x^2 + y^2 + 6x + 12y + 36 = 0$

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176. The number of common tangents to the circles $x^2 + y^2 - 4x - 6y - 12 = 0$ and $x^2 + y^2 + 6x + 18y + 26 = 0$

A. 2

B. 3

C. 4

D. 1

Answer: B

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177. A circle S passes through the point (0, 1) and is orthogonal to the circles $(x-1)^2+y^2=16$ and $x^2+y^2=1$. Then

A. radius of S is 8

B. radius of S is 7

C. centre of S is (-7, 1)

D. centre of S is (- 8, 1)

Answer: B::C

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178. Let C be the circle with centre at (1, 1) and radius = 1. If T is the circle centered at (0, Y) passing through origin and touching the

circle C externally, then the radius of T is equal to :

A. $\frac{1}{2}$

B. $\frac{1}{4}$

C. $\frac{\sqrt{3}}{\sqrt{2}}$

D. $\frac{\sqrt{3}}{2}$

Answer: B

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179. The circle passing through (1, - 2) and touching the axis of x at (3, 0) also passes through the point

A. (2, - 5)

B. (- 2, 5)

C. (5,- 2)

D. (-5, 2)

Answer: C

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180. A point P lines on the circle $x^2 + y^2 = 169$. If Q = (5, 12) and R= (-12, 5) , then angle $\angle QPR$is

A. $\frac{\pi}{6}$

B. $\frac{\pi}{4}$

C. $\frac{\pi}{3}$

D. $\frac{\pi}{2}$

Answer: B

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181. A circle passing through (0, 0), (2, 6), (6, 2) cuts the x-axis at the point $P \neq (0, 0)$. Then the length of OP, where O is origin, is

A. 44232

B. $\frac{5}{\sqrt{2}}$

C. 5

D. 10

Answer: C

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182. A point moves so that the sum of squares of its distances from the points (1, 2) and (-2, 1) is always 6. Then its locus is

A. the straight line y -3/2= -3(x+1/2)

B. a circle with centre (-1/2,3/2) and radius $\sqrt{2}$

C. a parabola with focus (1, 2) and directix passing through (-2, 1)

D. an ellipse with foci (1, 2) and (-2, 1)

Answer: B

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183. If one end of a diameter of the circle $x^2 + y^2 - 4x - 6y + 11 = 0$ is (3, 4) then the other end is

A. (2, 1)

B. (2, 4)

C. (1, 2)

D. (-4, 2)

Answer: C

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184. The equation of the circle passing through the point (1, 1) and the points of intersection of $x^2 + y^2 - 6x + 8 = 0$ and $x^2 + y^2 - 6 = 0$ is

A. $x^2 + y^2 + 3x - 5 = 0$

B. $x^2 + y^2 - 3x + 1 = 0$

C. $x^2 + y^2 + 6x - 4 = 0$

D. $x^2 + y^2 - 4y - 2 = 0$

Answer: A

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185. The equations of the circles which touch both the axes and the line 4x + 3y = 12 and have centres in the first quadrant, are

A. $x^2 + y^2 - x - y + 1 = 0$

B. $x^2 + y^2 - 2x - 2y + 1 = 0$

C. $x^2 + y^2 - 12x - 12y + 36 = 0$

D. $x^2 + y^2 - 6x - 6y + 36 = 0$

Answer: B::C

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186. A tangent PT is drawn to the circle $x^2 + y^2 = 4$ at the point $P\left(\sqrt{3}, 1\right)$. A straight line L, perpendicular to PT is a tangent to the circle.

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

A possible equation of L is

A. $x - \sqrt{3}y = 1$

B. $x + \sqrt{3}y = 1$

C. $x - \sqrt{3}y = -1$

D. $x - \sqrt{3}y = 5$

Answer: A

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187. A tangent PT is drawn to the circle $x^2 + y^2 = 4$ at the point $P\left(\sqrt{3}, 1\right)$. A straight line L, perpendicular to PT is a tangent to the circle.

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

A common tangent of the two circles is

A. x = 4

B. y = 2

C. $x + \sqrt{3}y = 4$

D. $x + 2\sqrt{2}y = 6$

Answer: D

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188. The length of the diameter of the circle which touches the x-axis at the point (1,0) and passes through the point (2, 3) is ?

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189. If the circles $x^2 + y^2 + 2x + 2ky + 6 = 0$ and $x^2 + y^2 + 2ky + k = 0$ intersect orthogonally, then k is equal to _____

A. 2 or -3/2

B. -2 or -3/2

C. 2 or 3/2

D. -2 or 3/2

Answer: A

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190. Four distinct points (2k,3k),(1,0),(0,1)and(0,0) lie on a circle for

A. $k < 0$

B. $0 < k < 1$

C. k = 1

D. $k > 1$

Answer: C

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191. The incentre of an equilateral triangle is (1, 1) and the equation of the one side is $3x + 4y + 3 = 0$. Then the equation of the circumcircle of the triangle is

A. $x^2 + y^2 - 2x - 2y - 2 = 0$

B. $x^2 + y^2 - 2x - 2y - 14 = 0$

C. $x^2 + y^2 - 2x - 2y + 2 = 0$

D. $x^2 + y^2 - 2x - 2y + 14 = 0$

Answer: B

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192. The circle passing through (-1, 0) and touching the y - axis at (0, 2) also passes through the point

A. (-3/2,0)

B. (-5/2,0)

C. (-3/2,5/2)

D. (-4,0)

Answer: D

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193. The straight line 2x - 3y = 1 divides the circular region $x^2 + y^2 \leq 6$ into two parts. If

$$S = \left\{\left(2, \frac{3}{4}\right), \left(\frac{5}{2}, \frac{3}{4}\right), \left(\frac{1}{4}, -\frac{1}{4}\right), \left(\frac{1}{8}, \frac{1}{4}\right)\right\},$$

then the number of point(s) in S lying inside the smaller part is

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194. The two circles $x^2 + y^2 = ax$ and $x^2 + y^2 = c^2 (c > 0)$ touch each other if

A. $|a| = c$

B. a = 2c

C. $|a| = 2c$

D. $2|a| = c$

Answer: A

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195. If the straight line y = mx is outside the circle $x^2 + y^2 - 20y + 90 = 0$, then

A. $m < 3$

B. $|m| < 3$

C. $m > 3$

D. $|m| > 3$

Answer: B

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196. The locus of the centre of a circle which passes through two variable points (a, 0), (-a, 0) is

A. x = 1

B. x + y = a

C. x + y = 2a

D. x = 0

Answer: D

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197. The intercept on the line y = x by the circle $x^2 + y^2 - 2x = 0$ is AB. Equation of the circle with AB as diameter is

A. $x^2 + y^2 = 1$

B. x(x-1)+y(y-1) = 0

C. $x^2 + y^2 = 2$

D. (x-1) (x-2) + (y-1) + (y-2) = 0

Answer: B

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198. If the coordinates of one end of a diameter of the circle $x^2 + y^2 + 4x - 8y + 5 = 0$, is (2, 1), the coordinates of the other

end is

A. (-6, -7)

B. (6, 7)

C. (-6, 7)

D. (7, -6)

Answer: C

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