MATHS

BOOKS - MODERN PUBLICATION MATHS (KANNADA ENGLISH)

CIRCLES AND SYSTEMS OF CIRCLES

Mcqs Level I

1. $y^2 - 2x - 2y + 5 = 0$ is a :

A. Circle with centre (1, 1)

B. Parabola with vertex (1,2)

C. Parabola with directrix x = $\frac{3}{2}$

D. Parabola with directrix x= $\frac{1}{2}$

Answer: C

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2. The equation $x^2 + y^2 + x + y + 1 = 0$ represents whose centre is:

A. Origin

B. (-1,-1)

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

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

Answer: C

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3. If one end of the diameter of the circle $x^2 + y^2 - 8x - 4y + c = 0$ is (-3, 2), then the other end is :

A. (5, 3)

B. (6,2)

C. (1,-8)

D. (11,2)

Answer: D

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4. The value of k for which the circles $x^2 + y^2 - 3x + ky - 5 = 0$ and $4x^2 + 4y^2 - 12x - y - 9 = 0$ become concentric is:

A. $\frac{1}{8}$

B. $-\frac{1}{8}$

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

D. $-\frac{1}{4}$

Answer: D

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5. The number of tangents, which can be drawn from the point (1, 2) to the circle $x^2 + y^2 = 5$ is :

A. 1

B. 2

C. 3

D. 0

Answer: A

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6. The radius of the circle inscribed in the triangle formed by the lines x = 0, y = 0 and 4x + 3y - 24 = 0 is :

A. 12

B. 2

C. $2\sqrt{2}$

D. 6

Answer: B

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7. The equation of the chord of the circle $x^2 + y^2 - 4x = 0$, whose mid-point is (1, 0) is :

A. y = 2

B. y=1

C. x=2

D. x=1

Answer: D

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8. The locus of the mid-points of chords of the circle $x^2 + y^2 = 4$, which subtend a right angle at the origin, is:

A. x+y=2

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

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

D. x+y=1

Answer: B

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9. The length of the tangent from (5, 1) to the circle $x^2 + y^2 + 6x - 4y - 3 = 0$ is :

A. 81

B. 29

C. 7

D. 21

Answer: C

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

A. x=0 only

B. y = 0 only

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

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

Answer: C

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11. If x = 7 touches the circle $x^2 + y^2 - 4x - y - 12 = 0$, then the co-ordinates of the point of contact are :

A. (7,3)

B. (7,4)

C. (7,8)

D. (7,2)

Answer: A

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12. The equation of the circle passing through the point (4, 5) and having centre at (2, 2) is :

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

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

C. $x^2 + y^2 - 4x - 13 = 0$

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

Answer: B

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13. The length of the chord joining the points (4 cos θ, 4 sin θ) and (4 cos ($\theta + 60^\circ$), 4 sin ($\theta + 60^\circ$)) of the circle $x^2 + y^2 = 16$ is :

A. 16

B. 2

C. 8

D. 4

Answer: D

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14. If the equation $k\frac{(x+1)^2}{3}+\frac{(y+2)^2}{4}$ =1 represents a circle, then the value of k is:

A. $\frac{3}{2}$

B. 1

C. $\frac{3}{4}$

D. None of these

Answer: C

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15. The equation of a diameter of the circle $x^2+y^2=2ay$ that is perpendicular to the straight line x + 2y = 4 is :

A. 2x - y +a = 0

B. x + 2y - a=0

C. 2x - 2y + a = 0

D. None of these.

Answer: A

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16. The chord of contact of tangents drawn from any point on the circle $x^2 + y^2 = a^2$ to the circle $x^2 + y^2 = b^2$ touches the circle $x^2 + y^2 = c^2$. Then a, b, c are in:

A. A.P.

B. G.P.

C. H.P.

D. None of these.

Answer: B

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17. If the line 2x-y + k = 0 is a diameter of the circle $x^2 + y^2 + 6x - 6y + 5 = 0$, then k is:

A. 6

B. 9

C. 12

D. None of these

Answer: B

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18. If one end of diameter of the circle $2x^2 + 2y^2 - 4x - 8y + 2 = 0$ is (3,2) , then the other end is :

A. (2,3)

B. (4,-2)

C. (2,-1)

D. (-1,2)

Answer: D

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19. The condition that the line (x + g) cos θ + (y +f) sin θ = k is a tangent to $x^2 + y^2 + 2gx + 2fy + c = 0$:

A. $g^2 + f^2 = c^2 + k$

B. $g^2 + f^2 = c + k$

C. $g^2 + f^2 = c + k^2$

D. None of these

Answer: C

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20. If the straight line 3x + 4y = k touches the circle $x^2 + y^2 - 10x = 0$, then the value of k is:

A. 2 or 20

B. -2 or 20

C. -1 or 20

D. -10 or 40

Answer: D

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21. If $2x^2 + \lambda xy + 2y^2 + (\lambda - 4)x + 6y - 5 = 0$ represents a circle, then its radius is:

A. $2\sqrt{2}$

B. $3\sqrt{2}$

C. $2\sqrt{3}$

D. None of these

Answer: D

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22. Length of the chord of the circle $x^2 + y^2 + 4x - 7y + 12 = 0$ along the y-axis is:

A. 1

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

C. 2

D. 3

Answer: A

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23. Angle between a pair of tangents drawn from a point P to the circle $x^2 + y^2 + 4x - 6y + 9\sin^2\theta + 13\cos^2\theta = 0$ is 2θ . Then the locus of P is:

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

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

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

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

Answer: C

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24. The four distinct points (2, 3), (0, 2), (4, 5) and (0, k) are concyclic if the value of k is:

A. 1

B. 5

C. 17

D. 19

Answer: C

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25. A variable chord of the circle $x^2 + y^2 - 2ax = 0$ is drawn through the origin. Then the locus of the centre of the circle drawn on this chord as diameter is:

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

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

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

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

Answer: D

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26. OA and OB are tangents drawn from the origin O to the circle $x^2 + y^2 + 2gx + 2fy + c = 0$ where c > 0, C being the centre of the circle. Then ar (quad. OACB) is:

A. $\sqrt{c(g^2 + f^2 - c)}$

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

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

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

Answer: A

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27. Locus of a moving point such that tangents from it to the two circles : $x^2 + y^2 - 5x - 3 = 0$ and $3x^2 + 3y^2 + 2x + 4y - 6 = 0$ are equal, is :

A. 7x + 4y - 3 = 0

B. 3x - 4y + 9 = 0

C. 17x + 4y + 3 =0

D. 13x - 4y + 15 = 0.

Answer: C

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28. The lines 3x - 4y + 4 = 0 and 6x - 8y - 7 = 0 are tangents to the same circle. The radius of the circle is :

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

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

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

D. $\frac{3}{4}$

Answer: C

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29. The equation of the circle, which touches the axes of co-ordinates and the line $\frac{x}{3}+\frac{y}{4}=1$ and whose centre lies in the first quadrant is:

$x^2+y^2-2cx-2cy+c^2=0$ If c is :

A. 4,5

B. 3,4

C. 2,3

D. 1,6

Answer: D

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30. Number of feet of normals from the point (7, - 4) to the circle $x^2+y^2=5$ is :

A. 1

B. 2

C. 3

D. 4

Answer: B

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31. If $\left(m_i, \frac{1}{m_i}\right)$, i = 1, 2, 3, 4 are concyclic points, then the value of $m_1 m_2 m_3 m_4$ is :

A. -1

B. 0

C. 1

D. None of these

Answer: C

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32. A circle of radius 5 units touches both the axes and lies in the first quadrant. If the circle makes one complete roll on x-axis along the positive direction of x-axis, then its equation in new position is:

A. $x^2 + y^2 - 20\pi x - 10y + 100\pi^2 = 0$

B. $x^2 + y^2 + 20\pi x + 10y + 100\pi^2 = 0$

C. $x^2 + y^2 + 20\pi x - 10y + 100\pi^2 = 0$

D. None of these

Answer: D

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33. 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 :

A. $x^2 + y^2 + 32x + 4y + 235 = 0$

B. $x^2 + y^2 + 32x - 4y - 235 = 0$

C. $x^2 + y^2 + 32x + 4y - 235 = 0$

D. $x^2 + y^2 + 32x - 4y + 235 = 0$

Answer: A

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34. If the chord of contact of tangents drawn from the (h, k) to the circle $x^2 + y^2 = a^2$ subtends a right at the centre, then:

A. $h^2 + k^2 = a^2$

B. $h^2 - k^2 = a^2$

C. $2\left(h^2 + k^2\right) = a^2$

D. $h^2 + k^2 = 2a^2$

Answer: D

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35. Two circles $x^2 + y^2 = 6$ and $x^2 + y^2 - 6x + 8 = 0$ are given. Then the equation of the circle through their points of intersection and the point (1, 1) is :

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

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

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

D. None of these

Answer: B

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36. If a circle passes through the point (a, b) circle $x^2 + y^2 - k^2 = 0$ 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. $x^2 + y^2 - 2ax - 3by + \left(a^2 - b^2 - k^2\right) = 0$

Answer: A

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37. Circles $x^2 + y^2 - 2x - 4y = 0$ and $x^2 + y^2 - 8y - 4 = 0$

A. Touch each other externally

B. Touch each other internally

C. Do not touch each other

D. None of these

Answer: B

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38. The circles $x^2 + y^2 + 4x + 6y + 3 = 0$ and $2(x^2 + y^2) + 6x + 4y + c = 0$ will cut orthogonally if c is :

A. 4

B. 18

C. 12

D. 16

Answer: B

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39. The equation of the circle described on the common chord of circles $x^2 + y^2 - 8x + y - 15 = 0$ and $x^2 + y^2 - 4x + 4y - 42 = 0$ as diameters is :

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

B. $x^2 + y^2 + 10x - 2y + 12 = 0$

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

D. $x^2 + y^2 - 5x + 3y + 7 = 0$

Answer: C

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40. The equation of the circle passing through the point (1, 1) and the point of intersection of: $x^2 + y^2 + 13x - 3y = 0$ and $2x^2 + 2y^2 + 4x - 7y - 25 = 0$ is :

A. $4x^2 + 4y^2 - 30x - 10y - 25 = 0$

B. $4x^2 + 4y^2 + 30x - 13y - 25 = 0$

C. $4x^2 + 4y^2 - 17x - 10y + 25 = 0$

D. None of these

Answer: B

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41. The two circles $x^2 + y^2 - 2x - 3 = 0$ and $x^2 + y^2 - 4x - 6y - 8 = 0$ are such that :

A. They intersect each other

B. They touch each other

C. One lies inside the other

D. None of these.

Answer: A

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42. The circles $x^2 + y^2 - 25 = 0$ and $3(x^2 + y^2) - 30x - 40y + 175 = 0$ touch each other at :

A. (3,4)

B. (1,2)

C. (4,5)

D. None of these

Answer: A

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43. The circles $x^2 + y^2 - 12x - 12y = 0$ and $x^2 + y^2 + 6x + 6y = 0$:

A. Intersect in two points

B. Touch each other internally

C. Touch each other externally

D. None of these.

Answer: C

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44. Length of the common chord of the circles : $x^2 + y^2 + 2x + 6y = 0$ and $x^2 + y^2 - 4x - 2y - 6 = 0$ is :

A. $\frac{2}{5}\sqrt{106}$

B. $\frac{5}{2}\sqrt{106}$

C. $\sqrt{106}$

D. None of these

Answer: A

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45. The equation of circle through the intersection of circles: $x^2 + y^2 - 3x - 6y + 8 = 0$ and $x^2 + y^2 - 2x - 4y + 4 = 0$ and touching the line x+2y=5 is :

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

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

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

D. None of these

Answer: A

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46. If the circles $x^2 + y^2 + 2x + 2ky + 6 = 0$ and $x^2 + y^2 + 2ky + k = 0$ intersect orthogonally , then k is :

A. 2 or -3/2

B. -2 or -3/2

C. 2 or 3/2

D. -2 of 3/2

Answer: A

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47. The circles whose equations are : $x^2 + y^2 + c^2 = 2ax$ and $x^2 + y^2 + c^2 - 2by = 0$ will touch each other externally if:

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

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

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

D. None of these

Answer: C

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48. The circle, which passes through the origin and whose centre lies on the line y = x and cutting the circle $x^2 + y^2 - 4x - 6y + 10 = 0$ orthogonally is :

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

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

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

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

Answer: C

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49. Length of common chord of the circles: $(x-1)^2 + (y+1)^2 = r^2$ and $(x+1)^2 + (y-1)^2 = r^2$ is :

A. $\sqrt{r^2 - 2}$

B. $r + 2$

C. $\frac{1}{2}\sqrt{r^2 - 2}$

D. $2\sqrt{r^2 - 2}$

Answer: D

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50. The point from which the tangents to the circles: $x^2 + y^2 - 8x + 40 = 0, 5x^2 + 5y^2 - 25x + 80 = 0, x^2 + y^2 - 8x + 16y +$ are equal in length is :

A. $\left(8, \frac{15}{2}\right)$

B. $\left(8, -\frac{15}{2}\right)$

C. $\left(-8, \frac{15}{2}\right)$

D. $\left(-8, -\frac{15}{2}\right)$

Answer: B

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51. For the two circles: $x^2 + y^2$=16 and $x^2 + y^2 - 2y$=0 there :

A. is one pair of common tangents

B. are two pairs of common tangents

C. are three common tangents

D. is no common tangent.

Answer: D

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52. The common tangents to the circles $x^2 + y^2 + 2x = 0$ and $x^2 + y^2 - 6x = 0$ form a triangle which is:

A. isosceles

B. equilateral

C. right-angled

D. None of these

Answer: A

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53. The equation of the circle, which cuts orthogonally : $x^2 + y^2 + 3x - 5y + 6 = 0$ and $4x^2 + 4y^2 - 28x + 29 = 0$ and whose centre lies on 3x+4y+1=0 is :

A. $x^2 + y^2 + \frac{3x}{2} + \frac{5}{4} = 0$

B. $x^2 + y^2 + \frac{y}{2} + \frac{29}{4} = 0$

C. $x^2 + y^2 + \frac{7x}{2} + \frac{7y}{2} + 5 = 0$

D. None of these

Answer: D

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54. Angle of intersection of two circles is given by :

A. $\cos\theta = \frac{r_1^2 + r_2^2 - d^2}{r_1^2 r_2^2}$

B. $\sec\theta = \frac{r_1^2 + r_2^2 - d^2}{2r_1^2 r_2^2}$

C. $\sec\theta = \frac{2r_1 r_2}{r_1^2 + r_2^2 - d^2}$

D. None of these

Answer: C

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

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

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

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

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

Answer: C

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56. The circles $x^2 + y^2 = r^2$ and $x^2 + y^2 - 10x + 16 = 0$ intersect each other in distinct points if:

A. r gt8

B. r lt 2

C. 2 lt r lt 8

D. $2 \leq r \leq 8$

Answer: C

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57. 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. $\pi/2$

B. $\pi/3$

C. $\pi/4$

D. $\pi/6$

Answer: C

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58. Let PQ and RS be tangents at the extremities of the diameter PR of a circle of radius r. If PS and RQ intersect at a point X on the circumference of the circle, then 2r equals:

A. $\sqrt{\frac{PQ.}{RS}}$

B. $\frac{PQ+RS}{2}$

C. $\frac{2PQ.RS}{PQ+RS}$

D. $\sqrt{\frac{PQ^2+RS^2}{2}}$

Answer: A

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59. The equation of the tangent to the circle $x^2 + y^2$ + 4x - 4y + 4 = 0 which makes equal intercepts on the positive coordinate axes is:

A. x+4=2

B. $x + y = 2\sqrt{2}$

C. $x + y = 4$

D. $x + y = 8$

Answer: B

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60. The lines 2x - 3y = 5 and 3x - 4y = 7 are diameters of a circle having area as 154 sq. units. Then the equation of the circle is:

A. $x^2 + y^2 + 2x - 2y = 47$

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

C. $x^2 + y^2 - 2x + 2y = 62$

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

Answer: B

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61. If the tangent at a point P on the circle $x^2 + y^2 + 6x + 6y = 2$, meets the straight line 5x- 2y + 6 = 0 at a point Q 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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62. If a > 2b > 0, then the positive value of m for which $y = mx - b\sqrt{1 - m^2}$ is a common tangent to $x^2 + y^2 = b^2$ and $(x - a)^2 + y^2 = b^2$ is :

A. $\frac{2b}{\sqrt{a^2 - 4b^2}}$

B. $\frac{\sqrt{a^2 - 4b^2}}{2b}$

C. $\frac{2b}{a - 2b}$

D. $\frac{b}{a - 2b}$

Answer: A

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

A. r lt 2

B. r =2

C. r gt 2

D. 2 lt r lt 8

Answer: D

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64. A square is formed by two pairs of straight lines $x^2 - 8x + 12 = 0$ and $y^2 - 14y + 45 = 0$. A circle is inscribed in it. The centre of the circle is:

A. (7,4)

B. (4,7)

C. (6,5)

D. (5,6)

Answer: B

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65. A variable circle passes through the fixed point A (p, q) and touches x-axis. The locus of the other end of the diameter through A is :

A. $(x-p)^2 = 4qy$

B. $(x-q)^2 = 4py$

C. $(y-p)^2 = 4qx$

D. $(y-q)^2 = 4px$

Answer: A

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66. If a circle passes through the point (a, b) and cuts $x^2 + y^2 = 4$ orthogonally, then the locus of its centre is :

A. $2ax + 2by + \left(a^2 + b^2 + 4\right) = 0$

B. $2ax + 2by - \left(a^2 + b^2 + 4\right) = 0$

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

D. $2ax - 2by - \left(a^2 + b^2 + 4\right) = 0$

Answer: B

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67. If the lines $2x + 3y + 1 = 0$ and $3x - y - 4 = 0$ lie along diameters of a circle of circumference 10π , then the equation of the circle is :

A. $x^2 + y^2 - 2x + 2y - 23 = 0$

B. $x^2 + y^2 - 2x - 2y - 23 = 0$

C. $x^2 + y^2 + 2x + 2y - 23 = 0$

D. $x^2 + y^2 + 2x - 2y - 23 = 0$

Answer: A

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

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: A

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69. 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 circles is :

A. $\sqrt{3}$

B. $\sqrt{2}$

C. 3

D. 2

Answer: C

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70. The radius of the circle having centre at (2, 1) whose one of the chords is a diameter of the circle :

A. 1

B. 2

C. 3

D. $\sqrt{3}$

Answer: C

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Mcqs Level Ii

1. The equation of the circle in the first quadrant touching each co-ordinate axis at a distance of one unit from the origin is:

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

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

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

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

Answer: A

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2. The equation of the circle having centre (1, 2) and passing through the point of intersection of the lines: 3x+y=14 and 2x+5y=18 is :

A. $x^2 + y^2 - 2x + 4y - 20 = 0$

B. $x^2 + y^2 - 2x - 4y - 20 = 0$

C. $x^2 + y^2 + 2x - 4y - 20 = 0$

D. $x^2 + y^2 + 2x + 4y - 20 = 0$

Answer: A

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3. The area of the circle centred at (1, 2) and passing through (4,6) is :

A. 5π

B. 10π

C. 25π

D. None of these

Answer: C

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4. Equation of a circle which passes through (3, 6) and touches the axes is:

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

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

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

D. None of these

Answer: C

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5. Equation of the circle with centre on the y-axis and pussing through the origin und the point (2, 3) is :

A. $3x^2 + 3y^2 - 13y = 0$

B. $3x^2 + 3y^2 + 13x + 3 = 0$

C. $6x^2 + 6y^2 - 26xy = 0$

D. $x^2 + y^2 + 13x + 3 = 0$

Answer: A

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6. The equation of a circle with origin as centre and passing through the vertices of an equilateral triangle whose median is of length 3a is:

A. $x^2 + y^2 = 9a^2$

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

C. $x^2 + y^2 = 4a^2$

D. $x^2 + y^2 = a^2$

Answer: C

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7. The tangent to the circle $x^2 + y^2$ = 9, which is parallel to y-axis and does not lie in the third quadrant, touches the circle at the point:

A. (3,0)

B. (-3,0)

C. (0,3)

D. (0,-3)

Answer: A

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8. The angle between the tangents from the origin to the circle $(x-7)^2 + (y+1)^2 = 25$ is :

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

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

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

D. $\frac{\pi}{8}$

Answer: C

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9. The circle on the chord x cos α + y sin α-p= 0 of the circle $x^2 + y^2 - 2 = 0$ as diameter is:

A. $x^2 + y^2 - a^2 - 2p(x\cos\alpha + y\sin\alpha - p)(x\sin\alpha + y\cos\alpha) = 0$

B. $(x\cos\alpha + y\sin\alpha - p)^2 + x^2 + y^2 - a^2 = 0$

C. $x^2 + y^2 - a^2 - 2p(x\cos\alpha + y\sin\alpha - p) = 0$

D. None of these

Answer: C

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10. The equation to the circle which intersects the circles: $x^2 + y^2 - 6y + 1 = 0$ and $x^2 + y^2 - 4y + 1 = 0$ orthogonally and touch the line 3x+4y+5=0 is given by :

A. $4\left(x^2 + y^2\right) + 15x - 4 = 0$

B. $4\left(x^2 + y^2\right) + 15x + 4 = 0$

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

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

Answer: C

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11. The number of integral values of k for which : $x^2 + y^2 + kx + (1 - k)y + 5 = 0$ represents a circle whose radius cannot exceed 5, is:

A. 14

B. 16

C. 18

D. 20

Answer: B

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12. If the centroid of an equilateral triangle is (1, 1) and its one vertex is (-1, 2), then the equation of the circumcentre is :

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

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

C. $x^2 + y^2 - 2x - 2y - 3 = 0$

D. $x^2 + y^2 + 2x + 2y + 3 = 0$

Answer: C

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13. A foot of the normal from the point (4, 3) to a circle is (2, 1) and a diameter of the circle has the equation 2x - y = 2. Then the circle is:

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

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

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

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

Answer: A

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14. A tangent to the circle $x^2 + y^2 = 1$ through the point (0, 5) cuts the centre $x^2 + y^2 = 4$ at P and Q. The tangents to the circle $x^2 + y^2 = 4$ at P and Q meet at R. Then the co-ordinates of R are :

A. $\left(-\frac{8}{5}\sqrt{6}, -\frac{4}{5} \right)$

B. $\left(\frac{8}{5}\sqrt{6}, \frac{4}{5}\right)$

C. $\left(8, 5\sqrt{6}, -\frac{4}{5}\right)$

D. None of these

Answer: B

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15. The abscissae of two points P and Q are the roots of the equation $x^2 + 2ax - b^2 = 0$ and their ordinates are the roots of the equation $x^2 + 2a'x - b^2 = 0$. Then the radius of the circle having PQ as diameter is :

A. $\sqrt{a^2 + a'^2}$

B. $\sqrt{b^2 + b'^2}$

C. $\sqrt{a^2 + b^2 + a'^2 + b'^2}$

D. None of these

Answer: C

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16. If the polar of a point P w.r.t. the circle $x^2 + y^2 = a^2$ touches the circle $(x - a)^2 + y^2 = a^2$, then P lies on:

A. $x^2 + 2ay = a^2$

B. $x^2 - 2ay = a^2$

C. $y^2 - 2ax = a^2$

D. $y^2 + 2ax = a^2$

Answer: D

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17. The locus of the poles of the line ax + by + c = 0 w.r.t. circles which touch the x-axis at the origin is:

A. (ax+by)y=cx

B. (bx-ay)y=cx

C. (ax-by)x=cy

D. (ax-by)y=cx

Answer: B

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18. Length of tangent drawn from any point on the circle $x^2 + y^2 + 2gx + 2fy + c = 0$ to the circle :

$x^2 + y^2 + 2gx + 2fy + c' = 0$ is :

A. $\sqrt{c' - c}$

B. $\sqrt{c - c'}$

C. $\sqrt{cc'}$

D. $\sqrt{\frac{c}{c'}}$

Answer: A

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19. The tangents drawn from the origin to the circle : $x^2 + y^2 - 2gx - 2fy + f^2 = 0$ are perpendicular if:

A. $g^2 + f^2 = 1$

B. $g^2 - f^2 = 1$

C. $g^2 - f^2 = 0$

D. None of these

Answer: C

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20. If a circle of constant radius 3k passes through the origin and meets the axes in A and B, then 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. $x^2 + y^2 = 4k^2$

Answer: D

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21. If the chord of contact of tangents from a point P (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 :

A. a circle

B. a parabola

C. an ellipse

D. a hyperbola.

Answer: B

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

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

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

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

D. $(x - 3)^2 + (y - 4)^2 = 25$

Answer: B

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23. The tangent to $x^2 + y^2 = 9$, which is parallel to y-axis and does not lie in the third quadrant, touches the circle at the point :

A. (0,-3)

B. (0,3)

C. (-3,0)

D. (3,0)

Answer: D

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24. The circle $x^2 + y^2 - 6x - 10y + k = 0$ does not touch or intersect the x-axis and the point (1, 4) lies inside the circle, then:

A. $25 < k < 29$

B. $9 < k < 25$

C. $9 < k < 29$

D. None of these.

Answer: A

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25. Two tangents to the circle $x^2 + y^2 = 4$ at the points A and B meet at P (- 4, 0). Then the area of the quadrilateral PAOB, O being the origin, is :

A. 4

B. $4\sqrt{3}$

C. $6\sqrt{2}$

D. None of these

Answer: B

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26. If the radical axis of the circles $x^2 + y^2 + 2gx + 2fy + c = 0$ and $2x^2 + 2y^2 + 3x + 8y + 2c = 0$ touches the circle :

$x^2 + y^2 + 2x + 2y + 1 = 0$, then :

A. $g = \frac{3}{4}, f \neq 2$

B. $g \neq \frac{3}{4}, f = 2$

C. $g = \frac{3}{4}, f = 2$

D. None of these

Answer: C

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27. The equation of the circle having its centre on the line x +2y - 3 = 0 and passing through the points of intersection of the circles $x^2 + y^2 - 2x - 4y + 1 = 0$ and $x^2 + y^2 - 4x - 2y + 4 = 0$ is :

A. $x^2 + y^2 - 6x + 7 = 0$

B. $x^2 + y^2 - 3x + 4 = 0$

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

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

Answer: A

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28. 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: B

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29. Number of common tangents to the circles : $x^2 + y^2 - 6x - 14y + 48 = 0$ and $x^2 + y^2 - 6x = 0$ is :

A. 0

B. 1

C. 2

D. 4

Answer: D

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

A. $y^2 = 16x$

B. x^2=16 y

C. y^2 =16x+4

D. x^2 = 16y+4

Answer: A

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31. Co-ordinates of radical centre of the circles : $x^2 + y^2 = 9, x^2 + y^2 - 2x - 2y = 5$ and $x^2 + y^2 + 4x + 6y = 19$ are :

A. (0,0)

B. (1,1)

C. (-1,1)

D. (1,-1)

Answer: B

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32. The equation of the family of circles, which same radical axis, as the circles :

$x^2 + y^2$=4 and $x^2 + y^2 + 2x + 4y = 6$ is :

A. $x^2 + y^2 + 2\lambda x + \lambda y - (4 + \lambda) = 0$

B. $x^2 + y^2 + \lambda x + 2\lambda y - (4 + \lambda) = 0$

C. $x^2 + y^2 + \lambda(x - 2y - 1) = 4$

D. $x^2 + y^2 + \lambda(x + 2y - 4) = 1$, where λ is a parameter.

Answer: B

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33. 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 gt 0, c lt 0

B. ab gt 0, c gt 0

C. ab lt 0 , c gt 0

D. None of these

Answer: B

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34. The radius of the smallest circle, which passes through the points of intersection of the circles : $x^2 + y^2 + 2x - 3 = 0$ and $x^2 + y^2 + 3x - y = 0$ is :

A. 1

B. 2

C. $\sqrt{2}$

D. $\sqrt{3}$

Answer: C

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35. The equation of the four circles are $(x \pm a)^2 + (y \pm a)^2 = a^2$. The radius of the smallest circle, which touches all the four circles, is:

A. $2\sqrt{2}a$

B. $\left(\sqrt{2}-1\right)a$

C. $\left(\sqrt{2}+1\right)a$

D. $\left(2+\sqrt{2}\right)a$

Answer: B

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36. The circles : $x^2+y^2+2g_1x-a^2=0$ and $x^2+y^2+2g_2x-a^2=0$ cut each other orthogonally. Let p_1 and p_2 be the perpendiculars from (0, a) and (0, - a) on the common tangent of these circles. Then p_1p_2 equals :

A. $\frac{a^2}{2}$

B. a^2

C. a^2+2

D. $2a^2$

Answer: B

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37. If the circle $x^2 + y^2 + 2gx + 2fy + c = 0$ bisects the circumference of the circle $x^2 + y^2 + 2g'x + 2f'y + c' = 0$, then :

A. 2g(g-g')+2f(f-f')=c'-c

B. 2g'(g-g')+2f'(f-f')=c-c'

C. 2g'(g-g')+2f'(f-f')=c'-c

D. 2g(g-g')+2f(f-f')=c-c'

Answer: B

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38. Let AB be a chord of the circle $x^2 + y^2 = a^2$ subtending a right angle at the centre. Then the locus of the centroid of triangle PAB as P moves

on the circle is:

A. a parabola

B. a circle

C. an ellipse

D. a pair of st. lines

Answer: B

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39. Locus of centroid of the triangle whose vertices are (a cos t, a sin t),(b sin t , - b cos 1) and (1, 0), where 't' is a parameter, is :

A. $(3x-1)^2+(3x)^2=a^2+b^2$

B. $(3x+1)^2+(3y)^2=a^2+b^2$

C. $(3x+1)^2+(3y)^2=a^2-b^2$

D. $(3x-1)^3+(3y)^2=a^2-b^2$

Answer: A

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40. If the circles $x^2 + y^2 + 2ax + cy + a = 0$ and $x^2 + y^2 - 3ax + dy - 1 = 0$ intersect in two distinct points P and Q, then the line 5x + by - a = 0 passes through P and Q for :

A. no value of a

B. exactly one value of a

C. exactly two values of a

D. infinitely many values of a.

Answer: A

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

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

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

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

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

Answer: C

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42. If the pair of lines $ax^2 + 2(a + b)xy + by^2 = 0$ lie along diameters of a circle and divide the circle into four sectors such that the area of one of the sectors is thrice the area of another sectors, then:

A. $3a^2 - 2ab + 3b^2 = 0$

B. $3a^2 - 10ab + 3b^2 = 0$

C. $3a^2 + 2ab + 3b^2 = 0$

D. $3a^2 + 10ab + 3b^2 = 0$

Answer: C

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43. If the lines 3x - 4y - 7 = 0 and 2x - 3y - 5 = 0 are two diameters of a circle of area 49π square units, then the equation of the circle is:

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

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

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

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

Answer: D

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44. Let 'C' be the circle with centre (0,0) and radius 3 units. The equation of the locus of the mid points of chords of the circle 'C' that subtend an angle of $2\pi/3$ at its centre is:

A. $x^2 + y^2 = \frac{3}{2}$

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

C. $x^2 + y^2 = \frac{27}{4}$

D. $x^2 + y^2 = \frac{9}{4}$

Answer: D

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45. Let ABCD be a quadrilateral with area 18, with side AB parallel to the side CD and AB = 2 CD. Let AD be perpendicular to AB and CD. If a circle is drawn inside the quadrilateral ABCD touching all the sides, then its radius is :

A. 3

B. 2

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

D. 1

Answer: B

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46. Consider a family of circles which are passing through the point (-1, 1) and are tangent to x-axis. If (h,k) are the co-ordinates of the centre of the circle, then the set of values of k is given by the interval :

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

B. $-\frac{1}{2} \leq k \leq \frac{1}{2}$

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

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

Answer: A

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47. The point diametrically opposite to the point P (1, 0) on the circle $x^2 + y^2 + 2x + 4y - 3 = 0$ is :

A. (3,4)

B. (3,-4)

C. (-3,4)

D. (-3,-4)

Answer: D

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48. If P and Q are the points of intersection of the circles $x^2 + y^2 + 3x + 7y + 2p - 5 = 0$ and $x^2 + y^2 + 2x + 2y - p^2 = 0$, then

there is a circle passing through P, Q and (1, 1) for :

A. all values of p

B. all except one value of p

C. all except two values of p

D. exactly one value of p.

Answer: B

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49. If a variable circle 'C' touches the x-axis and touches the circle $x^2 + (y-1)^2 = 1$ externally, then the locus of centre of 'C' can be:

A. $x^2 = 4y \cup \{(0, 4) : y < 0\}$

B. $(x-1)^2 + y^2 = 1$

C. $x^2 = 4y$

D. $x^2 = 4y \cup \{(0, y) : y \in R\}$

Answer: A

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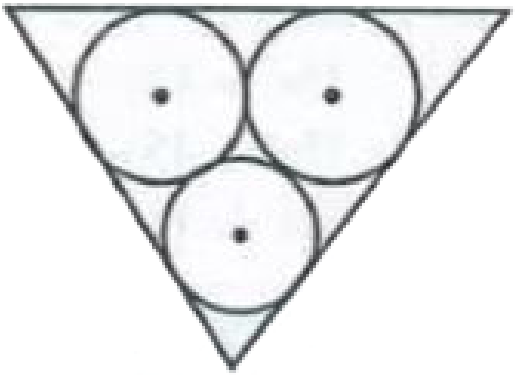
50. Three coins of unit radius are placed in an equilateral triangle as shown in the following figure. The area of that equilateral triangle is :



A. $6 + 4\sqrt{3}$

B. $20 + 8\sqrt{3}$

C. $7 + 4\sqrt{3}$

D. None of these

Answer: A

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51. Tangents drawn from the point P (1, 8) to the circle $x^2 + y^2 - 6x - 4y - 11 = 0$ touch the circle at the points A and B. The equation of the circumcircle of the triangle PAB is:

A. $x^2 + y^2 + 4x - 6y + 19 = 0$

B. $x^2 + y^2 - 4x - 10y + 19 = 0$

C. $x^2 + y^2 - 2x + 6y - 29 = 0$

D. $x^2 + y^2 - 6x - 4y + 19 = 0$

Answer: B

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Aieee Jee Examination

1. The circle $x^2 + y^2 = 4x + 8y + 5$ intersects the line 3x-4y=m at two distinct points if :

A. -85 lt m lt -35

B. $-35 < m < 15$

C. 15 lt m lt 65

D. 35 lt m lt 85

Answer: B

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

A. 2|a|=c

B. |a|=c

C. a=2c

D. $|a|=2c$

Answer: B

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

A. $\left(-\frac{3}{2}, 0\right)$

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

C. $\left(-\frac{3}{2}, \frac{5}{2}\right)$

D. (-4,0)

Answer: D

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4. The equation of the circle passing through the points (1, 0) and (0, 1) and having smallest radius is :

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

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

C. $x^2 + y^2 + 2x + 2y - 7 = 0$

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

Answer: B

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5. 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:

A. $\frac{10}{3}$

B. $\frac{3}{5}$

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

D. $\frac{5}{3}$

Answer: A

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6. The locus of the mid-point of the chord of contact of tangents drawn from points lying on the straight line 4x - 5y = 20 to the circle $x^2 + y^2 = 9$ is:

A. $20(x^2 + y^2) - 36x + 45y = 0$

B. $20(x^2 + y^2) + 36x - 45y = 0$

C. $36(x^2 + y^2) - 20x + 45y = 0$

D. $36(x^2 + y^2) + 20x - 45y = 0$

Answer: A

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

A. (2,-5)

B. (5,-2)

C. (-2,5)

D. (-5,2)

Answer: B

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8. Let C be the circle with centre at (1, 1) and radius = 1. If T is the circle centred at (0, y), passing through origin and touching the circle C externally, then the radius of T is equal to :

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

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

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

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

Answer: C

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

A. 1

B. 2

C. 3

D. 4

Answer: C

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1. Two circles are centred at (2, 3) and (5, 6,) which intersect each other. If the radii are equal, the equation of the common chord is:

A. x-y-8=0

B. x+y-8=0

C. x-y+1=0

D. x+y+1=0

Answer: B

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2. Equation of the circle centred at (4, 3), touching the circle $x^2 + y^2 = 1$ externally is:

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

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

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

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

Answer: D

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3. The points (1,0),(0,1),(0,0) and (2k,3k), k $\neq$ 0 are concyclic if k =

A. $\frac{5}{13}$

B. $\frac{-5}{13}$

C. $-\frac{1}{5}$

D. $\frac{1}{5}$

Answer: A

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

A. y-axis but not x -axis

B. x-axis but not y-axis

C. both x and y axes

D. neither x-axis nor y-axis.

Answer: A

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5. The Locus of the centre of the circle of radius 3, which rolls on the outside of the circle $x^2 + y^2 + 3x - 6y - 9 = 0$ is :

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

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

C. $x^2 + y^2 + 3x - 6y - 45 = 0$

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

Answer: C

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6. The length of the chord of the circle $x^2 + y^2 + 3x + 2y - 8 = 0$ intercepted by the y-axis is

A. 3

B. 8

C. 9

D. 6

Answer: D

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7. The number of real circles culting orthogonally the circle $x^2 + y^2 + 2x - 2y + 7 = 0$ is

A. 0

B. 1

C. 2

D. infinitely many

Answer: A

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8. Equation of circle with centre (-a, -b) and radius $\sqrt{a^2 - b^2}$ is

A. $x^2 + y^2 - 2ax - 2by - 2b^2 = 0$

B. $x^2 + y^2 + 2ax + 2by + 2a^2 = 0$

C. $x^2 + y^2 + 2ax + 2by + 2b^2 = 0$

D. $x^2 + y^2 - 2ax - 2by + 2b^2 = 0$

Answer: C

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9. If a circle with the point (-1, 1) as the centre touches the line x + 2y + 9 = 0, then the co-ordinates of the point of contact are:

A. (-3,3)

B. (-3,-3)

C. (0,0)

D. $\left(\frac{7}{3}, \frac{17}{3}\right)$

Answer: B

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10. If the circles $x^2 + y^2 + 2gx + 2fy = 0$ and $x^2 + y^2 + 2g'x + 2f'y = 0$ touch each other, then

A. fg=f'g'

B. f'g=fg'

C. ff'=gg'

D. None of these

Answer: B

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11. The number of common tangents to the circles: $x^2 + y^2 = 4, x^2 + y^2 - 4x + 2y - 4 = 0$ is :

A. 1

B. 2

C. 3

D. 4

Answer: B

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12. The length of the tangent drawn from any point on the circle : $x^2 + y^2 - 4x + 2y - 4 = 0$ to the circle $x^2 + y^2 - 4x + 6y = 0$ is :

A. 8

B. 4

C. 2

D. None of these

Answer: C

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