36. CIRCLES

1. The equation of a circle with centre (5, 4) and touch the y-axis is
[AP EAMCET 17-09-20_Shift-1]
1. $x^2+y^2-10x-8y-16=0$
2. $x^2+y^2-10x-8y-61=0$
3. $x^2+y^2+10x+8y+16=0$
4. $x^2+y^2-10x-8y+16=0$

2. If $x^2+y^2+6x+2ky+25=0$ to touch y-axis, then k= **[AP EAMCET 17-09-20_Shift-1]**
1. ± 20
2. $-1,-5$
3. ± 5
4. 4

3. The point on the circle $x^2+y^2=4$ whose distance from the line $4x+3y-12=0$ is 4/5 units is equal to
[AP EAMCET 17-09-20_Shift-1]
1. $\left(\frac{12}{25},\frac{36}{25}\right)$
2. $(4,0)$
3. $(2,0)$
4. $\left(\frac{-14}{25},\frac{48}{25}\right)$

4. The equation of the circle passing through (0,0) and which makes intercepts a and b on the co-ordinate axes is
[AP EAMCET 17-09-20_Shift-1]
1. $x^2+y^2+ax+by=0$
2. $x^2+y^2+ax-by=0$
3. $x^2+y^2-ax+by=0$
4. $x^2+y^2-ax-by=0$

5. The value of m+n if the circumference of the circle $x^2+y^2+8x+8y-m=0$ is bisected by the circle $x^2+y^2-2x+4y+n=0$
[AP EAMCET 17-09-20_Shift-1]
1. -56
2. 56
3. 50
4. -34

6. The equation of normal at (1, 1) to the circle $x^2+y^2-x-3y-4=0$ is ______
[AP EAMCET 17-09-20_Shift-2]
1. $x+y-2=0$
2. $2x-y-1=0$
3. $x-y+2=0$
4. $x-y-2=0$

7. The length of the diameter of the circle $x^2+y^2-6x-8y=0$ is ______ units
[AP EAMCET 17-09-20_Shift-2]
1. 5
2. 10
3. 15
4. 20

8. If $3x+y+k=0$ is a tangent to the circle $x^2+y^2=10$, then k= **[AP EAMCET 17-09-20_Shift-2]**
1. ± 7
2. ± 5
3. ± 9
4. ± 10

9. The equations of tangents to the circle $x^2+y^2=10$ from the point (4, -2) are
[AP EAMCET 17-09-20_Shift-2]
1. $x+y=2,\ 3x+2y=16$
2. $5x+y=18,\ 3x-y=4$
3. $3x+y=10, x-3y=10$
4. $5x-y=4, x+y=0$

10. If the two circles $(x-1)^2+(y-3)^2=r^2$ and $x^2+y^2-8x+2y+8=0$ intersect in two different points, then what can we conclude about r?
[AP EAMCET 17-09-20_Shift-2]
1. $r<2$
2. $r=2$
3. $r>2$
4. $2<r<8$

11. The polar of (1, -2) with respect to $x^2+y^2-10x-10y+25=0$ is
[AP EAMCET 17-09-20_Shift-2]
1. $4x+7y+30=0$
2. $4x+7y-30=0$
3. $4x-7y+30=0$
4. $x+y=0$

12. The equation of the smallest circle passing through the intersection of the line $x+y=1$ and the circle $x^2+y^2=9$ is______
[AP EAMCET 18-09-20_Shift-1]
1. $x^2+y^2-9-(x+y+1)=0$
2. $x^2+y^2-9-(x+y-1)=0$
3. $x^2+y^2-9-x+y-1=0$
4. $x^2+y^2-9+x+y-1=0$

13. A circle is drawn touching the x-axis, with its centre at the point of reflection of (m ,n) on the line y-x=0. Then the equation of the circle is **[AP EAMCET 18-09-20_Shift-1]**

1. $x^2+y^2-2mx-2ny+m^2=0$
2. $x^2+y^2-2mx+2ny+m^2=0$
3. $x^2+y^2+2nx-2my-n^2=0$
4. $x^2+y^2-2nx-2my+n^2=0$

14. To which point the origin is to be shifted in order to eliminate first powers of x and y $(x' \text{and } y' \text{terms})$ from the equation $4x^2+9y^2-8x+36y+4=0$? **[AP EAMCET 18-09-20_Shift-1]**

1. (1,2) 2. (-1,2)
3. (1,-2) 4. (-1,-3)

15. Let PQ and RS be tangents at the extremeties of a diameter PR of a circle of radius r such that PS and RQ intersect at a point X on the circumference of the circle, then 2r equals **[AP EAMCET 18-09-20_Shift-1]**

1. $\sqrt{PQ.RS}$ 2. $\frac{PQ+RS}{2}$
3. $\frac{2PQ.RS}{PQ+RS}$ 4. $\sqrt{\frac{(PQ)^2+(RS)^2}{2}}$

16. The area of the equilateral triangle inscribed in the circle $x^2+y^2+6x+2y-28=0$ is_____ square units**[AP EAMCET 18-09-20_Shift-1]**

1. $\frac{27\sqrt{3}}{2}$ 2. $\frac{37\sqrt{3}}{2}$
3. $\frac{31\sqrt{3}}{2}$ 4. $\frac{57\sqrt{3}}{2}$

17. The equation of the circle with centre (2,3) and touching the line $3x-4y+1=0$ is **[AP EAMCET 18-09-20_Shift-2]**

1. $x^2+y^2+4x+4y+12=0$
2. $x^2+y^2-4x-6y-14=0$
3. $x^2+y^2-4x-6y+14=0$
4. $x^2+y^2-4x-6y+12=0$

18. The length of the chord intercepted by the circle $x^2+y^2-6x+8y-5=0$ on the line $2x-y=5$ is equal to-------units **[AP EAMCET 18-09-20_Shift-2]**

1. 10 2. 12
3. 7 4. 8

19. The circle $x^2+y^2-6x-10y+p=0$ neither intersects nor touch the coordinate axes and the point (1,4) lies inside the circle. Then the range of possible values of 'p' is **[AP EAMCET 18-09-20_Shift-2]**

1. 23<p<25 2. 25<p<29
3. 21<p<23 4. 12<p<21

20. A circle passes through the centre of another circle $x^2+y^2-3x-4y-1=0$ and whose centre is (5,2). Then the equation of this circle is ____ **[AP EAMCET 21-09-20_Shift-1]**

1. $4x^2+4y^2-40x-16y+67=0$
2. $3x^2+3y^2-40x-16y+67=0$
3. $2x^2+2y^2-40x-16y+67=0$
4. $x^2+y^2-10x-4y+67=0$

21. If the chord of contact of tangents from a point A to a given circle passes through B, then the circle with AB as a diameter will ____ **[AP EAMCET 21-09-20_Shift-1]**

1. Touch the given circle internally
2. Cut the given circle orthogonally
3. Touch the given circle externally
4. Neither intersect nor touch the given circle

22. Find the equation of circle having normals (x-1) (y-2)=0 and tangent 3x+4y=6? **[AP EAMCET 21-09-20_Shift-1]**

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

23. If $y=\sqrt{3}x+k_1$ and $y=\sqrt{3}x+k_2$ are two parallel tangents of a circle of radius 2 units, then $|k_1-k_2|$ is equal to

[AP EAMCET 21-09-20_Shift-1]

1. 1　　2. 8
3. 4　　4. 2

24. The centre of a circle is (2,-3) and the circumference is 10π. Then its equation is

[AP EAMCET 21-09-20_Shift-1]

1. $x^2+y^2+4x+6y+12=0$　　2. $x^2+y^2-4x+6y+12=0$
3. $x^2+y^2-4x+6y-12=0$　　4. $x^2+y^2-4x-6y-12=0$

25. Find the maximum distance of the point K(10,7) from the circle $x^2+y^2-4x-2y-20=0$

[AP EAMCET 21-09-20_Shift-1]

1. 25　　2. 10
3. 15　　4. 5

26. In ΔABC, $\angle A=90^0$ and co-ordinates of points B and C are (2,-4) and (1,5). Then the equation of the circumcircle of ΔABC is

[AP EAMCET 21-09-20_Shift-1]

1. $x^2+y^2+3x+y+18=0$
2. $x^2+y^2-3x+y-18=0$
3. $x^2+y^2-3x-y-18=0$
4. $x^2+y^2+3x-y+18=0$

27. The equation of the circle circumscribing the triangle formed by the straight lines $x+y=6, 2x+y=4 \, and \, x+2y=5$ is given by

[AP EAMCET 21-09-20_Shift-2]

1. $x^2+y^2+17x+19y+50=0$
2. $x^2+y^2-17x-19y+50=0$
3. $x^2+y^2+17x-19y-50=0$
4. $x^2+y^2-17x+19y-50=0$

28. If the point $(1,4)$ lies inside the circle $x^2+y^2-6x-10y+p=0$ and the circle does not touch or intersect the coordinates axes ,then

[AP EAMCET 21-09-20_Shift-2]

1. 0<p<34　　2. 25<p<29
3. 9<p<25　　4. 7<p<29

29. In Δ ABC, the circle that touches the sides BC internally and other two sides AB and AC externally ,is called.......

[AP EAMCET 21-09-20_Shift-2]

1. Ex circle opposite to angle A
2. Inscribed circle opposite to angle A
3. Circumcircle of the triangle
4. No such circle exists

30. The length of the tangent drawn from the mid-point of the line joining the origin and the point (4,-4), to the circle $2x^2+2y^2-y=0$ is ------- units **[AP EAMCET 22-09-20_Shift-1]**

1. $3\sqrt{2}$　　2. $\sqrt{2}$
3. $\sqrt{10}$　　4. 3

31. For the circle $x^2+y^2-9=0$, find the equation of the chord having (1, 2) as its mid-point.

[AP EAMCET 22-09-20_Shift-1]

1. $x+2y+5=0$　　2. $x-3y-5=0$
3. $x-3y+9=0$　　4. $x+2y-9=0$

32. The area of the quadrilateral formed by the tangents from the point (4, 5) to the circle $x^2+y^2-4x-2y-11=0$, with a pair of radii joining the points of contact of these tangents is **[AP EAMCET 22-09-20_Shift-1]**

1. 4　　2. 6
3. 8　　4. 10

33. A square is inscribed in the circle $x^2+y^2-2x+4y-93=0$ with its sides parallel to the co-ordinate axes. Then which among the following can be one of the vertices of the square?

[AP EAMCET 22-09-20_Shift-1]

1. (5, 8)　　2. (8, 5)
3. (8, -5)　　4. (-8, 5)

34. Find the equation of a circle with radius 5 units and touching the circle $x^2+y^2-2x-4y-20=0$ at the point (5, 5).

[AP EAMCET 22-09-20_Shift-1]

1. $x^2+y^2-18x-16y+120=0$
2. $x^2+y^2+18x+16y-120=0$
3. $x^2+y^2-18x+16y-120=0$
4. $x^2+y^2+18x+16y+120=0$

35. The length of the tangent from (6, 8) to the circle $x^2 + y^2 = 4$ is

[AP EAMCET 22-09-20_Shift-2]

1. $\sqrt{6}$ 2. $2\sqrt{6}$
3. $4\sqrt{6}$ 4. $5\sqrt{6}$

36. If the length of the tangent from (f, g) to the circle $x^2 + y^2 = 6$ be twice the length of the tangent from the same point to the circle $x^2 + y^2 + 3x + 3y = 0$, then $f^2 + g^2 + 4f + 4g + 2$ is equal to

[AP EAMCET 22-09-20_Shift-2]

1. -1 2. 1
3. 0 4. -2

37. The radius of any circle touching the lines $3x - 4y + 5 = 0$, $6x - 8y - 9 = 0$

[AP EAMCET 22-09-20_Shift-2]

1. 1 2. 23/15
3. 20/19 4. 19/20

38. The equation of pair of straight lines parallel to x-axis and touching the circle $x^2+y^2-6x-4y-12=0$ is **[AP EAMCET 22-09-20_Shift-2]**

1. $y^2 - 4y - 21 = 0$ 2. $y^2 + 4y - 21 = 0$
3. $y^2 - 4y + 21 = 0$ 4. $y^2 + 4y + 21 = 0$

39. Find the area of the circle $(x+1)(x+2)+(y-1)(y+3)=0$

[AP EAMCET 22-09-20_Shift-2]

1. $\frac{17\pi}{4}$ 2. $\frac{17\pi}{2}$
3. $\frac{2\pi}{17}$ 4. $\frac{\pi}{3}$

40. The equation of a circle which touches the x-axis and whose centre is (1, 2) is ____

[AP EAMCET 23-09-20_Shift-1]

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

41. If a line drawn from a fixed point $M(a,b)$ cuts the circle $x^2 + y^2 = k^2$ at C and D, then $MC \times MD$ is equal to ______

[AP EAMCET 23-09-20_Shift-1]

1. $a^2 + b^2 + k^2$ 2. $a^2 + b^2 - k^2$
3. $a^2 - b^2 - k^2$ 4. k^2

42. The radius of the circle $2x^2 + 2y^2 - 3x + 2y - 1 = 0$ is _____ units.

[AP EAMCET 23-09-20_Shift-1]

1. $\frac{\sqrt{21}}{2}$ 2. $\frac{\sqrt{21}}{4}$
3. $\frac{21}{4}$ 4. $\frac{\sqrt{5}}{4}$

43. If one end of the diameter of $x^2 + y^2 - 2x - 6y - 15 = 0$ is (4,1) then the co-ordinates of the other end is

[AP EAMCET 23-09-20_Shift-1]

1. (5,-2) 2. (-2,5)
3. (1,3) 4. (-2,-5)

44 The angle between the pair of tangents drawn from (1,3) to the circle $x^2 + y^2 - 2x + 4y - 11 = 0$ is

[AP EAMCET 23-09-20_Shift-1]

1. $\sin^{-1}(\frac{24}{25})$ 2. $\sin^{-1}(\frac{7}{25})$
3. $\cos^{-1}(\frac{24}{25})$ 4. $\tan^{-1}(\frac{7}{24})$

45. If (1,a),(b,2) are conjugate points with respect to the circle $x^2 + y^2 = 25$,then $4a + 2b =$

1. 25 2. 50
3. 75 4. 100

46 A circle cuts off positive intercepts 5 and 6 on the x and y axes respectively, and passes through the origin. Then the equation of the circle is

1. $x^2 + y^2 + 5x + 6y = 0$ 2. $x^2 + y^2 - 5x + 6y = 0$
3. $x^2 + y^2 - 5x - 6y = 0$ 4. $x^2 + y^2 + 5x - 6y = 0$

47. The length of the chord intercepted by the circle $x^2+y^2-4x+4y+3=0$ on the line x=3y+13 is _____ units.

1. $\sqrt{10}$
2. $\sqrt{20}$
3. $5\sqrt{2}$
4. $2\sqrt{5}$

48. The equation of the tangent to the circle $x^2+y^2=5$ at (-3, 4) is __

1. 4x-3y+25=0
2. x+y-1=0
3. 3x+4y=0
4. 3x-4y+5=0

49. The equation of a normal to the circle $x^2+y^2-2x=0$ that is parallel to the line $x+2y-3=0$ is_____

1. $x-2y=1$
2. $x+2y=1$
3. $x+2y+1=0$
4. $x-2y-2=0$

50. If the circle $x^2+y^2-6x+2y=28$ cuts off a chord of length λ units on the line $2x-5y+18=0$ then the value of λ is

[TS EAMCET 09-09-20_Shift-1]

1. 3
2. 6
3. 12
4. 9

51. Consider the circles

$S_1: x^2+y^2+2x+8y-23=0$

$S_2: x^2+y^2-4x+10y+19=0$

And. If the polar of the centre of a circle with respect to the another circle are L_1 *and* L_2 ,then L_1, L_2 are

[TS EAMCET 09-09-20_Shift-1]

1. parallel and separated by a distance of $4\sqrt{10}$ units
2. perpendicular and intersect at (1,3)
3. perpendicular and intersect at (1,-5)
4. parallel and separated by a distance of $2\sqrt{10}$ units

52. If the circle $S \equiv x^2+y^2-4=0$ intersects another circle $S'=0$ of radius $\frac{5\sqrt{2}}{2}$ in such a manner that the common chord is of maximum length with slope equal to $\frac{1}{4}$, then the centre of $S'=0$ is

[TS EAMCET 09-09-20_Shift-1]

1. $(-1,4)$ *or* $(1,-4)$
2. $\left(-\frac{\sqrt{2}}{2}, 2\sqrt{2}\right)$ *or* $\left(\frac{\sqrt{2}}{2}, -2\sqrt{2}\right)$
3. $\left(-2\sqrt{2}, \frac{\sqrt{2}}{2}\right)$ *or* $\left(2\sqrt{2}, \frac{-\sqrt{2}}{2}\right)$
4. $(4,-1)$ *or* $(-4,1)$

53. If A(-1,3) and B(5,3) are points on a circle C and the chord AB subtends an angle $\frac{\pi}{4}$ at a point P on C, then the equation of such a circle C is **[TS EAMCET 09-09-20_Shift-2]**

1. $x^2+y^2-4x+12y+22=0$
2. $x^2+y^2-4x-12y+22=0$
3. $x^2+y^2-4x-12y-22=0$
4. $3x^2+3y^2-12x-36y-66=0$

54. The midpoint of the chord of the circle $x^2+y^2-6x+4y-12=0$ drawn parallel to the tangent at (-1,1) and at a distance of one unit from the tangent is

[TS EAMCET 09-09-20_Shift-2]

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

55. If the angle between the pair of tangents drawn to the circle $x^2+y^2-2x+4y+3=0$ from (6,-5) θ,is then $\tan\theta =$

[TS EAMCET 09-09-20_Shift-2]

1. $\frac{5}{8}$
2. $\frac{15}{8}$
3. $\frac{8}{15}$
4. $\frac{19}{8}$

56. Two points from the set of concyclic points of the circle passing through (1,1),(2,-1),(3,2) is **[TS EAMCET 10-09-20_Shift-1]**

1. $\left(\frac{5}{2}+\sqrt{\frac{5}{2}},\frac{1}{2}+\sqrt{\frac{5}{2}}\right),\left(\frac{5}{2},\frac{1}{2}+\sqrt{\frac{5}{2}}\right)$

2. $\left(\frac{5}{2}+\sqrt{\frac{5}{2}},\frac{1}{2}\right),\left(\frac{5+\sqrt{5}}{2},\frac{1+\sqrt{5}}{2}\right)$

3. $\left(\frac{5+\sqrt{5}}{2},\frac{1+\sqrt{5}}{\sqrt{2}}\right),\left(\frac{5}{2}+\sqrt{\frac{5}{2}},\frac{1+\sqrt{5}}{4}\right)$

4. $\left(\frac{5}{2}-\frac{\sqrt{5}}{2},\frac{1}{2}-\frac{\sqrt{5}}{2}\right)\left(\frac{5}{2}-\frac{\sqrt{5}}{2},\frac{1}{2}+\frac{\sqrt{5}}{2}\right)$

57. If the polar of a point P with respect to a circle of radius r which touches the coordinate axes and lies in the first quadrant is $x+2y=4r$, then the point P is

[TS EAMCET 10-09-20_Shift-1]

1. $(r,2r)$
2. $(2r,r)$
3. $(2r,3r)$
4. $(-r,4r)$

58. If the circles $x^2+y^2-2x-2(3+\sqrt{7})y+8+6\sqrt{7}=0$ and $x^2+y^2-8x-6y+k^2=0$. $k\in Z$ have exactly two common tangents, then the number of possible values for k is

[TS EAMCET 10-09-20_Shift-1]

1. 8
2. 5
3. 9
4. 11

59. If the origin lies on a diameter of the circle if $x^2+y^2-4x-2y-4=0$, then the equation of the circle, then the equation of the circle passing through the end points of that diameter and the point (1, 2) is

[TS EAMCET 10-09-20_Shift-2]

1. $x^2+y^2-2x-4y=0$,
2. $3x^2+3y^2-19x+8y-12=0$,
3. $7x^2+7y^2-31x-28y+17=0$,
4. $x^2+y^2=5$

60 If $\alpha\neq-4$ and $(2,\alpha)$ is the mid point of a chord of the circle $x^2+y^2-4x+8y+6=0$, then the values of the y-intercept of the chord lie in the interval **[TS EAMCET 10-09-20_Shift-2]**

1. $\left(-4-\sqrt{14},-4+\sqrt{14}\right)$
2. $(-4,4)$
3. $\left(4-\sqrt{14},4+\sqrt{14}\right)$
4. $(-2,2)$

61. C_1 and C_2 are the external and internal centres of similitude of the circles $x^2+y^2-2x+4y+1=0$ and $x^2+y^2+4x-6y+12=0$ .If the radius of the circle having C_1C_2 as its diameters is r then $\frac{9}{2}r=$

[TS EAMCET 10-09-20_Shift-2]

1. $\sqrt{15}$
2. $3\sqrt{15}$
3. $2\sqrt{34}$
4. $3\sqrt{24}$

62. If the poles of the line x-y=0 with respect to the circles $x^2+y^2-2g_ix+c_i^2=0\,(i=1,2,3)$ are (α_i,β_i), then $\sum_{i=1}^{3}\frac{\alpha_i+\beta_i}{g_i}=$

[TS EAMCET 11-09-20_Shift-1]

1. 3
2. 6
3. $\frac{3}{2}$
4. $\frac{3}{4}$

63. If the circles $x^2+y^2-4x+6y+13-a^2=0$ and $x^2+y^2-10x-2y+17=0$ intersect in two distinct points, then 'a' is

[TS EAMCET 11-09-20_Shift-1]

1. $-8<a<-2$
2. $a>8$
3. $2<a<8$
4. $a<-8$

64 If a circle of radius r touches the positive coordinate axes and also the circle $x^2+y^2-12x-10y+52=0$ externally,then the distance between the centres of the two circles is **[TS EAMCET 11-09-20_Shift-1]**

1. 7
2. 5
3. 6
4. 8

65. If the circles $x^2+y^2-2x+k=0$ *and* $x^2+y^2+4x+6y+4=0$ touch each other externally, then the point of contact of two circles is

[TS EAMCET 11-09-20_Shift-1]

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

66. If PA and PB are the tangents drawn from the point p(1,1) to the circle $x^2+y^2+gx+gy-2=0$ with C as the centre, then the area (in sq . units) of the quadrilateral PACB is **[TS EAMCET 11-09-20_Shift-2]**

1. $2\sqrt{g}$
2. $\sqrt{g^3-4g}$
3. $\sqrt{g^3+4g}$
4. $\sqrt{\frac{g^3}{2}+4g}$

67. The point(s) of intersection of the common tangents of the two circles $x^2+y^2-8x-6y+21=0$ and $x^2+y^2-2y-15=0$ is / are

[TS EAMCET 11-09-20_Shift-2]

1. (5,8), (-4,3)
2. (8,5)
3. (3,1)
4. (2,1),(4,3)

68 The condition that the lines joining the origin to the points of intersection of the two curves $x^2+y^2+gx+c=0, x^2+y^2+2fy-c=0$ are at right angles, is

[TS EAMCET 14-09-20_Shift-2]

1. $g^2-f^2=4c$
2. $g^2-f^2=2c$
3. $f^2-4g^2=8c$
4. $g^2-4f^2=8c$

69 If α represent the square of the distance between the origin and the point of intersection of the lines $x^2-y^2-x+3y-2=0$ and β represent the product of the perpendicular distances from the origin on the pair of lines, then $\alpha\beta=$

[TS EAMCET 14-09-20_Shift-2]

1. $\frac{5}{4}$
2. 1
3. $\frac{5}{2}$
4. 4

70. If the parametric equations of the circle passing through the points $(3,4),(3,2)$ and $(1,4)$ is $x=a+r\cos\theta, y=b+r\sin\theta$, then $b^a r^a=$

[TS EAMCET 14-09-20_Shift-2]

1. 27
2. 18
3. 9
4. 54

71 From a point P on the circle $x^2+y^2-4x-6y+9=0$, a pair of tangents PQ and PR are drawn touching the circle $x^2+y^2-4x-6y+12=0$, at Q and R. if C is the centre of the concentric circles, then the area of the ΔCQR (in sq.units) is

[TS EAMCET 14-09-20_Shift-2]

1. $\frac{1}{2}$
2. $\frac{\sqrt{3}}{2}$
3. $\frac{\sqrt{3}}{4}$
4. $\frac{3}{4}$

72. Find the equations of the tangents drawn to the circle $x^2+y^2=50$ at the points where the line $x+7=0$ meets it

[AP EAMCET 19-08-2021_Shift-1]

1. $7x+y+50=0$ & $7x-y+50=0$
2. $x+y=0$ & $x-y=0$
3. $x+7y+5=0$ & $y-7x+5=0$
4. $x+7y+50=0$ & $x-7y+50=0$

73. If the chord of the contact of tangents from a point on the circle $x^2+y^2=r_1^2$ to the circle $x^2+y^2=r_2^2$ touches the circle $x^2+y^2=r_3^2$ then r_1, r_2, r_3 are in

[AP EAMCET 19-08-2021_Shift-1]

1. AP
2. HP
3. GP
4. AGP

74. Find the equation of the circle passing through $(1,-2)$ and touching the x- axis at $(3,0)$. **[AP EAMCET 19-08-2021_Shift-1]**

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

75. 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 represent L_1

[AP EAMCET 19-08-2021_Shift-1]

1. $x+y=0\ \&\ x+7y=0$
2. $x-y=0\ \&\ x+7y=0$
3. $x-7y=0\ \&\ x+y=0$
4. $x-7y=0\ \&\ x-y=0$

76. The equations of the tangents to the circle $x^2+y^2=4$ drawn from the point $(4,0)$ are

[AP EAMCET 19-08-2021_Shift-2]

1. $y=\pm\frac{1}{\sqrt{3}}(x-4)$
2. $y=\pm\frac{2}{\sqrt{3}}(x-4)$
3. $x=\pm\frac{1}{\sqrt{3}}(y-4)$
4. $x=\pm\frac{2}{\sqrt{3}}(y-4)$

77 If $P(-9,-1)$ is a point on the circle $x^2+y^2+4x+8y-38=0$, then find equation of the tangent drawn at the other end of the diameter drawn through P.

[AP EAMCET 19-08-2021_Shift-2]

1. $7x-3y=60$
2. $7x-3y=56$
3. $7x+3y=56$
4. $7x+3y=60$

78. Find the equation of a circle whose radius is 5 units and passes through two points on the $x-$axis which are at a distance of 4 units from the origin.

[AP EAMCET 19-08-2021_Shift-2]

1. $x^2+y^2-6x-25=0$
2. $x^2+y^2-6y-25=0$
3. $x^2+y^2+6y-16=0$
4. $x^2+y^2+6x-16=0$

79. If a foot of the normal from the point $(4,3)$ to a circle is $(2,1)$ and $2x-y-2=0$ is a diameter of the circle , then the equation of the circle is______

[AP EAMCET 19-08-2021_Shift-2]

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

80. The length of the tangent from any point on the circle $(x-3)^2+(y+2)^2=5r^2$ to the circle $(x-3)^2+(y+2)^2=r^2$ is 16 units, then the area between the two circles in sq. units is____ **[AP EAMCET 19-08-2021_Shift-2]**

1. 32π
2. 4π
3. 8π
4. 256π

81. Find the equation of the circle which passes through origin and cuts off the intercepts -2 and 3 over the x and y axes respectively.

[AP EAMCET 20-08-2021_Shift-1]

1. $x^2+y^2-2x+8y=0$
2. $2(x^2+y^2)+2x-3y=0$
3. $x^2+y^2-2x-8y=0$
4. $x^2+y^2+2x-3y=0$

82. The angle between the pair of tangents drawn from $(1,1)$ to the circle $x^2+y^2+4x+4y-1=0$ is ______

[AP EAMCET 20-08-2021_Shift-1]

1. $\frac{\pi}{2}$
2. $\frac{\pi}{4}$
3. $\frac{\pi}{3}$
4. $\frac{\pi}{6}$

83. If the circle $x^2+y^2-4x-8y-5=0$ intersects the line $3x-4y-m=0$ in two distinct points, then the number of integral values of 'm' is ______ **[AP EAMCET 20-08-2021_Shift-1]**

1. 52
2. 51
3. 50
4. 49

84. Let C be the circle with center $(0,0)$ and radius 3 units. The equation of the locus of the mid points of the chords of the circle C that subtends an angle of $\frac{2\pi}{3}$ at its center is ____

[AP EAMCET 20-08-2021_Shift-1]

1. $x^2+y^2=\frac{1}{4}$
2. $x^2+y^2=\frac{27}{4}$
3. $x^2+y^2=\frac{9}{4}$
4. $x^2+y^2=\frac{5}{4}$

85. The points where the circle $x^2+y^2-3x-4y+2=0$ cuts the x-axis are

[AP EAMCET 20-08-2021_Shift-2]

1. $(1,2)\&(2,0)$
2. $(2,0)\&(3,0)$
3. $(0,2)\&(0,1)$
4. $(1,0)\&(2,0)$

86. The centre and radius of the circle $x^2+y^2+8x+10y-8=0$ respectively are ___and ____ units

[AP EAMCET 20-08-2021_Shift-2]

1. $(-4,-5),7$
2. $(4,5),49$
3. $(-8,-10),8$
4. $(-4,5),7$

87. The poles of the tangents to the circle $x^2+y^2=4$ with respect to the circle $(x+2)^2+y^2=8$, lie on **[AP EAMCET 20-08-2021_Shift-2]**

1. $y^2+8x=0$
2. $x^2+8y=0$
3. $y^2-8x=0$
4. $x^2-8y=0$

88. If the power of the point $(1,6)$ with respect to the circle $x^2+y^2+4x-6y-a=0$ is -16 then 'a' equals**[AP EAMCET 20-08-2021_Shift-2]**

1. 5
2. 11
3. 21
4. 6

89. The circle $x^2+y^2+4x-4y+4=0$ touches ______ **[AP EAMCET 23-08-2021_Shift-1]**

1. $x-$axis only
2. $y-$axis only
3. $x-$axis and $y-$axis
4. $x=y$

90. Given three collinear points $A(3,1), B(7,-1)$ and $(5,0)$. The length of a tangent drawn from A to any circle that passes through B and C is ______ units.

[AP EAMCET 23-08-2021_Shift-1]

1. $2\sqrt{10}$
2. $3\sqrt{10}$
3. $\sqrt{10}$
4. $\sqrt{20}$

91. Suppose a circle passes through (2,2) and (9,9) and touches the x–axis at P. If O is the origin, then OP is equal to ______

[AP EAMCET 23-08-2021_Shift-1]

1. 4
2. 5
3. 6
4. 9

92. The radius of a circle whose centre lies in the fourth quadrant and touches each of the three lines $x=0, y=0$ and $3x+4y-12=0$, is ____ units.

[AP EAMCET 23-08-2021_Shift-1]

1. 1
2. 2
3. 3
4. 4

93. If the lengths of the tangents drawn from the point (1, 2) to the circles $x^2+y^2+x+y-4=0$ and $3x^2+3y^2-x-y-\lambda=0$ are in the ratio 3 : 4. Then $\lambda=$_____

[AP EAMCET 24-08-2021_Shift-1]

1. $\frac{23}{4}$
2. $\frac{17}{4}$
3. $-\frac{28}{3}$
4. $\frac{19}{4}$

94. If the length of the tangent drawn from the point from the point from (–2, 3) to the circle $x^2+y^2+8x-6y+k=0$ is 4 units, then $k =$ _____ **[AP EAMCET 24-08-2021_Shift-1]**

1. 34
2. 36
3. 38
4. 37

95. If two diameters of a circle o circumference 10π lie along the lines $2x+3y+1=0$ and $3x-y-4=0$, then the equation of circle is_____ **[AP EAMCET 24-08-2021_Shift-1]**

1. $x^2+y^2+2x-2y-23=0$
2. $x^2+y^2-2x+2y-23=0$
3. $x^2+y^2+2x+2y-23=0$
4. $x^2+y^2-2x-2y-23=0$

96. The lengths of the tangents from the point (1, 2) to the circle $x^2+y^2+x+y-4=0$ and $3x^2+3y^2-x-y-k=0$ are in the ratio 4:3, then the value of k is

[AP EAMCET 24-08-2021_Shift-1]

1. $\frac{9}{4}$
2. $\frac{13}{4}$
3. $\frac{17}{4}$
4. $\frac{21}{4}$

97. The equation of a circle with center at $(-2,3)$ and circumference of 4π units is ____ **[AP EAMCET 24-08-2021_Shift-2]**

1. $x^2+y^2+4x-6y-9=0$
2. $x^2+y^2+4x-6y+9=0$
3. $x^2+y^2+4x-6y-3=0$
4. $x^2+y^2-4x+6y-9=0$

98. If a circle of a constant radius 6 passes through origin O and meets the coordinate axes at A and B, then find the locus of the centroid of triangle OAB.

[AP EAMCET 24-08-2021_Shift-2]

1. $x^2+y^2=4$
2. $x^2+y^2=36$
3. $x^2+y^2=16$
4. $x^2+y^2=6$

99. If the point $(\lambda,1+\lambda)$ lies inside the circle $x^2+y^2=1$, then _______

[AP EAMCET 24-08-2021_Shift-2]

1. $\lambda>0$
2. $\lambda<0$
3. $-1<\lambda<0$
4. $0<\lambda<1$

100. The perpendicular distance from the point (1, 2) to common chord of the circles $x^2+y^2-2x+4y-4=0$ and $x^2+y^2+4x-6y-3=0$ is _____ units.

[AP EAMCET 24-08-2021_Shift-2]

1. $\frac{13}{\sqrt{123}}$
2. $\frac{13}{\sqrt{136}}$
3. $\frac{13}{\sqrt{63}}$
4. $\frac{13}{\sqrt{132}}$

101. If $(6,-k)$ and $(-3,2)$ are conjugate points with resect to circle $x^2+y^2+6x+4y+12=0$ then 'k' equals _____

[AP EAMCET 25-08-2021_Shift-1]

1. $\frac{-7}{4}$
2. $\frac{7}{4}$
3. $\frac{4}{7}$
4. $-\frac{4}{7}$

102 If the parametric values of two points A, B on the circle $x^2+y^2-6x+4y-12=0$ are $30°$ and $90°$ respectively, then the equation of chord $\overline{AB}$ is _______

[AP EAMCET 25-08-2021_Shift-1]

1. $x+\sqrt{3}y=0$
2. $x-\sqrt{3}y=0$
3. $x+\sqrt{3}y-3\left(1+\sqrt{3}\right)=0$
4. $\sqrt{3}x+\sqrt{3}y+61=0$

103. The length of the chord intercepted by the circle $x^2+y^2-8x-2y-8=0$ on the line $x+y+1=0$ is ______ units.

[AP EAMCET 25-08-2021_Shift-1]

1. 14
2. 7
3. $2\sqrt{7}$
4. $\sqrt{7}$

104. The length of the chord joining points $(4\cos\theta, 4\sin\theta)$ and $[4\cos(\theta+60°), 4\sin(\theta+60°)]$ on the circle $x^2+y^2=16$ is

1. 4
2. 8
16
4. 2

105. If the lines $x+2y-5=0$ and $3x-y-1=0$ denote two diameters of a circle of radius 5 units, then the equation of the circle is _____

[AP EAMCET 25-08-2021_Shift-2]

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

106. The equation of polar of (1, 1) with respect to the circle $x^2+y^2+4x+6y-3=0$ is ____

[AP EAMCET 25-08-2021_Shift-2]

1. $2x+3y-1=0$
2. $3x+4y+8=0$
3. $4x+3y+2=0$
4. $3x+4y+2=0$

107. The equation of the circle which touches the x–axis and y–axis at the point (1,0) and (0,1) respectively is ______

[AP EAMCET 25-08-2021_Shift-2]

1. $x^2+y^2-4y+3=0$
2. $x^2+y^2-2y+2=0$
3. $x^2+y^2-2x-2y+2=0$
4. $x^2+y^2-2x-2y+1=0$

108. The equations of the tangent to the circle $5x^2+5y^2=1$ parallel to the line $3x+4y=1$ are **[AP EAMCET 25-08-2021_Shift-2]**

1. $3x+4y=\pm 2\sqrt{5}$
2. $3x+4y=\pm\sqrt{5}$
3. $6x+8y=\pm\sqrt{5}$
4. $3x+4y=\pm 3\sqrt{5}$

109. The area of a circle having the lines $3x-4y+4=0$ and $6x-8y-7=0$ as two of its tangents, is

[TS EAMCET 04-08-2021_Shift-2]

1. $\frac{9\pi}{4}$
2. $\frac{9\pi}{16}$
3. $\frac{3\pi}{4}$
4. $\frac{3\pi}{16}$

110. The polars of (-1,2) with respect to the circles $S_1 = x^2+y^2+6y+7=0$ and $S_2 = x^2+y^2+6x+1=0$ are

[TS EAMCET 04-08-2021_Shift-2]

1. Parallel
2. Coincident
3. perpendicular
4. intersecting at a non zero point

111. The internal centre of similitude of the two circles $x^2+y^2-4x-6y+12=0$, $x^2+y^2+4x-2y-4=0$

[TS EAMCET 04-08-2021_Shift-2]

1. $(4,4)$
2. $\left(4,\frac{5}{2}\right)$
3. $\left(1,\frac{5}{2}\right)$
4. $\left(2,\frac{3}{2}\right)$

112. If a circle has its centre on the line $x-y-1=0$ and passes through the points of intersection of the two circles $x^2+y^2+2x-2y-2=0$ and $x^2+y^2-2x+2y-7=0$, then the centre of that circle is **[TS EAMCET 04-08-2021_Shift-2]**

1. $\left(\frac{-1}{2},\frac{-3}{2}\right)$
2. $\left(\frac{1}{2},\frac{-1}{2}\right)$
3. $\left(\frac{1}{3},\frac{-2}{3}\right)$
4. $(-2,-3)$

113. If (a,b) is the centre of the circle passing through the vertices of the triangle formed by $x+y=6, 2x+y=4$ *and* $x+2y=5$, then (a,b) is **[TS EAMCET 04-08-2021_Shift-1]**

1. $(-17,-16)$
2. $\left(\frac{17}{2},\frac{19}{2}\right)$
3. $(17,18)$
4. $\left(\frac{-17}{2},\frac{-19}{2}\right)$

114. The locus of the mid points of the chords of the circle $x^2-2x+y^2=0$ drawn from a point (0,0) on it is

[TS EAMCET 04-08-2021_Shift-1]

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

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

[TS EAMCET 04-08-2021_Shift-1]

1. 4
2. 3
3. 1
4. 0

116. If $(2,\alpha)$ does not lie outside the circles $x^2+y^2=13$ and $x^2+y^2+x-2y=14$, then α lies in

[TS EAMCET 05-08-2021_Shift-1]

1. $(-\infty,-3)\cup(4,\infty)$
2. $[-3,4]$
3. $(-\infty,-1)\cup(3,\infty)$
4. $[-2,3]$

117. The locus of the centre of the circles passing through the origin and cutting off a chord of length 2 units on the line $x=1$ is

[TS EAMCET 05-08-2021_Shift-1]

1. a straight line
2. a circle
3. a parabola
4. an ellipse

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

[TS EAMCET 05-08-2021_Shift-1]

1. 4
2. 0
3. 2
4. 1

119. If the line $y=mx+C$ is a tangent to the circle $x^2+y^2=16$ then $m=$

[TS EAMCET 05-08-2021_Shift-2]

1. $\pm\frac{1}{4}\sqrt{C-16}$
2. $\pm\frac{1}{4}\sqrt{C^2-16}$
3. $\pm\frac{1}{C}\sqrt{C^2+16}$
4. $\pm\frac{1}{16}(C^2-16)$

120. If the points $(2,3)$ and $(K,-2)$ are conjugate with respect to the circle $x^2+y^2-2x+4y-2=0$ then $K=$

[TS EAMCET 05-08-2021_Shift-2]

1. 8
2. 6
3. 4
4. 3

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

[TS EAMCET 05-08-2021_Shift-2]

1. 0
2. 1
3. 1
4. 3

122. A point that lies on the common tangent to circles $x^2+y^2-2x+18y+78=0$ and $x^2+y^2+8x-6y-200=0$ among the following options is

[TS EAMCET 05-08-2021_Shift-2]

1. $\left(0,\frac{139}{12}\right)$
2. $\left(\frac{-137}{5},\frac{-1}{6}\right)$
3. $\left(31,\frac{-4}{3}\right)$
4. $\left(\frac{-2}{5},\frac{-47}{4}\right)$

123. The length of the common chord of the circles $x^2+y^2+2x+3y+1=0$ and $x^2+y^2+4x+3y+2=0$ is

[TS EAMCET 05-08-2021_Shift-2]

1. $\sqrt{2}$
2. $2\sqrt{2}$
3. 2
4. 4

124. If α,β are the roots of $x^2+2x-3=0$ and γ,δ are the roots of $y^2-y+4=0$, then the equation of the circle having (α,γ) and (β,δ) as ends of a diameter is

[TS EAMCET 06-08-2021_Shift-2]

1. $x^2+y^2+4x-3y+2=0$
2. $x^2+y^2+2x-y+1=0$
3. $x^2+y^2-3x+4y+1=0$
4. $x^2+y^2-2x+y-1=0$

125. If the inverse point of $(1,1)$ with respect to the circle $x^2+y^2-4x-6y+12=0$ is (h,k) then $h+k=$ **[TS EAMCET 06-08-2021_Shift-2]**

1. $\frac{22}{5}$
2. $\frac{8}{5}$
3. 2
4. $\frac{-6}{5}$

126. If $hkpq \neq 0$ and the circles

$x^2+y^2+2hx+2ky=0$

and $x^2+y^2+2px+2qy=0$ touch each other at the origin, then $hq-pk-\frac{hq}{pk}=$

[TS EAMCET 06-08-2021_Shift-2]

1. -1
2. 0
3. 1
4. 2

127. The circle $x=5\cos\theta, y=5\sin\theta$ is bounded by the rectangle formed by the lines $x\pm6=0$ & $y\pm6=0$. The area of the triangle that lies inside the rectangle which is formed by the tangent at $P\left(\frac{2\pi}{3}\right)$ to the circle with two of the above given lines is

[TS EAMCET 06-08-2021_Shift-1]

1. $x^2+y^2+4x-6y-9=0$
2. $x^2+y^2-4x+6y-4=0$
3. $48+\sqrt{3}$
4. $\frac{1}{2}\left(\frac{6\sqrt{3}-4}{\sqrt{3}}\right)^2$

128. If the two circles

$x^2+y^2-2x-6y+10-r^2=0$ &

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

Have a common chord of non-zero length, then **[TS EAMCET 06-08-2021_Shift-1]**

1. $2<r<8$
2. $0<r<2$
3. $r=2,8$
4. $8<r<13$

129. The Locus of centers of the circles, possessing the same area and having $3x-4y+4=0$ and $6x-8y+7=0$ as their common tangent, is

[AP EAMCET 04-07-2022_Shift-1]

1. $12x-16y-15=0$
2. $3x-4y+\frac{11}{2}=0$
3. $12x-16y+15=0$
4. $3x-4y-\frac{11}{2}=0$

130. For any two nonzero real numbers a and b if this line $\frac{x}{a}+\frac{y}{b}=1$ is a tangent to the circle $x^2+y^2=1$, then which of the following is true? **[AP EAMCET 04-07-2022_Shift-1]**

1. $\left(\frac{1}{a},\frac{1}{b}\right)$ lies inside the circle
2. (a,b) lies inside the circle
3. $\left(\frac{1}{a},\frac{1}{b}\right)$ lies on the circle
4. (a,b) lies on the circle

131. The length of the intercept on the line $4x-3y-10=0$ by the circle $x^2+y^2-2x+4y-20=0$ is

[AP EAMCET 04-07-2022_Shift-1]

1. 5
2. 2
3. 10
4. 6

132. The pole of the line $\frac{x}{a}+\frac{y}{b}=1$ with respect of the circle $x^2+y^2=c^2$ is

[AP EAMCET 04-07-2022_Shift-1]

1. $\left(\frac{c^2}{a},\frac{c^2}{b}\right)$
2. $\left(\frac{c^2}{b},\frac{c^2}{a}\right)$
3. $\left(\frac{c}{a},\frac{c}{b}\right)$
4. $\left(\frac{c}{b},\frac{c}{a}\right)$

133. 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 Q on the y–axis, then the length of PQ is

[AP EAMCET 04-07-2022_Shift-1]

1. 5
2. 6
3. 4
4. 3

134. For any real number the point $\left(\frac{8t}{1+t^2}, \frac{4(1-t^2)}{1+t^2}\right)$ lies on a/an

[AP EAMCET 04-07-2022_Shift-2]

1. Circle of radius 2
2. Circle of radius 4
3. Ellipse with 4 as its major axis length
4. Ellipse with 4 as its minor axis length

135. The area of the circle passing through the points $(5, \pm 2)$, $(1,2)$ is

[AP EAMCET 04-07-2022_Shift-2]

1. 8π 2. 4π
3. 2π 4. 16π

136. The ratio of the largest and shortest distances from the point (2,-7) to the circle $x^2 + y^2 - 14x - 10y - 151 = 0$

[AP EAMCET 04-07-2022_Shift-2]

1. 15:13 2. 7:1
3. 3:2 4. 14:1

137. A circle has its centre in the first quadrant and passes through (2,3). If this circle makes intercepts of length 3 and 4 respectively on x=2 and y=3, its equation is

1. $x^2 + y^2 + 3x - 5y + 8 = 0$
2. $x^2 + y^2 - 4x - 6y + 13 = 0$
3. $x^2 + y^2 - 6x - 8y + 23 = 0$
4. $x^2 + y^2 - 8x - 9y + 30 = 0$

[AP EAMCET 04-07-2022_Shift-2]

138. The radius of the circle having $3x - 4y + 4 = 0$ and $6x - 8y - 7 = 0$ as its tangents is

[AP EAMCET 05-07-2022_Shift-1]

1. $3/2$ 2. 3
3. 6 4. $3/4$

139. A circle is such that $(x-2)\cos\theta + (y-2)\sin\theta = 1$ touches it for all values of θ. Then the circle is

[AP EAMCET 05-07-2022_Shift-1]

1. $x^2 + y^2 - 4x - 4y + 7 = 0$
2. $x^2 + y^2 + 4x + 4y + 7 = 0$
3. $x^2 + y^2 - 4x - 4y - 7 = 0$
4. $x^2 + y^2 + 4x + 4y - 7 = 0$

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

[AP EAMCET 05-07-2022_Shift-1]

1. 6 2. 7
3. 4 4. 5

141. Suppose that the x–coordinates of the points A and B satisfy $x^2 + 2x - a^2 = 0$ and their y–coordinates satisfy $y^2 + 4y - b^2 = 0$. Then the equation of the circle with AB as its diameter is **[AP EAMCET 05-07-2022_Shift-1]**

1. $x^2 + y^2 + 2x + 4y - a^2 - b^2 = 0$
2. $x^2 + y^2 + 2x + 4y + a^2 + b^2 = 0$
3. $x^2 + y^2 - 2x - 4y - a^2 - b^2 = 0$
4. $x^2 + y^2 - 2x - 4y + a^2 + b^2 = 0$

142. The circle touching the y–axis at a distance 4 units from the origin and cutting off an intercept 6 from x–axis is

[AP EAMCET 05-07-2022_Shift-2]

1. $x^2 + y^2 \pm 10x - 8y + 16 = 0$
2. $x^2 + y^2 \pm 5x - 8y + 16 = 0$
3. $x^2 + y^2 \pm 5x - 2y - 8 = 0$
4. $x^2 + y^2 \pm 2x - y - 12 = 0$

143. The set of all points that are at a distance of at least 2 units from (–3, 0) is

[AP EAMCET 05-07-2022_Shift-2]

1. $\{(x, y) \mid x^2 + y^2 + 6x - 7 > 0\}$
2. $\{(x, y) \mid x^2 + y^2 + 6x + 5 \geq 0\}$
3. $\{(x, y) \mid x^2 + y^2 + 6x + 5 < 0\}$
4. $\{(x, y) \mid x^2 + y^2 + 6x + 7 \leq 0\}$

144. The circle touching the coordinate axes with its centre lying on $x-2y-3=0$ is

[AP EAMCET 05-07-2022_Shift-2]

1. $x^2+y^2-2x+2y+1=0$
2. $x^2+y^2+2x-2y+1=0$
3. $x^2+y^2+6x+6y-9=0$
4. $x^2+y^2-6x-6y+9=0$

145. Suppose a circle passes through (0, a) and (b, h) having its centre at (c, 0). Then the value of c is **[AP EAMCET 05-07-2022_Shift-2]**

1. $\frac{b^2-a^2+h^2}{2b}$
2. $\frac{b^2+a^2-h^2}{2b}$
3. $\frac{b^2-a^2+h^2}{2a}$
4. $\frac{b^2+a^2-h^2}{2a}$

146. For a circle of diameter R, touching $x^2+y^2-4y=0$ and passing through (4, 5), Which of the following is correct?

[AP EAMCET 05-07-2022_Shift-2]

1. $3\le R\le 7$
2. $0<R<3$
3. $R>7$
4. $\frac{3}{2}\le R\le\frac{7}{2}$

147. The centre of the circle that passes through the point (0, 1) and touches the curve $y=x^2$ *at* $(2,4)$ is

[AP EAMCET 06-07-2022_Shift-1]

1. $\left(\frac{-16}{5},\frac{27}{10}\right)$
2. $\left(\frac{-16}{7},\frac{53}{10}\right)$
3. $\left(\frac{-16}{5},\frac{53}{10}\right)$
4. $\left(\frac{-16}{5},\frac{-53}{10}\right)$

148. The slope of the normal to the circle $x^2+y^2+2gx+2fy+c=0$ at (x_1,y_1) is

[AP EAMCET 06-07-2022_Shift-1]

1. $-\left(\frac{x_1+g}{y_1+f}\right)$
2. $-\left(\frac{y_1+f}{x_1+g}\right)$
3. $\frac{x_1+g}{y_1+f}$
4. $\frac{y_1+f}{x_1+g}$

149. The circle possessing y–axis as its tangent at (0, 2) and passing through $(-1,0)$, also passes through **[AP EAMCET 06-07-2022_Shift-1]**

1. $\left(\frac{-3}{2},0\right)$
2. $\left(\frac{-5}{2},2\right)$
3. $\left(\frac{-3}{2},\frac{5}{2}\right)$
4. $(-4,0)$

150. Suppose the tangents drawn to the circle $x^2+y^2-6x-4y-11=0$ from P(1, 8) touch the circle at A and B. Then the centre of the circle passing through P, A and B is

[AP EAMCET 06-07-2022_Shift-1]

1. (2, 5)
2. (−2, −5)
3. (−2, 5)
4. (2, −5)

151. If the circle $x^2+y^2+2\alpha x+c=0$ lies completely inside the circle $x^2+y^2+2\beta x+c=0$, then which of the following holds?

[AP EAMCET 06-07-2022_Shift-2]

1. $\alpha\beta<0$
2. $C<0$
3. $C=0$
4. $\alpha\beta>0$

152. If the line 3x-4y=1 touches the circle $(x-1)^2+(y+2)^2=4$ at (α,β), the values of α and β are

[AP EAMCET 06-07-2022_Shift-2]

1. $\alpha=\frac{1}{5},\beta=\frac{-1}{10}$
2. $\alpha=\frac{-1}{5},\beta=\frac{-2}{5}$
3. $\alpha=\frac{-2}{5},\beta=\frac{-11}{20}$
4. $\alpha=\frac{2}{5},\beta=\frac{1}{20}$

153. The equation of a tangent to the circle $x^2+y^2=1$, which is perpendicular to the line y=mx+1, is

[AP EAMCET 06-07-2022_Shift-2]

1. $x+my-\sqrt{1+m^2}=0$
2. $mx+y-\sqrt{1+m^2}=0$
3. $x+my+\sqrt{1+m^2}=0$
4. $mx+y+\sqrt{1+m^2}=0$

154. If the equation $ax^2+by^2+2hxy+2gx+2fy+c=0$ represents a circle passing through the origin, then **[AP EAMCET 06-07-2022_Shift-2]**

1. a=b,c=0
2. $|a|=|b|, h=0=c$
3. a=b,h=c=0
4. a=b,h=0

155. Suppose d_1 and d_2 are respectively the lengths of intercepts of the circle $x^2+y^2=4$ and $x^2+y^2-10x-14y+65=0$ on the line $2x-2y-3=0$. Then which of the following is true?

[AP EAMCET 07-07-2022_Shift-1]

1. $d_1=2d_2$
2. $d_2=2d_1$
3. $d_1=3d_2$
4. $d_1=d_2$

156. If the point $(2,\lambda)$ lies inside the circles $x^2+y^2=13$ and $x^2+y^2+x-2y=14$, λ lies in the set **[AP EAMCET 07-07-2022_Shift-1]**

1. $(-\infty,-3)\cup(4,\infty)$
2. $(-\infty,-1)\cup(3,\infty)$
3. $[-3,4]$
4. $(-2,3)$

157. For different real non zero numbers x_1, x_2, x_3 and x_4 suppose the points $\left(x_1,\frac{1}{x_1}\right),\left(x_2,\frac{1}{x_2}\right),\left(x_3,\frac{1}{x_3}\right)$ and $\left(x_4,\frac{1}{x_4}\right)$ lie on the boundary of a circle of radius 4. Then the value of $x_1x_2x_3x_4$

[AP EAMCET 07-07-2022_Shift-1]

1. 1
2. 2
3. 4
4. $\frac{1}{4}$

158. The equation of the tangent to the circle $x^2+y^2-9=0$, making an angle 60^0 with the x-axis is **[AP EAMCET 07-07-2022_Shift-1]**

1. $\frac{1}{\sqrt{3}}x-y\pm6=0$
2. $\sqrt{3}x-y\pm6=0$
3. $\sqrt{3}x+y\pm6=0$
4. $\frac{1}{\sqrt{3}}x+y\pm6=0$

159. The straight line touching the circle $x^2+y^2-2x-3=0$ and remaining normal to the circle $x^2+y^2-4y-6=0$ is

[AP EAMCET 07-07-2022_Shift-2]

1. $4x-3y+6=0$
2. $y+2=0$
3. $4x+3y-6=0$
4. $2x+3=0$

160. The ratio of the areas of the greatest and the smallest circles touching $(x\pm1)^2+(y\pm1)^2=1$ is

[AP EAMCET 07-07-2022_Shift-2]

1. $\frac{\sqrt{3}+1}{\sqrt{3}-1}$
2. $\frac{3+\sqrt{2}}{3-\sqrt{2}}$
3. $\frac{3+2\sqrt{2}}{3-2\sqrt{2}}$
4. 4

161. The equation of circle with centre (2,-3) and touching x-axis is

[AP EAMCET 07-07-2022_Shift-2]

1. $x^2+y^2-4x-6y+4=0$
2. $x^2+y^2-4x-6y-8=0$
3. $x^2+y^2-4x+6y+4=0$
4. $x^2+y^2+4x-6y+8=0$

162. In a square ABCD of side length a, suppose AB and AD are along the coordinate axes. Then the circle that circumscribes the square is

[AP EAMCET 07-07-2022_Shift-2]

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

163. If a point $P(\alpha,\beta)$ on the line y = 1 is such that the two distinct chords drawn on $x^2+y^2-\alpha x-y=0$ from P are bisected by the x-axis, then

[AP EAMCET 08-07-2022_Shift-1]

1. $\alpha^2<8$
2. $\alpha=2\sqrt{2}$
3. $\alpha^2>8$
4. $\alpha=-2\sqrt{2}$

164. The ratio of the areas of the concentric circles $x^2 + y^2 - 6x + 12y + 15 = 0$ and $x^2 + y^2 - 6x + 12y - 15 = 0$ is

[AP EAMCET 08-07-2022_Shift-1]

1. $1:\sqrt{2}$
2. $1:\sqrt{3}$
3. $1:2$
4. $1:4$

165. For any real number $\lambda \neq 1$, the centre of the circle that passes through $A(1,\lambda)$, $B(\lambda,1)$ and $C(\lambda,\lambda)$ is **[AP EAMCET 08-07-2022_Shift-1]**

1. $\left(\frac{1+\lambda}{2},\frac{1+\lambda}{2}\right)$
2. $\left(\frac{1+2\lambda}{3},\frac{1+2\lambda}{3}\right)$
3. $(1+2\lambda, 1+2\lambda)$
4. $\left(\frac{\lambda}{2},\frac{\lambda}{2}\right)$

166. The shortest distance from the line $3x + 4y = 25$ to the circle $x^2 + y^2 - 6x + 8y = 0$ is

[AP EAMCET 08-07-2022_Shift-1]

1. $\frac{9}{5}$
2. $\frac{7}{5}$
3. $\frac{8}{5}$
4. $\frac{13}{5}$

167. If a circle of radius 3 passes through the point (7,3) and has its centre on the line x-y-1=0, then its equation among the following is

[AP EAMCET 08-07-2022_Shift-2]

1. $x^2 + y^2 + 14x - 12y + 76 = 0$
2. $x^2 + y^2 + 14x - 12y - 76 = 0$
3. $x^2 + y^2 + 8x - 6y + 16 = 0$
4. $x^2 + y^2 - 14x - 12y + 76 = 0$

168. If the segments of the straight lines $x + y = 6$ *and* $x + 2y = 4$ are two diameters of a circle passing through (6,2), then the equation of that circle is

[AP EAMCET 08-07-2022_Shift-2]

1. $x^2 + y^2 - 2x - 4y - 20 = 0$
2. $x^2 + y^2 + 6x - 4y - 68 = 0$
3. $x^2 + y^2 - 16x + 4y + 48 = 0$
4. $x^2 + y^2 + 2x - 10y - 32 = 0$

169. The circle $x^2 + y^2 - 4x - 8y + 16 = 0$ rolls up along the tangent drawn to it at $(2+\sqrt{3},3)$ by 2 units. The equation of the circle in the new position is **[AP EAMCET 08-07-2022_Shift-2]**

1. $x^2 + y^2 - 6x - 2(4+\sqrt{3})y + (24+8\sqrt{3}) = 0$
2. $x^2 + y^2 - 6x + 2(4+\sqrt{3})y + (24+8\sqrt{3}) = 0$
3. $x^2 + y^2 + 6x - 2(4+\sqrt{3})y + (24+8\sqrt{3}) = 0$
4. $x^2 + y^2 + 6x + 2(4+\sqrt{3})y + (24+8\sqrt{3}) = 0$

170. Suppose the angle between the tangents drawn from (0,0) to the circle $(x+\lambda)^2 + (y+1)^2 = \lambda^2$ *is* $\frac{\pi}{2}$. Then λ satisfies

[AP EAMCET 08-07-2022_Shift-2]

1. $\lambda^2 = 1$
2. $\lambda = 0$
3. $\lambda^2 = 4$
4. $\lambda^2 = 9$

171. A circle passes through the points (1, 2), (3,4). If its centre lies on the line $x - y + 3 = 0$, then its radius is equal to

[TS EAMCET 18-07-2022_Shift-1]

1. 4
2. 3
3. 1
4. 2

172. A line drawn through the point A(5, 7) cuts the circle $x^2 + y^2 - 36 = 0$ at the points P and Q. Then, AP.AQ =

[TS EAMCET 18-07-2022_Shift-1]

1. 110
2. 60
3. 38
4. 12

173. Let P be any point on the circle $x^2 + y^2 - 2x - 1 = 0$ and C be its centre. Let AB be the chord of contact of P with respect to the circle $x^2 + y^2 - 2x = 0$. Then the locus of the circumcentre of the triangle CAB is

[TS EAMCET 18-07-2022_Shift-1]

1. $2x^2 + 2y^2 - 4x + 1 = 0$
2. $x^2 + y^2 - 4x + 2 = 0$
3. $x^2 + y^2 - 4x + 1 = 0$
4. $2x^2 + 2y^2 - 4x + 3 = 0$

174. If a circle C passing through (4,0) touches the circle $x^2+y^2+4x-6y-12=0$ externally at the point (1, -1), then the radius of C is

[TS EAMCET 18-07-2022_Shift-1]

1. $\sqrt{12}$
2. 4
3. $\sqrt{3}$
4. 5

175. If the circles $C_1: x^2+y^2+2x+4y-20=0$, $C_2: x^2+y^2+6x-8y+9=0$ have n common tangents and the length of the tangent drawn from the centre of similitude to the circle C_2 is l then $\frac{l}{n^2}=$

[TS EAMCET 18-07-2022_Shift-1]

1. $4\sqrt{39}$
2. $\sqrt{39}$
3. $\frac{\sqrt{39}}{4}$
4. $2\sqrt{39}$

176. From a point A(0, 3) on the circle $(x+2)^2+(y-3)^2=4$ a chord AB is drawn and it is extended to a point Q such that AQ = 2AB. Then the locus of Q is **[TS EAMCET 18-07-2022_Shift-2]**

1. $(x+4)^2+(y-3)^2=16$
2. $(x+1)^2+(y-3)^2=32$
3. $(x+1)^2+(y-3)^2=4$
4. $(x+1)^2+(y-3)^2=1$

177. If m_1, m_2 are the slopes of the tangents drawn from a point (1, -3) to the circle $x^2+y^2-6x+4y+12=0$ then $9(m_1^2+m_2^2)=$

[TS EAMCET 18-07-2022_Shift-2]

1. 16
2. 25
3. 4
4. 1

178. If A, B are the points of contact of the tangents drawn from the point P (-2, -3) to the circle $x^2+y^2-8x-10y+5=0$ and the chord AB subtends an angle θ at P then $\tan\theta=$

[TS EAMCET 18-07-2022_Shift-2]

1. $\frac{3}{4}$
2. $\frac{24}{7}$
3. $\frac{7}{24}$
4. $\frac{4}{3}$

179. The equation of the transverse common tangent of the circles $x^2+y^2-6x-8y+9=0$ and $x^2+y^2+2x-2y+1=0$

[TS EAMCET 18-07-2022_Shift-2]

1. $4x+3y-4=0$
2. $3x+y-1=0$
3. $2x-y+2=0$
4. $x+2y-3=0$

180. If θ is the angle between the circles $x^2+y^2-2x-4y-4=0$ and $x^2+y^2-8x-12y+43=0$ then $|7\sec\theta-18\cos\theta|=$

[TS EAMCET 18-07-2022_Shift-2]

1. 11
2. 9
3. 0
4. 1

181. The equation of the incircle of the triangle formed by the lines $x=0, y=0$ and $3x+4y-24=0$ is **[TS EAMCET 19-07-2022_Shift-I]**

1. $x^2+y^2-24x-24y+144=0$
2. $x^2+y^2-6x-6y+9=0$
3. $x^2+y^2-4x-4y+4=0$
4. $x^2+y^2-8x-8y+16=0$

182. If two tangents are drawn from the point $P\left(\frac{\pi}{4}\right)$ on the circle $x^2+y^2=4$ to the circle $x^2+y^2=1$ then the slopes of the tangents are

[TS EAMCET 19-07-2022_Shift-I]

1. $2\pm\sqrt{2}$
2. $1\pm\sqrt{2}$
3. $2\pm\sqrt{3}$
4. $1\pm\sqrt{3}$

183. If $5x+6y-34=0$ and $2x+y+c=0$ are conjugate lines with respect to the circle $x^2+y^2-8x-10y+25=0$ then the point on the line $2x+y+c=0$ is

[TS EAMCET 19-07-2022_Shift-I]

1. (3, 3)
2. (2, 4)
3. (1, -5)
4. (-2, -2)

184. If C_1 and C_2 are the centres of similitude with respect to the circles $x^2+y^2+6x+8y+24=0$ and $x^2+y^2-6x-8y+9=0$ then $C_1C_2=$

[TS EAMCET 19-07-2022_Shift-I]

1. 10
2. 5
3. $\frac{16}{3}$
4. $\frac{19}{3}$

185. The radius of the circle passing through the points (–1,1), (2,–1) and (1,0) is

[TS EAMCET 19-07-2022_Shift-2]

1. 5
2. $\frac{\sqrt{130}}{2}$
3. 6
4. $\frac{\sqrt{145}}{2}$

186. If A=(0,–2) and B is any point on the circle $x^2+y^2-2x-2y+1=0$, then the maximum value of $\left(\overline{AB}\right)^2$ is

[TS EAMCET 19-07-2022_Shift-2]

1. 51
2. $11+2\sqrt{10}$
3. $9+3\sqrt{5}$
4. $\frac{5+2\sqrt{3}}{2}$

187. If (α,β) is the pole of the line 3x–5y+6=0 with respect to the circle $x^2+y^2-10x+14y+46=0$ then $\alpha+\beta=$

[TS EAMCET 19-07-2022_Shift-2]

1. –1
2. 8
3. 3
4. –4

188. O(0,0) and A(1,0) are centres of two unit circles C_1 and C_2 respectively. C_3 is also a unit circle having its centre above X–axis and passing through O and A. The equation of the common tangent to C_1 and C_3 which does not intersect the circle C_2 is

[TS EAMCET 19-07-2022_Shift-2]

1. $\sqrt{3}x-y+2=0$
2. $x+\sqrt{3}y+2=0$
3. $\sqrt{3}x-y-2=0$
4. $x+\sqrt{3}y-2=0$

189. If the circles $x^2+y^2-16x-20y+164=r^2 (r>0)$ and $x^2+y^2-8x-14y+29=0$ intersect in two distinct points, then the maximum possible integral value of r is

[TS EAMCET 19-07-2022_Shift-2]

1. 1
2. 10
3. –2
4. 2

190. Let the centre of the circle S=0 lie on the line x+y–5=0 and also lie in the first quadrant. If this circle touches both the lines x–2=0 and y–5=0, then the area of the circle is

[TS EAMCET 20-07-2022_Shift-1]

1. π sq. units
2. 2π sq.units
3. 4π sq.units
4. $\frac{1}{4}\pi$ sq.units

191. The straight line x+2y=1 cuts the X–axis at A and Y–axis at B. A circle is drawn through A, B and the origin. The sum of the perpendicular distances from A,B on to the tangent drawn at origin to the circle S is

[TS EAMCET 20-07-2022_Shift-1]

1. equal to the radius of the circle S
2. equal to the diameter of the circle S
3. equal to twice the diameter of the circle S
4. equal to $\sqrt{5}$ times the radius of the circle S

192. Let P and Q be two external points of the circle $S=x^2+y^2-a^2=0$. Let the chord of contact of the point P with respect to the circle S=0 pass through Q. If l_1 and l_2 are the lengths of the tangents drawn from P and Q to the circle S=0, then PQ=

[TS EAMCET 20-07-2022_Shift-1]

1. $\sqrt{l_1+l_2}$
2. $\frac{l_1+l_2}{2}$
3. $\sqrt{l_1^2+l_2^2}$
4. $\sqrt{l_1^2-2l_1+l_2^2-2l_2}$

193. $A(x_1,y_1)$ is the internal centre of similitude and $B(x_2,y_2)$ is the external centre of similitude of two circles C_1 and C_2 whose centres are $P(\alpha,\beta)$ *and* $Q(\gamma,\delta)$ respectively. If PA=3, AB=5 , QB=2 , then ratio of the radii of the two circles is

[TS EAMCET 20-07-2022_Shift-1]

1. 2:3
2. 3:2
3. 1:1
4. 5:2

194. The equation of the direct common tangent of the circles $x^2+y^2-6x-4y-23=0$ and $x^2+y^2+2x+2y+1=0$ is

[TS EAMCET 20-07-2022_Shift-1]

1. $6x-4y+1=0$
2. $3x-4y+6=0$
3. $4x+3y+12=0$
4. $2x-4y+3=0$

195. The line $x+2y-c=0$ meets the curve $x^2+y^2-3x-6y+3=0$ at two points P and Q and $\angle POQ=\frac{\pi}{2}$, where O is the origin. Then, $2c^2-15c=$

[TS EAMCET 20-07-2022_Shift-2]

1. 15
2. –15
3. 2
4. –2

196. The line $4x+3y-4=0$ divides the circumference of a circle in the ratio 1 : 2. If C(5, 3) is the centre of that circle, then equation of the circle is **[TS EAMCET 20-07-2022_Shift-2]**

1. $(x-5)^2+(y-3)^2=10^2$
2. $(x-5)^2+(y-3)^2=12^2$
3. $(x-5)^2+(y-3)^2=7^2$
4. $(x-5)^2+(y-3)^2=8^2$

197. Two sides of a square are along the lines $x=-5$ and $y=4$. The point of intersection of the diagonals is (3,–4).The point of intersection of the tangents drawn to the circumcircle of the square at the two consecutive vertices lying on $x=-5$ is

[TS EAMCET 20-07-2022_Shift-2]

1. (–4, –4)
2. (–13, –4)
3. (–4, –13)
4. (–4, –10)

198. If L_1, L_2 and L_3 are the chords of contact of the three points (2, 0), (1, –2) and (4, 4) respectively with respect to the circle $x^2+y^2=3$, then L_1, L_2, L_3 are

[TS EAMCET 20-07-2022_Shift-2]

1. Concurrent lines
2. Sides of a right-angled triangle
3. Sides of an equilateral triangle
4. Parallel lines

199. The combined equation of the direct common tangents of the circles $x^2+y^2+2x=0$ and $x^2+y^2-2y-3=0$ is

[TS EAMCET 20-07-2022_Shift-2]

1. $xy+x+2y+2=0$
2. $x^2-xy-2y^2+3x-6y=0$
3. $2x^2+5xy+2y^2+13x+14y+20=0$
4. $2x^2-9xy+9y^2+3x-6y+1=0$

200. Suppose two tangents PA and PB are drawn to the circle centered at C(1, 2) from the point P(16, 7). If the area of the quadrilateral PACB is 75 square units, then the radius of the circle is **[AP EAMCET 06-07-2022_Shift-1]**

1. 5
2. 25
3. 225
4. $\sqrt{5}$

201. If the coordinates of point of contact of the circles $x^2+y^2-4x+8y+4=0$ and $x^2+y^2+2x=0$ is (a,b), then $a+2b=$

[15th May 2023 Shift 1]

1. -1
2. -2
3. 0
4. 1

202. If the chord of contact of the point P(h, k) with respect to the circle $x^2+y^2-4x-4y+8=0$ meets the circle in two distinct points and it also makes an angle 45° with the positive X-axis in the positive direction, then (h, k) cannot be

[15th May 2023 Shift 1]

1. $\left(\frac{5}{2},\frac{3}{2}\right)$.
2. $\left(\frac{5}{3},\frac{7}{3}\right)$
3. $(3,1)$
4. $(2,2)$

203. The equation of the pair of tangents drawn from the point (1, 1) to the circle $x^2+y^2+2x+2y+1=0$ is

[15th May 2023 Shift 1]

1. $3x^2-8xy+3y^2-2x-2y+6=0$
2. $11x^2-8xy+11y^2-4x-4y-6=0$
3. $3x^2-8xy+3y^2+2x+2y-2=0$
4. $x^2-4xy+y^2+x+y=0$

204. The distance between the centres of similitude of the circles $x^2+y^2+6x-8y+16=0$ and $x^2+y^2-2x-2y+1=0$ is

[15th May 2023 Shift 2]

1. $\frac{15}{4}$
2. $\frac{5}{4}$
3. $\frac{5}{2}$
4. $\frac{15}{2}$

205. Let P and Q be the inverse points with respect to the circle $S\equiv x^2+y^2-4x-6y+k=0$ and C be the Centre of the circle S=0 such that CP.CQ=4. If $P=(1,2)$ and $Q=(\text{a},\text{b})$, *then* $2a=$

[15th May 2023 Shift 2]

1. b
2. –1
3. 3b
4. 0

206. Let A(2,3), B(3,–1) and C(–3,2) be three points. If the centre of the circle passing through A,B and C is (h, k), then $2k-4h=$

[15th May 2023 Shift 2]

1. 0
2. 2
3. –1
4. 1

207. If $P\left(\frac{\pi}{3}\right)$ *and* $Q\left(\frac{2\pi}{3}\right)$ represent two points on the circle $x^2+y^2-4x+6y-12=0$ in parametric form , then the length of the chord PQ is **[15th May 2023 Shift 2]**

1. $4\sqrt{3}$
2. 5
3. $5\sqrt{2}$
4. 13

208. If the circles

$x^2+y^2-2x+4y+c=0$ *and*

$x^2+y^2+2x-4y+c=0$

Have four common tangents , then

[16th May 2023 Shift 1]

1. $c<0$
2. $-2<c<2$
3. $0<c<5$
4. $c>0$

209.The locus of the poles of the tangents to the circle $x^2+y^2-2x+2y-2=0$ with respect to the circle $x^2+y^2=4,$ is

[16th May 2023 Shift 1]

1. $3x^2+2xy+3y^2+8x-8y-16=0$
2. $x^2-2xy+y^2+4x+4y+8=0$
3. $3x^2+2xy+3y^2+4x+4y+16=0$
4. $x^2+y^2-4x+4y-8=0$

[16th May 2023 Shift 1]

210.Let the circle S which is concentric with the circle $x^2+y^2-2x+ky+4=0$ pass through the point (3,-2). If one of the diameters of S lies along the line $3x-2y+4=0,$ then the radius of the circle S is **[16th May 2023 Shift 1]**

1. $\frac{\sqrt{149}}{2}$
2. $\sqrt{31}$
3. $\sqrt{38}$
4. $\frac{1}{2}\sqrt{137}$

211.If the length of the chord 2x+3y+k = 0 of the circle $x^2+y^2-6x-8y+9=0$ is $2\sqrt{3}$, then one of the values of k is

[16th May 2023 Shift 1]

1. 31
2. 5
3. –5
4. –13

212.If Q is the inverse point of the point P(2,3) with respect to the circle $x^2+y^2-2x-2y+1=0,$ then the circle with PQ as diameter is

[16th May 2023 Shift 1]

1. $3x^2+3y^2-14x-16y+37=0$
2. $x^2+y^2-4x-6y+13=0$
3. $5x^2+5y^2-16x-22y+33=0$
4. $2x^2+2y^2-3x-3y-11=0$

213.The lengths of the intercepts made by a circle S on X and Y–axes are $\frac{2\sqrt{13}}{3}$ and $\frac{2\sqrt{22}}{3}$ respectively. If the radius of the circle S is $\frac{\sqrt{38}}{3}$ and its centre C lies in the second quadrant, then C =

[16th May 2023 Shift 2]

1. $\left(\frac{-5}{3},\frac{4}{3}\right)$
2. $\left(\frac{-4}{3},\frac{5}{3}\right)$
3. $\left(\frac{-6}{5},\frac{7}{5}\right)$
4. $\left(\frac{-7}{5},\frac{6}{5}\right)$

214. If the mid point of the chord intercepted by the circle $x^2+y^2-8xy+10y+5=0$ on the line $2x+y+2=0$ is (h,k) then k+4h=

[16th May 2023 Shift 2]

1. 2
2. 0
3. 1
4. –1

215.If a circle S passing through the points A(1,2) and B(2,1) has its centre C located in the third quadrant at a distance of $\frac{7}{\sqrt{2}}$ units from AB, then the point P(1,–2) **[16th May 2023 Shift 2]**

1. Lies inside the circle S
2. Lies outside the circle S
3. Lies on the circle S
4. Lies on the line AB

216. The equation of a tangent to the circle $x^2+y^2+2x-12y-132=0$ which is perpendicular to the line $12x+5y+k=0$ is

[16th May 2023 Shift 2]

1. $5x-12y+92=0$ 2. $5x-12y-246=0$
3. $5x-12y-169=0$ 4. $5x-12y+246=0$

217. A circle S touches Y-axis at (0, 3) and makes an intercept of length 8 units on X-axis. If the centre C of the circle S lies in the second quadrant ,then the distance of C from the point (-2, -1)is

[17th May 2023 Shift 1]

1. 13 2. 10
3. 5 4. $\sqrt{2}$

218. If the equation of the circle of radius 3 units which touches the circle $x^2+y^2+6x-8y-11=0$ externally at $(3,0)$ is $x^2+y^2+2gx+2fy+c=0$, then $3g-4f+c=$ **[17th May 2023 Shift 1]**

1. 0 2. 5
3. 1 4. -1

219. Tangent $L_1 \equiv 3x-4y-8=0$ and the chord $L_2 \equiv x+y-1=0$ are at a distance of 2 and $\sqrt{2}$ units respectively from the centre of a circle S. (h,k) is the centre of S such that $h^2+k^2=13$. If the midpoint of the chord $L_2=0 \, is\, (\alpha,\beta)$ and the radius of the circle is r, then $\alpha+\beta+r=$

[17th May 2023 Shift 1]

1. 4 2. -1
3. 7 4. 3

220. The polar of a point with respect to the circle $x^2+y^2-10x+12y-3=0$ which is not a tangent and not a chord of contact is **[17th May 2023 Shift 1]**

1. $2x+3y+8=0$ 2. $3x+4y+5=0$
3. $5x-12y+7=0$ 4. $6x-8y+15=0$

221. Let the locus of the point of intersection of the perpendicular tangents drawn to the circle $x^2+y^2+6x-4y-12=0$ be the circle S. Then the equation of the tangent drawn to S which is perpendicular to the line 6x–4y+k=0 is **[17th May 2023 Shift 2]**

1. $4x+6y\pm\sqrt{26}=0$ 2. $2x+3y\pm\sqrt{26}=0$
3. $2x+3y\pm5\sqrt{26}=0$ 4. $4x+6y\pm5\sqrt{26}=0$

222. The distance of the origin from the external centre of similitude for the circles $x^2+y^2-8x-10y-8=0$ and $x^2+y^2+2x-2y-2=0$

[17th May 2023 Shift 2]

1. $\frac{3\sqrt{26}}{5}$ 2. $\frac{\sqrt{290}}{9}$
3. $\frac{\sqrt{290}}{5}$ 4. $\frac{\sqrt{26}}{3}$

223. Let the equation $ax^2+2hxy+by^2+2gx+2fy+c=0$ represent a point circle other than the origin. Then which one of the following conditions must hold? **[17th May 2023 Shift 2]**

1. b c > 0 2. b > 0 and c > 0
3. b < 0 and c > 0 4. b ≤0 and c < 0

224. The point of intersection of the tangents drawn at the points where the line 2x–y+3=0 meets the circle $x^2+y^2-4x-6y+4=0$ is

[17th May 2023 Shift 2]

1. $\left(-8,\frac{15}{2}\right)$ 2. $\left(\frac{-5}{2},\frac{21}{4}\right)$
3. $\left(\frac{5}{2},\frac{-21}{4}\right)$ 4. $\left(8,\frac{-15}{2}\right)$

225. If $S \equiv 2x^2+2y^2-8x+8y-7=0$ is the circle passing through the points of intersection of the circles $x^2+y^2+kx-ky+1=0$ and $x^2+y^2-kx+ky-2=0$, then the length of the tangent drawn from the point (k, k) to the circles is [**17th May 2023 Shift 2**]

1. $\sqrt{\frac{29}{2}}$ 2. 3
3. $\sqrt{\frac{23}{2}}$ 4. $\sqrt{23}$

226. The line 3x+y-5=0 touches a circle S at (1, 2). If (h, k) is the centre of the circle S such that $h^2+hk+k^2=37$ and the radius of the circle S is $\sqrt{10}$, then k= [**18^{th} May2023 shift -1**]

1. 4 2. 3
3. 2 4. 1

227. If x+y-1=0 and 2x-y+1=0 are conjugate lines with respect to a circle $x^2+y^2-4x+2fy-1=0$, then f= [**18^{th} May2023 shift -1**]

1. -1 or 3 2. 1 or 2
3. -2 or 0 4. -1 or 2

228. The product of the slopes of the common tangents drawn to the circles $x^2+y^2+2x-2y-2=0$ and $x^2+y^2-2x+2y+1=0$ which passes through the point (3,-3) [**18^{th} May2023 shift -1**]

1. -1 2. 3
3. $\frac{-8}{3}$ 4. 1

229. The length of the chord of contact of the point (2, 1) with respect to the circle $x^2+y^2+4x+2y+1=0$ [**18^{th} May2023 shift -1**]

1. $\frac{8}{\sqrt{5}}$ 2. $\frac{4}{\sqrt{5}}$
3. $\frac{4\sqrt{6}}{\sqrt{5}}$ 4. $\frac{2\sqrt{6}}{\sqrt{5}}$

230. Let S=0 be the circle passing through the points (2,0),(1,-2),(-1,1). Then the point (1,2) [**18th May 2023 Shift 2**]

1. Lies inside the circle S=0
2. Lies outside the circle S=0
3. Lies on the circle S =0
4. is the centre of the circle S = 0

231. If the acute angle between the pair of tangents drawn from the origin to the circle $x^2+y^2-4x-8y+4=0$ is α, then tan α = [**18th May 2023 Shift 2**]

1. 3/5 2. 3/4
3. 4/3 4. 4/5

232. Let C be the centre and A be one end of a diameter of the circle $x^2+y^2-2x-4y-20=0$. If P is point on AC such that A divides CP in the ratio 2:3, then the locus of P is [**18th May 2023 Shift 2**]

1. $x^2+y^2-2x-4y-205=0$
2. $2x^2+2y^2-4x-8y-405=0$
3. $x^2+y^2-2x-4y-450=0$
4. $4x^2+4y^2-8x-16y-605=0$

233. If the chord of contact of the point P(1, 1) with respect to the circle $S=x^2+y^2+4x+6y-3=0$ meet the circle S=0 at A and B, then the area of ΔPAB is [**18th May 2023 Shift 2**]

1. $\frac{216}{25}$ 2. $\frac{108}{25}$
3. $\frac{27}{25}$ 4. $\frac{54}{5}$

234. Let $M\left(\frac{-7}{2},\frac{-5}{2}\right)$ be the midpoint of the chord AB of the circle $x^2+y^2+10x+8y-23=0$. if $ax+by+1=0$ is the equation of AB, then $3a+3b=$ [**19th May 2023 Shift 1**]

1. 6 2. 1
3. 36 4. -1

235. If the inverse point of the point (3, 2) with respect to the circle $x^2+y^2-2x+4y-4=0$ is (ℓ,m) then $2\ell+19m=$

[19th May 2023 Shift 1]

1. 3
2. 1
3. 0
4. -1

236. Let S be a circle concentric with the circle $3x^2+3y^2+x+y-1=0$. If the length of the tangent drawn from a point (2, -2) to the given circle is the radius of the circle S, then the power of the point (2, 1) with respect to circle S is **[19th May 2023 Shift 1]**

1. $\frac{-137}{18}$
2. $\frac{1}{18}$
3. $\frac{-29}{18}$
4. $\frac{23}{18}$

237. If P (2,3) and Q(-1,2) are conjugate with respect to the circle $x^2+y^2+2gx+3y-2=0$, Then the radius of the circle is

[19th May 2023 Shift 1]

1. $\frac{19}{6}$
2. $\frac{3\sqrt{21}}{\sqrt{2}}$
3. $\frac{3\sqrt{3}}{\sqrt{2}}$
4. $\frac{35}{2}$

238. If a diameter of the circle $x^2+y^2-4x+6y-12=0$ is a chord of a circle S whose centre is at $(-3,2)$, then the radius of S is

[12TH MAY 2023 SHIFT-1]

1. $5\sqrt{3}$
2. $4\sqrt{3}$
3. $2\sqrt{3}$
4. 5

239. If a circle passing through $A(1,1)$ touches the X-axis, then the locus of the other end of the diameter through A is

[12TH MAY 2023 SHIFT-1]

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

240. If $C(\alpha,\beta)$ $(\alpha<0)$ is the centre of the circle that touches the Y-axis at $(0,3)$ and makes an intercept of length 2 units on positive X-axis, then $(\alpha,\beta)=$ **[12TH MAY 2023 SHIFT-1]**

1. $(-3,\sqrt{10})$
2. $(-3,-\sqrt{10})$
3. $(-\sqrt{10},3)$
4. $(-\sqrt{10},-3)$

241. The equations of the tangents to the circle $x^2+y^2=4$ drawn from the point $(4,0)$ are

[12TH MAY 2023 SHIFT-1]

1. $\sqrt{3}y=\pm(x-4)$
2. $\sqrt{3}y=\pm2(x-4)$
3. $\sqrt{3}x=\pm(y-4)$
4. $\sqrt{3}x=\pm2(y-4)$

242. The image of every point lying on the curve $x^2+y^2=1$ in the line $x+y=1$ satisfies the equation **[12TH MAY 2023 SHIFT-1]**

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

243. If the inverse of $P(-3,5)$ with respect to a circle is $(1,3)$, then polar of P with respect to that circle is **[12TH MAY 2023 SHIFT-1]**

1. $x+2y=7$
2. $2x-2y+4=0$
3. $2x-y+1=0$
4. $2x+y-5=0$

244. If the tangent drawn 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 Q on the Y-axis, then the length of PQ is

[12TH MAY 2023 SHIFT-1]

1. 5
2. 4
3. 2
4. 1

245. If a circle passing trough $(1,-2)$ has $x-y=2$ and $2x+3y=14$ as its diameters, then the radius of the circle is

[12TH MAY 2023 SHIFT -2]

1. 2
2. 3
3. 4
4. 5

246. The number of common tangents to the circles $x^2+y^2-2x-6y+9=0$ and $x^2+y^2+6x-2y+1=0$ is

[12TH MAY 2023 SHIFT -2]

1. 1
2. 2
3. 3
4. 4

247. The pole of the straight line $9x+y-28=0$ with respect to the circle $2x^2+2y^2-3x+5y-7=0$ is

[12TH MAY 2023 SHIFT -2]

1. (3,1)
2. (–3,1)
3. (–2,1)
4. (3,–1)

248. Let a chord AB subtend an angle of 60^0 at the centre C(2,3) of a circle S. If the equation of AB is $x+y+1=0$, then the equation of the circle S is **[13TH MAY 2023 SHIFT-1]**

1. $x^2+y^2-4x-6y+11=0$
2. $x^2+y^2-4x-6y+37=0$
3. $x^2+y^2-4x-6y-11=0$
4. $x^2+y^2-4x-6y-37=0$

249. Let 6,8 be the X and Y- intercepts made by the circle $S \equiv x^2+y^2+2gx+2fy+c=0$ respectively. If $gx+fy+1=0$ is a line passing through the point(1,-1), then the radius of the circle S=0 is

[13TH MAY 2023 SHIFT-1]

1. $\sqrt{41}$
2. 13
3. $\sqrt{26}$
4. 5

250. If(3,1) and (-2,4) are points on a circle S whose centre lies on the line $x-y+1=0$ then the parametric equations of S are

[13TH MAY 2023 SHIFT-1]

1. $x=-1+\sqrt{17}\cos\theta, y=\sqrt{17}\sin\theta$
2. $x=2+\sqrt{13}\cos\theta, y=1+\sqrt{13}\sin\theta$
3. $x=\sqrt{26}\cos\theta, y=-1+\sqrt{26}\sin\theta$
4. $x=-1+\sqrt{19}\cos\theta, y=2+\sqrt{19}\sin\theta$

251. Let $S \equiv x^2+y^2-8x+10y+5=0$ be a circle. Let P(1,1) and Q(1,-1) be two points. Then the point of intersection of the polar of P with respect to S=0 and the chord with Q as mid-point to S=0 is

[13TH MAY 2023 SHIFT-1]

1. (2,2)
2. (11,13/2)
3. (-4,-1)
4. (5,7/2)

252. If the parametric equations of the circle passing through the points (3,4),(3,2) and (1,4) is $x=a+r\cos\theta, y=b+r\sin\theta$ then $b^a r^a =$

[EAPCET 14-05-23 SHIFT-1]

1. 9
2. 18
3. 27
4. 54

253. A tangent PT is drawn to the circle $x^2+y^2=4$ at the point $P\left(\sqrt{3},1\right)$. If a straight line L which is perpendicular to PT is a tangent to the cirle $(x-3)^2+y^2=1$, then a possible equation of L is

[EAPCET 14-05-23 SHIFT-1]

1. $x-\sqrt{3}y=1$
2. $x-\sqrt{3}y=4$
3. $x-\sqrt{3}y=-1$
4. $x-\sqrt{3}y=7$

254. If the angle between the pair of tangents drawn to the circle $x^2+y^2-2x+4y+3=0$ from the point (6,-5) is θ, then $\cot\theta =$

[EAPCET 14-05-23 SHIFT-1]

1. $\frac{8}{15}$
2. $\frac{1}{4}$
3. 4
4. $\frac{15}{8}$

255. The radius of a circle touching all the four circle $(x\pm\lambda)^2+(y\pm\lambda)^2=\lambda^2$

[EAPCET 14-05-23 SHIFT-1]

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

256. The equation of the circle inscribed in a square formed by the lines $x+y-2=0$, $x+y-6=0$, $x-y+1=0$ and $x-y+5=0$ is **[EAPCET 13-05-23 SHIFT-2]**

1. $2x^2+2y^2-2x-14y+21=0$
2. $x^2+y^2-x-7y+10=0$
3. $2x^2+2y^2-x-7y+21=0$
4. $x^2+y^2-2x-14y+10=0$

257. Let the circle $S \equiv x^2+y^2+2gx+2fy+c=0$ touch the positive X-axis and the positive Y-axis. Let (2,4) be a point on the circle S=0. If two such circles exist, then the difference of their areas is **[EAPCET 13-05-23 SHIFT-2]**

1. 104π
2. 96π
3. 9π
4. 41π

258. If the equations $2x-3y+3=0$, $2x+y+1=0$ and $6x+4y+1=0$ represent the sides of a triangle, then the equation of the circle passing through the vertices of this triangle is **[EAPCET 13-05-23 SHIFT-2]**

1. $4x^2+4y^2+9x-10y+7=0$
2. $2x^2+2y^2-7x-5y+9=0$
3. $8x^2+8y^2+18x-20y+17=0$
4. $x^2+y^2+3x-y+13=0$

259. If T_1T_1' *and* T_2T_2' are the common tangents of the circles $S \equiv x^2+y^2-2x-4y-4=0$ and $S^1 \equiv x^2+y^2+4x+4y+4=0$ where T_1, T_1', T_2, T_2' are the points of contact, then the distance between T_1 *and* T_1' is **[EAPCET 13-05-23 SHIFT-2]**

1. $6\sqrt{6}$
2. $5\sqrt{6}$
3. $10\sqrt{6}$
4. $2\sqrt{6}$

KEY

1)	4	2)	3	3)	3	4)	4	5)	1
6)	1	7)	2	8)	4	9)	3	10)	4
11)	2	12)	2	13)	4	14)	3	15)	1
16)	4	17)	4	18)	1	19)	2	20)	1
21)	2	22)	1	23)	2	24)	3	25)	3
26)	3	27)	2	28)	2	29)	1	30)	4
31)	4	32)	3	33)	2	34)	1	35)	3
36)	3	37)	4	38)	1	39)	1	40)	2
41)	2	42)	2	43)	2	44)	1	45)	2
46)	3	47)	1	48)	4	49)	2	50)	2
51)	1	52)	2	53)	2	54)	3	55)	3
56)	2	57)	3	58)	3	59)	2	60)	1
61)	4	62)	1	63)	3	64)	2	65)	1
66)	4	67)	2	68)	4	69)	3	70)	2
71)	3	72)	1	73)	3	74)	4	75)	2
76)	1	77)	2	78)	3	79)	3	80)	4
81)	4	82)	1	83)	3	84)	3	85)	4
86)	1	87)	1	88)	3	89)	3	90)	3
91)	3	92)	3	93)	3	94)	4	95)	2
96)	4	97)	2	98)	3	99)	3	100)	2
101)	2	102)	3	103)	3	104)	1	105)	2
106)	4	107)	4	108)	2	109)	2	110)	4
111)	3	112)	2	113)	2	114)	1	115)	3
116)	4	117)	3	118)	1	119)	1	120)	1
121)	1	122)	4	123)	2	124)	2	125)	1
126)	1	127)	3	128)	1	129)	3	130)	3
131)	3	132)	1	133)	1	134)	2	135)	1
136)	4	137)	4	138)	4	139)	1	140)	4
141)	1	142)	1	143)	2	144)	1	145)	1
146)	1	147)	3	148)	4	149)	4	150)	1
151)	4	152)	2	153)	1	154)	3	155)	4
156)	4	157)	1	158)	2	159)	1	160)	3
161)	3	162)	2	163)	3	164)	3	165)	1
166)	2	167)	4	168)	3	169)	1	170)	1
171)	4	172)	3	173)	1	174)	4	175)	2
176)	1	177)	1	178)	2	179)	1	180)	1
181)	3	182)	3	183)	3	184)	3	185)	2
186)	2	187)	1	188)	1	189)	2	190)	1
191)	2	192)	3	193)	3	194)	3	195)	2
196)	1	197)	2	198)	1	199)	1	200)	1
201)	2	202)	4	203)	3	204)	1	205)	4

206) 4	**207) 2**	**208) 3**	**209) 1**	**210) 4**
211) 3	**212) 3**	**213) 2**	**214) 1**	**215) 1**
216) 4	**217) 3**	**218) 2**	**219) 4**	**220) 4**
221) 3	**222) 1**	**223) 1**	**224) 2**	**225) 1**
226) 2	**227) 3**	**228) 4**	**229) 1**	**230) 2**
231) 3	**232) 4**	**233) 2**	**234) 2**	**235) 3**
236) 3	**237) 2**	**238) 1**	**239) 3**	**240) 3**
241) 1	**242) 4**	**243) 3**	**244) 1**	**245) 4**
246) 4	**247) 4**	**248) 3**	**249) 4**	**250) 1**
251) 2	**252) 2**	**253) 1**	**254) 4**	**255) 2**
256) 1	**257) 2**	**258) 3**	**259) 4**	**260)**

SOLUTIONS

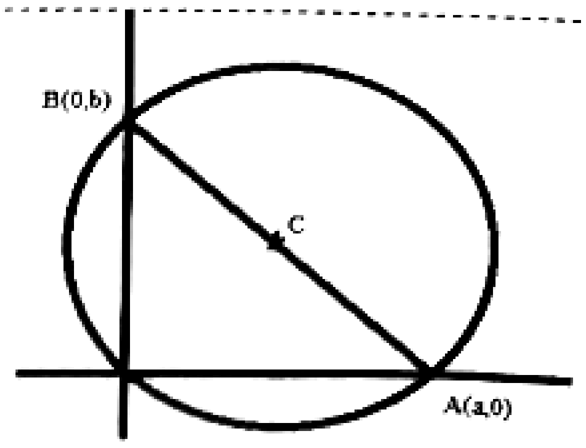
1. Circle touches y-axis $\Rightarrow f^2 = c$
Given
$(-g,-f)=(5,4)$
$\Rightarrow g=-5, f=-4$
$\Rightarrow c=16$
Sub in $x^2+y^2+2gx+2fy+c=0$

2. Use $f^2 = c$

3. $P(2\cos\theta, 2\sin\theta)$ ....(i)
Given
$$\frac{|8\cos\theta+6\sin\theta-12|}{5}=\frac{4}{5}$$
$8\cos\theta+6\sin\theta-12=\pm 4$
$8\cos\theta+6\sin\theta=8$ *or*
$8\cos\theta+6\sin\theta=-16$ (*not possible*)
Take
$8\cos\theta+6\sin\theta=8$
$4\cos\theta+3\sin\theta=4$
Squaring and then solve we get

$\cos\theta=\frac{7}{25},1$
If $\cos\theta=1$
$\theta=0^0$

If $\theta=0^0$; point $P(2,0)$ *from*.....(i)

4. 

Centre =midpoint AB=$\left(\frac{a}{2},\frac{b}{2}\right)$
Now verify option

5. C_1 passing through $S-S'=0$
$S-S' \Rightarrow 10x+4y-m-n=0$
Sub $C_1(-4,-4)$
$-40-16=m+n$
$m+n=-56$

6. Equation of normal at $p(x_1,y_1)$ to circle
$x^2+y^2+2gx+2fy+c=0$ is
$(y_1+f)(x-x_1)-(x_1+g)(y-y_1)=0$
Equation of normal at $(1,1)$ to
$x^2+y^2-x-3y-4=0$ is
$$\left(1-\frac{3}{2}\right)(x-1)-\frac{1}{2}(y-1)=0$$
$x+y-2=0$

7. Given circle
$x^2+y^2-6x-8y=0$
$C(-g,-f)=C(3,4)$
$r=\sqrt{g^2+f^2-c}=5$
$d=2r=10$

8. *given* $x^2+y^2=10$
$c(0,0)$ & $r=\sqrt{10}$
and line $3x+y+k=0$
$y=-3x+(-k)$
$m=-3, c=-k$
condition for tan *gent* $c^2=r^2(1+m^2)$
$\Rightarrow k^2=10(1+9)$
$\therefore k=\pm 10$

9. *circle equation* $x^2+y^2=10$ *and* $p(4,-2)$

eqn of tan *gent* $y=mx\pm r\sqrt{1+m^2}$

$p(x_1,y_1)$ *lies on* tan *gent* $y_1=mx_1\pm r\sqrt{1+m^2}$

here, $-2=4m\pm\sqrt{10}\sqrt{1+m^2}$

$\Rightarrow(4m+2)^2=10(1+m^2)$

$\Rightarrow 3m^2+8m-3=0$

$\Rightarrow(3m-1)(m+3)=0$

$\Rightarrow m=\frac{1}{3}$ *or* $m=-3$

equation of tangent at P(4,-2) and $m=\frac{1}{3}$

$x-3y=10$

equation of tangent at P(4,-2) and $m=-3$

$3x+y=10$

10. $(x-1)^2+(y-3)^2=r^2.....(i)$

$C_1(1,3),\ r_1=r$

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

$C_2(4,-1),\ r_2=3$

$C_1C_2=5$

Two circles intersect in two distinct points

Req. condition $=|r_1-r_2|<C_1C_2<r_1+r_2$

$\Rightarrow r-3<5<r+3$

$r-3<5\ ,\quad 5<r+3$

$r<8\ ,\quad r<2$

$\therefore 2<r<8$

11. *Equation of polar at* $P(x_1,y_1)$ *is* $S_1=0$

$\Rightarrow xx_1+yy_1-5(x+x_1)-5(y+y_1)+25=0$

Polar at $(1,-2)$ *is*

$x(1)+y(-2)-5(x+1)-5(y-2)+25=0$

$4x+7y-30=0$

12. *Equation of circle* $S+\lambda L=0$

$x^2+y^2-9+\lambda(x+y-1)=0\rightarrow(1)$

$x^2+y^2+\lambda x+\lambda y-9-\lambda=0$

$g=\frac{-1}{2},f=\frac{-\lambda}{2},c=-9-\lambda$

Radius $r=\sqrt{\frac{\lambda^2}{4}+\frac{\lambda^2}{4}+9+\lambda}$

Smallest circle is possible if r_{min} *then*

$\lambda=-1$

$x^2+y^2-9-1(x+y-1)=0$

13. *Centre = reflex of (m, n) w.r.t. y=x*

C=(n, m) r=m

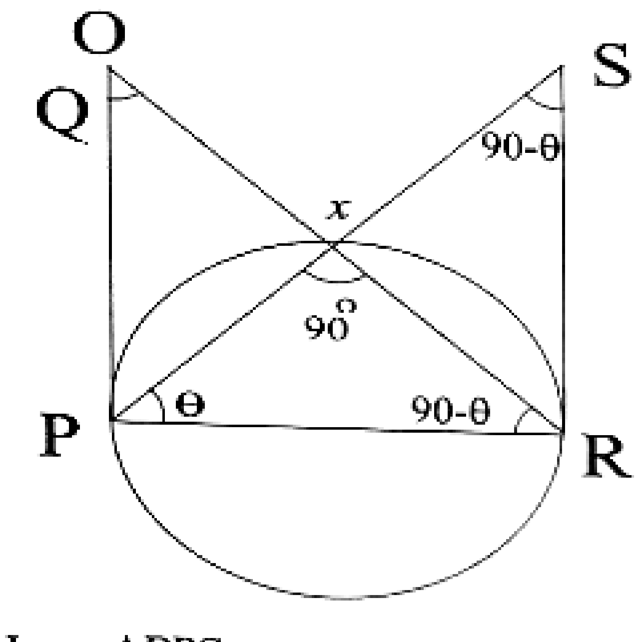
required circle is $(x-h)^2+(y-m)^2=m^2$

$x^2+y^2-2nx-2my+n^2=0$

14. To eliminate $(x'\textit{and } y'\textit{ terms})$ of origin is shifted

to $\left(-\frac{g}{a},-\frac{f}{b}\right)$=(1,-2)

15.



In a ΔPRS

$Tan\theta=\frac{SR}{PR}\rightarrow(1)$

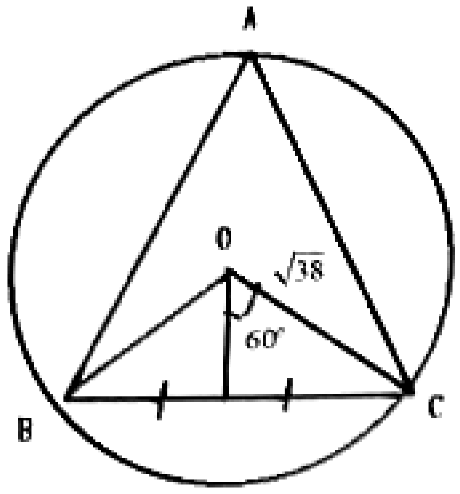
$Tan(90-\theta)=\frac{PQ}{PR}\rightarrow(2)$

$\text{Eq}(1)\times\text{Eq}(2)$

$1=\frac{SR}{PR}\times\frac{PQ}{PR}$

$\Rightarrow PR=\sqrt{PQ.RS}$

16.



Radius $r = \sqrt{38}$

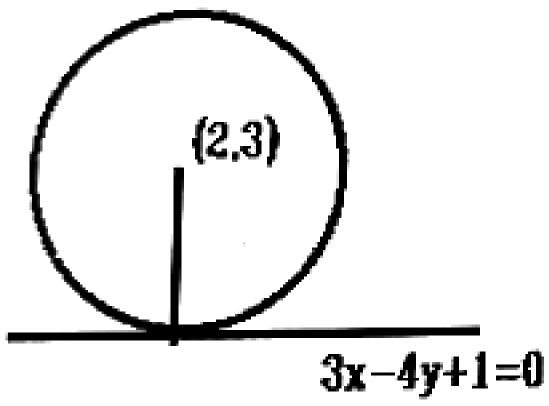
$\sin 60^{0} = \dfrac{MC}{\sqrt{38}}$

$MC = \sqrt{38}.\dfrac{\sqrt{3}}{2}$

$BD = \sqrt{38}.\sqrt{3}$

Area of equilateral $\Delta^{le} = \dfrac{\sqrt{3}}{4} \times 38 \times 3 = \dfrac{57\sqrt{3}}{2}$

17.



r=d=1

$\therefore$req. eq. is $(x-2)^2+(y-3)^2=1$

$r = \sqrt{30}$

18. d=[perpendicular distance from (3,-4) to $2x-y-5=0$]= $\sqrt{5}$

Length of the chord $= 2\sqrt{r^2-d^2} = 10$

$(x-3)^2+(y-5)^2 = 34-p$

19. *Here* $34-p>0 \Rightarrow p<34 \rightarrow (1)$

and $r<3 \Rightarrow 34-p<9 \Rightarrow p>25 \rightarrow (2)$

$(1,4)$ lies inside the circle $\Rightarrow$ $S_{11} < 0$

$\Rightarrow p<29 \rightarrow (3)$

from(1),(2) *and* (3)

$25<p<29$

20. Req. circle passing through $P=\left(\dfrac{3}{2},2\right)$ with center C=(5,2) is r=CP

$(x-5)^2+(y-2)^2 = r^2 = \left(5-\dfrac{3}{2}\right)^2$

$4x^2+4y^2-40x-16y+67=0$

21. Conceptual

22. Eq. of normals is (x-1)(y-2)=0

Center C=(1,2)

Eq. of tangent to the circle is 3x+4y=6

$r = \dfrac{|3+8-6|}{5} = 1$

Req. equation is $(x-1)^2+(y-2)^2=1$

23. $d = \dfrac{|k_1-k_2|}{\sqrt{3+1}} = 2r = 4$

$|k_1-k_2| = 8$

24. $2\pi r = 10\pi \Rightarrow r=5$

Required equation is $(x-2)^2+(y+3)^2=5^2$

$x^2+y^2-4x+6y-12=0$

25. $C=(2,1), K=(10,7)$

$r = \sqrt{4+1+20} = 5$

$req.\ CK + r = 15$

26. Since $\angle A = 90^{o}$

B,C are extremeties of diameter of req. circle

$(x-2)(x-1)+(y+4)(y-5)=0$

$x^2+y^2-3x-y-18=0$

27. Solving given 3 lines the vertices of the triangle are A(1,2),B(-2,8),C=(7,-1) and

let S(α,β) be the circumcentre of the circle

w.k.t SA=SB=SC

solving we get S$(\alpha,\beta)=\left(\dfrac{17}{2},\dfrac{19}{2}\right)$

$\& r = SA = \sqrt{\dfrac{15^2}{4}+\dfrac{15^2}{4}} = \dfrac{15}{\sqrt{2}}$

$\therefore$ required circle eq. is

$x^2+y^2-17x-19y+50=0$

28. Given circle equation is

$x^2+y^2-6x-10y+p=0$

$(x-3)^2+(y-5)^2=34-p$

Now $34-p>0 \Rightarrow p<34 \rightarrow (1)$

Now point (1,4) lies inside the circle

$p-29<0 \Rightarrow p<29 \rightarrow (2)$

Now it does not touch or intersect coordinate axis at x=0

$y^2-10y+p>0$ since it will lie outside the circle

Hence $b^2-4ac<0 \Rightarrow p>25$

$\therefore 25<p<29$

29. In ΔABC, the circle that touches the sides BC internally and other two sides AB and AC externally is called "Ex-circle opposite to angle A".

30. Midpoint of (0,0),(4,-4) is (2,-2)

Length of tangent $=\sqrt{S_{11}}=\sqrt{4+4+1}=3$

31. Equation of chord

$xx_1+yy_1-9=0$

$x+2y-9=0$

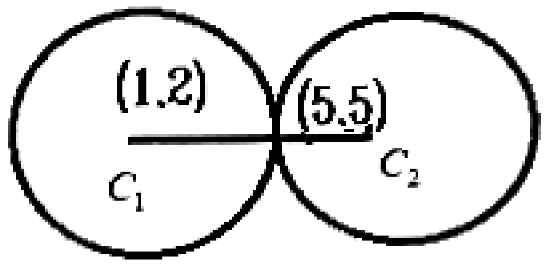
32. $\sqrt{s_{11}}=\sqrt{16+25-16-10-11}$

Area of quadrilateral $=2\times\frac{1}{2}\times4\times2$

$=8$

33. Conceptual

34.



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

$C_1=(1,2), r_1=5$

$C_2=(9,8), r_2=5$

$(x-9)^2+(y-8)^2=52$

$x^2+y^2-18x-16y+120=0$

35. $x^2+y^2=4,\ (6,8)$

$length\ of\ \tan gent\ \sqrt{S_{11}}=\sqrt{6^2+8^2-4}=4\sqrt{6}$

36. $\sqrt{f^2+g^2-6}=2\sqrt{f^2+g^2+3f+3g}$

Squaring on B.S, we get

$3f^2+3g^2+12f+12g+6=0$

$f^2+g^2+3f+4g+2=0$

37. $3x-4y+5=0....(1)$

$6x-8y-9=0....(2)$

$radius\ of\ the\ circle=\frac{1}{2}\frac{19}{10}=\frac{19}{20}$

38. $x^2+y^2-6x-4y-12=0$

$c(3,2)\ \&\ r=5$

let $y=k$ *is a* tan *gent to the circle parallel to* $X-axis$

$d=r$

$y-k=0$

$|2-k|=5$

$2-k=\pm5$

$\Rightarrow k=7,-3$

39. *given circle is*

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

$x^2+y^2+3x2y-1=0$

$r^2=\frac{9}{4}+1+1=\frac{17}{4}$

$area\ of\ triangle=\pi\frac{17}{4}$

40. $(x-1)^2+(y-2)^2=4$

Here $r=|y|$

41. $MC\times MD=S_{11}=a^2+b^2-k^2$

42. $x^2+y^2-\frac{3}{2}x+y-\frac{1}{2}=0$

$r=\frac{\sqrt{21}}{4}$

43. One end A(4, 1)
Other end B(x, y)
Centre = (1, 3)
Centre = Midpoint of AB

44. $\operatorname{Tan}\frac{\theta}{2} = \frac{r}{\sqrt{S_{11}}} = \frac{4}{3}$

$$\sin\theta = \frac{2\operatorname{Tan}\frac{\theta}{2}}{1+\operatorname{Tan}^2\frac{\theta}{2}} = \frac{24}{25}$$

45. $(1, a), (b, 2)$ are conjugate points

Given circle $x^2 + y^2 = 25$

$S_{12} = 0 \Rightarrow x_1x_2 + y_1y_2 = 25$

$b + 2a = 25 \Rightarrow 2b + 4a = 50$

46. The circle passes through origin $\Rightarrow c = 0$

x-intercept =5

$2\sqrt{g^2 - c} = 5 \Rightarrow 2g = 5$

y-intercept =6

$2\sqrt{f^2 - c} = 6 \Rightarrow 2f = 6$

$\therefore$ req. equation of circle $x^2 + y^2 + 5x + 6y = 0$.

47. Length of the chord $= 2\sqrt{r^2 - d^2}$

$r = \sqrt{5},\ d = \sqrt{\frac{5}{2}}$

48. Equation of tangent to the circle $x^2 + y^2 = 5$ at (-3, 4) is $S_1=0$

$\Rightarrow xx_1 + yy_1 - 5 = 0$

$\Rightarrow -3x + 4y - 5 = 0$

$\Rightarrow 3x - 4y + 5 = 0$

49. The equation of normal parallel to the line $x + 2y - 3 = 0$ is $x + 2y + k = 0$.

$\because$ the normal always passes through centre of the circle $(-g, -f) = (1, 0)$

$\therefore k = -1$

Required equation is $x + 2y = 1$

50. Given circle $x^2 + y^2 - 6x + 2y - 28 = 0$

C =(3,1), $r = \sqrt{9+1+28} = \sqrt{38}$

$$d = \frac{|6+5+18|}{\sqrt{4+25}} = \sqrt{29}$$

$\lambda = 2\sqrt{r^2 - d^2}$

$\lambda = 6$

51. $s_1 : x^2 + y^2 + 2x + 8y - 23 = 0$

$C_1 = (-1, -4)$

$S_2 : x^2 + y^2 - 4x + 10y + 19 = 0$

$C_2 = (2, -5)$

The polar of C_1 w.r.to S_2 is $3x - y - 1 = 0$

The polar of C_2 w.r.to S_1 is $3x - y - 41 = 0$

52. Diagram Commom chord is maximum length then diameter of $x^2 + y^2 - 4 = 0$ is a common chord From diagram $d = \frac{\sqrt{17}}{2}$

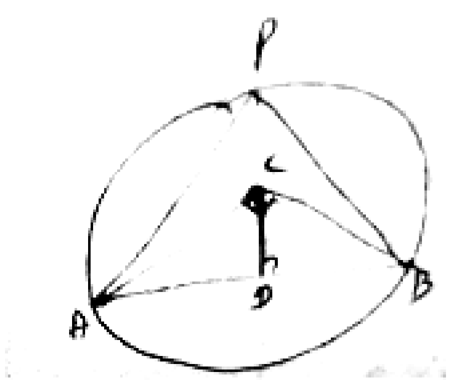
$\sin\theta = \frac{4}{\sqrt{17}}, \cos\theta = \frac{-1}{\sqrt{17}}$

Centre of circle is

$$\left(x_1 \pm r\cos\theta, y_1 \pm r\sin\theta\right) = \left(\mp\frac{1}{\sqrt{2}}, \pm 2\sqrt{2}\right)$$

53. AB=6 D=midpoint of AB = (2, 3)

$\angle ACB = \frac{\pi}{2}$



$AC^2 + BC^2 = AB^2$

$r^2 + r^2 = 36,\ r^2 = 18,\ AD = 3$

$CD^2 = AC^2 - AD^2 = 18 - 9 = 9$

$CD = 3,\ \overline{AB} \perp \overline{CD}$

$C = (2, 3+3) = (2, 6)$

Equation of centre is

$(x-2)^2 + (y-6)^2 = 18$

$x^2 + y^2 - 4x - 12y + 22 = 0$

54. $S_1 = 0,\ p(-1, 1)$

$4x - 3y + 7 = 0,\ r = 1$

Tangent slope=4/3

Normal slope (m)= -3/4

$\operatorname{Tan}\theta = -3/4$

Midpoint

$$= (x_1 \pm r\cos\theta,\ y_1 \pm r\sin\theta) = \left(\frac{-9}{5}, \frac{8}{5}\right), \left(\frac{-1}{5}, \frac{2}{5}\right)$$

55. $\operatorname{Tan}\frac{\theta}{2}=\frac{r}{\sqrt{s_{11}}}=\frac{1}{4}$

$$\operatorname{Tan}\theta=\frac{2\operatorname{Tan}\theta/2}{1-\operatorname{Tan}^2\theta/2}=\frac{8}{15}$$

56. Circle equation passing through given 3 points is

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

Choose $x=\frac{5}{2}+\sqrt{\frac{5}{2}},y=\frac{1}{2}$

$$=\left(\frac{5}{2}+\sqrt{\frac{5}{2}}\right)^2+\left(\frac{1}{2}\right)^2-5\left(\frac{5}{2}+\sqrt{\frac{5}{2}}\right)-\frac{1}{2}+4$$

$$=\frac{25}{4}+\frac{5}{2}+\frac{5\sqrt{5}}{\sqrt{2}}+\frac{1}{4}-\frac{25}{2}-\frac{5\sqrt{5}}{\sqrt{2}}-\frac{1}{2}+4$$

$$=\frac{26-26}{4}=0$$

57. Equation of the circle is

$$(x-r)^2+(y-r)^2+r^2=0$$

$$x^2+y^2-2xr-2ry+r^2=0$$

Equation of polar is $S_1=0$

$$xx_1+yy_1-r(x+x_1)-r(y+y_1)+r^2=0$$

$$x(x_1-r)+y(y_1-r)-rx_1-ry_1+r^2=0.....(1)$$

$x+2y=4r......(2)$

(1)&(2) are identical lines

$$\frac{x_1-r}{1}=\frac{y_1-r}{2}=\frac{-rx_1-ry_1+r^2}{-4r}$$

After taking two in a pair and then solving the two equations for x_1,y_1 will be quite hard in comparing to checking the options. So after putting these given options one by one we will get answer

$$\frac{2r-r}{1}=\frac{3r-r}{2}=\frac{-2r^2-3r^2+r^2}{-4r}$$

$r=r=r$

58. $C_1=\left(1,3+\sqrt{7}\right);r_1=3$

$C_2=(4,3);r_2=\sqrt{25-k^2}$

Given $C_1C_2<r_1r_2$

$\sqrt{9+7}<\sqrt{25-k^2}+3$

$1<25-k^2$

$k^2<24$

$|k|<2\sqrt{6}$

$-2\sqrt{6}<k<2\sqrt{6}$

$-4.89<k<4.89$

$k=-4,-3,-2,-1,0,1,2,3,4$

No. of values =9

59. Equation of diameter passes through

$(0,0)$ *and* $(2,1)$ is, $x-2y=0$

Req. equation is, $S+\lambda L=0$

$\Rightarrow x^2+y^2-4x-2y-4+\lambda(x-2y)=0...(1)$

It passes through (1, 2)

$\Rightarrow\lambda=\frac{-7}{3}$

From (1) $3x^2+3y^2-19x+8y-12=0$

60. $|d|<r$

$\Rightarrow|4+\alpha|<\sqrt{14}$

$\Rightarrow\alpha\in\left(-4-\sqrt{14},-4+\sqrt{14}\right)$

61. $C_1=(-5,8)$ and $C_2=\left(-1,\frac{4}{3}\right)$

$$r=\frac{C_1C_2}{2}=\frac{2\sqrt{34}}{3}$$

$$\therefore\frac{9}{2}r=3\sqrt{34}$$

62. Given circle , $S \cong x^2+y^2-2g_ix+c_i^2=0$

Let $P(x_i,y_i)$ be the pole.

w.k.t, equation of polar w.r. to S=0 to the pole $P(x_i,y_i)$

is, $S_1=0$

$\Rightarrow (x_i-g)x+(y_i)y+(c^2-gx_i)=0 \rightarrow (1)$

Given line, $x-y=0 \rightarrow (2)$

Compare (1)&(2) $\Rightarrow (x_i,y_i)=\left[\frac{c_i^2}{g_i},\frac{g_i^2-c_i^2}{g_i}\right]$

$$\sum_{i=1}^{3}\frac{x_i+y_i}{g_i}=\sum_{i=1}^{3}(1)=3$$

63. Given $x^2+y^2-4x+6y+13-a^2=0$

$C_1=(2,-3)$ *and* $r_1=a$

Also $x^2+y^2-10x-2y+17=0$

$C_2=(5,1)$ *and* $r_2=3$

w.k.t $r_1-r_2<C_1C_2<r_1+r_2$

$\Rightarrow a-3<5<a+3$

$a-3<5 \Rightarrow a<8$

$5<a+3 \Rightarrow a>2$

By combining we get $2<a<8$

64. Given 'r' is the radius of the circle, which touches positive co-ordinate axes

i.e., $|h|=|k|=r$ $C_1=(r,r)$ *and radius* $=r$

Since, circle with centre C_1 touches externally to the circle $x^2+y^2-12x-10y+52=0$

$C_2=(6,5)$ *and radius* $=3$

We can write $C_1C_2=r_1+r_2$

$\sqrt{(6-r)^2+(5-r)^2}=r+3$

On simplifying, we get $r=2(or)26$

Take $r=2$, $\therefore C_1C_2=r_1+r_2$

$C_1C_2=2+3$

$C_1C_2=5$

65. Given circle $S_1 \cong x^2+y^2-2x-2y+k=0$ *and*

$S_2 \cong x^2+y^2+4x+6y+4=0$

$C_1=(1,1)$ *and* $r_1=\sqrt{2-k}$

$C_2=(-2,-3)$ *and* $r_2=3$

When circles touch each other externally

$C_1C_2=r_1+r_2$

$5=\sqrt{2-k}+3 \Rightarrow k=-2$

$S_1=x^2+y^2-2x-2y-2=0$

$S_2=x^2+y^2+4x+6y+4=0$

Point of contact divides 'C_1C_2' in the ratio $r_1:r_2$ internally. i.e.

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

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

66. Area of quadrilateral $PACB=r.\sqrt{S_{11}}$

$r=\sqrt{\frac{s^2}{2}+2}, S_{11}=\sqrt{2g}$

$area=\sqrt{g^3+4g}$

67. $C_1=(4,3), r_1=2, C_2(0,1), r_2=4$

$C_1C_2=\sqrt{20}<r_1+r_2,\ r_1:r_2=1:2$

No. of point of intersection of common tangents =1 $P.I=(8,5)$

68. Given circles are $S=0, S'=0$

Equation of radical axis $L \cong gx-2fy+2c=0$

Homogenising $S=0$ w.r.t L=0

$$x^2+y^2+gx\left(\frac{gx-2fy}{-2c}\right)+c\left(\frac{gx-2fy}{-2c}\right)^2=0$$

$(4c-g^2)x^2-8gfxy+(4c+4f^2)y^2=0$

Coeff of x^2 + coeff of $y^2=0$

$g^2-4f^2=8c$

69. P=P.O.I. of lines

$$=\left(\frac{-g}{a},\frac{-f}{b}\right)=\left(\frac{1}{2},\frac{3}{2}\right)$$

$$\alpha = OP^2 = \frac{5}{2}$$

$$\beta = \frac{|c|}{\sqrt{(a-b)^2+4h^2}} = 1$$

$$\alpha\beta = \frac{5}{2}$$

70. Equation of a circle passing through $(3,4),(3,2)$ is $S+\lambda L=0$

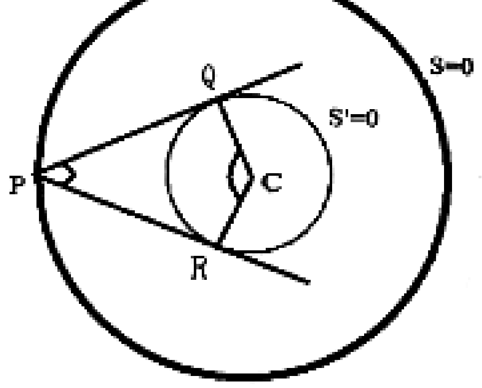
i.e. $x^2+y^2-6x-6y+17+\lambda(2x-6)=0$

which passes through $(1,4) \Rightarrow \lambda=1$

the circle is: $x^2+y^2-4x-6y+11=0$

centre$=(a,b)=(2,3)$ $r=\sqrt{2}$

71.



Let $S \equiv x^2+y^2-4x-6y+9=0$ and

$S' \equiv x^2+y^2-4x-6y+12=0$

Let $P(x_1,y_1)$, C=(2,3)

$CQ=CR=\sqrt{9+4-12}=1$

$\tan\frac{\theta}{2}=\frac{r}{\sqrt{s_{11}}}=\frac{1}{\sqrt{-9+12}}$ $[\because P \ lies \ on \ S=0]$

$$\theta=\frac{\pi}{3}$$

Clearly P,Q,C,R are concyclic points

$\theta+\alpha=\pi$

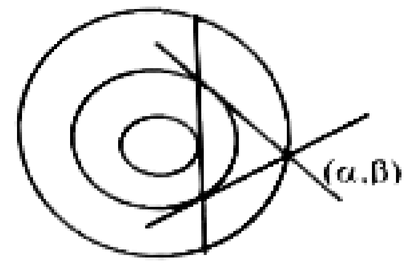
$$\alpha=\frac{2\pi}{3}$$

$$Area\ of\ \Delta CQR=\frac{1}{2}\times CQ\times CR\times\sin\frac{2\pi}{3}$$

$$=\frac{\sqrt{3}}{4}$$

72. $P(-7,1),Q(-7,-1),S_1=0$

73.



Let $P(\alpha,\beta)$ be point on $x^2+y^2=r_1^2$

Equation of contact of P w.r.t $x^2+y^2=r_2^2$ is

$S_1=0$

$\alpha x+\beta y=r_2^2$.......(1)

(1) is tangent to

$x^2+y^2=r_3^2 \Rightarrow r=d \Rightarrow r_2^2=r_1r_3$

$\therefore r_1,r_2,r_3$ are in G.P.

74. Option verification.

75. Length of intercept made by $x+y=1$ is

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

$r=\sqrt{\frac{10}{4}},d=\sqrt{2}$ $\therefore 2\sqrt{r^2-d^2}=\sqrt{2}$

Let line by $y=mx$

$$2\sqrt{r^2-d_1^2}=\sqrt{2}$$

$$2\sqrt{\frac{10}{4}-\frac{\left(\frac{m+3}{2}\right)^2}{1+m^2}}=\sqrt{2}$$

$$\Rightarrow m=1,\frac{-1}{7}$$

$$\therefore y=x, y=\frac{-1}{7}x$$

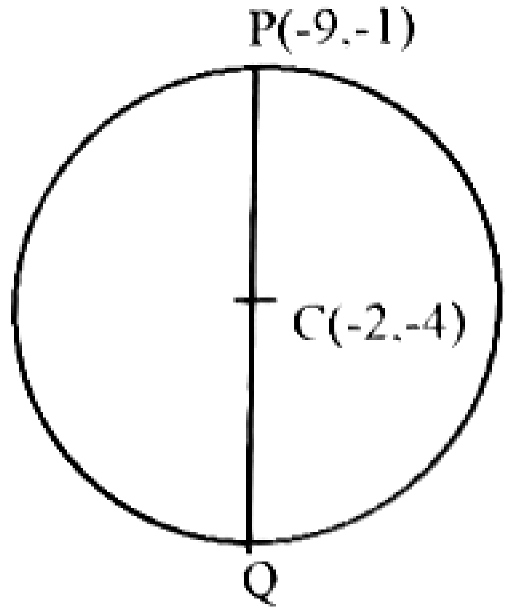
$$\Rightarrow x-y=0, x+7y=0$$

76. $y-0=m(x-4)\Rightarrow mx-y-4m=0$

$$r=d\Rightarrow 2=\frac{|4m|}{\sqrt{1+m^2}}\Rightarrow m=\pm\frac{1}{\sqrt{3}}$$

$$\therefore y=\pm\frac{1}{\sqrt{3}}(x-4)$$

77.



$C=\dfrac{P+Q}{2} \Rightarrow Q=2C-P=(5,-7)$

Equation of tangent is $S_1=0$

$5x-7y+2(x+5)+4(y-7)-38=0$

$7x-3y=56$

78. Passing through $(4,0),(-4,0)$

Option verification.

79. Equation of line passing through $(4,3),(2,1)$ is

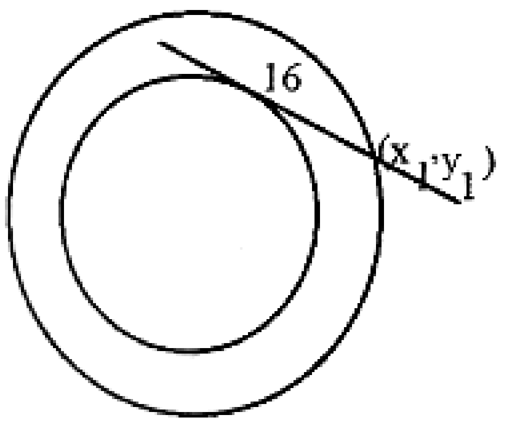
$x-y-1=0.....(1)$

Given line $2x-y-2=0.......(2)$

Centre $C=(1,0), r=\sqrt{2}$

Equation of circle $x^2+y^2-2x-1=0$

80.



Length of tangent $=\sqrt{S_{11}}=2r$

$2r=16 \Rightarrow r=8$

Area $=\pi\left(R^2-r^2\right) \quad \left(\because R^2=5r^2\right)$

$=\pi\left(4r^2\right)=256\pi$

81. Passing through $(0,0),(-2,0),(0,3)$

Option verification.

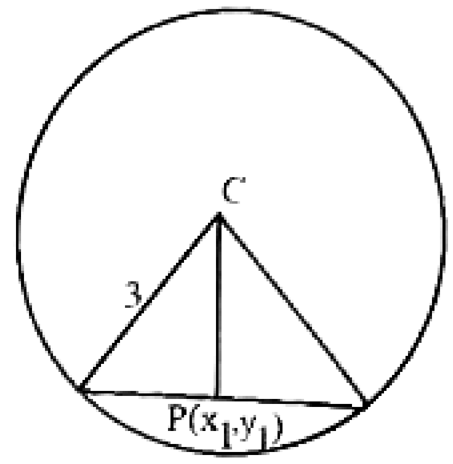
82. $\tan\dfrac{\theta}{2}=\dfrac{r}{\sqrt{S_{11}}} \Rightarrow \theta=\dfrac{\pi}{2}$

83. $r>d \Rightarrow 5>\dfrac{|6-16-m|}{5} \Rightarrow -35<m<15$

$[m]=\{-35,....,0,1,...14\}$

No. of integral values of $m=50$

84.



$C=(0,0), r=3$

$\cos 60^0=\dfrac{CP}{3} \Rightarrow CP^2=\dfrac{9}{4}$

$\therefore x^2+y^2=\dfrac{9}{4}$

85. Put $y=0 \Rightarrow x^2-3x+2=0 \Rightarrow x=1,2$

86. $C=(-4,-5), r=7$

87. Let $P(x_1,y_1)$ be pole.

Equation of polar of P w.r.t.

$x^2+y^2+4x-4=0$ is $S_1=0$

$\Rightarrow (x_1+2)x+y_1y+2x_1-4=0.....(1)$

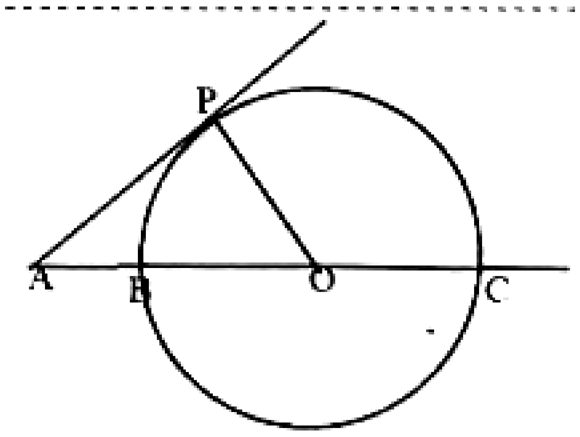
(1) is tangent to $x^2+y^2=4 \quad \therefore r=d$

$\Rightarrow 2=\dfrac{|2x_1-4|}{\sqrt{(x_1+2)^2+y_1^2}} \Rightarrow y_1^2+8x_1=0$

88. $S_{11}=-16 \Rightarrow 5-a=-16 \Rightarrow a=21$

89. $g^2=c, f^2=c \quad \therefore$ touches both the axes.

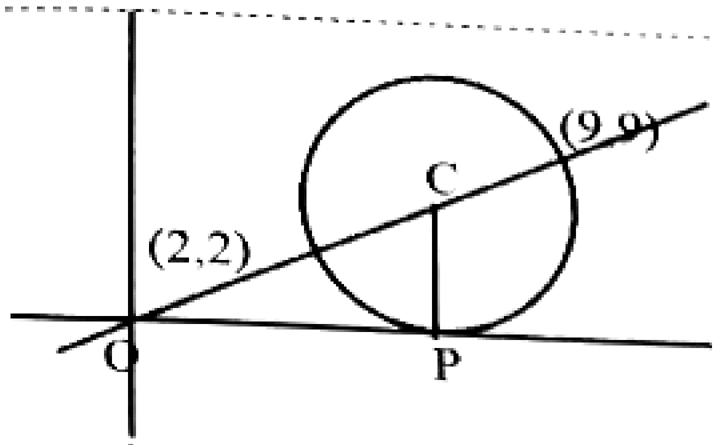
90.



$O=\dfrac{B+C}{2}=\left(6,\dfrac{-1}{2}\right), r=\dfrac{BC}{2}=\dfrac{\sqrt{5}}{2}$

$OA^2=OP^2+PA^2 \Rightarrow PA=\sqrt{10}$

91.



$C=\left(\frac{11}{2},\frac{11}{2}\right), r=\frac{7}{\sqrt{2}},$

$OP^2=OC^2-CP^2=36 \Rightarrow OP=6$

92. $g^2=c, f^2=c \quad \therefore r=d$

$\sqrt{g^2+f^2-c}=\frac{|-3g-4f-12|}{\sqrt{9+16}}$

$\Rightarrow g=2,-3 \qquad (\because g^2=f^2)$

$\therefore g=-3, f=3$

$\therefore r=\sqrt{9+9-9}=3$

93. $\frac{\sqrt{S_{11}}}{\sqrt{S'_{11}}}=\frac{3}{4} \Rightarrow \lambda=\frac{-28}{3}.$

94. $\sqrt{S_{11}}=4 \Rightarrow k=37$

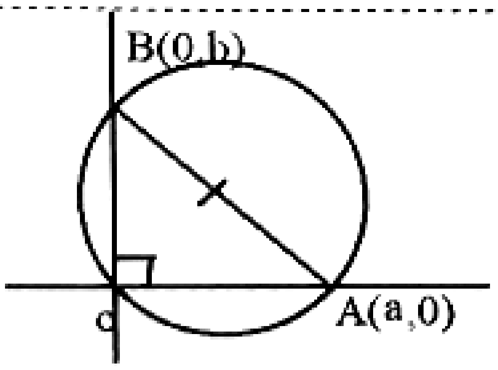
95. $2\pi r=10\pi \Rightarrow r=5,\ (x,y)=(1,-1)$

Equation is $(x-1)^2+(y+1)^2=25$

96. $\frac{\sqrt{S_{11}}}{\sqrt{S'_{11}}}=\frac{4}{3} \Rightarrow k=\frac{21}{4}.$

97. $2\pi r=4\pi \Rightarrow r=2 \therefore (x+2)^2+(y-3)^2=4$

98.



$r=6 \Rightarrow \sqrt{a^2+b^2}=6\times 2 \Rightarrow a^2+b^2=144$

$G(\alpha,\beta)=\left(\frac{a}{3},\frac{b}{3}\right) \Rightarrow a=3\alpha, b=3\beta$

$\Rightarrow \alpha^2+\beta^2=16 \Rightarrow x^2+y^2=16$

99 $S_{11}<0 \Rightarrow 2\lambda(\lambda+1)<0 \Rightarrow -1<\lambda<0$

100. $S-S'=0 \Rightarrow 6x-10y+1=0,\ d=\frac{13}{\sqrt{136}}$

101. $S_{12}=0 \Rightarrow k=\frac{7}{4}$

102. $(x+g)\cos\left(\frac{\theta_1+\theta_2}{2}\right)+(y+f)\sin\left(\frac{\theta_1+\theta_2}{2}\right)$

$=r\cos\left(\frac{\theta_1+\theta_2}{2}\right)$

$(x-3)\cos 60^0+(y+2)\sin 60^0=5\cos 30^0$

$\Rightarrow x+\sqrt{3}y-3\left(1+\sqrt{3}\right)=0$

103. $2\sqrt{r^2-d^2}=2\sqrt{7}$

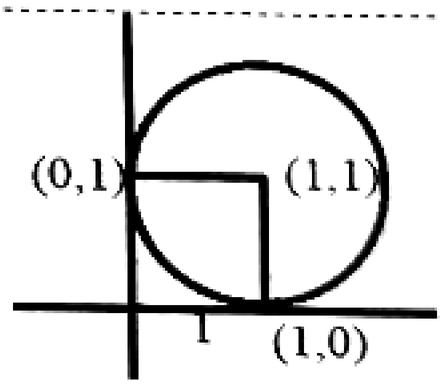
104. Put $\theta=0$, $A(4,0), B\left(2,2\sqrt{3}\right), AB=4$

105. $(x,y)=C=(1,2), r=5$

$\Rightarrow x^2+y^2-2x-4y-20=0$

106. $S_1=0 \Rightarrow 3x+4y+2=0$

107.



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

108. Line parallel to $3x+4y=1$ is

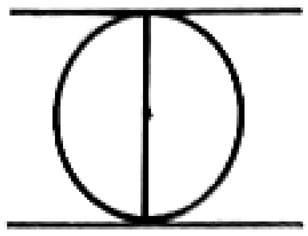
$3x+4y+k=0....(1)$

(1) is tangent to $x^2+y^2=\frac{1}{5} \quad \therefore r=d$

$k=\pm\sqrt{5}$

$\therefore$ Requires lines $3x+4y\pm\sqrt{5}=0$

109.



Given tangents $3x-4y+4=0$

$6x-8y+8=0 \ldots (1)$

$6x-8y-7=0 \ldots (2)$

$r=\frac{1}{2}\times$ distance between (1) and (2)

$=\frac{1}{2}\times\frac{15}{\sqrt{36+64}}=\frac{15}{2\times 10}=\frac{3}{4}$

Area $=\pi r^2=\pi\times\frac{9}{16}=\frac{9\pi}{16}\,sq.units$

110. Polar of $(-1,2)$ w.r.to $S_1=0$ is $x-5y-13=0$

Polar of $(-1,2)$ w.r.to $S_2=0$ is $x+y-1=0$

These lines intersecting at non zero point

$(3,-2)$

111. $C_1=(2,3), C_2=(-2,1)$

$r_1=1, r_2=3$

$I.C.S=\left(\frac{r_1x_2+r_2x_1}{r_1+r_2},\frac{r_1y_2+r_2y_1}{r_1+r_2}\right)=(1,5/2)$

112. $S=x^2+y^2+2x-2y-2=0$

$S'=x^2+y^2-2x+2y-7=0$

$L=S-S'=0$

$4x-4y+5=0$

$S+\lambda L=0$

$x^2+y^2+2x-2y-2+\lambda(4x-4y+5)=0$

$x^2+y^2+2(1+2\lambda)x-2(1+2\lambda)y+5\lambda-2=0$

centre $=(-1-2\lambda,1+2\lambda)$

Centre lies on $x-y-1=0$

$\lambda=\frac{-3}{4}$

Circle is $4x^2+4y^2-4x+4y-23=0$

Centre $=\left(\frac{1}{2},\frac{-1}{2}\right)$

113. $SA^2=SB^2$

$6x-12y+63=0 \ldots\ldots (1)$

$SB^2=SC^2$

$4x-2y-15=0 \ldots (2)$

$solving\,(1)\,\&\,(2), x=\frac{19}{2}, y=\frac{17}{2}$

114. $S_1=S_{11}$

$xx_1-(x+x_1)+yy_1=x_1^{\,2}-2x_1+y_1^{\,2}$

$0-(0+x_1)+0=x_1^{\,2}-2x_1+y_1^{\,2}$

$\boxed{x_1^{\,2}-x_1+y_1^{\,2}=0}$

115. $r_1=4, r_2=2$

$c_1c_2=2, r_1+r_2=6, |r_1-r_2|=2$

$\boxed{c_1c_2=|r_1-r_2|}$

No. Of tangents=1

116. Given $(2,\alpha)$ does not lie out side the circle

$x^2+y^2-13=0$

$\therefore S_{11}\le 0$

$4+\alpha^2-13\le 0$

$\alpha^2-9\le 0$

$\alpha\in[-3,3]$

$(2,\alpha)$ does not lie outside the circle

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

$\therefore S_{11}\le 0$

$4+\alpha^2+2-2\alpha-14\le 0$

$\alpha^2-2\alpha-8\le 0$

$(\alpha-4)(\alpha+2)\le 0$

$\alpha\in[-2,4]$

$\therefore \alpha\in[-3,3]\cap[-2,4]=[-2,3]$

117. Diagram

Let $C(h,k)$ be the centre of the circle.

$r=\sqrt{h^2+k^2} \Rightarrow r^2=h^2+k^2$

$d=\perp^r$ distance from (h,k) to $x-1=0$.

$d=\frac{|h-1|}{\sqrt{1}}=|h-1|$

$2\sqrt{r^2-d^2}=2$

$r^2-d^2=1$

$h^2+k^2-(h-1)^2=1$

$k^2+2h=0$

Locus of centre is $y^2+2x=0$.

Which is parabola.

118. Diagram

$C_1(0,0), r_1=1$

$C_2=(1,3), r_2=\sqrt{1+9-6}=2$

$C_1C_2=\sqrt{1+9}=\sqrt{10}$

$r_1+r_2=1+2=3=\sqrt{9}$

$C_1C_2>r_1+r_2$

$\therefore$ No. of common tangents = 4.

119. $x^2+y^2=16$

$r=4$

Condition for tangent $c^2=x^2(1+m^2)$

$\Rightarrow c^2=16(1+m^2)$

$\Rightarrow 16m^2=c^2-16$

$m=\pm\frac{1}{4}\sqrt{c^2-16}$

120. $P(2,3), Q(k,-2)$

P,Q conjugate points w.r.to circle

$S\equiv x^2+y^2-2x+4y-2=0$ is $S_{12}=0$

$\Rightarrow x_1x_2+y_1y_2-(x_1+x_2)+2(y_1+y_2)-2=0$

$\Rightarrow 2k-6-(2+k)+2(1)-2=0$

$\Rightarrow k=8$

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

$C_1(1,1), r_1=5$

$x^2+y^2-4x-4y-1=0$

$C_2(2,2), r_2=3$

$C_1C_2=\sqrt{(2-1)^2+(2-1)^2}=\sqrt{2}$

Clearly $C_1C_2<|r_1-r_2|$

One circle lies inside the other circle

Therefore, no. of common tangents = 0

122. Required common tangent is $S-S'=0$

$\Rightarrow 5x-12y-139=0....(1)$

Verify the option:

Point $P\left(\frac{-2}{5},\frac{-47}{4}\right)$ satisfies (1)

123. Given circles $x^2+y^2+2x+3y+1=0$

$C_1(-1,-3/2), r_1=\sqrt{1+\frac{9}{4}-1}=3/2$

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

$C_2(-2,-3/2), r_2=\sqrt{17}/2$

Equation of common chord is $2x+1=0....(1)$

d = distance from C_1 to (1)

$=\left|\frac{-2+1}{\sqrt{4}}\right|=\frac{1}{2}$

Length of common chord

$=2\sqrt{r^2-d^2}=2\sqrt{\frac{9}{4}-\frac{1}{4}}=2\sqrt{2}$

124. $x^2+2x-3=(x-\alpha)(x-\beta)$

$y^2-y+4=(y-\gamma)(y-\delta)$

The equation of circle having diameter $(\alpha,\gamma)(\beta,\delta)$ is

$(x-\alpha)(x-\beta)+(y-\gamma)(y-\delta)=0$

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

117. Diagram

Let $C(h,k)$ be the centre of the circle.

$r=\sqrt{h^2+k^2} \Rightarrow r^2=h^2+k^2$

$d=\perp^r$ distance from (h,k) to $x-1=0$.

$d=\frac{|h-1|}{\sqrt{1}}=|h-1|$

$2\sqrt{r^2-d^2}=2$

$r^2-d^2=1$

$h^2+k^2-(h-1)^2=1$

$k^2+2h=0$

Locus of centre is $y^2+2x=0$.

Which is parabola.

118. Diagram

$C_1(0,0), r_1=1$

$C_2=(1,3), r_2=\sqrt{1+9-6}=2$

$C_1C_2=\sqrt{1+9}=\sqrt{10}$

$r_1+r_2=1+2=3=\sqrt{9}$

$C_1C_2>r_1+r_2$

$\therefore$ No. of common tangents = 4.

119. $x^2+y^2=16$

$r=4$

Condition for tangent $c^2=x^2(1+m^2)$

$\Rightarrow c^2=16(1+m^2)$

$\Rightarrow 16m^2=c^2-16$

$m=\pm\frac{1}{4}\sqrt{c^2-16}$

120. $P(2,3), Q(k,-2)$

P,Q conjugate points w.r.to circle

$S\equiv x^2+y^2-2x+4y-2=0$ is $S_{12}=0$

$\Rightarrow x_1x_2+y_1y_2-(x_1+x_2)+2(y_1+y_2)-2=0$

$\Rightarrow 2k-6-(2+k)+2(1)-2=0$

$\Rightarrow k=8$

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

$C_1(1,1), r_1=5$

$x^2+y^2-4x-4y-1=0$

$C_2(2,2), r_2=3$

$C_1C_2=\sqrt{(2-1)^2+(2-1)^2}=\sqrt{2}$

Clearly $C_1C_2<|r_1-r_2|$

One circle lies inside the other circle

Therefore, no. of common tangents = 0

122. Required common tangent is $S-S'=0$

$\Rightarrow 5x-12y-139=0....(1)$

Verify the option:

Point $P\left(\frac{-2}{5},\frac{-47}{4}\right)$ satisfies (1)

123. Given circles $x^2+y^2+2x+3y+1=0$

$C_1(-1,-3/2), r_1=\sqrt{1+\frac{9}{4}-1}=3/2$

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

$C_2(-2,-3/2), r_2=\sqrt{17}/2$

Equation of common chord is $2x+1=0....(1)$

d = distance from C_1 to (1)

$=\left|\frac{-2+1}{\sqrt{4}}\right|=\frac{1}{2}$

Length of common chord

$=2\sqrt{r^2-d^2}=2\sqrt{\frac{9}{4}-\frac{1}{4}}=2\sqrt{2}$

124. $x^2+2x-3=(x-\alpha)(x-\beta)$

$y^2-y+4=(y-\gamma)(y-\delta)$

The equation of circle having diameter $(\alpha,\gamma)(\beta,\delta)$ is

$(x-\alpha)(x-\beta)+(y-\gamma)(y-\delta)=0$

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

125. The polar of $(1,1)$ w.r.t to $x^2+y^2-4x-6y+12=0$ is $x+2y-7=0$

The inverse of $(1,1)$ is the foot of the perpendicular from $(1,1)$ to $x+2y-7=0$.

$\therefore$ Inverse point

$=\left(\frac{9}{5},\frac{13}{5}\right)=(h,k)$

$h+k=\frac{22}{5}$

126. $x^2+y^2+2hx+2ky=0, C_1=(-h,-k), r_1=\sqrt{h^2+k^2}$

$x^2+y^2+2hx+2ky=0, C_2=(-p,-q), r_2=\sqrt{p^2+q^2}$

$C_1C_2=r_1+r_2$

$(hq-pk)^2=0\Rightarrow hq=pk$

$hq-pk-\frac{hq}{pk}=-1$

127. $x\cos\theta+y\sin\theta=5$

$x\left(\frac{-1}{2}\right)+y\frac{\sqrt{3}}{2}=5$

$-x+y\sqrt{3}=10$

solve

128. Given two circles are

$x^2+y^2-2x-6y+10-r^2=0,$

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

$C_1=(1,3), r_1=r$

$C_2=(4,-1), r_2=3$

Given circles have a common chord then

$|r_1-r_2|<C_1C_2<|r_1+r_2|$

$r-3<5<r+3\Rightarrow 2<r<8$.

129. $3x-4y+4=0\times 2$

$6x-8y+8\rightarrow(1)$

$6x-8y+7\rightarrow(2)$

Req. locus is $6x-8y+\frac{8+7}{2}=0$

$12x-16y+15=0$

130. r = d

131. Length of chord = $2\sqrt{r^2-d^2}$

132. $pole=\left(\frac{-a^2l}{n},\frac{-a^2m}{n}\right)$

133. $5x-2y+6=0$

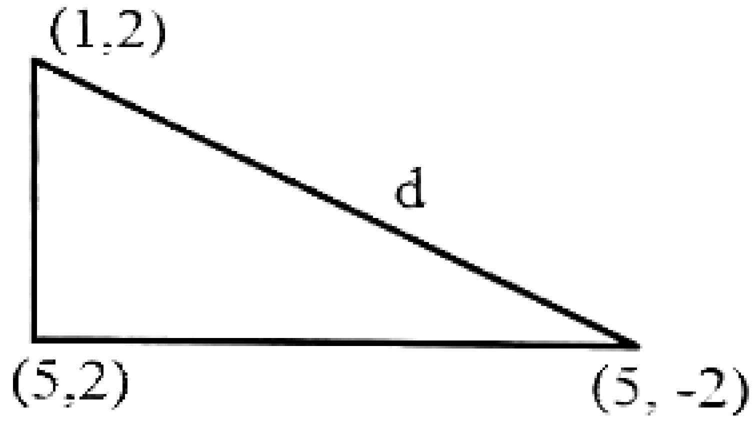
$put\,x=0\Rightarrow y=3$

$Q=(0,3)=(x_1,y_1)$

$PQ=\sqrt{S_{11}}$

134. $x^2+y^2=16$

135.



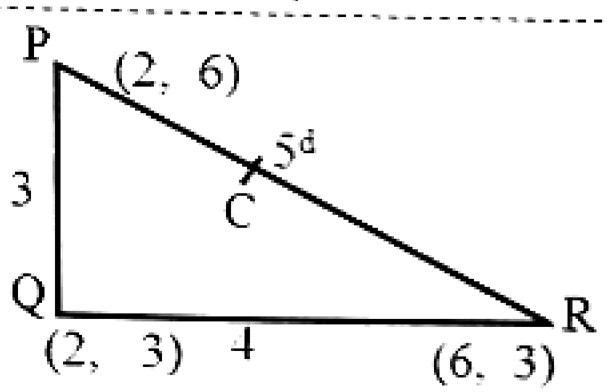
$d=4\sqrt{2}$

$r=2\sqrt{2}$

Area $=\pi r^2$

136. Ratio = $|cp+r|:|cp-r|$

137.



$c=(4,\ 9/2)$

$r=\frac{d}{2}=5/2$

Req circle is

$(x-h)^2+(y-K)^2=r^2$

138. $d=\frac{|C_1-C_2|}{\sqrt{a^2+b^2}}$

139. Option verification

140. $d=|cp-r|$

141. $(x-x_1)(x-x_2)+(y-y_1)(y-y_2)=0$

$\Rightarrow x^2-(x_1+x_2)x+x_1x_2+y^2-(y_1+y_2)y+y_1y_2=0$

$\Rightarrow x^2+2x-a^2+y^2+4y-b^2=0$

142. $f^2=c, \quad g^2-c=9$

$x^2+y^2+2gx+2fy+c=0$

Put $(0,\ 4)$ in (1)

$f^2+8f+16=0$

$f=-4$

$c=16, \quad g=\pm 5$

143. $PA \le 2$

$A=(-3,\ 0)$

$P=(x,\ y)$

144. $c=(-r,r)\in Q_4$

radius = $|r|$

$-r-2r-3=0$

$r=-1$

$C=(1,-1)$,

radius = 1

$\therefore (x-1)^2+(y+1)^2=1$

145. SA = SB

$2ay-2bx-2hy+b^2+h^2-a^2=0\rightarrow(1)$

Put (c,0) in (1) $\qquad C=\dfrac{b^2+h^2-a^2}{2b}$

146. $C=(0,2),\ P=(4,5)$

$CP=5, \quad r=2$

$CP-r\le R\le CP+r$

147. $y=x^2$

$\dfrac{dy}{dx}=2x$

$m=\left(\dfrac{dy}{dx}\right)_{p(2,4))}=4$

Eq. of tangent

$y-y_1=m(x-x_1)$

$\Rightarrow L\equiv 4x-y-4=0$

Req circle $S+\lambda L=0$

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

Put $(0,1)$, $\lambda=13/5$

$C=\left(\dfrac{-16}{5},\dfrac{53}{10}\right)$

148. Conceptual

$m=\dfrac{y_1+f}{x_1+g}$

149. Conceptual

150. $C=(3,2),\ P=(1,8)$

Centre = Mid point of CP

151. If circles lie on same side of the y-axis then $\alpha\beta>0$ .Since y-axis is radical axis of the given equations.

152. $C=(1,-2), \quad r=2$

$\dfrac{\alpha-1}{3}=\dfrac{\beta+2}{-4}=\dfrac{-(3+8-1)}{25}$

$\alpha=\dfrac{-1}{5},\beta=\dfrac{-2}{5}$

153. $y=\dfrac{-1}{m}x\pm 1\sqrt{1+\dfrac{1}{m^2}}$

$my=-x\pm\sqrt{m^2+1}$

$x+my\pm\sqrt{m^2+1}=0$

154. Conceptual

155. $d_1=2\sqrt{r^2-d^2}$

156. $S_{11}<0$

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

Put $y=\dfrac{1}{x}$

$x^4+1=4x^2$

$x^4-4x^2+1=0$

It has four roots

x_1,x_2,x_3,x_4

$x_1,x_2,x_3,x_4=\dfrac{e}{a}=\dfrac{1}{1}=1$

158. $y = mx \pm r\sqrt{1+m^2}$

$r = 3,\ \ m = \sqrt{3}$

$C(0,2)$

159. Equation of line is

$y - 2 = m(x)$

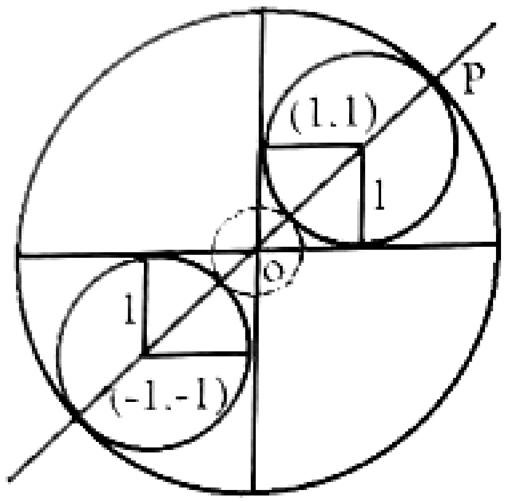
$mx - y + 2 = 0$

$C_1(1,0).\ r = 2$

r=d

$m = 0,\ \ 4/3$.

160.



$O = (0,0),\ \ g = (1,1)$

$cp - r = \sqrt{2} - 1$

$cp + r = \sqrt{2} + 1$

$\therefore r_1 = \sqrt{2} + 1, r_2 = \sqrt{2} - 1$

Ratio $\dfrac{\pi r_1^2}{\pi r_2^2} = \dfrac{3+2\sqrt{2}}{3-2\sqrt{2}}$

161. $r = |f| = 3$

$(x-2)^2 + (y+3)^2 = 9$

162. $x + y = a$

$ab(x^2+y^2) + c(bx+ay) = 0$

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

163. In $P(\alpha,\beta)[\beta = 1]$

Let $(x_1, 0)$ be midpoint of chord $S_1 = S_{11}$

$2xx_1 - \alpha x + \alpha x_1 - y - 2x_1^2 = 0$

Put $(\alpha, 1)$

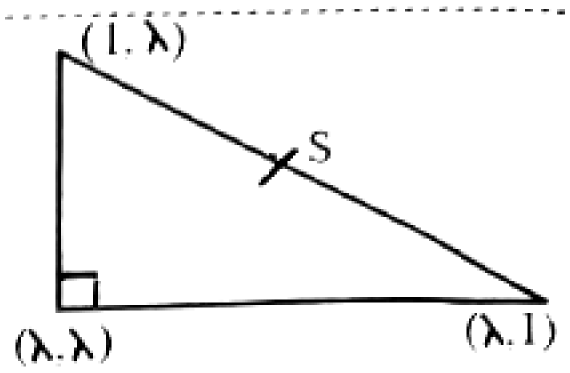
$2x_1^2 = 3 \times x_1 + x^2 + 1 = 0$

$\Delta > 0\ \&\ \alpha^2 > 8$

164. $r_1 = \sqrt{30}, r_2 = \sqrt{60}$

$\dfrac{\pi r_1^2}{\pi r_2^2} = \dfrac{1}{2}$

165.



$s = \left(\dfrac{1+\lambda}{2}, \dfrac{1+\lambda}{2}\right)$

166. d= distance from C(3,-4) on to the line

3x+4y=25

r=5

shortest distance=d-r

167. $CP = (\alpha+1, \alpha)$

$p = (7,3)$

$CP^2 = r^2$

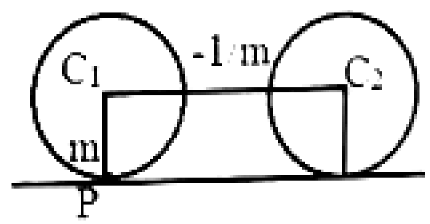
$\alpha = 6,3$

$c = (7,6),(4,3)$

168. Conceptional

169. $C = (2,4)$

$P = (2+\sqrt{3}, 3)$



m=slope of C_1P

$= \dfrac{1}{-\sqrt{3}}$

$\therefore$ req line $C_1\ C_2$ slope = $\sqrt{3}$

$C_1 = (h, k),\ \theta = 60^o,\ r = 2$

$C_2 = (h + r\cos\theta, k + r\sin\theta)$

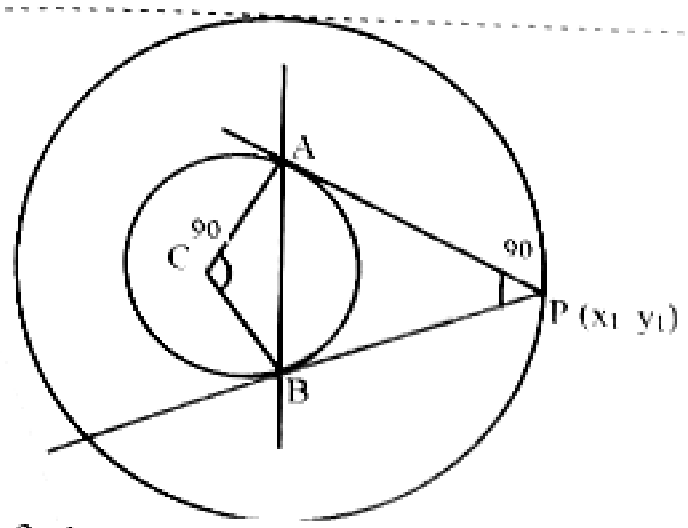
$= (3, 4+\sqrt{3})$.

170. $r = \sqrt{S_{11}}$

171. Conceptual

172. AP. AQ = S_{11}

173.



Locus of circumcentre of CAB = Midpoint of AB = foot of $\perp^{r}$ of C on $AB=(h,k)$

AB line $S_1=0$

$xx_1+yy_1-(x+x_1)=0$

$(x_1-1)x+yy_1-x_1=0\rightarrow(1)$

$h=1+\frac{x_1-1}{(x_1-1)^2+y_1^2}$

$k=\frac{y_1}{(x_1-1)^2+y_1^2}$

$(h-1)^2+K^2=1/2$ ($\because$ p lines on(1))

$2h^2+2k^2-4h+1=0$.

174. $S=(x-1)^2+(y+1)^2=0$

$S^1=x^2+y^2+4x-6y-12=0$

Reg circle

$S+\lambda S^1=0$

Passes through (4, 0)

$\lambda=-2$

175. Conceptual

$l=4\sqrt{39}, n=2$

176. B=midpoint of AQ

B lies on circle

177. $P=(1,-3)$

Eq. of tangent

$y+3=m(x-1)$

mx–y–m–3=0

r=d

$m^2+1=(2m-1)^2$

$m^2+1=4m^2-4m+1$

$9(m_1^2+m_2^2)=9\left(\frac{16}{9}\right)=16$

178. $\tan\theta/2=\frac{r}{\sqrt{S_{11}}}=\frac{3}{4}$

$\tan\theta=\frac{24}{7}$

179. $C_1C_2=r_1+r_2$

Common tangent is $S-S^1=0$

180. $\cos\theta=\frac{C_1+C_2-2g_1g_2-2f_1f_2}{2r_1r_2}$

181. $C=(r,r)$, radius=r

r = d

r = 12,2

c = (2,2), r = 2

182. $P(r\cos\theta, r\sin\theta)=\left(\frac{2}{\sqrt{2}},\frac{2}{\sqrt{2}}\right)=(\sqrt{2},\sqrt{2})$

Eq. of tangent

$y-y_1=m(x-x_1)$

$mx-y+\sqrt{2}-\sqrt{2}m=0$

r = d

$m=2\pm\sqrt{3}$

183. $r^2(l_1l_2+m_1m_2)=(l_1g+m_1f-n_1)$

$(l_2g+m_2f-n_2)$

c=3

option verification

184. Conceptual

185. Conceptual

186. $\overline{AB}^2=(CP+r)^2$

187. $pole=\left(-g+\frac{lr^2}{\lg+mf-n},-f+\frac{mr^2}{\lg+mf-n}\right)$

188. Req. circle

$(x-h)^2+(y-k)^2=1$

Passes through (0, 0), (1,0)

$\Rightarrow h=\frac{1}{2}, k=\frac{\sqrt{3}}{2}$

$C_3\equiv x^2+y^2-x-\sqrt{3}y=0$

Option verification.

189. $|r_1-r_2|<C_1C_2<r_1+r_2$

$x-2=0, y-5=0$

190. $c=(\alpha,5-\alpha)$

$d_1=d_2$

$|\alpha-2|=|\cancel{5}-\alpha-\cancel{5}|$

$|\alpha-2|=|\alpha|$

$\alpha-2=\pm\alpha$

$2\alpha=2$

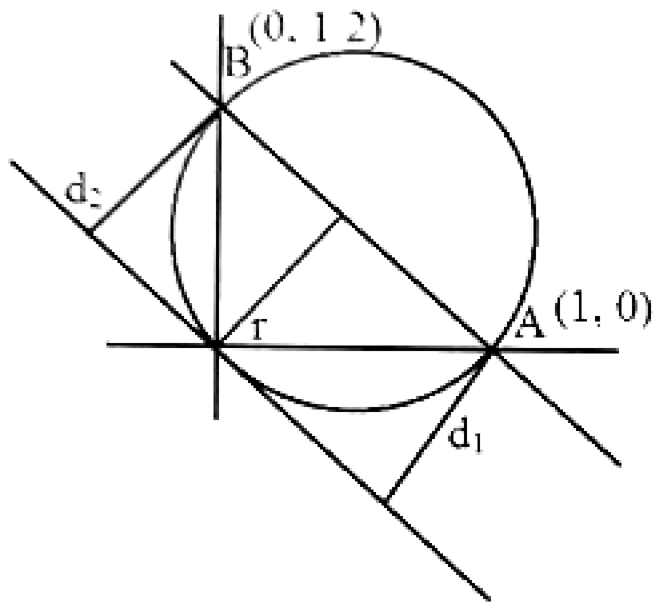
$\alpha=1$

C=(1,4)

r = 1

$A=\pi r^2=\pi$

191. Conceptual



$d_1=d_2=r$

$\therefore d_1+d_2=2r$

192. P, Q are conjugate Points : $S_{12}=0 \Rightarrow$

$$x_1x_2+y_1y_2=a^2$$

$$\sqrt{l_1^2+l_2^2}=\sqrt{x_1^2+x_2^2+y_2^2-2a^2+y^2}$$

$$=\sqrt{(x_1-x_2)^2+(y_1-y_2)^2}=PQ$$

193. A is midpoint PQ

$r_1:r_2=1:1$

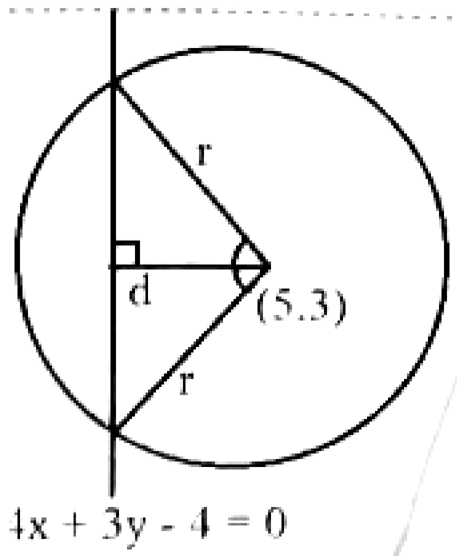
194. Conceptual

195. By Homogenisation

$\angle POQ=90^o \rightarrow$

coeff of x^2 + coeff of $y^2=0$

196.



$x+2x=2\pi r$

$3x=2\pi r$

$x=\dfrac{2\pi r}{3}$

$d=\dfrac{|20+9-4|}{\sqrt{16+9}}=\dfrac{25}{5}=5$

$\dfrac{\theta}{360^o}\times\cancel{2\pi r}=\dfrac{\cancel{2\pi r}}{3}$

$\theta=120^0$

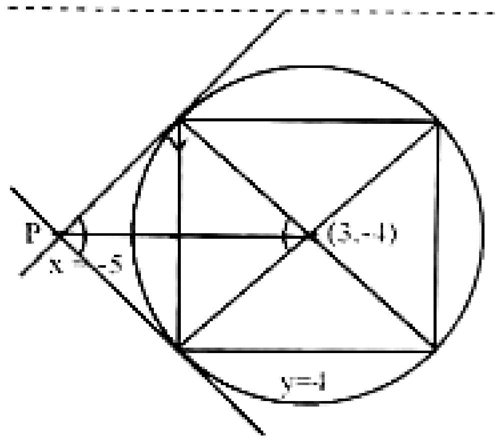
$\cos\dfrac{\theta}{2}=\dfrac{d}{r}$

$\cos 60^o=\dfrac{5}{r}$

$\dfrac{1}{2}=\dfrac{5}{r}$

r = 10

197.



P=image of (3, –4) w.r.to x= – 5

$\therefore p=(-13,-4)$

198. $A(2,0),B(1,-2),C(4,4)$

AB slope = $\dfrac{-2}{-1}=2$

BC slope = $\dfrac{6}{3}=2$

$\therefore A,B,C$ are collinear

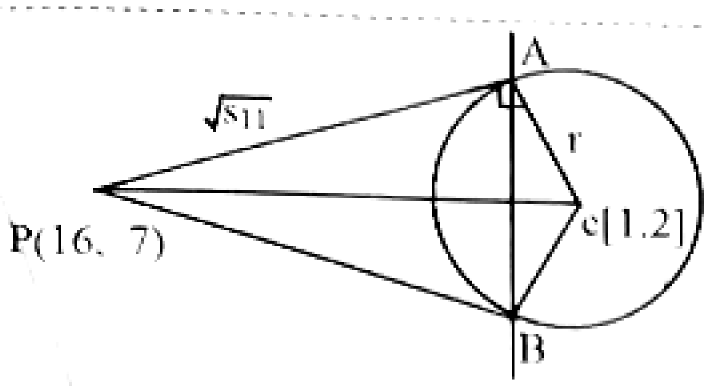
$\therefore L_1,L_2,L_3$

Are concurrent

Q=external centre of similitude.

199. $S_1^2 = S.S_{11}$

200.



$G.T. \left|r\sqrt{S_{11}}\right| = 75 \qquad \sqrt{s_{11}} = \dfrac{75}{r}$

$CP = \sqrt{225+25} = \sqrt{250} = 5\sqrt{10}$

$\angle PAC = \dfrac{\pi}{2} \qquad CP^2 = PA^2 + AC^2$

$\Rightarrow \left(\sqrt{250}\right)^2 = \dfrac{(75)^2}{r^2} + r^2 \Rightarrow r^4 - 250r^2 + (75)^2 = 0$

$\Rightarrow r = 5(or)15$

201. $S = x^2 + y^2 - 4x + 8y + 4 = 0 \quad C_1 = (2,-4),$

$S^1 = x^2 + y^2 + 2x = 0 \qquad C_2 = (-1,0),$

$r_1 = \sqrt{4+16-4} = 4,$

$r_2 = 1$

$C_1C_2 = \sqrt{9+16} = 5 = r_1 + r_2$

Touch each other extremely

$\therefore$ **Point of contact divides C1C2 in ratio 4:1internally**

$$\Rightarrow \text{Point of contact} = \left(\frac{-4+2}{4+1}, \frac{0-4}{4+1}\right)$$

$$= \left(\frac{-2}{5}, \frac{-4}{5}\right)$$

$$a = \frac{-2}{5},\ b = \frac{-4}{5}$$

$$\therefore a + 2b = \frac{-2}{5} - \frac{8}{5} = -2$$

202. **Here (2,2) lies on the circle**

Chord of contact = tangent at that point $\therefore$ it won't intersect circle at 2 points

203. $S_1^2 = S.S_{11}$

$$\Rightarrow \left[x(1) + y(1) + (x+1) + (y+1) + 1\right]^2 = \left(x^2 + y^2 + 2x + 2y + 1\right)(7)$$

$$\Rightarrow (2x + 2y + 3)^2 = 7x^2 + 7y^2 + 14x + 14y + 7$$

$$\Rightarrow 4x^2 + 4y^2 + 9 + 8xy + 12y + 12x = 7x^2 + 7y^2 + 14x + 14y + 7$$

$$\Rightarrow 3x^2 - 8xy + 3y^2 + 2x + 2y - 2 = 0$$

204. $C_1 = (-3,4), C_2 = (1,1), r_1 = 3, r_2 = 1$

$$I.C.S(\text{P}) = \left(\frac{3-3}{4}, \frac{3+4}{4}\right) \Rightarrow \left(0, \frac{7}{4}\right)$$

$$E.C.S(\text{Q}) = \left(\frac{3+3}{2}, \frac{3-4}{2}\right) \Rightarrow \left(3, \frac{-1}{2}\right)$$

$$PQ = \sqrt{(0-3)^2 + \left(\frac{-1}{2} - \frac{7}{4}\right)^2}$$

$$= \sqrt{\frac{225}{16}} \Rightarrow \frac{15}{4}$$

205. $C(2,3)\ r = \sqrt{4+9-k} = \sqrt{13-k}$

$CP.CQ = 4 \Rightarrow r^2 = 4 \Rightarrow 13 - k = 4 \Rightarrow k = 9$

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

Equation of polar at $P(1,2)$ *is* $S_1 = 0$

$\Rightarrow x + 2y - 2(x+1) - 3(y+2) + 9 = 0$

$\Rightarrow x + y - 1 = 0$

inverse point Q is foot of perpendicular of P w.r.to line

$\dfrac{a-2}{1} = \dfrac{b-3}{1} = \dfrac{-(2+3-1)}{2} = -2$

$a - 2 = -2$

$a = 0$

$\therefore 2a = 0$

206. $Let\ x^2 + y^2 + 2gx + 2fy + c = 0 \rightarrow (1)$

$A(2,3)\ B(3,-1)\ C(-3,2)$ *lies on eqn*(1)

$4g+6f+c+13=0, 6g-2f+c+10=0, -6g+4f+c+13=0$

solve these equations we get $g = \dfrac{1}{14}, f = \dfrac{-5}{14}$

$centre(-g,-f) = \left(\dfrac{-1}{14}, \dfrac{5}{14}\right) = (h,k)$

$2k - 4h = 2\left(\dfrac{5}{14}\right) - 4\left(\dfrac{-1}{14}\right) = \dfrac{14}{14} = 1$

207. $centre(h,k)=(2,-3), r=\sqrt{4+9+12}=5$

$P\left(\frac{\pi}{3}\right)=(h+r\cos\theta, k+r\sin\theta)=\left(2+5\left(\frac{1}{2}\right), -3+5\left(\frac{\sqrt{3}}{2}\right)\right)$

$Q\left(\frac{2\pi}{3}\right)=(h+r\cos\theta, k+r\sin\theta)=\left(2+5\left(\frac{-1}{2}\right), -3+5\left(\frac{\sqrt{3}}{2}\right)\right)$

$length\ of\ \overline{PQ}=\sqrt{\left(\frac{5}{2}+\frac{5}{2}\right)^2}=5$

208. $C_1=(1,-2), r_1=\sqrt{1+4-c}=\sqrt{5-c}$

$C_2=(-1,2), r_2=\sqrt{1+4-c}=\sqrt{5-c}$

since 1 & 2 *have four common* tangents

$C_1C_2>r_1+r_2$

$c_1c_2=\sqrt{20}$

$\therefore \sqrt{20}>2\sqrt{5-c}$

$\Rightarrow c>0$ *but* $5-c>0$

$c-5<0$

$c<5$

$\therefore 0<c<5$

209. *Let* $p(x_1,y_1)$ be the pole

polar of $p(x_1,y_1)$ $w.r.t$ $x^2+y^2=4$ *is* $S_1=0$

$xx_1+yy_1-4=0\rightarrow(1)$

(1) *is* tangent to

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

$c=(1,-1)\ r=\sqrt{1+1+2}=2$

$r=d$

$2=\frac{|x_1-y_1-4|}{\sqrt{x_1^2+y_1^2}}$

Locus is

$3x^2+3y^2+2xy+8x-8y-16=0$

210. **Given Circle is** $x^2+y^2-2x+ky+4=0$ **....(1)**

Eq of circle concentric with (1) is

$Centre=(1,\frac{7}{2})$

$radius=\sqrt{1+\frac{49}{4}}$

$\sqrt{\frac{88+49}{4}}$

$\sqrt{\frac{137}{4}}$

211. $C=(3,4)$

$r=4$

Given line is $2x+3y+k=0$

$d=\frac{|6+12+k|}{\sqrt{13}}=\frac{|18+k|}{\sqrt{13}}$

Length of chord $=2\sqrt{3}$

$\cancel{2}\sqrt{r^2-d^2}=\cancel{2}\sqrt{3}$

$r^2-d^2=3$

$13=d^2$

$13=(18+k)^2/13$

$(18+k)^2=169$

$18+k=\pm13$

$k=-5,-31$

212. **Given P=(2,3)**

Circle $x^2+y^2-2x-2y+1=0$

Eq of polar is $S_1=0$

$x+2y-4=0$

$Q=$ Foot of $\perp er$ on $x+2y-4=0$

$\frac{h-2}{1}=\frac{k-3}{2}=-\frac{(2+6-4)}{5}$

$Q=\left[\frac{6}{5},\frac{7}{5}\right]$

Eq of Circle with PQ are end point of diameter

$(x-2)(x-\frac{6}{5})+(y-3)(y-\frac{7}{5})=0$

$\Rightarrow 5x^2+5y^2-16x-22y+33=0$

213. $2\sqrt{g^2-c}=\frac{2\sqrt{13}}{3}$

$g^2-c=\frac{13}{9}-(1)$

$2\sqrt{f^2-c}=\frac{2\sqrt{22}}{3}$

$f^2-c=\frac{22}{9}-(2)$

(1) – (2)

$f^2-g^2=1-(3)$

By verification,opt (2) $\left(\frac{-4}{3},\frac{5}{3}\right)$

$\frac{25}{9}-\frac{16}{9}=1$

$\frac{9}{9}=1$ **(satisfied)**

214. $x^2+y^2-8x+10y+5=0$

$C(4,-5)$

$AB:2x+y+2=0-(1)$

$m_{AB}=-2$

$m_{cp}=1/2$

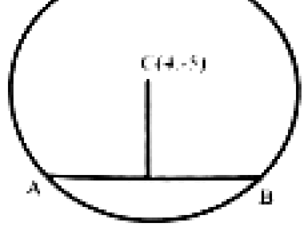
$y+5=\frac{1}{2}(x-4)$

$2y+10=x-4$

$x-2y-14=0-(2)$

Solve (1) & (2), we get (h, k) = (2,- 6)

$\therefore k+4h=-6+4(2)=-6+8=2$



215. $x^2+y^2+2gx+2fy+c=0-(1)$

(1) passes through A(1, 2), we get

5 + 2g + 4f + c = 0 – (2)

(1) passes the B(2, 1), we get

$5+4g+2f+c=0$ **- (3)**

Eq (2) – Eq(3) – we get

g = f

$m_{AB}=-1$

Equ of AB is y -2 = - (x – 1)

$x+y-3=0$

$\because \frac{|-2g-3|}{\sqrt{2}}=\frac{7}{\sqrt{2}}$

$2g+3=7$

$g=2$

$C(-g,-f)=C(-2,-2)$

$\therefore AB=\sqrt{2}$

$2\sqrt{r^2-\frac{49}{4}}=\sqrt{2}$

$\Rightarrow r^2=\frac{51}{4}$

$\therefore$ **Eqn of circle** $(x+2)^2+(y+2)^2=\frac{51}{4}-(4)$

Put P (1, -2) in (4)

$9-\frac{51}{4}=\frac{-15}{4}<0$

$\therefore$ **'p' lies inside the circle.**

216. $c(-g,-f)=c(-1,6)$

$r=13$

$12x+5y+k=0$

$m=\frac{-12}{5}$

$\perp^r$ **slope,** $m=\frac{5}{13}$

$y=mx+r\sqrt{1+m^2}$

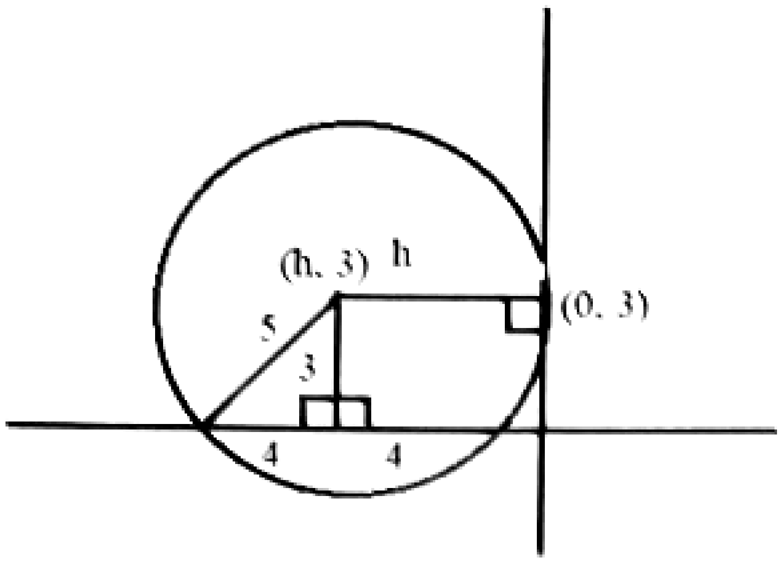
$y=\frac{5}{12}x\pm 13\sqrt{1+\frac{25}{144}}$

$y=\frac{5}{12}x\pm 13\left(\frac{13}{12}\right)$

$12y=5x\pm 169$

5x–12y–169=0

217.



$f^2 = c, 2\sqrt{g^2 - c} = 8$

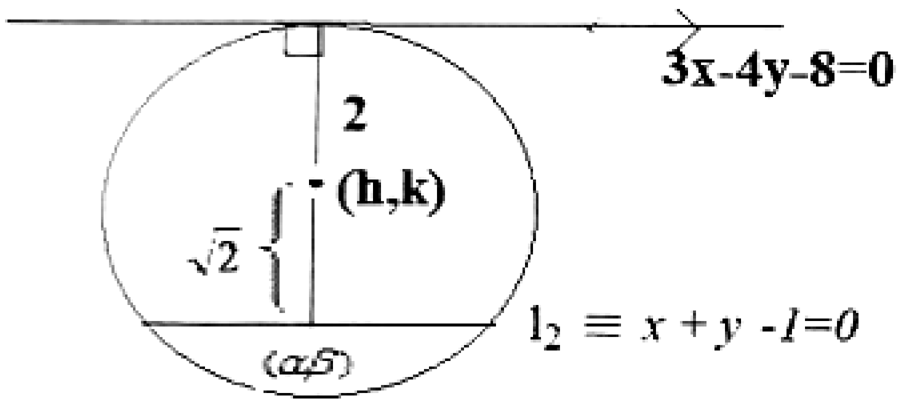
$f = -3, c = 9, g = \pm 5$

Since C lies in Q_3

$C = (-5,3),\ P = (-2,-1) \Rightarrow CP = 5$

218. **IPE model**

219.



$$\frac{\alpha - h}{1} = \frac{\beta - k}{1} = -\frac{(h+k-1)}{1+1}$$

$$\alpha = \frac{-h-k+1}{2} + h \quad , \quad \beta = \frac{-h-k+1}{2} + k$$

$$\alpha = \frac{h-k+1}{2} \quad , \quad \beta = \frac{-h+k+1}{2}$$

$\alpha + \beta = 1$

$\alpha + \beta + r = 1 + 2 = 3$

220. **C(5, -6) ,**

$$r = \sqrt{25+36+3} = 8$$

Perpendicular distance > radius

4th option satisfies.

221.

Required circle radius $= \sqrt{2}$ (Given circle radius)

$= 5\sqrt{2}$

$C = (-3,2)$

Required tangent is perpendecular to $6x - 4y + k = 0$

$\Rightarrow -4x - 6y = k$ is required tangent

$$5\sqrt{2} = \frac{|12-12-k|}{\sqrt{52}}$$

$5\sqrt{2}(\sqrt{52}) = |k|$

$k = \pm 10\sqrt{26}$

Required line $-4x - 6y \pm 10\sqrt{26} = 0$

$\Rightarrow 2x + 3y \pm 5\sqrt{26} = 0$

222.

$C_1(4,5)\ C_2(-1,1),\ r_1 = 7, r_2 = 2$

$r_1 : r_2 = 7:2$

$P =$ Exteranal entre of similitude

$$= \left(\frac{-7-8}{5}, \frac{7-10}{5}\right)$$

$$= \left(-3, \frac{-3}{25}\right)$$

$$OP = \sqrt{9 + \frac{89}{25}}$$

$$= \frac{3\sqrt{26}}{5}$$

223.

$h = 0$

$a = b$

$bx^2 + by^2 + 2gx + 2fy + c = 0$

$r \geq 0$

$$\Rightarrow \sqrt{\frac{g^2}{b^2} + \frac{f^2}{b^2} - \frac{c}{b}} \geq 0$$

$\Rightarrow g^2 + f^2 - bc \geq 0$

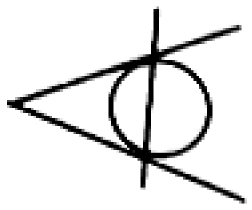
Given circle is point circle

$\Rightarrow r = 0$

$g^2 + f^2 = bC > 0$

Ans. $bc > 0$

224. $let(\alpha,\beta)$ point of intersction of the tangets



Chord of contact of (α,β) is

$(\alpha-2)\,x+(\beta-3)y-(2\alpha+3\beta-4)=0$

Given $2x-y+3=0$

$$\frac{\alpha-2}{2}=\frac{\beta-3}{-1}=\frac{-(2\alpha+3\beta-4)}{3}$$

Simplify it $\alpha=\frac{-5}{2},\ \beta=\frac{21}{4}$

225. Common chord $of\ x^{2}+y^2+kx-ky+1=0\rightarrow(1)$

$\&\ x^2+y^2-kx+ky-2=0\rightarrow(2)$

is $2Kx-2Ky+3=0\rightarrow(3)$

Given$x^2+y^2-4x+4y-\frac{7}{2}=0\rightarrow(4)$

Circle passing through point

point of interection of (1)&(2)

$\Rightarrow x^2+y^2+kx-ky+1+\lambda(2kx-2ky+3)=0$

$\Rightarrow x^2+y^2+x(k+2k\lambda)+y(-k-2k\lambda)+3\lambda=0.....(5)$

(4),(5)same

$k(1+2\lambda)=-4\ \&\ 3\lambda=\frac{-7}{2}$

$k(1+\cancel{2}(\frac{-7}{\cancel{6}_3}))=-4$

$\Rightarrow k(\frac{-\cancel{4}}{3})=-\cancel{4}$

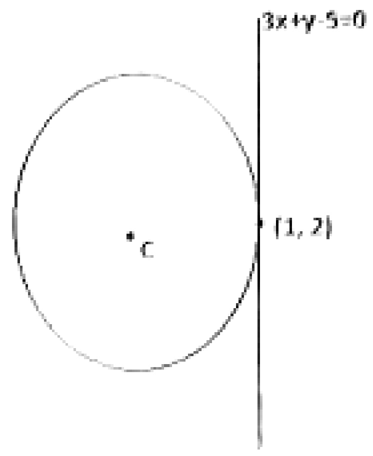
$k=3,\text{point}(3,3)$

length of tangent $=\sqrt{9+9-1\cancel{2}+1\cancel{2}-\frac{7}{2}}$

$=\sqrt{18-\frac{7}{2}}$

$=\sqrt{\frac{29}{2}}$

226.



$(-3)\left(\frac{2-k}{1-h}\right)=-1$

$h-3k+5=0\rightarrow$ 1

$(h-1)^2+(k-2)^2=10$

$h^2+k^2-2h-4k=5$

$37-hk-2h-4k=5\rightarrow$ 2

From 1 **&** 2

$3k^2+5k-42=0$

Now use option verification

227. **Pole of x+y-1=0 w. r. t s=0**

$\left(2+\frac{5+f^2}{f-1},-f+\frac{5+f^2}{f-1}\right)$

Sub in 2x+y-1=0

$\Rightarrow 2f^2+4f=0$

$f=0,f=-2$

228. **Here two circles intersect**

C1(-1, 1), C2(1, -1), r1=2, r2=1

Point =(3, -3)

Equation of tangent y+3=m(x-3)

mx-y-3m-3=0

take r=d

$\Rightarrow 3m^2+8m+3=0$

$m_1m_2=1$

229. **Equation of chord is 4x+2y+6=0**

2x+y+3=0

Length of chord $=2\sqrt{r^2-d^2}$

230. **Eqn of circle passing through given points is**

S = 7x2 + 7y2 – 6x + 10y – 22 = 0

$S_{11}=7x_1^{\,2}+7y_1^{\,2}-6x_1+10y_1-22$

= 7 (1) + 7(4) – 6(1) + 10(2) – 22

= 55 – 28

S11 = 27 > 0

231. **C = (2, 4)**

$$\sqrt{S_{11}} = \sqrt{4} = 2$$

$$r = \sqrt{4+16-4} = 4$$

$$\tan\frac{\alpha}{2} = \frac{r}{\sqrt{S_{11}}}$$

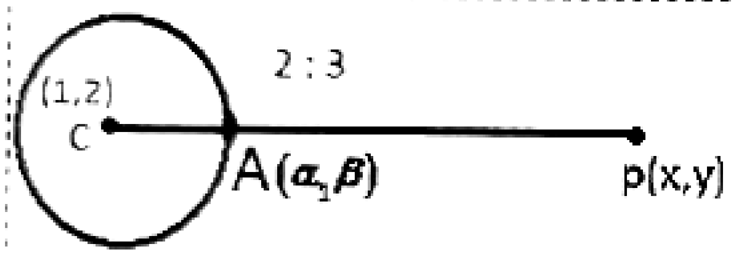
$$\tan\frac{\alpha}{2} = \frac{4}{2} = 2$$

$$\tan\alpha = \left|\frac{2\tan\alpha/2}{1-\tan^2\alpha/2}\right|$$

$$= \left|\frac{4}{1-4}\right|$$

$$\tan\alpha = \frac{4}{3}$$

232.



$$(\alpha,\beta) = \left(\frac{2x+3}{5}, \frac{2y+6}{5}\right)$$

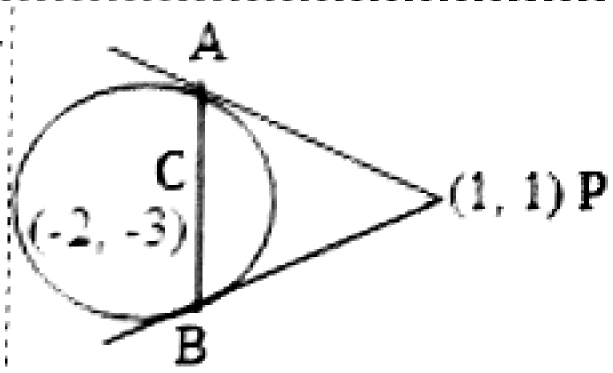
$$x^2 + y^2 - 2x - 4y - 20 = 0$$

$$\left(\frac{2x+3}{5}\right)^2 + \left(\frac{2y+6}{5}\right)^2 - 2\left(\frac{2x+3}{5}\right)$$

$$-4\left(\frac{2y+6}{5}\right) - 20 = 0$$

$$4x^2 + 4y^2 - 8x - 16y - 605 = 0$$

233.



$$S_{11} = 9, C = (-2,-3), r = 4$$

$$Area\ of\ \Delta^{le} PAB = \frac{r(S_{11})^{3/2}}{S_{11}+r^2} = \frac{108}{25}$$

234. $\boxed{S_1 = S_{11}}$

235. $S_1 = 0$

$$2x + 4y - 3 = 0, l = \frac{19}{10},$$

$$m = -\frac{1}{5}.$$

236. $let \sqrt{S_{11}} = \sqrt{\frac{23}{3}}, C = \left(-\frac{1}{6}, -\frac{1}{6}\right),$

$$p = (2,1)$$

$$\therefore CP^2 - r^2$$

237. $\boxed{S_{12} = 0}$

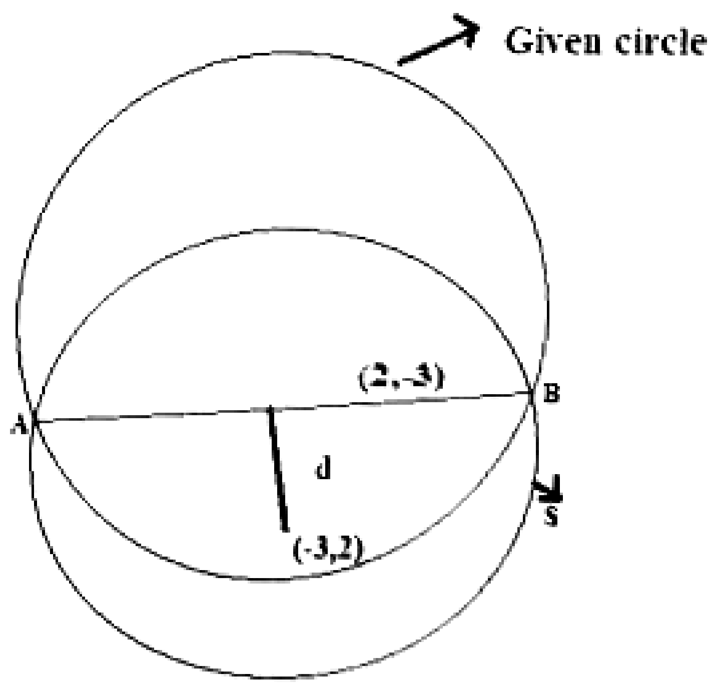
238. **AB=10**

$$2\sqrt{r^2 - d^2} = \cancel{10}^{5}$$

$$r^2 - 50 = 25$$

$$r^2 = 75$$

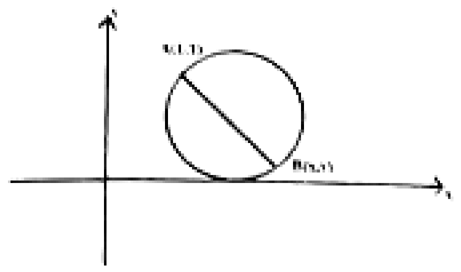
$$r = 5\sqrt{3}$$



239. Let B (x_1, y_1) **be the other end of diameter**

Eq. of circle with $\overline{AB}$ **as diameter is**

$(x-1)(x-x_1)+(y-1)(y-y_1)=0$



$x^2-(x_1+1)x+x_1+y^2-(y_1+1)y+y_1=0$

$x^2+y^2-(x_1+1)x-(y_1+1)y+x_1+y_1=0$

it touches x - axis

$\therefore g^2=c$

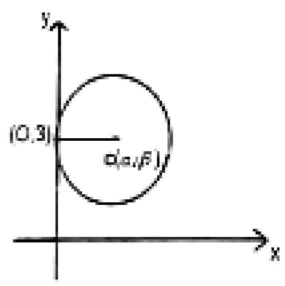
$\left[\dfrac{-(x_1+1)}{2}\right]^2=x_1+y_1$

$(x_1+1)^2=4x_1+4y_1$

$(x_1-1)^2=4y_1$

locus is $(x-1)^2=4y$

240.



Give circle touches the y-axes at (0,3) & Make intercept of length 2 unit on positive x-axis

W.K.T $f^2=c$, $\cancel{2}\sqrt{g^2-c}=\cancel{2}$ $\cancel{2}\sqrt{g^2-c}=\cancel{2}$

$g^2-c=1$

$\boxed{g^2-f^2=1}$

$\beta=3, f=3, g=\pm\sqrt{10}$

By verification, option:- $C(-\sqrt{10},3)$.

241. **Given circlex2+y2=4& P(4,0)**

W.K.T equationof tangent is

$y-mx\pm r\sqrt{1+m^2}$

$o=m(4)\pm 2\sqrt{1+m^2}$

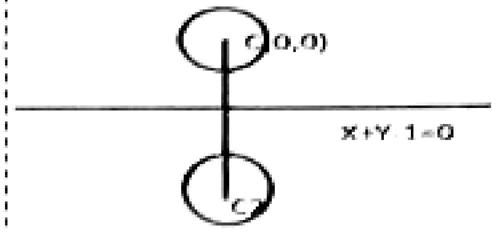
simply, weget

$m=\pm\dfrac{1}{\sqrt{3}}$

$\therefore$ **Required tangent lines are** $\sqrt{3}y=\pm(x-4)$.

242. *Given curve* $x^2+y^2=1$

line $x+y-1=0$



Using Image theorem, we get

$\dfrac{h-0}{1}=\dfrac{k-0}{1}=\dfrac{-2(-1)}{2}$

$h=1,\quad k=1\ ,\ r=1$

$\text{Re}q$ *circle* $\& x^2+y^2-2x-2y+1=0$

243. *Given* $\overline{CP}$ *equation is* $(y-5)=\dfrac{\cancel{-2}}{\cancel{4}_2}(x+3)$

$\Rightarrow x+2y-7=0$

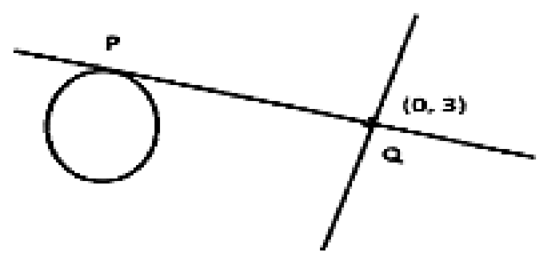
perpendicular line form is $2x-y+k=0\rightarrow(1)$

$Q(1,3)$ *passing through* 1, *we get*

$k=1$

$\therefore\ 2x-y+1=0$

244.



Given line $5x-2y+6=0$ *meets* $y-axis$

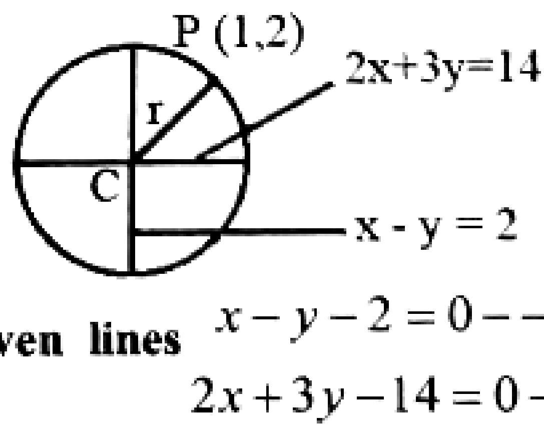
$x=0\Rightarrow y=3\qquad\therefore\ Q(0,3)$

Given circle equation $x^2+y^2+6x+6y-2=0$

PQ Length is $=\sqrt{S_{11}}$

$=\sqrt{0+9+0+18-2}=\underline{5}$

245.



Given lines $x-y-2=0--(1)$

$2x+3y-14=0---(2)$

Solve (1) & (2) we get

Centre $C(4,2), P(1,-2)$

Radius $r=cp=\sqrt{(1-4)^2+(-2-2)^2}$

$=\sqrt{9+16}$

$=\sqrt{25}=5$

246. **Given circles are**

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

$$x^2+y^2+6x-2y+1=0$$

$$c_1(1,3)\quad c_2(-3,1)$$

$$r_1=1,\quad r_2=3$$

Now $\overline{c_1c_2}=2\sqrt{5},\qquad r_1+r_2=4$

$\therefore\qquad \overline{c_1c_2}>r_1+r_2$

Hence the number of common tangents =4

247. **Given circle is** $2x^2+2y^2-3x+5y-7=0$

$$x^2+y^2-\frac{3}{2}x+\frac{5}{2}y-\frac{7}{2}=0$$

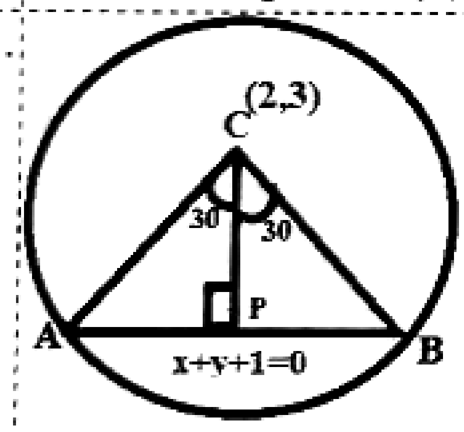
$$g=\frac{-3}{4},f=\frac{5}{4},c=\frac{-7}{2},r^2=\frac{90}{16}$$

Given line $9x+y-28=0$

$$\therefore Pole=\left(-g+\frac{lr^2}{lg+mf-n},-f+\frac{mr^2}{lg+mf-n}\right)$$

Hence the pole is (3,-1)

248.



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

$$\cos 30=\frac{3\sqrt{2}}{AC}$$

$$AC=2\sqrt{6}=r$$

$$(x-2)^2+(y-3)^2=24$$

$$x^2+y^2-4x-6y-11=0$$

249. $2\sqrt{g^2-c}=6$

$$g^2-c=9$$

$$g^2-9=c$$

$$2\sqrt{f^2-c}=8$$

$$f^2-c=16$$

$$f^2-16=c$$

$$g^2-9=f^2-16$$

$$g^2-f^2=-7$$

$$(g+f)(g-f)=-7$$

$gx+fy+1=0$

it passing through $(1,-1)$

$g(1)+f(-1)+1=0$

$g-f+1=0$

$g-f=-1$

$$(g+f)(g-f)=-7$$

$$(g+f)(-1)=-7$$

$$-g-f=-7$$

$$g+f=7$$

$$g-f=-1$$

$2g=6$ $\quad f=g+1$

$\boxed{g=3}\quad \boxed{f=3+1=4}\quad \boxed{c=0}$

$$radius(r)=\sqrt{9+16}=5$$

250. $x^2+y^2+2gx+2fy+c=0$

$(3,1)\Rightarrow\ 6g+2f+c+10=0......(1)$

$(-2,4)\Rightarrow -4g+8f+c+20=0.....(2)$

(1)–(2) $\Rightarrow 10g-6f-10=0$

$$5g-3f-5=0.....(3)$$

Centre lies on $x-y+1=0$

$$-5g+5f5=10....(4)$$

$(3)+(4)\Rightarrow\ \boxed{f=0}$

$\Rightarrow\boxed{g=1}$

Centre = $(-1,0)$

Parametric equations are

$x=-1+\sqrt{17}\cos\theta$

$y=\sqrt{17}\sin\theta$

$\boxed{c=-16}$

$r=\sqrt{1+0+16}$

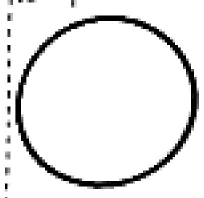
$r=\sqrt{17}$

251. $S = x^2 + y^2 - 8x + 10y + 5 = 0$

$P(1,1), Q(1,-1)$

The polar of 'p' w.r.t S=0

is $S_1 = 0$



$x(1) + y(1) - 4(x+1) + 5(y+1) + 5 = 0$

$-3x + 6y + 6 = 0$

$x - 2y - 2 = 0 ....(1)$

The eqn of chord whose midpoint Q(1,–1) w.r.t s=0 is

$S_1 = S_{11}$

$x - y - 4x - 4 +$

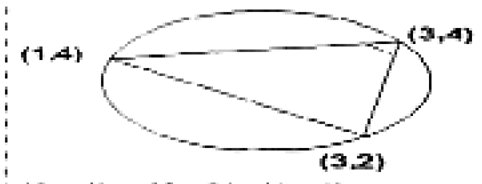
$5y - 5 + 5 = 1 + 1 - 8 - 10 + 5$

$-3x + 4y + 7 = 0$

$3x - 4y - 7 = 0....(2)$

P.I of (1) and (2) is $\left(11, 13/2\right)$

252. **The equation of circle passing through**



$(3,4), (3,2)(1,4)$

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

$x^2 + y^2 - 4x - 6y + 11 = 0$

Centre $= (2,3) = (a,b)$

Radius r $= \sqrt{4+9-11} = \sqrt{2}$

$b^a r^a = 3^2.\left(\sqrt{2}\right)^2$

=18

253. **The equation of tangent to**

$x^2 + y^2 = 4 \ at \ p(\sqrt{3},1)$

Is PT is $\sqrt{3}\,x + y - 4 = 0$

The line which is perpendicualar to PT

$x - \sqrt{3}\,y + k = 0$

Which is a tangent to $(x-3)^2 + y^2 = 1$

$1 = \dfrac{|3+0+k|}{\sqrt{4}}$

$|k+3| = 2$

$k + 3 = \pm 2$

K=–1, or –5

$x - \sqrt{3}\ y = 1 \ or$

Required eqn is $x - \sqrt{3}\ y = 5$

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

P(6, –5)

$Tan\dfrac{\theta}{2} = \dfrac{r}{\sqrt{s_{11}}}$

$r = \sqrt{1+4-3} = \sqrt{2}$

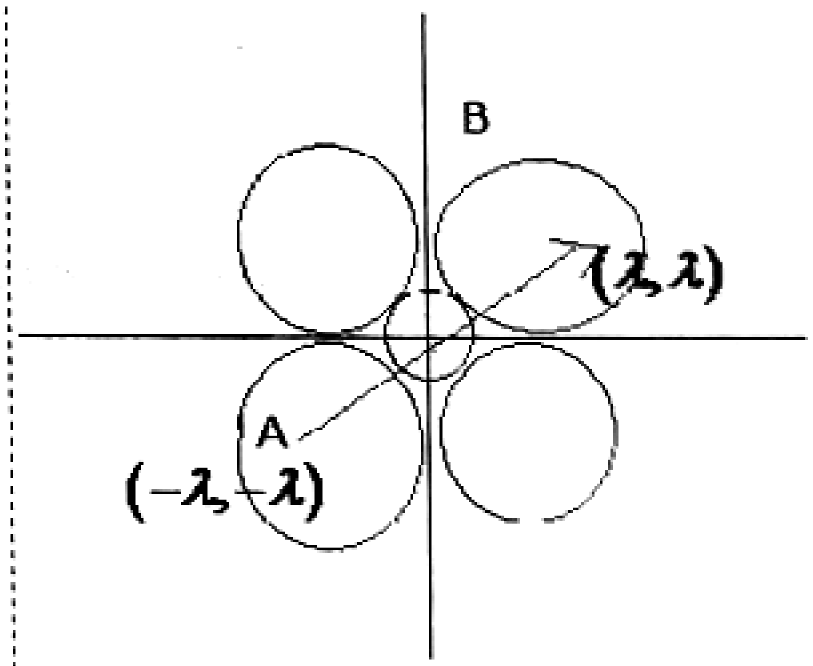
$\sqrt{s_{11}} = \sqrt{36+25-12-20+3} = \sqrt{32} = 4\sqrt{2}$

$Tan\theta/2 = \dfrac{\sqrt{2}}{4\sqrt{2}} = \dfrac{1}{4}$

$Tan\theta = \dfrac{2Tan\theta/2}{1-Tan^2\theta/2} = \dfrac{2.1/4}{1-\dfrac{1}{16}} = \dfrac{8}{15}$

$\cot\theta = \dfrac{15}{8}$

255. $(x \pm \lambda)^2 + (y \pm \lambda)^2 = \lambda^2$



Let r be the radians of required circle

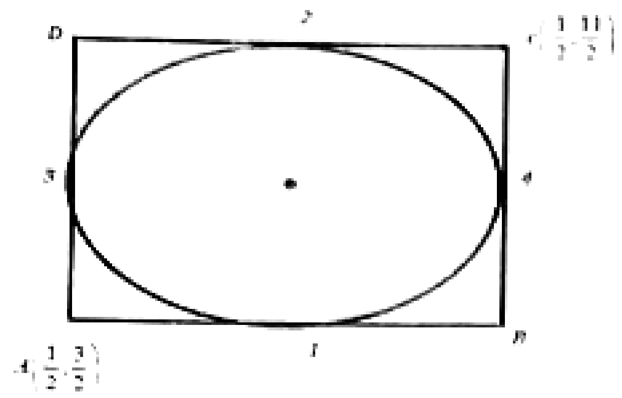
$AB = \lambda + 2r + \lambda$

$\sqrt{4\lambda^2 + 4\lambda^2} = 2r + 2\lambda$

$2\sqrt{2}\ \lambda = 2r + 2\lambda$

$r = \left(\sqrt{2}-1\right)\lambda$

256. x +y-2 =0 , ____ (1) x+y-6 = 0______ (2)
x-y+1 ______(3) , x-y+5 =0 ______(4)



$(1) \parallel^{el} (2),\ (3) \parallel^{el} (4)$

$$d = \frac{4}{\sqrt{2}} = 2\sqrt{2}$$

2r = $2\sqrt{2}$

r = $\sqrt{2}$, r2= 2

solve (1) & (3) $(\frac{1}{2}, \frac{3}{2})$

solve (2) & (4) $(\frac{1}{2}, \frac{11}{2})$

centre 'C' mid point of AC

C $(\frac{1}{2}, \frac{7}{2})$

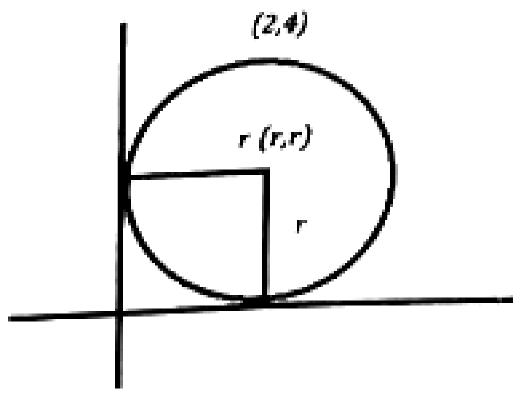
$$(x - \frac{1}{2})^2 + (y - \frac{7}{2})^2 = 2$$

∴ 2x2 +2y2 – 2x – 14y+21 = 0

257. (x- r)2 + (y- r)2= r2---(1)
Passes the p(2,4)
(2 – r)2 + (4 –r)2 = r2
4 + r2- 4r + 16 + r2 - 8r=r2
r2 – 12r + 20 =0
r = 10, 2

$$A_1 = \pi r_1^2 = \pi 100, A_2 = \pi_2^2 = \pi 4$$

$$|A_1 - A_2| = 100\pi - 4\pi = 96\pi$$

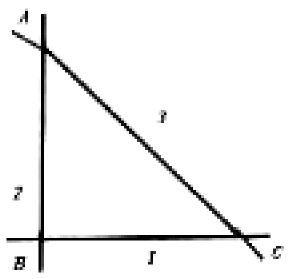


258. 2x – 3y +3 = 0 ________(1)

6x+4y+1 = 0 __________(2)

2x+y+1 = 0 _______(3)

solve (2) &(3) A $(\frac{-3}{2}, 2)$



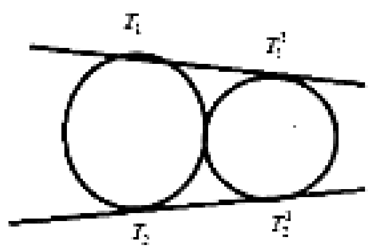
by option verification

opt (3)

$$8(\frac{9}{4}) + 8(4) + 18(\frac{-3}{2}) - 20(2) + 17 = 0$$

18+32–27–40+17=0 (satisfied)

259. c1 (1, 2) , r1 = 3,
c2 (–2, –2), r2= 2
c1c2= 5 , r1 +r2 = 5
c1c2 = r1+r2



length of direct common tangent

$$T_1T_1^1 = \sqrt{d^2 - (r_1 - r_2)^2}$$

$= \sqrt{25 - 1} \qquad = \sqrt{24}$

$= 2\sqrt{6}$