MATHS

BOOKS - SAI MATHS (TELUGU ENGLISH)

CIRCLE

Problems

1. If (4,2) and (k,-3) are conjugate points with respect to $x^2 + y^2 - 5x + 8y + 6 = 0$ them k=

A. $\frac{28}{3}$

B. $\frac{-28}{3}$

C. $\frac{3}{28}$

D. $\frac{-3}{28}$

Answer: A

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2. The area (in sq units) of the triangle formed by the tangent, normal at $(1, \sqrt{3})$ to the circle $x^2 + y^2 = 4$ and the X-axis, is

A. $4\sqrt{3}$

B. $\frac{7}{2}\sqrt{3}$

C. $2\sqrt{3}$

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

Answer: C

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3. The value of a, such that the power of the point (1, 6) with respect to the circle $x^2 + y^2 + 4x - 6y - a = 0$ is -16 is

A. 7

B. 11

C. 13

D. 21

Answer: D

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4. The sum of the minimum and maximum distances of the point (4,-3) to the circlex^2 +y^2+4x-10y-7=0

A. 10

B. 12

C. 16

D. 20

Answer: D

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5. If $x - y + 1 = 0$ meets the circle $x^2 + y^2 + y - 1 = 0$ at A and B , then the equation of the circle with AB as diameter is

A. $2\left(x^2 + y^2\right) + 3x - y + 1 = 0$

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

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

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

Answer: A

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6. A circle with centre at (2, 4) is such that the line x+y+2 =0 cuts a chord of length 6. The radius of the circle is

A. $\sqrt{41}$ cm

B. $\sqrt{11}$ cm

C. $\sqrt{21}$ cm

D. $\sqrt{31}$ cm

Answer: A

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7. The condition for the lines lx + my + n = 0 and $l_1x + m_1y + n_1 = 0$ to be conjugate with respect to the circle $x^2 + y^2 = r^2$, is

A. $r^2(11_1 + mm_1) = nn_1$

B. $r^2(11_1 - mm_1) = nn_1$

C. $r^2(11_1 + mm_1) + nn_1 = 0$

D. $r^2(1m_1 + 1_1m) = nn_1$

Answer: A

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8. The circle $4x^2 + 4y^2 - 12x - 12y + 9 = 0$

A. toches both the axes

B. touches the x-axis only

C. touches the y-axis only

D. does not touch the axes

Answer: A

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9. For the circle C with the equation $x^2 + y^2 - 16x - 12y + 64 = 0$ match the List I with the List II given below,

	List I		List II
(i)	The equation of the polar of (-5, 1) with respect to C	(A)	$y = 0$
(ii)	The equation of the tangent at (8, 0) to C	(B)	$y = 6$
(iii)	The equation of the normal at (2, 6) to C	(C)	$x + y = 7$
(iv)	The equation of the diameter of C through (8, 12)	(D)	$13x + 5y = 98$
		(E)	$x = 8$

The correct match is

A.
i	ii	iii	iv
D	B	A	E

B.
i	ii	iii	iv
D	A	B	E

C.
i	ii	iii	iv
C	D	A	B

D.
i	ii	iii	iv
C	E	B	A

Answer: B

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10. If the length of the tangent from (h,k) to the circle $x^2 + y^2 = 16$ is twice the length of the tangent from the same point to the circle

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

A. $h^2 + k^2 + 4h + 4k + 16 = 0$

B. $h^2 + k^2 + 3h + 3k = 0$

C. $3h^2 + 3k^2 + 8h + 8k + 16 = 0$

D. $3h^2 + 3k^2 + 4h + 4k + 16 = 0$

Answer: C

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11. Given the circle C with the equation $x^2 + y^2 - 2x + 10y - 38 = 0$.

Match the List I with the List II given below concerning C.

	List I		List II
$A.$	The equation of the polar of $(4, 3)$ with respect to C	$I.$	$y + 5 = 0$
$B.$	The equation of the tangent at $(9, -5)$ on C	$II.$	$x = 1$
$C.$	The equation of the normal at $(-7, -5)$ on C	$III.$	$3x + 8y = 27$
$D.$	The equation of the diameter of C passing through $(1, 3)$	$IV.$	$x + y = 3$
		$V.$	$x = 9$

The correct answer is

A. $\begin{matrix} A & B & C & C \\ III & I & V & II \end{matrix}$

B. $\begin{matrix} A & B & C & C \\ IV & V & I & II \end{matrix}$

C. $\begin{matrix} A & B & C & C \\ III & V & I & II \end{matrix}$

D. $\begin{matrix} A & B & C & C \\ IV & II & I & V \end{matrix}$

Answer: C

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12. Consider the circle $x^2 + y^2 - 4x - 2y + c = 0$ whose centre is A(2, 1)

If the point P (10, 7) is such that the line segment PA meets the circle in Q

With PQ=5, then c=

A. -15

B. 20

C. 30

D. -20

Answer: D

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13. If the line x+3y=0 is tangent at (0,0) to the circle of radius 1, then the centre of one such circle is

A. (3, 0)

B. $\left(\frac{-1}{\sqrt{10}}, \frac{3}{\sqrt{10}}\right)$

C. $\left(\frac{3}{\sqrt{10}}, \frac{-3}{\sqrt{10}}\right)$

D. $\left(\frac{1}{\sqrt{10}}, \frac{3}{\sqrt{10}}\right)$

Answer: D

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14. The radius of the circle $r = 12\cos\theta + 5\sin\theta$ is

A. $\frac{5}{12}$

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

C. $\frac{15}{2}$

D. $\frac{13}{2}$

Answer: D

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15. If the line y=2x+c is a tangent to the circle $x^2 + y^2 = 5$ then a value of c is

A. 2

B. 3

C. 4

D. 5

Answer: D

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16. A line segment AM=a moves in the XOY plane such that AM is parallel to the X-axis. If A moves along the circle $x^2 + y^2 = a^2$, then the locus of M is

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

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

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

D. $x^2 + y^2 = 2ax + 2ay$

Answer: B

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17. If the lines 3x+4y-14=0 and 6x+8y+7=0 are both tangents to a circle, then its radius is

A. 7

B. $\frac{7}{2}$

C. $\frac{7}{4}$

D. $\frac{7}{6}$

Answer: C

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18. The equation of the circle concentric with the circle $x^2 + y^2 - 6x + 12y + 15 = 0$ and of double its area is:

A. $x^2 + y^2 - 6x + 12y - 15 = 0$

B. $x^2 + y^2 - 6x + 12y - 30 = 0$

C. $x^2 + y^2 - 6x + 12y - 25 = 0$

D. $x^2 + y^2 - 6x + 12y - 20 = 0$

Answer: A

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19. The length of the common chord of the circles of radii 15 and 20, whose centres are 25 unit of distance apart, is

A. 12

B. 16

C. 24

D. 25

Answer: C

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20. The equations of the circles which pass through the origin and makes intercepts of lengths 4 and 8 on the x and y axis respectively, are :

A. $x^2 + y^2 \pm 4x \pm 8y = 0$

B. $x^2 + y^2 \pm 2x \pm 4y = 0$

C. $x^2 + y^2 \pm 8x \pm 16y = 0$

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

Answer: A

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21. The locus of centre of a circle which passes through the origin and cuts off a length of 4 units from the line x=3 is

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

B. $y^2 + 6x = 13$

C. $y^2 + 6x = 10$

D. $x^2 + 6y = 13$

Answer: B

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22. The diameters of a circle pre along 2x+y-7=0 and x+3y- 11=0. Then, the equation of this circle, which also passes through (5,7) is:

A. $x^2 + y^2 - 4x - 6y - 16 = 0$

B. $x^2 + y^2 - 4x - 6y - 20 = 0$

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

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

Answer: C

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23. If the lines 2x -3y=5 and 3x-4y=7 are two diameters of a circle of radius 7, then the equation of the circle is

A. $x^2 + y^2 + 2x - 4y - 47 = 0$

B. $x^2 + y^2 = 49$

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

D. $x^2 + y^2 = 17$

Answer: C

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24. The inverse of the point (1, 2) with respect to the circle $x^2 + y^2 - 4x - 6y + 9 = 0$ is

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

B. (2, 1)

C. (0, 1)

D. (1, 0)

Answer: C

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25. If θ is the angle between the tangents from (-1,0) to the circle $x^2 + y^2 - 5x + 4y - 2 = 0$, then $\theta =$

A. $2\tan^{-1}\left(\frac{7}{4}\right)$

B. $\tan^{-1}\left(\frac{7}{4}\right)$

C. $2\cot^{-1}\left(\frac{7}{4}\right)$

D. $\cot^{-1}\left(\frac{7}{4}\right)$

Answer: A

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26. The radius of the circle with the polar equation $r^2 - 8r\left(\sqrt{3}\cos\theta + \sin\theta\right) + 15 = 0$ is

A. 8

B. 7

C. 6

D. 5

Answer: B

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27. The equation of the circle of radius 3 that lies in the fourth quadrant and touching the lines x=0 and y=0 is

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

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

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

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

Answer: A

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28. The polar equation of the circle with centre $\left(2, \frac{\pi}{2}\right)$ and radius 3 units is

A. $r^2 + 4r\cos\theta = 5$

B. $r^2 + 4r\sin\theta = 5$

C. $r^2 - 4r\sin\theta = 5$

D. $r^2 - 4r\cos\theta = 5$

Answer: C

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29. The number of common tangentss to the circles $x^2 + y^2 - 8x + 2y = 0$ and $x^2 + y^2 - 2x - 16y + 25 = 0$ is

A. 1

B. 2

C. 3

D. 4

Answer: B

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30. Statement I The circle $x^2 + y^2 - 6x - 4y - 7 = 0$ touches y-axis

Statement II The circle $x^2 + y^2 + 6x + 4y - 7 = 0$ touches x-axis

Which of the following is a correct statement ?

A. Both I and II are true

B. Neither I nor II is true

C. I is true, II is false

D. I is false, II is true

Answer: B

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31. Find the length of the tangent form

$(1, 3)$ to the circle $x^2 + y^2 - 2x + 4y - 11 = 0$.

A. 1

B. 2

C. 3

D. 4

Answer: C

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32. If $x - y + 1 = 0$ meets the circle $x^2 + y^2 + y - 1 = 0$ at A and B , then the equation of the circle with AB as diameter is

A. $2\left(x^2 + y^2\right) + 3x - y + 1 = 0$

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

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

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

Answer: A

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33. If y=3x is a tangent to a circle with centre (1,1) then the other tangent drawn through (0,0) to the circle is

A. 3y = x

B. y = - 3x

C. y = 2x

D. y = - 2x

Answer: A

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34. Which of the following equation gives a circle ?

A. $r = 2\sin\theta$

B. $r^2\cos 2\theta = 1$

C. $r(4\cos\theta + 5\sin\theta) = 3$

D. $5 = r\left(1 + \sqrt{2}\cos\theta\right)$

Answer: A

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35. If P_1, P_2, P_3 are the perimeters of the three circles $x^2 + y^2 + 8x - 6y = 0, 4x^2 + 4y^2 - 4x - 12y - 186 = 0$ and $x^2 + y^2 - 6$ respectively, then

A. $P_1 < P_2 < P_3$

B. $P_1 < P_3 < P_2$

C. $P_3 < P_3 < P_1$

D. $P_2 < P_3 < P_1$

Answer: B

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36. The centre of the circle $r^2 - 4r(\cos\theta + \sin\theta) - 4 = 0$ in cartesian coordinates is

A. (1, 1)

B. (-1, -1)

C. (2, 2)

D. (-2, -2)

Answer: C

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37. The radius of the circle $r = \sqrt{3}\sin\theta + \cos\theta$ is

A. 1

B. 2

C. 3

D. 4

Answer: A

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38. The number of circles that touches all the three lines x+y-1=0, x-y-1=0 and y+1=0 is

A. 2

B. 3

C. 4

D. 1

Answer: C

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39. If the line 3x-2y + 6=0 meets X-axis and Y-axis respectively at A and B, then the equalion of the circle with radius AB and centre at A. is

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

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

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

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

Answer: B

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40. A line l meets the circle $x^2 + y^2 = 61$ in A , B and P(-5,6) is such that PA = PB = 10 . Then the quation of l is

A. 5x + 6y + 11 = 0

B. 5x - 6y - 11 = 0

C. 5x - 6y + 11 = 0

D. 5x - 6y + 12 = 0

Answer: C

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

A. 25

B. 50

C. 100

D. 150

Answer: B

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42. If P is a point such that the ratio of the square of the lengths of the tangents from R to the circles $x^2 + y^2 + 2x - 4y - 20 = 0$ and $x^2 + y^2 - 4x + 2y - 44 = 0$ is $2 : 3$, then the locus of P is a circle with centre

A. (7, -8)

B. (-7, 8)

C. (7, + 8)

D. (-7, -8)

Answer: B

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43. If $5x - 12y + 10 = 0$ and $12y - 5x + 16 = 0$ are two tangents to a circle, then the radius of the circle is

A. 1

B. 2

C. 4

D. 6

Answer: A

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44. The equation of the circle of radius 5 and touching the coordinate axes in third quadrant is

A. $(x-5)^2+(y+5)^2=25$

B. $(x+5)^2+(y+5)^2=25$

C. $(x+4)^2+(y+4)^2=25$

D. $(x+6)^2+(y+6)^2=25$

Answer: B

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45. The radius of the larger circle lying in the first quadrant and touching the line 4x + 3y - 12 = 0 and the coordinate axes is

A. 5

B. 6

C. 7

D. 8

Answer: B

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46. The four distinct points (0, 0), (2, 0), (0, -2) and (k, -2) are concyclic if k is equal t

A. 3

B. 1

C. -2

D. 2

Answer: D

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47. A line is at a constant distance c from the origin and meets the coordinate axes at A and B. The locus of the centre of the circle passing through, A, B, is

A. $x^2 + y^2 + c^2$

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

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

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

Answer: C

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48. The line y = mx + c intercepts the circle $x^2 + y^2 = r^2$ in two distinct points, if

A. $r\sqrt{1+m^2} < c < r\sqrt{1+m^2}$

B. $c < -r\sqrt{1+m^2}$

C. $c < r\sqrt{1+m^2}$

D. None of the above

Answer: A

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49. The equation of the normal to the circle $x^2 + y^2 + 6x + 4y - 3 = 0$ at (1,-2) to is

A. y + 1 = 0

B. y + 2 = 0

C. y + 3 = 0

D. y - 2 = 0

Answer: B

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50. The number of circles that touch all the straight lines $x + y = 4$, $x - y = -2$ and $y = 2$, is

A. 1

B. 2

C. 3

D. 4

Answer: D

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