MATHS

BOOKS - BITSAT GUIDE

THE CIRCLE

Practice Exercise

1. The points (5,11), (11 ,19) , (18 ,-4) lie on a circle, centre of the circle is at

A. $(3, 4)$

B. $(4, 3)$

C. $(4, 3)$

D. None of these

Answer: D

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2. If the base of a triangle and the ratio of the lengths of the other two unequal sides are given, then the vertex lies on

A. . straight line

B. circle

C. ellipse

D. parabola

Answer: B

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

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

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

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

D. None of these

Answer: A

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4. A circle of radius 5 units touches both the axes and lies in the first quadrant. If the circle makes one complete roll on x-

axis along the positive direction of x-axis, then its equation in the new position is

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

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

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

D. None of the above

Answer: D

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5. The values of λ for which the circle $x^2 + y^2 + 6x + 5 + \lambda(x^2 + y^2 - 8x + 7) = 0$ dwindles into a point are

A. $1 \pm \frac{\sqrt{2}}{3}$

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

C. $2 \pm \frac{4\sqrt{2}}{3}$

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

Answer: C

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6. The equation of the circle which passes through the points $(2, 3)$ and $(4, 5)$ and the centre lies on the straight line $y - 4x + 3 = 0$, is

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

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

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

D. None of the above

Answer: A

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7. The equation of circle which passes through the point (2,0) and whose centre is the limit of the point of intersection of the lines $3x + 5y = 1$ and $(2 + x)x + 5c^2y = 1 asc \to 1$, is

A. $25(x^2 + y^2) - 20x + 2y + 60 = 0$

B. $25(x^2 + y^2) - 20x + 2y - 60 = 0$

C. $25(x^2 - y^2) - 20x - 2y - 60 = 0$

D. None of the above

Answer: B

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8. Consider a family of circles which are passing through the point (1,1) and are tangent to X-axis. If (h,k) are the coordinates of the centre of the circles, then the set of values of k is given by the interval

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

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

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

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

Answer: B

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9. The cartesian equations of the curves $x = 7 + 4\cos\alpha$ and $y = -3 + 4\sin\alpha$ is

A. $x^2 + y^2 - 14x + 6y + 42 = 0$

B. $x^2 + y^2 - 6x + 14y + 21 = 0$

C. $x^2 + y^2 - 10x + 12y + 28 = 0$

D. None of the above

Answer: A

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10. Two conics $a_1x^2 + 2h_1xy + b_1y^2 = c_1, a_2x^2 + 2h_2xy + b_2y^2 = c_2$

intersect in 4 concyclic points. Then

A. $(a_1 - b_1)h_2 = (a_2 - b_2)h_1$

B. $(a_1 - b_1)h_1 = (a_2 - b_2)h_2$

C. $(a_1 + b_1)h_2 = (a_2 + b_2)h_1$

D. $(a_1 + b_1)h_1 = (a_2 + b_2)h_2$

Answer: A

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

A. $(-5, 2)$

B. $(2, -5)$

C. $(5, -2)$

D. $(-2, 5)$

Answer: C

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12. A circle touches the hypotenuse of a right angle triangle at its middle point and passes through the mid-point of the shorter side. If a and b $(a < b)$ are the length of the sides, then the radius is

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

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

C. $\frac{b}{4a}\sqrt{a^2 + b^2}$

D. None of these

Answer: C

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

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

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

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

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

Answer: C

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14. The equation of the locus of a point such that the sum of its distances from (0, 2) and (0,-2) is 6, is given by

A. $\frac{x^2}{5}+\frac{y^2}{9}=1$

B. $\frac{x^2}{9}+\frac{y^2}{5}=1$

C. $\frac{x^2}{5}-\frac{y^2}{9}=1$

D. None of these

Answer: A

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15. If the circle $x^2+y^2-4x-4y-1=0$ has two points P and Q on it which are farthest and nearest respectively from

the point (6,5),then

A. $P = -\left(-\frac{22}{5}, 3\right)$

B. $Q = -\left(\frac{22}{5}, \frac{19}{5}\right)$

C. $P = -\left(\frac{14}{3}, -\frac{11}{5}\right)$

D. $Q = -\left(-\frac{14}{3}, -4\right)$

Answer: B

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16. Equation of the circle with centre on the Y-axis and passing through the origin and the point (2, 3), is

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

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

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

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

Answer: C

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17. Find the equation of a circle which touches both the axes and the line 3 4 8 0 x y - + = and lies in the third quadrant.

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

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

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

D. None of the above

Answer: C

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18. If a circle has centre (3,-1) and cut-off an intercept of length 6 from the line 2x-5y+18=0. Then, the equation of the circle is

A. $x^2 + y^2 - 6x + 2y + 28 = 0$

B. $x^2 + y^2 + 6x + 2y - 28 = 0$

C. $x^2 + y^2 - 6x - 2y + 28 = 0$

D. $x^2 + y^2 - 6x + 2y - 28 = 0$

Answer: D

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

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

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

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

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

Answer: C

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

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

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

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

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

Answer: D

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21. If the squares of the length of the tangents from a point P to the circles $x^2 + y^2 = a^2, x^2 + y^2 = b^2$ and $x^2 + y^2 = c^2$ are in AP ,then

A. a ,b,c are in AP

B. a,b,c, are in GP

C. a^2, b^2, c^2 are in AP

D. a^2, b^2, c^2 are in GP

Answer: C

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22. If the lines $3x - 4y + 4 = 0$ and $6x - 8y - 7 = 0$ are tangents to a circle ,then find the radius of the circle .

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

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

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

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

Answer: A

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23. What is the length of an equilateral triangle inscribed in the circle $x^2 + y^2 = \frac{4}{3}$?

A. 2 units

B. 5 units

C. 3 units

D. 7 units

Answer: A

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24. The circle $x^2 + y^2 = 5$ has a tangent at the point $(1, -2)$ .If this tangent touches the circle $x^2 + y^2 - 8x + 6y + 20 = 0$ also .Then ,its point of contact is

A. $(3, -1)$

B. $(-3, 0)$

C. $(-1, -1)$

D. $(-2, 1)$

Answer: A

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25. The point of contact of $4x + 5y + 6 = 0$ and $x^2 + y^2 - 2x - 4y - 8 = 0$ is

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

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

C. $(3, -2)$

D. None of these

Answer: B

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26. Let A be the centre of the circle $x^2 + y^2 - 2x - 4y - 20 = 0$ .If the tangents at the points

B(1,7)andD(4,-2) on the circle meet at C , then find the area of the quadrilateral ABCD .

A. 78

B. 75

C. 79

D. 85

Answer: B

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

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

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

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

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

Answer: C

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28. If the circles $(x-a)^2+(y-b)^2=c^2$ and $(x-b)^2+(y-a)^2=c^2$ touch each other, then

A. $a=b\pm 2c$

B. $a=b\pm\sqrt{2}c$

C. $b\pm c$

D. None of these

Answer: C

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29. How many tangents can be drawn from the poin (3,-2) to the circle $x^2 + y^2 - 8x - 6y + 9 = 0$?

A. 2

B. 1

C. 0

D. None of these

Answer: A

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30. If the line $3x - 4y - k = 0(k > 0)$ touches the circle $x^2 + y^2 - 4x - 8y - 5 = 0$ at (a, b) then $k + a + b$ is equal to :-

A. 20

B. 22

C. -30

D. -28

Answer: A

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31. The locus of the poin ,the chord of contact of tangents from which to the circle $x^2 + y^2 = a^2$ subtends a right angle at the centre , is a circle of radius

A. 2a

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

C. $\sqrt{2}a$

D. a^2

Answer: C

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32. The locus of the mid -point of the chords of a circle $x^2 + y^2 = 4$,which subtends a right angle at the centre , is

A. $x + y = 2$

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

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

D. $x - y = 0$

Answer: C

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33. If two distinct chords drawn from the point (p,q) on the circle $x^2 + y^2 = px + qy$ (where $pq \neq 0$) are bisected by X - axis ,then

A. $p^2 = q^2$

B. $p^2 = 8q^2$

C. $p^2 < 8q^2$

D. $p^2 > 8q^2$

Answer: D

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34. The equation of the circle described on the common chord of the circles , $x^2 + y^2 - 12x + 2y - 10 = 0$ and $x^2 + y^2 - 8x + 5y - 37 = 0$ as a diameter , is

A. $25(x^2 + y^2) - 348x + 14y - 74 = 0$

B. $25(x^2 + y^2) - 348x + 140y - 74 = 0$

C. $25(x^2 + y^2) - 300x + 14y + 70 = 0$

D. None of the above

Answer: A

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35. AB is a chord of the circle $x^2 + y^2 = 25$. The tangents of A and B intersect at C. If (2, 3) is the mid-point of AB,then area of the quadrilateral OACB is

A. $50\sqrt{\frac{13}{3}}$

B. $50\sqrt{\frac{3}{13}}$

C. $50\sqrt{3}$

D. $\frac{50}{\sqrt{3}}$

Answer: B

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36. The equation of the smallest circle passing through the intersection of line x+y =2 and the circle $x^2 + y^2 = 16$ is

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

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

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

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

Answer: A

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

A. exactly two values of a

B. infinitely many values of a

C. no value of a

D. exactly one value of a

Answer: C

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

A. $-85 < m < -35$

B. $-35 < m < 15$

C. $15 < m < 65$

D. $35 < m < 85$

Answer: B

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

$x^2 + y^2 + 2x + 2y + p^2 = 0$, then there is a circle passing through P and Q and (1, 1) for

A. all values of p

B. all except one value of p

C. all except two values of p

D. exactly one value of p

Answer: C

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

A. $r < 2$

B. $r > 8$

C. $2 < r < 8$

D. $2 \leq r \leq 8$

Answer: C

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

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

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

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

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

Answer: A

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42. If $2x - 4y = 9$ and $6x - 12y + 7 = 0$ are common tangents to a circle , then radius of the circle is

A. $\frac{\sqrt{3}}{5}$

B. $\frac{17}{6\sqrt{5}}$

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

D. $\frac{17}{3\sqrt{5}}$

Answer: B

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

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

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

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

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

Answer: B

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44. If two circles $x^2 + y^2 + 4x + 6y = 0$ and $x^2 + y^2 + 2gx + 2fy = 0$ touch each other ,then

A. 3g ' = 2f'

B. 3f' =2g '

C. f ' +g '=6

D. f'-g'=1

Answer: A

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1. If the equation of circle which passes through the origin and cuts off intercepts 5 and 6 from the positive parts of the X-axis and Y-axis respectively, is $\left(x-\frac{5}{2}\right)^2+(y-3)^2=\lambda$,then λ equal is

A. $\frac{61}{4}$

B. $\frac{4}{6}$

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

D. 0

Answer: A

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2. Find the equation of the circle circumscribing the triangle formed by the straight lines $x + y = 6, 2x + y = 4$ and $x + 2y = 5$.

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

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

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

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

Answer: D

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

A. 7

B. 49

C. 63

D. 21

Answer: A

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

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

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

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

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

Answer: C

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5. If a circle passes through (0,0) and $(a, 0)$ and $(0, b)$, then the coordinates of its centre are

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

B. $\left(\frac{a}{2}, \frac{b}{2}\right)$

C. (b,a)

D. (a,b)

Answer: B

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6. If the sum of the distance of a point P from two perpendicular lines in a plane, is 1, then the locus of P is a

A. rhombus

B. circle

C. straight line

D. pair of straight lines

Answer: A

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

A. 8

B. 7

C. 6

D. 5

Answer: B

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9. The centre of circle whose normals are $x^2 - 2xy - 3x + 6y = 0$ is

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

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

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

D. None of these

Answer: A

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

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

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

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

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

Answer: A

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11. If the two circles $x^2 + y^2 - 2x + 22y + 5 = 0$ and $x^2 + y^2 + 14x + 6y + k = 0$ intersect orthogonally ,k is equal to

A. 47

B. -47

C. 49

D. -49

Answer: A

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12. The radius of the ciclle $x^2 + y^2 + 4x + 6y + 13 = 0$ is

A. $\sqrt{26}$

B. $\sqrt{13}$

C. $\sqrt{23}$

D. 0

Answer: D

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13. The centre of the circles $x = 2 + 3\cos\theta, y = 3\sin\theta - 1$ is

A. $(3, 3)$

B. $(2, 1)$

C. $(-2, 1)$

D. $(-2, 1)$

Answer: B

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14. The equation to the circle with centre $(2, 1)$ and touching the line $3x + 4y = 5$ is

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

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

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

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

Answer: C

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15. The condition for a line y = 2x + c to touch the circle $x^2 + y^2 = 16$ is

A. c=10

B. $c^2 = 80$

C. $c = 12$

D. $c^2 = 64$

Answer: B

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16. Let $P(x_1, y_1)$ and $Q(x_2, y_2)$ be two points such that their abscissae x_1 and x_2 are the roots of the equation $x^2 + 2x - 3 = 0$ while the ordinates y_1 and y_2 are the roots

of the equation $y^2 + 4y - 12 = 0$ .Then , the centre of the circle with PQ as diameter is

A. $(-1, -2)$

B. $(1, 2)$

C. $(1, -2)$

D. $(-1, 2)$

Answer: A

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17. The number of common tangents to the circles

$x^2 + y^2 + 2x + 8y - 23 = 0$ and

$x^2 + y^2 - 4x - 10y + 9 = 0$ are

A. 1

B. 3

C. 2

D. None of these

Answer: C

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18. If $\frac{x}{\alpha}+\frac{y}{\beta}=1$ touches the circle $x^2+y^2=a^2$ then point $\left(\frac{1}{\alpha},\frac{1}{\beta}\right)$ lies on (a) straight line (b) circle (c) parabola (d) ellipse

A. . straight line

B. circle

C. parabola

D. ellipse

Answer: B

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