MATHS

BOOKS - MHTCET PREVIOUS YEAR PAPERS AND PRACTICE PAPERS

PAIR OR STRAIGHT LINES

Practice Excercise Excercise 1 Topical Problems Combined Equation Of Two Lines And Homogeneous Equation Of Second Degree

1. The combined equation of lines $2x + y + 3 = 0$ and $x - y + 4 = 0$ is

A. $x^2 + 2y^2 + 10y - 12y + 5 = 0$

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

C. $2x^2 - xy - y^2 + 11x + y + 12 = 0$

D. None of the above

Answer: C

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2. Separate eqation of lines represented by the equation $6x^2 + 5xy - 4y^2 = 0$ is

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

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

C. $x + y = 0$ and $x - 4y = 0$

D. $2x^2 + y^2 - xy + 11x - y + 12 = 0$

Answer: B

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3. Two two straight lines given by $x^2\left(\tan^2\theta + \cos^2\theta\right) - 2xy\tan\theta + y^2\sin^2\theta = 0$ make with the axis of x angles such that the difference of their tangents is

A. 4

B. 3

C. 2

D. None of these

Answer: C

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4. If the slopes of the lines given by $ax^2 + 2hxy + by^2 = 0$ are in the ratio $3:1$, then $h^2 =$

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

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

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

D. None of these

Answer: B

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5. The equation to the pair of lines perpendicular to the pair of lines $3x^2 - 4xy + y^2 = 0$, is

A. $x^2 + 4xy + 3y^2 = 0$

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

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

D. None of these

Answer: A

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6. The angle between the pair of lines represented by $2x^2 - 7xy + 3y^2 = 0$ is

A. 60°

B. 45°

C. $\tan^{-1}.\left(\frac{7}{6}\right)$

D. 30°

Answer: B

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7. If θ is the acute angle between the lines given by $x^2 - 2pxy + y^2 = 0$, then

A. $\cos\theta = p$

B. $\tan\theta = p$

C. $\sec\theta = p$

D. $\cot\theta = p$

Answer: C

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8. If the pairs of straight lines $ax^2 + 2hxy - ay^2 = 0$ and 'bx^2+2gxy-by^2=0 be such that each bisects the angles between the other , then

A. $hg + ab = 0$

B. $ah + hb = 0$

C. $h^2 - ab = 0$

D. $ag + bh = 0$

Answer: A

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9. The equation $kx^2 + 4xy + 5y^2 = 0$ represents two lines inclined at an angle π if k is

A. $5/4$

B. $4/5$

C. -45

D. None of these

Answer: B

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10. The product of the perpendiculars drawn from the point (1,2) to the pair of lines $x^2 + 4xy + y^2 = 0$ is

A. $9/4$

B. $3/4$

C. $9/16$

D. $13/4$

Answer: D

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11. The equation of two straight lines through the point (x_1, y_1) and perpendicular to the lines given by $ax^2 + 2hxy + by^2 = 0$, is

A.

$$a(y - y_1)^2 + 2h(x - x_1)(y - y_1) + b(x - x_1)^2 = 0$$

B.

$$a(y - y_1)^2 - 2h(x - x_1)(y - y_1) + b(x - x_1)^2 = 0$$

C.

$$b(y - y_1)^2 + 2h(x - x_1)(y - y_1) + a(x - x_1)^2 = 0$$

D. None of these

Answer: C

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12. Find the combined equation of the pair of lines through the point (1, 0) and parallel to the lines represented by $2x^2 - xy - y^2 = 0$

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

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

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

D. None of these

Answer: B

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13. If the pairs of lines $ax^2 + 2hxy + by^2 = 0$ and $a'x^2 + 2h'xy + b'y^2 = 0$ have one line in common, then $(ab' - a'b)^2$ is equal to

A. $(h'b - hb')(ha' - h'a)$

B. $4(h'b - hb')(ha' - h'a)$

C. $2(h'b - hb')(ha' - h'a)$

D. $4(h'b + hb')(ha' + h'a)$

Answer: B

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14. If the pair of lines represented by $ax^2 + 2hxy + by^2 = 0, ab \neq 0$, are such that the sum of the slopes of the lines is three times the product of their slopes , then

A. $3b + 2h = 0$

B. $3a + 2h = 0$

C. $2a + 3h = 0$

D. None of these

Answer: B

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15. If the sum of slopes of the lines given by $4x^2 + 2kxy - 7y^2 = 0$ is equal to the product of slopes , then k is equal to

A. -4

B. 4

C. -2

D. 2

Answer: C

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16. The combined equation of the images of pair of lines given by $ax^2 + 2hxy + by^2 = 0$ in the line mirror $y = 0$, is

A. $ax^2 - 2hxy + by^2 = 0$

B. $bx^2 - 2hxy + ay^2 = 0$

C. $bx^2 + 2hxy + ay^2 = 0$

D. None of these

Answer: A

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17. Find the angle between the lines represented by $x^2 + 2xy\sec\theta + y^2 = 0$

A. 4θ

B. 2θ

C. θ

D. None of these

Answer: C

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18. The equation $3x^2 + 2hxy + 3y^2 = 0$ represents a pair of straight lines passing through the origin. The two lines are

A. real and distinct, if $h^2 > 3$

B. real and distinct, if $h^2 > 9$

C. real and coincident, if $h^2 = 3$

D. real and coincident , if $h^2 > 3$

Answer: B

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19. The set of value of h for which the equation $4x^2 + hxy - 3y^2 = 0$ represents a pair of real and distinct lines is

A. R

B. $(3, 4)$

C. $(-3, 4)$

D. $(4, \infty)$

Answer: A

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20. One bisector of the angle between the lines given by $a(x-1)^2 + 2h(x-1)y + by^2 = 0$ is $2x + y - 2 = 0$. The equation of the other bisector is

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

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

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

D. None of these

Answer: C

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21. The combined equation of the lines $L_1$and L_2 is $2x^2 + 6xy + y^2 = 0$, and that of the lines L_3 and L_4 is $4x^2 + 18xy + y^2 = 0$. If the angle between L_1 and L_4 be α , then the angle between L_1 and L_3 will be .

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

B. 2α

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

D. α

Answer: D

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22. The equation of two straight lines through the point (x_1, y_1) and perpendicular to the lines given by $ax^2 + 2hxy + by^2 = 0$, is

A.

$$b(x - x_1)^2 - 2h(x - x_1)(y - y_1) + a(y - y_1)^2 = 0$$

B.

$$b(x - x_1)^2 + 2h(x - x_1)(y - y_1) + a(y - y_1)^2 = 0$$

C.

$$a(x - x_1)^2 - 2h(x - x_1)(y - y_1) + b(y - y_1)^2 = 0$$

D. None of these

Answer: A

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23. The triangle formed by the lines whose combined equation is $\left(y^2-4xy-x^2\right)(x+y-1)=0$ is

A. equilateral

B. right angled

C. isosceles

D. obtuse angled

Answer: B

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24. The combined equation of the pair of lines through the origin and perpendicular to the pair of lines given by $ax^2 + 2hxy + by^2 = 0$, is

A. $ax^2 - 2hxy + by^2 = 0$

B. $bx^2 + 2hxy + ay^2 = 0$

C. $bx^2 - 2hxy + ay^2 = 0$

D. $bx^2 + 2hxy - ay^2 = 0$

Answer: C

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25. If the slope of one of the lines represented by $ax^2 + 2hxy + by^2 = 0$ is the square of the other , then $\frac{a+b}{h} + \frac{8h^2}{ab} =$

A. 3

B. 4

C. 5

D. 6

Answer: D

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26. Let 'a' and 'b' be non-zero real numbers. Then, the equation $\left(ax^2+by^2+c\right)\left(x^2-5xy+6y^2\right)$ represents :

A. four straight lines , when $c=0$ and a,b are of the same sign

B. two straight lines and a circle , when $a=b$ and c is of sign opposite to that of a

C. two straight lines and a hyperbola , when a and b are of the same sign and c is of sign opposite to that of a

D. a circle and an ellipse , when a and b are of the same sign and c is of sign opposite to that of a .

Answer: B

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27. The slopes of lines represented by $x^2 + 2hxy + 2y^2 = 0$ are in the ratio $1:2$, then h equals .

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

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

C. ± 1

D. ± 3

Answer: B

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28. If one of the lines given by $6x^2 - xy + 4cy^2 = 0$ is $3x + 4y = 0$, then $c =$

A. 1

B. -1

C. 3

D. -3

Answer: D

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29. The equation of pair of lines joining origin to the points of intersection of $x^2 + y^2 = 9$ and $x + y = 3$

A. $x^2 + (3 - x)^2 = 9$

B. $xy = 0$

C. $(3 + y)^2 + y^2 = 9$

D. $x - y^2 = 9$

Answer: B

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30. The centroid of the triangle formed by the pair of straight lines $12x^2 - 20xy + 7y^2 = 0$ and the line $2x - 3y + 4 = 0$is

A. $\left(-\frac{7}{3}, \frac{7}{3}\right)$

B. $\left(-\frac{8}{3}, \frac{8}{3}\right)$

C. $\left(\frac{8}{3}, \frac{8}{3}\right)$

D. $\left(\frac{4}{3}, \frac{4}{3}\right)$

Answer: C

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31. if $\frac{X^2}{a}+\frac{y^2}{b}+\frac{2xy}{h}=0$ represent pair of straight lies and slope one line is twice the other line then $ab:h^2$.

A. $9:8$

B. $8:9$

C. $1:2$

D. $2:$

Answer: A

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32. The equation $4x^2-24xy+11y^2=0$ represents

A. two parallel lines

B. two perpendicular lines

C. two lines through the origin

D. a circle

Answer: C

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33. The distance between the pair of parallel lines given by $x^2 - 1005x + 2006 = 0$ is

A. 1001

B. 1000

C. 1005

D. 2006

Answer: A

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34. The area (in sq unit) of the triangle formed by $x + y + 1 = 0$ and the pair of straight lines $x^2 - 3xy + 2y^2 = 0$ is

A. $\frac{7}{12}$

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

C. $\frac{1}{12}$

D. $\frac{1}{6}$

Answer: C

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35. If the lines $px^2 - qxy - y^2 = 0$ makes the angles α and β with X-axis , then the value of $\tan(\alpha + \beta)$ is

A. $\frac{-q}{1+p}$

B. $\frac{q}{1+p}$

C. $\frac{p}{1+q}$

D. $\frac{-p}{1+q}$

Answer: A

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36. The lines represents by $ax^2 + 2hxy + by^2 = 0$ are perpendicular to each other , if

A. $h^2 = a + b$

B. $a + b = 0$

C. $h^2 = ab$

D. $h = 0$

Answer: B

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37. If the pair of lines $ax^2 + 2hxy + by^2 = 0\left(h^2 > ab\right)$ forms an equilateral triangle with the line $lx + my + n = 0$ then $(a + 3b)(3a + b) =$

A. H^2

B. $-H^2$

C. $2H^2$

D. $4H^2$

Answer: D

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Practice Excercise Excercise 1 Topical Problems General Equation Of Second Degree

1. If in the general quadratic equation $f(x, y) = 0, \Delta = 0$ and $h^2 = ab$, then the equation represents.

A. two parallel straight lines

B. two perpendicular straight lines

C. two coincident lines

D. None of the above

Answer: A

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2. If the equation $3x^2 + xy - y^2 - 3x + 6y + k = 0$ represents a pair of straight lines, then the value of k, is

A. 0

B. 9

C. 1

D. -9

Answer: D

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3. If $\lambda x^2 - 10xy + 12y^2 + 5x - 16y - 3 = 0$, represents a pair of straight lines, then the value of λ is

A. 1

B. -1

C. 2

D. -2

Answer: C

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4. If $ax^2 - y^2 + 4x - y = 0$ represents a pair of lines , then a is equal to

A. -16

B. 16

C. 4

D. -4

Answer: B

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5. The value of λ for which the equation $x^2 - y^2 - x - \lambda y - 2 = 0$ represent a pair of straight line, are

A. $5/2$

B. ± 5

C. ± 3

D. $2/5$

Answer: C

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6. The value of 'p' for which the equation $x^2 + pxy + y^2 - 5x - 7y + 6 = 0$ represents a pair of straight lines , is

A. $5/2$

B. 5

C. 2

D. $2/5$

Answer: A

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7. If the equation $kx^2 - 2xy - y^2 - 2x + 2y = 0$ represents a pair of lines , then k is equal to

A. 2

B. -2

C. -5

D. 3

Answer: D

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8. The equationof the pair of straight lines perpendicular to the pair $2x^2 + 3xy + 2y^2 = 0$ and passing through the origin , is

A. $2x^2 + 5xy + 2y^2 = 0$

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

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

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

Answer: B

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9. The lines represented by the equation $x^2 - y^2 - x + 3y - 2 = 0$ are

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

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

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

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

Answer: D

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10. If the lines $x^2 + 2xy - 35y^2 - 4x + 44y - 12 = 0 and 5x + \lambda y - 8$ are concurrent, then the value of λ is a. 0 b. 1 c. -1 d. 2

A. 0

B. 1

C. -1

D. 2

Answer: D

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11. In order to eliminate the first degree terms from the equation $2x^2 + 4xy + 5y^2 - 4x - 22y + 7 = 0$, the point to which origin is to be shifted is- (1) $(1, -3)$ (2) $(2, 3)$ (3) $(-2, 3)$ (4) $(1, 3)$

A. $(1, -3)$

B. $(2, 3)$

C. $(-2, 3)$

D. $(1, 3)$

Answer: C

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12. The equation

$$x^2 + 2\sqrt{ab}xy + by^2 + 2gx + 2fy + c = 0$$

represents a pair of parallel straight lines, if

A. $ag^2 = bf^2$

B. $a^2g = b^2f$

C. $bg^2 = af^2$

D. $b^2g = a^2f$

Answer: C

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13. If the lines joining the origin to the points of intersection of the line $y = mx + 2$ and the curve $x^2 + y^2 = 1$ are at right-angles, then

A. $m^2 = 1$

B. $m^2 = 3$

C. $m^2 = 7$

D. $2m^2 = 1$

Answer: C

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14. If $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ represents parallel straight lines, then

A. $hf = bg$

B. $h^2 = bc$

C. $a^2 f = b^2 g$

D. None of these

Answer: A

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15. The equation $8x^2 + 8xy + 2y^2 + 26x + 13y + 15 = 0$ represents a pair of straight lines. The distance between them is

A. $\frac{7}{\sqrt{5}}\text{units}$

B. $\frac{7}{2\sqrt{5}}\text{units}$

C. $\sqrt{\frac{7}{5}}\text{units}$

D. None of these

Answer: B

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16. If the equation

$$ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$$

represents two straights lines, then the product of the perpendicular from the origin on these straight lines, is

A. $\frac{c}{\sqrt{(a-b)^2 - 4h^2}}$

B. $\frac{c}{\sqrt{(a-b)^2 + 4h^2}}$

C. $\frac{c}{\sqrt{(a+b)^2 - 4h^2}}$

D. None of these

Answer: B

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17. Prove that the straight lines joining the origin to the point of intersection of the straight line $hx + ky = 2hk$ and the curve $(x - k)^2 + (y - h)^2 = c^2$ are perpendicular to each other if $h^2 + k^2 = c^2$.

A. $h^2 + k2 = c^2$

B. $h^2 + k^2 = 2c^2$

C. $h^2 - k^2 = c^2$

D. None of these

Answer: A

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18. The equation $ax^2 + by^2 + cx + cy = 0c! \equiv 0$ represents a pair of straight lines if

A. $a + b = 0$

B. $a + c = 0$

C. $b + c = 0$

D. None of these

Answer: A

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19. If the equation $12x^2 + 7xy - py^2 - 18x + qy + 6 = 0$ represents a pair of perpendicular straight lines, then

A. $p = 12, q = -1$

B. $p = -12, q = 1$

C. $p = 12, q = 1$

D. $p = 1, q = 12$

Answer: C

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20. The pairs of straight lines $x^2 - 3xy + 2y^2 = 0$ and $x^2 - 3xy + 2y^2 + x - 1$ form a

A. square but not rhombus

B. rhombus

C. parallelogram

D. rectangle but not a square

Answer: C

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Excercise 2 Miscellaneous Problems

1. The equation of pair of straight lines joining the point of intersection of the curve $x^2 + y^2 = 4$ and $y - x = 2$ to the origin , is

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

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

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

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

Answer: A

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2. The condition of representing the coincident lines by the general quadratic equation $f(x, y) = 0$, is

A. $\Delta = 0, h^2 = ab$

B. $\Delta = 0$ and $a + b = 0$

C. $\Delta = 0, h^2 = ab, g^2 = ac, f^2 = bc$

D. $h^2 = ab, g^2 = ac$ and $f^2 = bc$

Answer: C

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3. If the lines $(p-q)x^2+2(p+q)xy+(q-p)y^2=0$ are mutually perpendicular , then

A. $p=q$

B. $p=0$

C. $q=0$

D. p and q may have any value

Answer: D

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4. If the equation $2x^2 - 2hxy + 2y^2 = 0$ represents two coincident straight lines passing through the origin , then h is equal to

A. ± 6

B. $\sqrt{6}$

C. $-\sqrt{6}$

D. ± 2

Answer: D

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5. The angle between the straight lines joining the origin to the point of intersection of $3x^2 + 5xy - 3y^2 + 2x + 3y = 0$ and $3x - 2y = 1$, is

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

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

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

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

Answer: D

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6. The two lines represented by $3ax^2 + 5xt + (a^2 - 2)y^2 = 0$ are perpendicular to each other for

A. two value of a

B. a

C. for one value of a

D. for no value of a

Answer: A

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7. The equation $\lambda\left(x^3 - 3xy^2\right) + y^3 - 3x^2y = 0$ represent three straight lines passing through the origin such that

A. they are equally inclined to one another

B. two of which are at right angles

C. two of which are coincident

D. None of the above

Answer: A

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8. The equation $x^3 + x^2y - xy^2 - y^3 = 0$ represents three straight lines passing through the origin such that

A. two of them are coincident and two of them are perpendicular

B. two of them are coincident but no two are perpendicular

C. two of them are perpendicular but no two are coincident

D. None of the above

Answer: A

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9. The straight lines represented by $x^2 + mxy - 2y^2 + 3y - 1 = 0$ meet at $\left(-\frac{1}{3}, \frac{2}{3}\right)$ (b) $\left(-\frac{1}{3}, -\frac{2}{3}\right)$ $\left(\frac{1}{3}, \frac{2}{3}\right)$ (d) none of these

A. $(1/3, -2/3)$

B. $(-1/3, -2/3)$

C. $(1/3, 2/3)$

D. None of these

Answer: C

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10. All chords of the curve $3x^2 - y^2 - 2x + 4y = 0$ which subtend a right angle at the origin, pass through the fixed point

A. $(1, 2)$

B. $(-1, 2)$

C. $(1, -2)$

D. $(-1, -2)$

Answer: C

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11. Distance between the lines represented by the equation $x^2 + 2\sqrt{3}xy + 3y^2 - 3x - 3\sqrt{3}y - 4 = 0$ is

(A) $\frac{5}{2}$

(B) $\frac{5}{4}$

(C) 5

(D) 0

A. perpendicular to each other

B. parallel

C. inclined at 45° to each other

D. None of the above

Answer: B

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12. The lines represented by $x^2 + 2\lambda xy + 2y^2 = 0$ and the lines represented by $1 + \lambda_x^2 - 8xy + y^2 = 0$ are equally inclined, then

A. λ is any real number

B. $\lambda > 2$

C. $\lambda = \pm 2$

D. $\lambda < -2$

Answer: C

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13. The pair of lines passing through the origin and parallel to the lines represented by the equation $2x^2 - xy - 6y^2 + 7x + 21y - 15 = 0$, is

A. $2x^2 - xy - 6y^2 = 0$

B. $6x^2 - xy - 6y^2 = 0$

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

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

Answer: A

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14. If the bisectors of angles represented by $ax^2 + 2hxy + by^2 = 0$ and $a'x^2 + 2h'xy + b'y^2 = 0$ is same , then

A. $(a - b)h' = (a' - b')h$

B. $(a - b)h = (a' - b')h'$

C. $(a + b)h' = (a'b')h$

D. $a - b)h' = (a' + b')h$

Answer: A

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15. The angle between the pair of straight lines $y^2 \sin^2\theta - xy\sin^2\theta + x^2(\cos^2\theta - 1) = 0$ is

A. $\pi/3$

B. $\pi/4$

C. $\pi/6$

D. $\pi/2$

Answer: D

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16. Find the distance between the pair of parallel lines

$$x^2 + 4xy + 4y^2 + 3x + 6y - 4 = 0$$

A. $\sqrt{5}$

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

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

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

Answer: A

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17. The distance btween the parallel lines $9x^2 - 6xy + y^2 + 18x - 6y + 8 = 0$, is

A. $\frac{1}{\sqrt{10}}$

B. $\frac{1}{\sqrt{10}}$

C. $\frac{4}{\sqrt{10}}$

D. $\sqrt{10}$

Answer: B

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18. The point of intersection of the pair of straight lines given by $6x^2 + 5xy - 4y^2 + 7x + 13y - 2 = 0$, is

A. $(1, 1)$

B. $(1, -1)$

C. $(-1, 1)$

D. $(-1, -1)$

Answer: C

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19. If first degree terms and constant term are to be removed from the equation $12x^2 + 7xt - 12y^2 - 17x - 31y - 7 = 0$, then the origin must be shifted at shifted at the point .

A. $(1, -1)$

B. $(-1, 1)$

C. $(-1, -1)$

D. None of these

Answer: A

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20. The straight lines represented by $(y-mx)^2=a^2\left(1+m^2\right)$ and $(y-nx)^2=a^2\left(1+n^2\right)$ from a rectangle (b) rhombus trapezium (d) none of these

A. rectangle

B. trapezium

C. rhombus

D. None of these

Answer: C

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21. A pair of perpendicular straight lines is drawn through the origin forming with the line $2x + 3y = 6$ an isosceles triangle right-angled at the origin. The equation to the line pair is $5x^2 - 24xy - 5y^2 = 0$

$5x^2 - 26xy - 5y^2 = 0$ $5x^2 + 24xy - 5y^2 = 0$

$5x^2 + 26xy - 5y^2 = 0$

A. $5x^2 - 24xy - 5y^2 = 0$

B. $5x^2 - 26xy - 5y^2 = 0$

C. $5x^2 + 24xy - 5y^2 = 0$

D. $5x^2 + 26xy - 5y^2 = 0$

Answer: A

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22. If the origin is shifted to the point $\left(\frac{ab}{a-b}, 0\right)$ without rotation, then the equation $(a-b)(x^2+y^2) - 2abx = 0$ becomes

$(a-b)(x^2+y^2) - (a+b)xy + abx = a^2$

$(a+b)(x^2+y^2) = 2ab \qquad (x^2+y^2) = (a^2+b^2)$

$(a-b)^2(x^2+y^2) = a^2b^2$

A. $(a-b)(X^2+Y^2) - (a+b)XY + abX = a^2$

B. $(a+b)(X^2+Y^2) = 2ab$

C. $(X^2+Y^2) = (a^2+b^2)$

D. $(a-b)^2(X^2+Y^2) = a^2b^2$

Answer: D

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23. If one of the lines of $my^2 + (1 - m^2)xy - mx^2 = 0$ is a bisector of the angle between the lines $xy = 0$, then m is 1 (b) 2 (c) $-\frac{1}{2}$ (d) -1

A. 3

B. 2

C. $-1/2$

D. -1

Answer: D

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24. The slopes of lines represented by $x^2 + 2hxy + 2y^2 = 0$ are in the ratio $1:2$, then h equals .

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

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

C. ± 1

D. ± 3

Answer: B

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25. The angle between the pair of lines whose equation is $4x^2 + 10xy + my^2 + 5x + 10y = 0$, is

A. $\tan^{-1}(3/8)$

B. $\tan^{-1}(3/4)$

C. $\tan^{-1}\left(2\sqrt{25 - 4m}/m + 4\right), m \in R$

D.

Answer: B

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26. The equation $x - y = 4$ and $x^2 + 4xy + y^2 = 0$ represent the sides of

A. an equilateral triangle

B. a right angled triangle

C. an isosceles triangle

D. None of these

Answer: A

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27. The distance between the two lines represented by the sides of an equilateral triangle a right-angled triangle an isosceles triangle none of these

A. 8/5 units

B. 6/5 units

C. 11/5 units

D. None of these

Answer: A

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28. If the pairs of lines $x^2 + 2xy + ay^2 = 0$ and $ax^2 + 2xy + y^2 = 0$ have exactly one line in common then the joint equation of the other two lines is given by

A. $3x^2 + 8xy - 3y^2 = 0$

B. $3x^2 + 10xy + 3y^2 = 0$

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

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

Answer: B

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29. If one of the lines of $my^2 + (1 - m^2)xy - mx^2 = 0$ is a bisector of the angle between the lines $xy = 0$, then m is 1 (b) 2 (c) $-\frac{1}{2}$ (d) -1

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

B. -2

C. ± 1

D. 2

Answer: C

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30. The angle between the pair of straight lines formed by joining the points of intersection of $x^2 + y^2 = 4$ and $y = 3x + c$ to the origin is a right angle. Then c^2 is equal to

A. 20

B. 13

C. $1/5$

D. 5

Answer: A

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31. The angle between lines joining origin and intersection points of line $2x + y = 1$ and curve $3x^2 + 4yx - 4x + 1 = 0$, is

A. $\pi/2$

B. $\pi/3$

C. $\pi/4$

D. $\pi/6$

Answer: A

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32. If the equation $\lambda x^2 + 2y^2 - 5xy + 5x - 7y + 3 = 0$ represents two straight lines , then the value of λ will be

A. 3

B. 2

C. 8

D. -8

Answer: B

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33. If the equation of the pair of straight lines passing through the point $(1, 1)$, one making an angle θ with the positive direction of the x-axis and the other making the same angle with the positive direction of the y-axis, is

$x^2 - (a + 2)xy + y^2 + a(x + y - 1) = 0, a \neq 2,$

then the value of $\sin 2\theta$ is $a - 2$ (b) $a + 2$ $2(a + 2)$ (d) $\frac{2}{a}$

A. $a-2$

B. $a+2$

C. $2/(a+2)$

D. $2/a$

Answer: C

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34. The equations $a^2x^2+2h(a+b)xy+b^2y^2=0$ and $ax^2+2hxy+by^2=0$ represent.

A. two pairs of perpendicualr straight lines

B. two pairs of parallel straight lines

C. two pairs of straight lines which are eqaully inclined to each other

D. None of these

Answer: C

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35. The lines $a^2x^2 + bcy^2 = a(b+c)xy$ will be coincident , if

A. $a = 0$ or $b = c$

B. $a = b$ or $a = c$

C. $c = 0$ or $a = b$

D. $a = b + c$

Answer: A

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36. If the slope of one of the lines represented by the equation $ax^2 + 2hxy + by^2 = 0$, is λ that of the other , then

A. $4\lambda h = ab(1 + \lambda)$

B. $\lambda h = ab(1 + \lambda)^2$

C. $4\lambda h^2 = ab(1 + \lambda)^2$

D. None of these

Answer: C

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37. The equation $y^2 - x^2 + 2x - 1 = 0$, represents

A. a pair of striaght lines

B. a parallel straight lines

C. a perpendicular straight lines

D. None of the above

Answer: C

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38. The pair of straight lines passing through that point $(1, 2)$ and perpendicular to the pair of straight lines $3x^2 - 8xy + 5y^2 = 0$, is

A. $(5x + 3y + 11)(x + y + 3) = 0$

B. $(5x + 3y - 11)(x + y - 3) = 0$

C. $(3x + 5y - 11)(x + y + 3) = 0$

D. $(3x_5y + 11)(x + y - 3) = 0$

Answer: B

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39. If two sides of a triangle are represented by $x^2 \_ 7xy + 6y^2 = 0$ and the centroid is $(1, 0)$ then the equation of third side is

A. $2x + 7y + 3 = 0$

B. $2x - 7y + 3 = 0$

C. $2x + 7y - 3 = 0$

D. $2x - 7y - 3 = 0$

Answer: D

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40. If the angle between the lines represented by the equation $y^2 + kxy - x^2 \tan^2 A = 0 is 2A$, then K is equal to

A. 0

B. 1

C. 2

D. tan A

Answer: A

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41. If the lines represented by the equation $2x^2 - 3xy + y^2 = 0$ make angles α and β with X-axis, then $\cot^2\alpha + \cot^2\beta$ is equal to

A. 0

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

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

D. $\frac{5}{4}$

Answer: D

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42. The line $x - 2y = 0$ will be a bisector of the angle between the lines represented by the equation $x^2 - 2hxy - 2y^2 = 0$, if h is equal to

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

B. 2

C. -2

D. $-\frac{1}{2}$.

Answer: C

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43. If $r\left(1-m^2\right)+m(p-q)=0$, then a bisector of the angle between the lines represented by the equation $px^2-2rxy+qy^2=0$, is.

A. $y=x$

B. $y=-x$

C. $y=mx$

D. $ym=x$

Answer: C

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44. The equation of the perpendiculars drawn from the origin to the lines represented by the equation $2x^2 - 10xy + 12y^2 + 5x - 16y - 3 = 0$, is

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

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

C. $6x^2 - 5xy + y^2 = 0$

D. None of these

Answer: A

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45. The equation $2x^2 + 4xy - py^2 + 4x + qy + 1 = 0$ will represent two mutually perpendicular straight lines , if

A. $p = 1$ and $q = 1$ or 6

B. $p = 2$ and $q = 0$ or 6

C. $p = 2$ and $q = 0$ or 8

D. $p = -2$ and $1 = -2$ or 8

Answer: C

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46. The acute angle formed between the lines joining the origin to the points of intersection of the curves $x^2 + y^2 - 2x - 1 = 0$ and $x + y = 1$, is

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

B. $\tan^{-1}(2)$

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

D. 60°

Answer: B

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47. Two lines are given by $(x-2y)^2+k(x-2y)=0$.

The value of k, so that the distance between them is 3,

is :

A. $\frac{1}{\sqrt{5}}$

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

C. $\pm 3\sqrt{5}$

D. None of these

Answer: C

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48. The locus of the point $P(x, y)$ satisfying the relation

$$\sqrt{(x-3)^2+(y-1)^2}+\sqrt{(x+3)^2+(y-1)^2}=6,$$

is

A. point

B. pair of coincident straight lines

C. circle

D. ellipse

Answer: B

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49. The lines joining the origin to the points of intersection of the line 3x-2y -1 and the curve $3x^2 + 5xy - 3y^2 + 2x + 3y = 0$, are

A. parallel to each other

B. perpendicular to each other

C. inclined at 45° to each other

D. None of these

Answer: B

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50. The pair of straight lines joining the origin to the points of intersection of the line $y = 2\sqrt{2x} + c$ and the circle $x^2 + y^2 = 21$ are at right angles , if

A. $c^2 - 4 = 0$

B. $c^2 - 8 = 0$

C. $c^2 - 9 = 0$

D. $c^2 - 10 = 0$

Answer: C

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51. The value of h for which the equation $3x^2 + 2hxy - 3y^2 - 40x + 30y - 75 = 0$ represents a pair of straight lines , are

A. 4,4

B. 4,6

C. 4,-4

D. 0,4

Answer: A

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52. Which of the following second , degree eqation represented a pair of straight lines ?

A. $x^2 - xy - y^2 = 1$

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

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

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

Answer: C

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53. The equation of one of the lines represented by the equation $pq(x^2 - y^2) + (p^2 - q^2)xy = 0$, is

A. $px + qy = 0$

B. $px - qy = 0$

C. $p^2x + q^2y = 0$

D. $q^2x - p^2y = 0$

Answer: B

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54. If the slope of one line in the pair $ax^2 + 4xy + y^2 = 0$ is three times the other, then a =

A. 1

B. 2

C. 3

D. 4

Answer: C

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55. If the acute angle between the pairs of lines $3x^2 - 7xy + 4y^2 = 0$ and $6x^2 - 5xy + y^2 = 0$ be θ_1 and θ_2 respectively, then

(A) $\theta_1 = \theta_2$

(B) $\theta_1 = 2\theta_2$

(C) $2\theta_1 = \theta_2$

(D) None of these

A. $\theta_1 = \theta_2$

B. $\theta_1 = 2\theta_2$

C. $2\theta_1 = \theta_2$

D. None of these

Answer: A

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56. The number of values of λ for which the bisectors of the angle between the lines $ax^2 + 2hxy + by^2 + \lambda(x^2 + y^2) = 0$ are the same as those of $ax^2 + 2hxy + by^2 = 0$ is

A. a

B. b

C. h

D. any real number

Answer: D

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57. The orthocentre of the triangle formed by the lines $xy = 0$ and $x + y = 1$, is

A. $(0, 0)$

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

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

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

Answer: A

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58. The equation of one of the lines represented by the equation $x^2 - 2xy\cot\theta - y^2 = 0$, is

A. $x - y\cot\theta = 0$

B. $x + y\tan\theta = 0$

C. $y\sin\theta + x(\cos\theta + 1) = 0$

D. $x\cos\theta + y(\sin\theta + 1) = 0$

Answer: C

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59. Difference of slopes of the lines represented by the equation

$x^2\left(\sec^2\theta - \sin^2\theta\right) - 2xy\tan\theta + y^2\sin^2\theta = 0$ is

(A) 4

(B) 3

(C) 2

(D) None of these

A. 4

B. 3

C. 2

D. None of these

Answer: C

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60. The lines $(lx+my)^2-3(mx-ly)^2=0$ and $lx+my+n=0$ forms

A. an isosceles triangle

B. a right angled triangle

C. an equilateral triangle

D. None of the above

Answer: C

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61. If $6x^2 + 11xy - 10y^2 + x + 31y + k = 0$ represents a pair of straight lines , then k is equal to.

A. -15

B. 6

C. -10

D. -4

Answer: A

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62. The equation $xy + a^2 = a(x + y)$ represents

A. a two perpendicualr lines

B. a pair of straight lines

C. two parallel straight lines

D. None of the above

Answer: A

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63. If the equation $ax^2 + by^2 + cx + cy = 0$ represents a pair of straight lines , then

A. $a(b + c) = 0$

B. $b(c + a) = 0$

C. $c(a+b)=0$

D. $a+b+c=0$

Answer: C

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64. If the angle between the two lines represented by $2x^2+5xy+3y^2+6x+7y+4=0$ is $\tan^{-1}(m)$, then m is equal to

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

B. 1

C. $\frac{7}{5}$

D. 7

Answer: A

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65. The point of intersection of the lines represented by the equation $2x^2 + 3y^2 + 7xy + 8x + 14y + 8 = 0$ is

A. $(0, 2)$

B. $(1, 2)$

C. $(-2, 0)$

D. $(-2, 1)$

Answer: C

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66. The equation of second degree $x^2 + 2\sqrt{2}x + 2y^2 + 4x + 4\sqrt{2}y + 1 = 0$ represents a pair of straight lines.The distance between them is a. 4 b. $\frac{4}{\sqrt{3}}$ c. 2 d. $2\sqrt{3}$

A. 4

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

C. 2

D. $2\sqrt{3}$

Answer: C

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67. The lines joining the point of intersection of the line x+y=1 and the curve $x^2 + y^2 - 2y + \lambda = 0$ to the origin are perpendicular, then value of λ wil be: (A). 1/2 (B). -1/2 (C). $\frac{1}{\sqrt{2}}$ (D). 0

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

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

C. $\frac{1}{\sqrt{2}}$

D. 0

Answer: D

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68. The equation of the line joining origin to the points of intersection of the curve $x^2 + y^2 = a^2$ and $x^2 + y^2 - ax - ay = 0$, is

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

B. $xy = 0$

C. $xy - x^2 = 0$

D. $y^2 + xy = 0$

Answer: B

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69. If the slope of one of the lines represented by $ax^2 + 2hxy + by^2 = 0$ is the sqaure of the other , then

A. $a^2b + ab^2 - 6abh + 8h^3 = 0$

B. $a^2b + ab^2 + 6abh + 8h^3 = 0$

C. $a^2b + ab^2 - 3abh + 8h^3 = 0$

D. $a^2b + ab^2 - 6abh - 8h^3 = 0$

Answer: A

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70. If $4ab = 3h^2$, then the ratio of the slopes of the lines represented by the equation $ax^2 + 2hxy + by^2 = 0$ will be

(A) $\sqrt{2} : 1$

(B) $\sqrt{3} : 1$

(C) $2 : 1$

(D) $1 : 3$

A. $\sqrt{2} : 1$

B. $\sqrt{3} : 1$

C. $2 : 1$

D. $1 : 3$

Answer: D

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71. The pair equation of the lines passing through the origin and having slopes 3 and $-\frac{1}{3}$, is

A. $3y^2 + 8xy - 3x^2 = 0$

B. $3x^2 + 8xy - 3y^2 = 0$

C. $3y^2 - 8xy + 3x^2 = 0$

D. $3x^2 + 8xy + 3y^2 = 0$

Answer: B

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72. If the sum of the slopes of the lines given by $x^2 - 2cxy - 7y^2 = 0$ is four times their product, then the value of c is____

A. -2

B. -1

C. 2

D. 1

Answer: C

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73. If the angle between the pair of straight lines represented by the equation $x^2 - 3xy + \lambda y^2 + 3x - 5y + 2 = 0$ is $\tan^{-1}(1/3)$, where λ is non - negative real number , then λ is equal to

A. 2

B. 0

C. 3

D. 1

Answer: A

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74. If one of the lines denoted by the line pair $ax^2 + 2hxy + by^2 = 0$ bisects the angle between the coordinate axes, then prove that $(a+b)^2 = 4h^2$

A. $(a-b)^2 = h^2$

B. $(a+b)^2 = h^2$

C. $(a-b)^2 = 4h^2$

D. $(a+b)^2 = 4h^2$

Answer: D

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75. The equation of second degree $x^2 + 2\sqrt{2}x + 2y^2 + 4x + 4\sqrt{2}y + 1 = 0$ represents a pair of straight lines.The distance between them is a. 4 b. $\frac{4}{\sqrt{3}}$ c. 2 d. $2\sqrt{3}$

A. $2\sqrt{3}$

B. $2\sqrt{5}$

C. 2

D. 0

Answer: C

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76. The point of itnersection of lines represented by ther equation $3x^2 + 8xy - 3y^2 + 29x - 3y + 18 = 0$ is

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

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

C. $(-3, -5)$

D. $(3, 5)$

Answer: B

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77. All chords of the curve $3x^2 - y^2 - 2x + 4y = 0$ which subtend a right angle at the origin, pass through the fixed point

A. $(1, 2)$

B. $(1, -2)$

C. $(-1, 2)$

D. $(-1, -2)$

Answer: B

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78. The pair of lines joining origin to the points of intersection of, the two curves $ax^2 + 2hxy + by^2 + 2gx = 0$ and $a'x^2 + 2h'xy + b'y^2 + 2g'x = 0$ will be at right angles, if

A. $(a' + b')g' = (a + b)g$

B. $(a + b)g' = (a' + b')g$

C. $h^2 - ab = h^2 - a'b'$

D. $a + b + h^2 = a' + b' + h^2$

Answer: B

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79. A diagonal of the rectangle formed by the lines $x^2 - 4x + 3 = 0$ and $y^2 - 6y + 8 = 0$ is given by

A. $x + y = 5$

B. $x - y = 5$

C. $x + y = 8$

D. $x - y = 3$

Answer: A

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80. The product of perpendicular distances from the origin to the pair of straight lines $12x^2 + 25xy + 12y^2 + 10x + 11y + 2 = 0$

A. $\frac{1}{25}$

B. $\frac{2}{25}$

C. $\frac{3}{25}$

D. $\frac{4}{25}$

Answer: B

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81. The angle between the pair of lines $\left(x^2+y^2\right)\sin^2\alpha=(x\cos\theta-y\sin\theta)^2;$ *is*

A. θ

B. 2θ

C. α

D. 2α

Answer: D

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82. The centroid of the triangle formed by the pair of straight lines $12x^2 - 20xy + 7y^2 = 0$ and the line $2x - 3y + 4 = 0$is

A. $\left(\frac{-7}{3}, \frac{7}{3}\right)$

B. $\left(\frac{-8}{3}, \frac{8}{3}\right)$

C. $\left(\frac{8}{3}, \frac{8}{3}\right)$

D. $\left(\frac{4}{3}, \frac{4}{3}\right)$

Answer: C

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83. The lines represented by the equation $x^2 - y^2 - x + 3y - 2 = 0$ are

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

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

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

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

Answer: D

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84. If the lines $x^2 + 2xy - 35y^2 - 4x + 44y - 12 = 0 and 5x + \lambda y - 8$ are concurrent, then the value of λ is a. 0 b. 1 c. -1 d. 2

A. 0

B. 1

C. -1

D. 2

Answer: D

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85. In order to eliminate the first degree terms from the equation $2x^2 + 4xy + 5y^2 - 4x - 22y + 7 = 0$, the point to which origin is to be shifted is- (1) $(1, -3)$ (2) $(2, 3)$ (3) $(-2, 3)$ (4) $(1, 3)$

A. $(1, -3)$

B. $(2, 3)$

C. $(2, 3)$

D. $(1, 3)$

Answer: C

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Mht Cet Corner

1. The joint equation of lines passing through the origin and trisecting the first quadrant is

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

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

C. $\sqrt{3}x^2 - 4xy + \sqrt{3}y^2 = 0$

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

Answer: C

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2. The joint equation of bisectors of angles between lines $x = 5$ and $y = 3$ is

A. $(x - 5)(y - 3) = 0$

B. $x^2 - y^2 - 10x + 6y + 16 = 0$

C. $xy = 0$

D. $xy - 5x - 3y + 15 = 0$

Answer: B

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3. Which of the following equation does not represent a pair of lines ?

A. $x^2 - x = 0$

B. $xy - x = 0$

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

D. $xy + x + y + 1 = 0$

Answer: C

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4. If one of the lines of the pair $ax^2 + 2hxy + by^2 = 0$ bisects the angle between positive direction of the axes, then a, b and h satisfy the relation.

A. $a + b = 2|h|$

B. $a + b = -2h$

C. $a - b = 2|h|$

D. $(a - b)^2 = 4h^2$

Answer: B

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5. If the pair of straight lines $x^2 - 2pxy - y^2 = 0$ and $x^2 - 2qxy - y^2 = 0$ be such that each pair bisects the angle between the other pair, then

A. $pq = -1$

B. $pq = 1$

C. $\frac{1}{p} + \frac{1}{q} = 0$

D. $\frac{1}{p} - \frac{1}{q} = 0$

Answer: A

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6. The angle between the lines in $x^2 - xy - 6y^2 - 7x + 31y - 18 = 0$ is

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

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

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

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

Answer: A

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7. The pair equation of the lines passing through the origin and having slopes 3 and $-\frac{1}{3}$, is

A. $3y^2 + 8xy - 3x^2 = 0$

B. $3x^2 + 8xy + 3y^2 = 0$

C. $3y^2 - 8xy - 3x^2 = 0$

D. $3x^2 + 8xy - 3y^2 = 0$

Answer: D

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8. Joint equation of pair of lines through $(3, -2)$ and parallel to $x^2 - 4xy + 3y^2 = 0$ is

A. $x^2 + 3y^2 - 4xy - 14y + 24y + 45 = 0$

B. $x^2 + 3y^2 + 4xy - 14 + 2y + 45 = 0$

C. $x^2 + 3y^2 + 4xy - 14x + 24y - 45 = 0$

D. $x^2 + 3y^2 + 4xy - 14x - 24y - 45 = 0$

Answer: A

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9. If θ is the angle between the lines $ax^2 + 2hxy + by^2 = 0$, then angle between $x^2 + 2xy\sec\theta + y^2 = 0$ is

A. θ

B. 2θ

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

D. 3θ

Answer: A

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10. If the equation $12x^2 + 7xy - py^2 - 18x + qy + 6 = 0$ represents a pair of perpendicular straight lines, then

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

B. -19

C. -12

D. 12

Answer: C

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11. The angle between the lines represented by the equation $2x^2 + 3xy - 5y^2 = 0$, is

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

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

C. $\tan^{-1}\left|\frac{12}{5}\right|$

D. $\tan^{-1}\left|\frac{7}{3}\right|$

Answer: D

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12. If the equation $4x^2 + hxy + y^2 = 0$ represent coincident lines, then h is equal to

A. 1

B. 3

C. 2

D. 4

Answer: D

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13. The sum of slopes of lines $3x^2 + 5xy - 2y^2 = 0$ is

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

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

C. $-\frac{5}{2}$

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

Answer: B

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