MATHS

BOOKS - ARIHANT MATHS

PAIR OF STRAIGHT LINES

Example

1. Find the joint equation of lines y =x and y=-x.

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2. Find the separate equation of lines represented by the equation

$$x^2 - 6xy + 8y^2 = 0$$

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3. Find the condition that the slope of one of the lines represented by $ax^2 + 2hxy + by^2 = 0$ should be n times the slope of the other .

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4. If the slope of one of the lines represented by $ax^2 + 2hxy + by^2 = 0$ be the nth power of the other, prove that ,

$(ab^n)^{\frac{1}{n+1}} + (a^nb)^{\frac{1}{n+1}} + 2h = 0.$

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5. Find the product of the perpendiculars drawn from the point (x_1, y_1) on the lines $ax^2 + 2hxy + by^2 = 0$

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6. Evaluate $\int 8^x \, dx$

7. Show that the area of the triangle formed by the lines

$ax^2 + 2hxy + by^2 = 0$ and lx+my+n=0

is $\dfrac{n^2\sqrt{(h^2 - ab)}}{|(am^2 - 2hlm + bl^2)|}$

8. Show that the area of the triangle formed by the lines

$ax^2 + 2hxy + by^2 = 0$ and lx+my+n=0

is $\dfrac{n^2\sqrt{(h^2 - ab)}}{|(am^2 - 2hlm + bl^2)|}$

9. Show that the two straight lines

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

Make with the axis of x angles such that the difference of their tangents

is 2 .

10. The angle between the lines $\left(x^2 + y^2\right)\sin^2\alpha = (x\cos\beta - y\sin\beta)^2$ is

11. Show that the angle between the lines given by

$$\left(a + 2hm + bm^2\right)x^2 + 2\{(b - a)m - \left(m^2 - 1\right)h\}xy + \left(am^2 - 2hm + b\right)$$

is the same whatever be the value of m ,.

12. Evaluate $\displaystyle\int 9^x \, dx$

13. Differentiate $\sin^2 x + \cos^2 x$ with respect to x.

14. Find the equation of the bisectors of the angle between the lines represented by $3x^2 - 5xy + 4y^2 = 0$

15. The lines $y = mx$ bisects the angle between the lines $ax^2 + 2hxy + by^2 = 0$ if

16. If the pair of straight lines $x^2 - 2pxy - y^2 = 0$ and $x^2 - 2qxy - y^2 = 0$ are such that each pair bisects the angle between the other pair , then prove that $pq = -1$.

17. Differentiate $\sin^{-1} x + \cos^{-1} x$ with respect to x.

18. Show that the pair of lines given by $a^2 x^2 + 2h(a + b)xy + b^2 y^2 = 0$ is equally inclined to the pair given by $ax^2 + 2hxy + by = 0$.

19. Evaluate $\int \left(5x^2 - 8x + 5\right) dx$

20. For what value of λ does the equation

$12x^2 - 10xy + 2y^2 + 11x - 5y + \lambda = 0$

represent a pair of straight lines ? Find their equations and the angle between them.

21. Prove that the equation $8x^2 + 8xy + 2y^2 + 26x + 13y + 15 = 0$ represents a pair of parallel straight lines . Also find the perpendicular distance between them .

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22. Find the combined equation of the straight lines passing through the point (1,1) and parallel to the lines represented by the equation . $x^2 - 5xy + 4y^2 + x + 2y - 2 = 0$.

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23. Evaluate $\int \left(- 6x^3 + 9x \right) dx$

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24. Find the point of inersection of lines represented by

$$2x^2 - 7xy - 4y^2 - x + 22y - 10 = 0$$

25. Find the new equation of curve

$$12x^2 + 7xy - 12y^2 - 17x - 31y - 7 = 0$$ after removing the first degree terms.

26. Find the equation to the pair of straight lines joining the origin to the intersections of the straight line $y = mx + c$ and the curve $x^2 + y^2 = a^2$. Prove that they are at right angles if $2c^2 = a^2(1 + m^2)$.

27. Prove that the pair of lines joining the origin to the intersection of the curve $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1$

the line lx+my+n=0 are coincident, if a $a^2l^2 + b^2m^2 = n^2$

28. 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

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

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

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

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

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

Answer: b

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30. The combined equation of the lines $l_1 and l_2$ is $2x^2 + 6xy + y^2 = 0$ and that of the lines $m_1 and m_2$ is $4x^2 + 18xy + y^2 = 0$. If the angle between l_1 and m_2 is α then the angle between $l_2 and m_1$ will be $\dfrac{\pi}{2} - \alpha$

(b) $2\alpha \dfrac{\pi}{4} + \alpha$ (d) α

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

B. $\dfrac{\pi}{4} + \alpha$

C. α

D. 2α

Answer: c

31. If the pair of lines $\sqrt{3}x^2 - 4xy + \sqrt{3}y^2 = 0$ is rotated about the origin by $\pi/6$ in the anticlockwise sense , then find the equation of the pair of lines in the new position.

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

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

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

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

Answer: c

32. If the pair of lines $ax^2 - 2xy + by^2 = 0$ and bx^2-2xy+ay^2=0`

be such that each pair bisects the angle between the other pair , then |a-

b| equals to

A. 1

B. 2

C. 3

D. 4

Answer: b

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33. The equation of line which is parallel to the line common to the pair

of lines given by $3x^2 + xy - 4y^2 = 0$ and $6x^2 + 11xy + 4y^2 = 0$ and at

a distance of 2 units from it is

A. $3x - 4y = -10$

B. $x - y = 2$

C. $3x + 4y = 10$

D. $2x + y = -2$

Answer: c

34. The lines joining the origin to the point of intersection of $3x^2 + mxy - 4x + 1 = 0$ and $2x + y - 1 = 0$ are at right angles. Then which of the following is a possible value of m? -4 (b) 4 (c) 7 (d) 3

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

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

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

D. $g^2 + f^2 = c^2$

Answer: c

35. The lines joining the origin to the point of intersection of $3x^2 + mxy - 4x + 1 = 0$ and $2x + y - 1 = 0$ are at right angles. Then which of the following is not a possible value of m?

A. -4

B. 3

C. 4

D. 7

Answer: (a,b,c,d)

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

A. an isosecles triangle

B. a right angled triangle

C. an equilateral triangle

D. None of these

Answer: (a,c)

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37. If the equatoin $ax^2 - 6xy + y^2 + 2bx + 2cy + d = 0$ represents a pair of lines whose slopes are m and m^2, then value (s) of a is /are

A. -27

B. -8

C. 8

D. 27

Answer: (a,c)

38. Consider the equation of a pair of straight lines as

$$\lambda xy - 8x + 9y - 12 = 0$$

A. 0

B. 2

C. 4

D. 6

Answer: d

39. The point of intersection of lines is (α, β) , then the equation whose roots are α, β, is

A. $4x^2 + x - 8 = 0$

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

C. $4x^2 - x - 8 = 0$

D. $6x^2 - x - 12 = 0$

Answer: b

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

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

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42. Find the slope of tangent to the curve if $ax^2 + 2hxy + by^2 = 0$

43. Statement I . The combined equation of l_1, l_2 is $3x^2 + 6xy + 2y^2 = 0$

and that of $m_1, m_2 is 5x^2 + 18xy + 2y^2 = 0$. If angle between $l_1, m_2 is \theta$,

then angle between $l_2, m_1 is \theta$.

Statement II . If the pairs of lines $l_1 l_2 = 0, m_1 m_2 = 0$ are equally

inclinded that angle between l_1 and m_2= angle between l_2 and m_1.

44. Statement I . The equation $2x^2 - 3xy - 2y^2 + 5x - 5y + 3 = 0$

represents a pair of perpendicular straight lines.

Statement   II   A   pair   of   lines   given   by

$ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ are perpendicular if $a + b = 0$

45. If the lines represented by $2x^2 - 5xy + 2y^2 = 0$ be the sides of a parallelogram and the line $5x + 2y = 1$ be one of its diagonal. Find the equation of the other diagonal, and area of the parallelogram .

46. Evaluate $\int (1 + 3t)t^2\ dx$

47. If $u = ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$

represents a pair of straight lines , prove that the equation of the third pair of straight lines passing through the points where these meet the axes is $ax^2 - 2hxy + by^2 + 2gx + 2fy + c + \dfrac{4fgxy}{c} = 0$.

48. If the equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ represents a pair of parallel lines,

if $h = \sqrt{ab}$ and $g\sqrt{b} = f\sqrt{a}$.

Prove that the distance between them is $2\sqrt{\left(\dfrac{g^2 - ac}{a(a + b)}\right)}$.

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49. Find $\dfrac{dy}{dx}$ if $x - 3y = x^4$

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50. Evaluate $\displaystyle\int \left(- 6x^3\right) dx$

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51. Show that if two of the lines $ax^3 + bx^2y + cxy^2 + dy^3 = 0(a \neq 0)$ make complementary angles with X -axis in anti -clockwise sense, then a(a-

c)+d(b-d)=0 .

52. Show that the equation $a(x^4 + y^4) - 4bxy(x^2 - y^2) + 6cx^2y^2 = 0$ represents two pairs of lines at right angles and that if $2b^2 = a^2 + 3ac$, the two pairs will coincide.

53. Show that the perpendiculars let fall from any point of the straight line 2x+11y=5 upon the two straight lines 24x+7y=20 and 4x−3y=2 are equal to each other.

54. Evaluate $\int 5x^3 \, dx$

1. The lines given by the equation $\left(2y^2 + 3xy - 2x^2\right)(x + y - 1) = 0$ form a triangle which is

    A. equilateral

    B. isosceles

    C. right angled

    D. obtuse angled

Answer: C

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2. Area of the triangle formed by the lines $y^2 - 9xy + 18x^2 = 0$ and $y = 9$ is

A. 27/4

B. 0

C. 9/4

D. 27

Answer: A

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3. 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

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

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

B. $a + b = -2h$

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

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

Answer: B

5. If the slope of the line given by $a^2x^2 + 2hxy + b^2y^2 = 0$ be three times of the other , then h is equal to

A. (a) $2\sqrt{3}ab$

B. (b) $-2\sqrt{3}ab$

C. (c) $\dfrac{2}{\sqrt{3}}ab$

D. (d) $-\dfrac{2}{\sqrt{3}}ab$

Answer: C::D

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6. Find the separate equation of two straight lines whose joint equation is ab $\left(x^2 - y^2\right) + \left(a^2 - b^2\right)xy = 0$

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7. Find the coordinates of the centroid of the triangle whose sides are $12x^2 - 20xy + 7y^2 = 0$ and $2x - 3y + 4 = 0$

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8. If the lines $ax^2 + 2hxy + by^2 = 0$ be two sides of a parallelogram and the line lx+my=1 be one of its diagonal, show that the equation of the other diagonal is y (bl-hm)=x(am-hl).

9. Find the condition that one of the lines given by $ax^2 + 2hxy + by^2 = 0$ may coincide with one of the lines given by $a'x^2 + 2h'xy + b'y^2 = 0$

Exercise For Session 2

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

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

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

C. $\dfrac{\pi}{3}$

D. $\dfrac{2\pi}{3}$

Answer: B

2. The angle between the lines $ay^2 - \left(1 + \lambda^2\right)xy - ax^2 = 0$ is same as the angle between the line:

A. (a) $5x^2 + 2xy - 3y^2 = 0$

B. (b) $x^2 - 2xy - 3y^2 = 0$

C. (c) $x^2 - y^2 = 100$

D. (d) xy=0

Answer: C::D

3. Which of the following pair of straight lines intersect at right angles ?

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

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

C. $2y(x + y) = xy$

D. $y = \overset{-}{+} 2x$

Answer: A

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4. if $h^2 = ab$, then the lines represented by $ax^2 + 2hxy + by^2 = 0$ are

A. Parallel

B. perpendicular

C. coincident

D. None of these

Answer: C

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5. Equation $ax^3 - 9x^2y - xy^2 + 4y^3 = 0$ represents three straight lines.

If the two of the lines are perpendicular , then a is equal to

a. -5

b. 5

c. -4

d. 4

    A. -5

    B. 5

    C. -4

    D. 4

Answer: B::C

6. Find the angle between the lines whose joint equation is

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

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7. Show that the lines

$$(1 - \cos\theta\tan\alpha)y^2 - (2\cos\theta + \sin^2\theta\tan\alpha)xy + \cos\theta(\cos\theta + \tan\alpha)x^2 =$$

include an angle α between them .

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8. Find the angle between the lines repersented by the equation

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

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9. Show that the lines $x^2 - 4xy + y^2 = 0$ and $x + y = 3$ form an equilateral triangle and find its area.

10. Find $\dfrac{dy}{dx}$ if $ax^2 + 2hxy + by^2 = 0$

Exercise For Session 3

1. If the coordinate axes are the bisectors of the angles between the pair of lines $ax^2 + 2hxy + by^2 = 0$, then

A. (a) a=b

B. (b) h=0

C. (c) $a^2 = b = 0$

D. (d) $a + b^2 = 0$

Answer: B

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2. The equation of the bisectors of angle between the lines $x^2 - 4xy + y^2 = 0$ is

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

A. 0

B. $\pi/2$

C. π

D. $3\pi/2$

Answer: A::C

4. The bisectors of the angles between the lines $(ax + by)^2 = c(bx - ay)^2, c > 0$ are respectively parallel and perpendicular to the line $bx - ay + \mu = 0$

A. $bx - ay + \mu = 0$

B. $ax + by + \lambda = 0$

C. $ax = by + v = 0$

D. $bx + ay + \tau = 0$

Answer: B

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

(a) p = –q (b) pq = 1 (c) pq = -1 (d) p = q.

6. Prove that the lines $2x^2 + 6xy + y^2 = 0$ are equally inclined to the lines $4x^2 + 18xy + y^2 = 0$

7. Show that the equation of the pair of lines bisecting the angles between the pair of bisectors of the angles between the pair of lines $ax^2 + 2hxy + by^2 = 0$ is $(a - b)(x^2 - y^2) + 4hxy = 0$

8. Prove that the bisectors of the angle between the lines $ax^2 + acxy + cy^2 = 0$ and $\left(3 + \dfrac{1}{c}\right)x^2 + xy + \left(3 + \dfrac{1}{a}\right)y^2 = 0$ are always the same .

9. 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 $\lambda =$

Exercise For Session 4

1. if $\lambda x^2 + 10xy + 3y^2 - 15x - 21y + 18 = 0$ represents a pair of straight lines. Then , the value of λ is

A. -3

B. 3

C. 4

D. -4

Answer: B

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2. Prove that the equartion $3y^2 - 8xy - 3x^2 - 29x + 3y - 18 = 0$ represents two straight lines. Find also their point of intersection and the angle between them.

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

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

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

D. $\left(-\dfrac{3}{2}, -\dfrac{5}{2}\right)$

Answer: D

3. if the equation $12x^2 + 7xy - py^2 - 18x + qy + 6 = 0$ represents two perpendicular lines , then the value of p and q are

A. 12,1

B. 12,-1

C. 12, $\dfrac{23}{2}$

D. $-\dfrac{23}{2}$

Answer: A::C

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

A. $-\dfrac{1}{5}$

B. $\dfrac{1}{5}$

C. $-\dfrac{3}{5}$

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

Answer: B

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5.　　　The　　　equation　　　of　　　second　　　degree

$x^2 + 2\sqrt{2}xy + 2y^2 + 4x + 4\sqrt{2}y + 1 = 0$ represents a pair of straight

lines.The distance between them is

A. 2

B. $2\sqrt{3}$

C. 4

D. $4\sqrt{3}$

Answer: A

6. Find the area of the parallelogram formed by the lines

$$6x^2 - 5xy - 6y^2 = 0 \text{ and } 6x^2 - 5xy - 6y^2 + x + 5y - 1 = 0$$

7. Evaluate $\int x^3 \, dx$

8. If the equation $2hxy + 2gx + 2fy + c = 0$ represents two straight lines, then show that they form a rectangle of area $\dfrac{|fg|}{h^2}$ with the coordinate axes.

9. Find the area of the triangle formed by the lines represented by $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ and axis of x .

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10. Find the combined equation of the straight lines passing through the point (1,1) and parallel to the lines represented by the equation . $x^2 - 5xy + 4y^2 + x + 2y - 2 = 0$.

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Exercise For Session 5

1. If the straight lines joining origin to the points of intersection of the line x+y=1 with the curve $x^2 + y^2 + x - 2y - m = 0$ are perpendicular to each other , then the value of m should be

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

B. 0

C. $\dfrac{1}{2}$

D. 1

Answer: A

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2. 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. -1

B. 6

C. 13

D. 20

Answer: A

3. If θ is an angle by which axes are rotated about origin and equation

$$ax^2 + 2hxy + by^2 = 0$$

does not contain xy term in the new system, then prove that

$$\tan 2\theta = \frac{2h}{a - b}.$$

A. $\dfrac{(a - b)}{2h}$

B. $\dfrac{2h}{(a + b)}$

C. $\dfrac{(a + b)}{2h}$

D. $\dfrac{2h}{(a - b)}$

Answer: A

4. The lines joining the origin to the points of intersection of

$$2x^2 + 3xy - 4x + 1 = 0 \text{ and } 3x + y = .1 \text{ given by}$$

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

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

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

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

Answer: A

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5. The equation of the line joining the origin to the point of intersection of the lines $2x^2 + xy - y^2 + 5x - y + 2 = 0$ is

A. x+y=0

B. x-y=0

C. x-2y=0

D. 2x+y=0

Answer: A

6. 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

7. If the straight lines joining the origin and the points of intersection of $y = mx + 1$ and $x^2 + y^2 = 1$ are perpendicular to each other, then find the value of m.

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

9. Show that for all values of λ, the lines joining the origin to the points common to $x^2 + 2hxy - y^2 + gx + fy = 0$ and $fx - gy = \lambda$ are at right angles .

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10. Find the equations of the straight lines joining the origin to the points of intersection of $x^2 + y^2 - 4x - 2y = 4$ and $x^2 + y^2 - 2x - 4y = 4$.

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Exercise Single Option Correct Type Questions

1. 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. a) -4

B. b) -2

C. c) 2

D. d) 4

Answer: B

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2. The equation $3ax^2 + 9xy + (a^2 - 2)y^2 = 0$ represents two perpendicular straight lines for

A. a) only one value of a

B. b) for all values of a

C. c) for only two values of a

D. d) for no value of a

Answer: C

3. The image of the pair of lines represented by $ax^2 + 2hxy + by^2 = 0$ by 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. $ax^2 - 2hxy + by^2 = 0$

Answer: D

4. Number of points lying on the line $7x + 4y + 2 = 0$ which is equidistant from the lines $15x^2 + 56xy + 48y^2 = 0$ is

   A. 0

B. 1

C. 2

D. 4

Answer: C

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5. Orthocentre of the triangle formed by the lines

$xy - 3x - 5y + 15 = 0$ and $3x + 5y = 15$ is

A. (-5,-3)

B. (5,3)

C. (-3,-5)

D. (3,5)

Answer: B

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6. Two of the straight lines given by $3x^3 + 3x^2y - 3xy^2 + dy^3 = 0$ are at right angles , if d equal to

    A. -4

    B. -3

    C. -2

    D. -1

Answer: B

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7. 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. (a) $\sqrt{5}$

    B. (b) $2\sqrt{5}$

C. (c) $3\sqrt{5}$

D. (d) $4\sqrt{5}$

Answer: C

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8. Evaluate $\displaystyle\int 7x^3\, dx$

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9. Distance between the parallel lines

$$4x^2 + 20xy + 25y^2 + 2x + 5y - 12 = 0$$

A. $\dfrac{3}{\sqrt{29}}$

B. $\dfrac{5}{\sqrt{29}}$

C. $\dfrac{7}{\sqrt{29}}$

D. $\dfrac{9}{\sqrt{29}}$

Answer: C

10. Find the point of inersection of lines represented by

$$2x^2 - 7xy - 4y^2 - x + 22y - 10 = 0$$

A. A. (-2,2)

B. B. (-3,3)

C. C. (3,3)

D. D. (2,2)

Answer: C

11. Evaluate $\int 8x^3 \, dx$

12. 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. a-2

B. a+2

C. $\dfrac{2}{(a + 2)}$

D. $\dfrac{2}{a}$

Answer: C

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Exercise More Than One Correct Option Type Questions

1. The equation of image of pair of lines $y = |x - 1|$ with respect to y-axis is :

A. y=|x+1|

B. y=|x-1|+3

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

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

Answer: A::C

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

A. a) $a + b = 0$

B. b) $c = 0$

C. c) $a + c = 0$

D. d) $c(a + b) = 0$

Answer: A::B::D

3. If $x^2 + \alpha y^2 + 2\beta y = a^2$ represents a pair of perpendicular straight lines , then

A. $\alpha = 1, \beta = a$

B. $\alpha = 1, \beta = -a$

C. $\alpha = -1, \beta = -a$

D. $\alpha = -1, \beta = a$

Answer: C::D

4. If the pair of lines $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ intersect on the y-axis then

A. $f^2 = bc$

B. abc=2fgh

C. $bg^2 \neq ch^2$

D. $2fgh = bg^2 + ch^2$

Answer: A::D

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5. Two pairs of straight lines have the equations $y^2 + xy - 12x^2 = 0$ and $ax^2 + 2hxy + by^2 = 0$. One line will be common among them if

A. a=-3(2h+3b)

B. a=8 (h-2b)

C. a=2(b+h)

D. a=-3(b+h)

Answer: A::B

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6. The three sides of a triangle are given by $(x^2 - y^2)(2x + 3y - 6) = 0$.

If the points (-2,a) lies inside and (b,1) lies outside the triangle, then

A. $2 < a < \dfrac{10}{3}$

B. $-2 < a < \dfrac{10}{3}$

C. $-1 < b < \dfrac{9}{2}$

D. $-1 < b < 1$

A. $2 < a < \dfrac{10}{3}$

B. $-2 < a < \dfrac{10}{3}$

C. $-1 < b < \dfrac{9}{2}$

D. $-1 < b < 1$

Answer: A::D

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Exercise Passage Based Questions

1. Consider the equation of a pair of straight lines as

$$x^2 - 3xy + \lambda y^2 + 3x - 5y + 2 = 0$$

The value of λ is

A. 1

B. 2

C. 3

D. 4

Answer: B

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2. Consider the equation of a pair of straight lines as

$$x^2 - 3xy + \lambda y^2 + 3x = 5y + 2 = 0$$

The point of intersection of line is (α, β), then the value of $\alpha^2 + \beta^2$ is

A. 2

B. 5

C. 10

D. 17

Answer: C

3. Consider the equation of a pair of straight lines as

$$x^2 - 3xy + \lambda y^2 + 3x - 5y + 2 = 0$$

The angle between the lines is θ then the value of $\cos 2\theta$ is

A. $\dfrac{1}{3}$

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

C. $\dfrac{3}{5}$

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

Answer: D

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4. Evaluate $\displaystyle\int 9x^3 \, dx$

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5. Evaluate $\displaystyle\int 2x^3 \, dx$

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6. Evaluate $\displaystyle\int 3x^3\,dx$

7. Consider a pair of perpendicular straight lines

$2x^2 + 3xy + by^2 - 11x + 13y + c = 0$ The value fo c is

A. -2

B. 2

C. -3

D. 3

Answer: A

8. Find $\dfrac{dy}{dx}$ if $2x^2 + 3xy + by - 11x + 13y + c = 0$

9. Consider the equation of a pair of straight lines as

$$x^2 - 3xy + \lambda y^2 + 3x - 5y + 2 = 0$$

The value of λ is

A. 2

B. 3

C. 4

D. 5

Answer: C

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Exercise Single Integer Answer Type Questions

1. Evaluate $\displaystyle\int 2x^4\, dx$

2. Evaluate $\int 3x^4 \, dx$

3. 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 $\lambda =$

4. If the lines joining the origin to the intersection of the line y=nx+2 and the curve $x^2 + y^2 = 1$ are at right angles, then the value of n^2 is

5. Area of the triangle formed by the line $x + y = 3$ and angle bisectors

of the pair of straight lines $x^2 - y^2 + 2y = 1$ is $2 sq\dot{u}nits$ b. $4 sq\dot{u}nits$ c.

$6 sq\dot{u}nits$ d. $8 sq\dot{u}nits$

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Pair Of Straight Lines Exercise 5 Matching Type Questions

1. Evaluate $\displaystyle\int 4x^4\, dx$

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Exercise Statement I And Ii Type Questions

1. Evaluate $\displaystyle\int 6x^4\, dx$

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2. Evaluate $\int 7x^4 \, dx$

3. Evaluate $\int 8x^4 \, dx$

4. Evaluate $\int 2x^5 \, dx$

Exercise Subjective Type Questions

1. Prove that the straight lines represented by

$(y - mx)^2 = a^2(1 + m^2)$ and $(y - nx)^2 = a^2(1 + n^2)$ form rhombus.

2. Prove that the equation m $(x^3 - 3xy^2) + y^3 - 3x^2y = 0$ represents three straight lines equally inclined to each other.

3. Show that straight lines $(A^2 - 3B^2)x^2 + 8ABxy + (B^2 - 3A^2)y^2 = 0$ form with the line $Ax + By + C = 0$ an equilateral triangle of area $\dfrac{C^2}{\sqrt{3}(A^2 + B^2)}$.

4. Find $\dfrac{dy}{dx}$ if $x \cos x = 2 \sin y$

5. Find $\dfrac{dy}{dx}$ if $y = ax^2 + 2hxy + by^2$

6. Find $\dfrac{dy}{dx}$ if $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$

7. If two of the lines represented by

$ax^4 + bx^3y + cx^2y^2 + dxy^3 + ay^4 = 0$ bisects the angle between the

other two, then

Exercise Questions Asked In Previous 13 Years Exam

1. If the pair of lines $ax^2 + 2(a + b)xy + by^2 = 0$ lie along diameters of a

circle and divide the circle into four sectors such that the area of one of

the sectors is thrice the area of another sector then

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

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

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

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

Answer: A

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2. 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

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

B. -2

C. 1

D. 2

Answer: C