



MATHS

BOOKS - SAI MATHS (TELUGU ENGLISH)

PAIR OF STRAIGHT LINES

Problem

1. The combined equation of the straight lines passing through the point $(4,3)$ and each line making intercepts on the coordinate axes whose sum is -1 is

A. $(3x - 2y - 6)(x - 2y + 2) = 0$

B. $(3x - 2y + 6)(x - 2y + 2) = 0$

C. $(3x - 2y - 6)(x - 2y - 2) = 0$

D. $(3x - 2y + 6)(x - 2y - 2) = 0$

Answer: A



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2. The line $x + y = k$ meets the pair of straight lines $x^2 + y^2 - 2x - 4y + 2 = 0$ in two points of

A and B . If O is the origin and $\angle AOB = 90^\circ$ then the value of $k > 1$ is ,

A. 5

B. 4

C. 3

D. 2

Answer: D



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3. Two pairs of straight lines with combined equations $xy + 4x - 3y - 12 = 0$ and $xy - 3x + 4y - 12 = 0$ form a square. Then the combined equation of its diagonals is

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

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

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

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

Answer: C



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4. The angle between the straight lines represented by

$$(x^2 + y^2) \sin^2 \alpha = (x \cos \alpha - y \sin \alpha)^2 \text{ is}$$

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

B. α

C. 2α

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

Answer: C



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5. If the slope of one of the lines represented by $ax^2 - 6xy + y^2 = 0$ is the square of the other , then the value of a is

A. -24 or 8

B. -3 or 2

C. -64 or 27

D. -4 or 3

Answer: A



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6. The area (in sq. units) of the triangle formed by the lines $x^2 - 3xy + y^2 = 0$ and $x + y + 1 = 0$, is

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

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

C. $5\sqrt{2}$

D. $\frac{1}{2\sqrt{5}}$

Answer: D



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7. If $x^2 + \alpha y^2 + By = a^2$ represents a pair of perpendicular lines, then β equals to,

A. $4a$

B. a

C. $2a$

D. $3a$

Answer: B



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8. The equation of the pair of lines passing through the origin whose sum and product of slopes are respectively the arithmetic mean and geometric mean of 4 and 9 is

A. $12x^2 - 13xy + 2y^2 = 0$

B. $12x^2 + 13xy + 2y^2 = 0$

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

D. $12x^2 + 15xy - 2y^2 = 0$

Answer: A



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9. The equation

$x^2 - 5xy + py^2 + 3x - 8y + 2 = 0$ represents a

pair of straight lines . If θ is the angle between

them , then $\sin \theta$ is equal to

A. $\frac{1}{\sqrt{50}}$

B. $\frac{1}{7}$

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

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

Answer: A



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10. If the equation

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

represents a pair of straight lines, then the square of the distance of their point of intersection from the origin is

A. $\frac{c(a + b) - af^2 - bg^2}{ab - h^2}$

B. $\frac{c(a + b) + f^2 + g^2}{ab - h^2}$

C. $\frac{c(a + b) - f^2 - g^2}{ab - h^2}$

D. $\frac{c(a + b) - f^2 - g^2}{(ab - h^2)^2}$

Answer: C



11. The distance between the parallel lines given by $(x + 7y)^2 + 4\sqrt{2}(x + 7y) - 42 = 0$ is

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

B. $4\sqrt{2}$

C. 2

D. $10\sqrt{2}$

Answer: C

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12. If the area of the triangle formed by the pair of lines $8x^2 - 6xy + y^2 = 0$ and the line $2x + 3y = a$ is 7, then a is equal to

A. 14

B. $14\sqrt{2}$

C. $28\sqrt{2}$

D. 28

Answer: D



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13. If the pair of lines given by $(x^2 + y^2) \cos^2 \theta = (x \cos \theta + y \sin \theta)^2$ are perpendicular to each other, then θ is equal to

A. 0

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

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

D. $\frac{3\pi}{4}$

Answer: B



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14. If one of the lines in the pair of straight lines given by $4x^2 + 6xy + ky^2 = 0$ bisects the angle between the coordinate axes, then $k \in$

A. $\{-2, -10\}$

B. $\{-2, 10\}$

C. $\{-10, 2\}$

D. $\{2, 10\}$

Answer: C



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

$\sqrt{\frac{g^2 - ac}{f^2 - bc}}$, is equal to

A. $\frac{a}{b}$

B. $\sqrt{\frac{a}{b}}$

C. $\sqrt{\frac{b}{a}}$

D. $\frac{b}{a}$

Answer: B



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16. If s and p are respectively the sum and the product of the slopes of the lines $3x^2 - 2xy - 15y^2 = 0$ then $s : p$ is equal to

A. 4:3

B. 2:3

C. 3:5

D. 3:4

Answer: B



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17. The distance between the two lines represented by

$$8x^2 - 24xy + 18y^2 - 6x + 9y - 5 = 0 \text{ is}$$

A. 0

B. $\frac{3}{4\sqrt{13}}$

C. $\frac{6}{\sqrt{13}}$

D. $\frac{7}{2\sqrt{13}}$

Answer: C



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18. A pair of perpendicular lines passes through the origin and also through the points of intersection of the curve $x^2 + y^2 = 4$ with $x + y = a$, where $a > 0$. Then a is equal to

A. 2

B. 3

C. 4

D. 5

Answer: A



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19. If $3x^2 - 11xy + 10y^2 - 7x + 13y + k = 0$

denotes a pair of straight lines, then the point of intersection of the lines is

A. $(1, 3)$

B. $(3, 1)$

C. $(-3, 1)$

D. $(1, -3)$

Answer: B



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20. If m_1 and m_2 are the roots of the equation $x^2 + (\sqrt{3} + 2)x + (\sqrt{3} - 1) = 0$ then the area of the triangle formed by the lines $x = m_1x$, $y = m_2x$ and $y = c$, is

A. $\left(\frac{\sqrt{33} - \sqrt{11}}{4}\right)c^2$

B. $\left(\frac{\sqrt{33} + \sqrt{11}}{4}\right)c^2$

C. $\left(\frac{\sqrt{11} - \sqrt{33}}{2}\right)c^2$

D. $\frac{\sqrt{33}}{2}c^2$

Answer: B



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21. The value of λ with $|\lambda| < 16$ such that

$$2x^2 - 10xy + 12y^2 + 5x + \lambda y - 3 = 0$$

represents a pair of straight lines, is

A. -10

B. -9

C. 10

D. 9

Answer: B



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22. The area (in square 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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23. The pairs of straight line $x^2 - 3xy + 2y^2 = 0$

and $x^2 - 3xy + 2y^2 + x - 2 = 0$ form a

- A. square but not rhombus
- B. rhombus
- C. parallelogram
- D. rectangle but not a square

Answer: C



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24. The value of λ such that

$$\lambda x^2 - 10xy + 12y^2 + 5x - 16y - 3 = 0$$

represents a pair of straight lines, is

A. 1

B. -1

C. 2

D. -2

Answer: C



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25. A pair of perpendicular straight lines passes through the origin and also through the point of intersection of the curve $x^2 + y^2 = 4$ and $x + y = a$. The set containing the value of a is

A. $\{-2, 2\}$

B. $\{-3, 3\}$

C. $\{-4, 4\}$

D. $\{-5, 5\}$

Answer: A



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26. 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

A. $(1, -3)$

B. $(2, 3)$

C. $(-2, 3)$

D. $(1, 3)$

Answer: C



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27. 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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28. If the lines

$$x^2 + 2xy - 35y^2 - 4x + 44y - 12 = 0 \quad \text{and}$$

$$5x + \lambda y - 8 = 0$$

are concurrent, then the value of λ is,

A. 0

B. 1

C. -1

D. 2

Answer: D



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29. The lines represented by the equation

$$x^2 - y^2 - x + 3y - 2 = 0 \text{ are}$$

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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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 the bisectors of the angles of the lines represented by $3x^2 - 4xy + 5y^2 = 0$ and $5x^2 + 4xy + 3y^2 = 0$ are same, then the angle made by the lines represented by first with the second, is

A. 30°

B. 60°

C. 45°

D. 90°

Answer: D



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

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

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

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

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

Answer: B



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33. The angle between the lines represented by

$$y^2 \sin^2 \theta - xy \sin^2 \theta + x^2 (\cos^2 \theta - 1) = 0, \text{ is}$$

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

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

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

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

Answer: D



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34. Area of the triangle formed by the lines

$$3x^2 - 4xy + y^2 = 0, 2x - y = 6 \text{ is ,}$$

A. 16 sq unit

B. 25 sq unit

C. 36 sq unit

D. 49 sq unit

Answer: C



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35. If the pair of straight lines given by $Ax^2 + 2Hxy + By^2 = 0$ ($H^2 > AB$) forms an equilateral triangle with line $ax + by + c = 0$ then $(A + 3B)(3A + B)$ is equal to

A. H^2

B. $-H^2$

C. $2H^2$

D. $4H^2$

Answer: D



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36. The area (in square units) of the quadrilateral formed by two pairs of lines

$$\lambda^2 x^2 - m^2 y^2 - n(\lambda x + my) = 0 \quad \text{and}$$

$$\lambda^2 x^2 - m^2 y^2 + n(\lambda x + my) = 0, \text{ is}$$

A. $\frac{n^2}{2|\lambda m|}$

B. $\frac{n^2}{|\lambda m|}$

C. $\frac{n}{2|\lambda m|}$

D. $\frac{n^2}{4|\lambda m|}$

Answer: A



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37. If the coordinate axes are the bisectors of the angle between the pairs of lines $ax^2 + 2hxy + by^2 = 0$, where $h^2 > ab$ and $a \neq b$, then

A. $a + b = 0$

B. $h = 0$

C. $h \neq 0, a + b = 0$

D. $a + b \neq 0$

Answer: B



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38. If the angle 2θ is acute then the acute angle between the pair of straight lines

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

is

A. 2θ

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

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

D. θ

Answer: D



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39. If the pair of straight lines $xy - y - y + 1 = 0$ and the line $ax + 2y - 3a = 0$ are concurrent, then a equal to

A. 0

B. 1

C. -1

D. 3

Answer: B



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40. The orthocentre of triangle formed by the lines $x + 3y = 10$ and $6x^2 + xy - y^2 = 0$ is

A. $(1, 3)$

B. $(3, 1)$

C. $(-1, 3)$

D. $(1, -3)$

Answer: A



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41. If one of the lines of pair of straight lines $ax^2 + 2hxy + by^2 = 0$ bisects the angle between the coordinate axes , then

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

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

C. $a^2 + b^2 = 4h^2$

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

Answer: B



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42. If the slope of one line is twice the slope of other in the pair of straight lines $ax^2 + 2hxy + by^2 = 0$ then $8h^2$ is equal to

A. $-9ab$

B. $9ab$

C. $-7ab$

D. $7a b$

Answer: B



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