MATHS

BOOKS - DISHA PUBLICATION MATHS (HINGLISH)

STRAIGHT LINES AND PAIR OF STRAIGHT LINES

Jee Main 5 Years At A Glance

1. Let the orthocentre and centroid of a triangle be $(-3, 5)$ and $B(3, 3)$ respectively. If C is the circumcentre of the triangle then the radrus of the circle having line segment AC as diameter, is

A. $2\sqrt{10}$

B. $3\sqrt{\frac{5}{2}}$

C. $\frac{3\sqrt{5}}{2}$

D. $\sqrt{10}$

Answer: B

Watch Video Solution

2. The straight line through a fixed point (2,3) intersects the coordinate axes at distinct point P and Q. If O is the origin and the rectangle OPRQ is completed then the locus of R is

A. $2x + 3y = xy$

B. $3x + 2y = xy$

C. $3x + 2y = 6xy$

D. $3x + 2y = 6$

Answer: B

Watch Video Solution

3. Two sides of a rhombus are along the lines,$x - y + 1 = 0$ and $7x - y - 5 = 0$. If its diagonals intersect at $(-1, -2)$, then which one of the following is a vertex of this rhombus ?

(1) $(-3, -9)$ (2) $(-3, -8)$ (3) $\left(\frac{1}{3}, -\frac{8}{3}\right)$ (4) $\left(-\frac{10}{3}, -\frac{7}{3}\right)$

A. $\left(\frac{1}{3}, \frac{8}{3}\right)$

B. $\left(-\frac{10}{3}, -\frac{7}{3}\right)$

C. $(-3, -9)$

D. $(-3, -8)$

Answer: A

Watch Video Solution

4. If a variable line drawn through the intersection of the lines $\frac{x}{3}+\frac{y}{4}=1$and $\frac{x}{4}+\frac{y}{3}=1$ meets the coordinate axes at A and B, $(A \neq B)$, then the locus of the midpoint of AB is (A) $6xy=7(x+y)$ (B) $4(x+y)^2-28(x+y)+49=0$ (C) $7xy=6(x+y)$ (D) $14(x+y)^2-97(x+y)+168=0$

A. $7xy=6(x+y)$

B. $4(x+y)^2-28(x+y)+49=0$

C. $6xy=7(x+y)$

D. $14(x+y)^2-97(x+y)+168=0$

Answer: A

Watch Video Solution

5. The point $(2, 1)$ is translated parallel to the line $L: x - y = 4$ by $2\sqrt{3}$units. If the new point Q lies in the third quadrant, then the equation of the line passing through Q and perpendicular to L is

A. $x + y = 2 - \sqrt{6}$

B. $2x + 2y = 1 - \sqrt{6}$

C. $x + y = 3 - 3\sqrt{6}$

D. $x + y = 3 - 2\sqrt{6}$

Answer: D

Watch Video Solution

6. Let L be the line passing through the point P (1,2) such that its intercepted segment between the co-ordinate axes is bisected at P. If L_1 is the line perpendicular to L and psssing through the point (-2,1), then the point of intersection of L and L_1 is

A. $\left(\frac{4}{5}, \frac{12}{5}\right)$

B. $\left(\frac{3}{5}, \frac{23}{10}\right)$

C. $\left(\frac{11}{20}\right), \left(\frac{29}{10}\right)$

D. $\left(\frac{3}{10}, \frac{17}{5}\right)$

Answer: A

Watch Video Solution

7. The points $\left(0, \frac{8}{3}\right), (1, 3)$ and $(82, 30)$ are vertices of

A. form an acute angled triangle.

B. form a right angled triangle

C. lie oin a straight line.

D. form an obtuse angled triangle

Answer: C

Watch Video Solution

8. Let a,b, c and d be non-zero numbers. If the point of intersection of the lines $4ax + 2ay + c = 0$ and $5bx + 2by + d = 0$ lies in the fourth quadrant and is equidistant from the two axes, then

A. $3bc - 2ad = 0$

B. $3bc + 2ad = 0$

C. $2bc - 3ad = 0$

D. $2bc + 3ad = 0$

Answer: A

Watch Video Solution

9. Let PS be the median of the triangle with vertices $P(2, 2), Q(6, -1) and R(7, 3)$ Then equation of the line passing through $(1, -1)$ and parallel to PS is

$2x - 9y - 7 = 0$ $2x - 9y - 11 = 0$ $2x + 9y - 11 = 0$

$2x + 9y + 7 = 0$

A. $4x + 7y + 3 = 0$

B. $2x - 9y - 11 = 0$

C. $4x - 7y - 11 = 0$

D. $2x + 9y + 7 = 0$

Answer: D

Watch Video Solution

10. Given three points P,Q,R with P(5,3) and R lies on the x-axis. If equation of RQ is $x - 2y = 2$ and PQ is parallel to the x-axis, then the centroid of ΔPQR lies on the line:

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

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

C. $5x - 2y = 0$

D. $2x - 5y = 0$

Answer: D

Watch Video Solution

Exercise 1 Concept Builder

1. Let $A\left(\alpha, \frac{1}{\alpha}\right), B\left(\beta, \frac{1}{\beta}\right), C\left(\gamma, \frac{1}{\gamma}\right)$ be the vertices of a ΔABC where α, β are the roots of the equation

$x^2 - 6p_1x + 2 = 0, \beta, \gamma$ are the roots of the equation

$x^2 - 6p_2x + 3 = 0$ and γ, α are the roots of the equation

$x^2 - 6p_3x + 6 = 0, p_1, p_2, p_3$ being positive. Then the coordinates of the cenroid of ΔABC is

A. $\left(1, \frac{11}{18}\right)$

B. $\left(0, \frac{11}{8}\right)$

C. $\left(2, \frac{11}{18}\right)$

D. None of these

Answer: C

Watch Video Solution

2. Locus of centroid of the triangle whose vertices are (a cos t, a sin t), (b sin t, - b cos t) and (1, 0), where is a

A. $(3x+1)^2+(3y)^2=a^2-b^2$

B. $(3x-1)^2+(3y)^2=a^2-b^2$

C. $(3x-1)^2+(3y)^2=a^2+b^2$

D. $(3x+1)^2+(3y)^2=a^2+b^2$

Answer: C

Watch Video Solution

3. ABC is an isosceles triangle. If the coordinates of the base are B(1, 3) and C(-2, 7). The coordinates of vertex A can be

A. (1,6)

B. (-1/2,5)

C. (5/6,6)

D. None of these

Answer: C

Watch Video Solution

4. The three points $[(a+b)(a+2b), (a+b)], [(a+2b)(a+3b), (a+2b)]$ and $[(a+3b)(a+4b), (a+3b)]$

A. are collinear

B. form a triangle whose area is independent of a

C. form a triangle whose area is independent of b

D. form a triangle whose area is independent of a,b

Answer: B

Watch Video Solution

5. The locus of the moving point whose coordinates are given by $\left(e^{t}+e^{-t}, e^{t}-e^{-t}\right)$ where t is a parameter, is $xy=1$ (b) $x+y=2$ $x^{2}-y^{2}=4$ (d) $x^{2}-y^{2}=2$

A. $xy=1$

B. $x+y=2$

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

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

Answer: C

Watch Video Solution

6. The coordinates of the point $AandB$ are (a,0) and $(-a, 0)$, respectively. If a point P moves so that $PA^2 - PB^2 = 2k^2$, when k is constant, then find the equation to the locus of the point P.

A. $2ax - k^2 = 0$

B. $2ax + k^2 = 0$

C. $2ay - k^2 = 0$

D. $2ay + k^2 = 0$

Answer: B

Watch Video Solution

7. A point A divides the join of $P(-5, 1)$ and $Q(3, 5)$ in the ratio $k:1$. Then the integral value of k for which the area of ABC, where B is $(1, 5)$ and C is $(7, -2)$, is equal to 2 units in magnitude is___

A. $7, \frac{30}{9}$

B. $7, \frac{31}{9}$

C. $4, \frac{31}{9}$

D. $7, \frac{31}{3}$

Answer: B

Watch Video Solution

8. The coordinates of A, B, C are $(6, 3)$, $(-3, 5)$ and $(4, -2)$ respectively and P is any point (x, y). Show that the ratio of the areas of triangles PBC and ABC is $\left|\frac{x+y-2}{7}\right|$.

A. $\left|\frac{x+y-2}{7}\right|$

B. $\left|\frac{x-y+2}{2}\right|$

C. $\left|\frac{x-y-2}{7}\right|$

D. None of these

Answer: A

Watch Video Solution

9. Let A(h, k), B(1, 1) and C(2, 1) be the vertices of a right angled triangle with AC as its hypotenuse. If the area of the triangle is 1, then the set of values which k can take is given by (1) $\{1, 3\}$ (2) $\{0, 2\}$ (3) $\{-1, 3\}$ (4) $\{-3, -2\}$

A. {-1,3}

B. {-3,-2}

C. {1,3}

D. {0,2}

Answer: A

Watch Video Solution

10. All points lying inside the triangle formed by the points (1. 3). (5, 0) and (-1, 2) satisfy (A) $3x + 2y \geq 0$ (B) $2x + y - 13 \geq 0$ (C) $2x - 3y - 12 \leq 0$ (D) $-2x + y \geq 0$

A. $3x + 2 \geq 0$

B. $2x + y - 13 \leq 0$

C. $2x - 3y - 12 \geq 0$

D. All the above

Answer: D

Watch Video Solution

11. The straight lines $x + 2y - 9 = 0, 3x + 5y - 5 = 0$, and $ax + by - 1 = 0$ are concurrent, if the straight line

$35x - 22y + 1 = 0$ passes through the point (a, b) (b) (b, a) $(-a, -b)$ (d) none of these

A. (a,b)

B. (b,a)

C. (a,-b)

D. (-a,b)

Answer: A

Watch Video Solution

12. Let $A(2, -3) and B(-2, 1)$ be vertices of a triangle ABC. If the centroid of this triangle moves on the line $2x + 3y = 1$, then the locus of the vertex C is the line $2x + 3y = 9$ $2x - 3y = 7$ $3x + 2y = 5$ $3x - 2y = 3$

A. $3x - 2y = 3$

B. $2x - 3y = 7$

C. $3x + 2y = 5$

D. $2x + 3y = 9$

Answer: D

Watch Video Solution

13. A rectangle $ABCD$, where $A \equiv (0, 0), B \equiv (4, 0), C \equiv (4, 2) D \equiv (0, 2)$, undergoes the following transformations successively: $f_1(x, y) \overrightarrow{y, x}$ $f_2(x, y) \overrightarrow{x + 3y, y}$ $f_3(x, y) \overrightarrow{(x - y)/2, (x + y)/2}$ The final figure will be square (b) a rhombus a rectangle (d) a parallelogram

A. a square

B. a rhombus

C. a rectangle

D. a parallelogram

Answer: D

Watch Video Solution

14. The ends of the base of an isosceles triangle are at $(2a, 0)$ and $(0, a)$. The equation of one side is $x = 2a$. The equation of the other side, is

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

B. $x + 2y - 2a$

C. $3x + 4y - 4a = 0$

D. $3x - 4y + 4a = 0$

Answer: D

Watch Video Solution

15. The point (x,y) lies on the line with slope m and passes through the fixed point (x_0, y_0) if and only if its coordinates satisfy the equation $y - y_0$ is equal to

A. $m(x - x_0)$

B. $m(y - x_0)$

C. $m(y - x)$

D. $m(x - y_0)$

Answer: A

Watch Video Solution

16. The two lines $ax + by = c$ and $a'x + b'y = c'$ are perpendicular if

A. $aa' - ' = 0$

B. $aa' + ' = 0$

C. $ab + a'b' = 0$

D. $ab - a'b' = 0$

Answer: B

Watch Video Solution

17. The slopes of the lines which make an angle 45° with the line $3x - y = -5$ is

A. $1, -1$

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

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

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

Answer: D

Watch Video Solution

18. The lines $x + 2y - 5 = 0, 2x - 3y + 4 = 0, 6x + 4y - 13 = 0$

A. are concurrent

B. form a right angled triangle

C. form an isosceles triangle

D. form an equilateral triangle.

Answer: B

Watch Video Solution

19. Two points P(a,0) and Q(-a,0) are given, R is a variable on one side of the line PQ such that $\angle RPQ - \angle RQP$ is a positive constant 2α. FInd the locus of point R.

A. $x^2 - y^2 + 2xy\cot 2\alpha - a^2 = 0$

B. $x^2 + y^2 + 2xy\cot 2\alpha - a^2 = 0$

C. $x^2 + y^2 + 2xy\cot 2\alpha + a^2 = 0$

D. None of the above

Answer: A

Watch Video Solution

20. Consider the equation $\sqrt{3}x + y - 8 = 0$

I. Normal form of the given equation is

$\cos 30^\circ x + \sin 30^\circ y = 4$

II. Values of p and w are 4 and 30° respectively.

Choose the correct option.

A. Only I is true

B. Only II is true

C. Both are true

D. Both are false

Answer: C

Watch Video Solution

21. The diagonals of the parallelogram whose sides are $lx + my + n = 0, lx + my + n' = 0, \quad mx + ly + n = 0,$ $mx + ly + n' = 0$ include an angle

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

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

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

D. $\tan^{-1}\left(\frac{2lm}{l^2 + m^2}\right)$

Answer: B

Watch Video Solution

22. The equation of a straight line which cuts off an intercept of 5 units on negative direction of y-axis and makes an angle of 120° with the positive direction ofx-axis is

A. $\sqrt{3}x + y + 5 = 0$

B. $\sqrt{3}x + y - 5 = 0$

C. $\sqrt{3}x - y - 5 = 0$

D. $\sqrt{3}x - y + 5 = 0$

Answer: A

Watch Video Solution

23. A ray of light passsing through a point (1,2) is reflected on the x-axis at point Q and passes through the point (5,8). Then

the abscissa of the point Q is

A. -3

B. $9/5$

C. $13/5$

D. None of these

Answer: B

Watch Video Solution

24. The inclination of the line $x - y + 3 = 0$ with the positive direction of x-axis is

A. 45°

B. 135°

C. -45°

D. -135°

Answer: A

Watch Video Solution

25. The line parallel to the x-axis and passing through the intersection of the lines $ax + 2by + 3b = 0$ and $bx - 2y - 3a = 0$, where $(a, b) \neq (0, 0)$, is above the x-axis at a distance of 3/2 units from it above the x-axis at a distance of 2/3 units from it below the x-axis at a distance of 3/2 units from it below the x-axis at a distance of 2/3 units from it

A. Above the x-axis at a distance of $\frac{3}{2}$ from it

B. Above the x-axis at a distance of $\frac{2}{3}$ from it

C. Below the x-axis at a distance of $\frac{3}{2}$ from it

D. Below the x-axis at a distance of $\frac{2}{3}$ from it

Answer: C

Watch Video Solution

26. A straight line l with negative slope passes through (8,2) and cuts the coordinate axes at P and Q. Find absolute minimum value of "OP+OQ where O is the origin-

A. 28

B. 15

C. 18

D. 10

Answer: C

Watch Video Solution

27. If (-4,5) is a vertex of a square and one of its diagonal is 7x-y+8-0.Find the equation of other diagonal

A. $x + 3y = 21$

B. $2x - 3y = 7$

C. $x + 7y = 31$

D. $2x + 3y = 21$

Answer: C

Watch Video Solution

28. What is the equation of the line mid way between the lines 3x-45y+12=0 and 3x-4y=6 ?

A. $3x - 4y - 9 = 0$

B. $3x - 4y + 9 = 0$

C. $3x - 4y - 3 = 0$

D. $3x - 4y + 3 = 0$

Answer: D

Watch Video Solution

29. What is the equation of the line through (1, 2) so that the segment of the line intercepted between the axes is bisected at this point ?

A. $2x - y = 4$

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

C. $2x + y = 4$

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

Answer: C

Watch Video Solution

30. The point $\left(t^2 + 2t + 5, 2t^2 + t - 2\right)$ lies on the line $x + y = 2$ for

A. All real values of t

B. Some real values of t

C. $t = \frac{-3 \pm \sqrt{3}}{6}$

D. None of these

Answer: D

Watch Video Solution

31. Find the value of x for which the points $(x-1),\ (2,1) and\ (4,5)$ are collinear.

A. 1

B. 2

C. 3

D. 4

Answer: A

Watch Video Solution

32. If (a, a^2) falls inside the angle made by the lines $y = \frac{x}{2}, x > 0$ and $y = 3x, x > 0$, then a belongs to the interval

A. $\left(0, \frac{1}{2}\right)$

B. $(3, \infty)$

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

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

Answer: C

Watch Video Solution

33. The perpendicular distance between the straight lines $6x + 8y + 15 = 0$ and $3x + 4y + 9 = 0$ is

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

B. $\frac{3}{10}$ unit

C. $\frac{3}{4}$ unit

D. $\frac{2}{7}$ unit

Answer: B

Watch Video Solution

34. The locus of a point that is equidistant from the lines $x + y - 2\sqrt{2} = 0$ and $x + y - \sqrt{2} = 0$ is (a)

$x + y - 5\sqrt{2} = 0$ (b) $x + y - 3\sqrt{2} = 0$ (c)

$2x + 2y - 3\sqrt{2} = 0$ (d) $2x + 2y - 5\sqrt{5} = 0$

A. $x + y - 5\sqrt{2} = 0$

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

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

D. $2x + 2y - 5\sqrt{2} = 0$

Answer: C

Watch Video Solution

35. If the line segment joining the points A(a,b) and B(c,d) subtends an angle θ at the origin, then $\cos\theta$ is equal to

A. $\dfrac{ac + bd}{\sqrt{(a^2 + b^2)(c^2 + d^2)}}$

B. $\frac{ab+cd}{\sqrt{(a^2+b^2)(c^2+d^2)}}$

C. $\frac{ad+bc}{\sqrt{(a^2+b^2)(c^2+d^2)}}$

D. None of these

Answer: A

Watch Video Solution

36. The angle between $y = x + 6$ and $y = \sqrt{3}x + y$ is

A. 15°

B. 12°

C. 13°

D. 14°

Answer: A

Watch Video Solution

37. If p be the length of the perpendicular from the origin on the straight line $x + 2by = 2p$.then what is the value of b?

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

B. p

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

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

Answer: D

Watch Video Solution

38. The medians AD and BE of the triangle with vertices A(0, b), B(0, 0) and C(a, 0) are mutually perpendicular if

A. $b = \sqrt{2}a$

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

C. $b = -\sqrt{2}a$

D. $a = 2b$

Answer: B

Watch Video Solution

39. Let $0 < \alpha < \frac{\pi}{2}$ be a fixed angle . If $p = (\cos\theta, \sin\theta)$ and $Q(\cos(\alpha - \theta))$, then Q is obtained from P by

A. clockwise rotation around the orign through an angle α

B. anticlockwise rotation around the origin through an angle α

C. reflection in the line through the origin with slope $\tan\alpha$

D. reflection in the line through the origin with slope $\tan(\alpha/2)$

Answer: D

Watch Video Solution

40. If $2p$ is the length of perpendicular from the origin to the lines $\frac{x}{a}+\frac{y}{b}=1$, then $a^2, 8p^2, b^2$ are in

A. A.p.

B. G.P.

C. H.P.

D. None of these

Answer: C

Watch Video Solution

41. Angle made with the x-axis by a straight line drawn through (1, 2) so that it intersects $x + y = 4$ at a distance $\frac{\sqrt{6}}{3}$ from (1, 2) is 105^0 (b) 75^0 (c) 60^0 (d) 15^0

A. 105°

B. 75°

C. 60°

D. 15°

Answer: B

Watch Video Solution

42. The distance of the point (1,2,3) form the coordinate axes are A,B and C respectively. $A^2 = B^2 + C^2$, $B^2 = 2C^2$, $2A^2C^2 = 13B^2$ which of these hold (s) true? (A) 1 only (B) 1 and 3 (C) 1 and 2 (D) 2 and 3

A. Only I

B. I and III

C. I and II

D. II and III

Answer: D

Watch Video Solution

43. Find the tangent of the angel between the lines whose intercepts n the axes are respectively $a, \ -badnb, \ -a.$

A. $\tan^{-1}\frac{a^2-b^2}{ab}$

B. $\tan^{-1}\frac{b^2-a^2}{2}$

C. $\tan^{-1}\frac{b^2-a^2}{2ab}$

D. None of these

Answer: C

Watch Video Solution

44. A straight line L through the point (3,-2) is inclined at an angle 60° to the line $\sqrt{3}x + y = 1$ If L also intersects the x-axis then the equation of L is

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

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

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

D. $\sqrt{3}y + x - 3 + 2\sqrt{3} = 0$

Answer: B

Watch Video Solution

45. Number of lines that can be drawn through the point $(4, -5)$ so that its distance from $(-2, 3)$ will be equal to 12 is equal to

A. 2

B. 1

C. 4

D. None of these

Answer: D

Watch Video Solution

46. The straight line $ax + by + c = 0$, where $abc \neq 0,$ will pass through the first quadrant if $ac > 0, bc > 0$ $c > 0 and bc < 0$ $bc > 0$ and/or $ac > 0$ (d) $ac < 0$ and/or $bc < 0$

A. $ac > 0, bc > 0$

B. $c > 0$ and $bc < 0$

C. $bc > 0$ and/or $ac > 0$

D. $ac < 0$ and/or $bc < 0$

Answer: D

Watch Video Solution

47. If p_1 and p_2 are the lengths of the perpendicular form the orgin to the line $x \sec\theta + y \cos ec\theta = a$ and $x \cos\theta - y \sin\theta = a \cos 2\theta$ respectively then prove that $4p_1^2 + p_2^2 = a^2$

A. $m = 1, n = 1$

B. $m = 1, n = 4$

C. $m = 4, n = 1$

D. $m = 1, n = 1$

Answer: B

Watch Video Solution

48. A point moves so that the distance between the feet ofperpendiculars drawn from it to the lines $ax^2 + 2hxy + by^2 = 0$ is a constant 2k. The equation of its locus is

A. $\left(x^2 + y^2\right)\left(h^2 + ab\right) = \lambda^2\left[(a+b)^2 - 4h^2\right]$

B. $\left(x^2 + y^2\right)\left(h^2 - ab\right) = \lambda^2\left[(a-b)^2 + 4h^2\right]$

C. $\left(x^2 - y^2\right)\left(h^2 - ab\right) = \lambda^2\left[(a-b)^2 - 4h^2\right]$

D. None of the above

Answer: B

Watch Video Solution

49. The range of value of α such that $(0, \alpha)$ lies on or inside the triangle formed by the lines y + 3x + 2 = 0, 3y - 2x - 5 = 0, 4y + x - 14 =0 is

A. $5 < \alpha \leq 7$

B. $\frac{1}{2} \leq \alpha \leq 1$

C. $\frac{5}{3} \leq \alpha \leq \frac{7}{2}$

D. None of these

Answer: C

Watch Video Solution

50. If P is a point (x, y) on the line $y = -3x$ such that P and the point (3, 4) are on the opposite sides of the line $3x - 4y = 8$, then $x > \frac{8}{15}$ (b) $x > \frac{8}{5}$ $y < -\frac{8}{5}$ (d) $y < -\frac{8}{15}$

A. $x > \frac{8}{15}, y \leq \frac{8}{5}$

B. $x > \frac{8}{5}, y < -\frac{8}{15}$

C. $x = \frac{8}{15}, y = -\frac{8}{5}$

D. $x < \frac{8}{5}, y > -\frac{8}{15}$

Answer: A

Watch Video Solution

51. If the line $yl = \sqrt{3}x$ cuts the curve $x^2 = y^2 + 3xy + 5x^2 + 3y^2 + 4x + 5y - 1 = 0$ at the point $A, B, C,$ then $OA\dot{O}B\dot{O}C$ is equal to $\left(\frac{k}{13}\right)\left(3\sqrt{3} - 1\right)$. The value of k is_____

A. $\frac{4}{13}\left(3\sqrt{3} - 1\right)$

B. $3\sqrt{3} + 1$

C. $\frac{2}{\sqrt{3}} + 7$

D. None of these

Answer: A

Watch Video Solution

52. The equation of a straight line, which passes through the point (a,0) and whose perpendicular distance from the point (2a,2a)is a,is

A. $3x - 4y - 3a = 0$

B. $x - a = 0$

C. both a and b

D. Neither of a and b

Answer: C

Watch Video Solution

53. P(m, n) (where m, n are natural numbers) is any point in the interior of the quadrilateral formed by the pair of lines $xy = 0$

and the lines $2x + y - 2 = 0$ and $4x + 5y = 20$. The possible number of positions of the point P is.

A. six

B. five

C. four

D. eleven

Answer: A

Watch Video Solution

54. Find the distance between the parallel lines $3x4y + 7 = 0$ and$3x4y + 5 = 0$.

A. 2

B. 5

C. 7

D. 3

Answer: C

Watch Video Solution

55. 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

Watch Video Solution

56. 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. 0.04

B. 0.06

C. 0.08

D. None of these

Answer: B

Watch Video Solution

57. 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

Watch Video Solution

58. 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. $a + 8h - 16b = 0$ (b) $a - 8h + 16b = 0$ $a - 6h + 9b = 0$ (d) $a + 6h + 9b = 0$

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

B. $a = 8(h - 2b)$

C. $a = 2(b + h)$

D. Both a and b

Answer: D

Watch Video Solution

59. 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. 1

B. -1

C. 0

D. $-1/2$

Answer: B

Watch Video Solution

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

is

A. $7/\sqrt{5}$

B. $7/2\sqrt{5}$

C. $\sqrt{7}/5$

D. None of these

Answer: B

Watch Video Solution

Exercise 2 Concept Applicator

1. If the point P(x, y) be equidistant from the points A(a + b, b - a) and B(a-b,a+b) , then prove that $bx = ay$

A. $ax = by$

B. $bx = qay$ and P can (a,b)

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

D. None of the above

Answer: B

Watch Video Solution

2. Let $O(0, 0), P(3, 4),$ and $Q(6, 0)$ be the vertices of triangle OPQ . The point R inside the triangle OPQ is such that the triangles OPR, PQR, OQR are of equal area. The coordinates of R are $\left(\frac{4}{3}, 3\right)$ (b) $\left(3, \frac{2}{3}\right)$ $\left(3, \frac{4}{3}\right)$ (d) $\left(\frac{4}{3}, \frac{2}{3}\right)$

A. (4/3,3)

B. (3,2/3)

C. (3,4/3)

D. (4/3,2/3)

Answer: C

Watch Video Solution

3. The co-ordinates of the orthocentre of the triangle bounded by the lines, $4x - 7y + 10 = 0; x + y = 5$ and $7x + 4y = 15$ is

A. (1,2)

B. (1,-2)

C. (-1,-2)

D. (-1,2)

Answer: A

Watch Video Solution

4. The equations of the sided of a triangle are $x+y-5=0, x-y+1=0,$ and $x+y-\sqrt{2}=0$ is $\left(-\infty, -\frac{4}{3}\right) \cup \left(\frac{4}{3}, +\infty\right)$ $\left(-\frac{4}{3}, \frac{4}{3}\right)$ (c) $\left(-\frac{3}{4}, \frac{4}{3}\right)$ none of these

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

B. $\left(-\infty, -\frac{4}{3}\right) \cup \left(\frac{4}{3}, \infty\right)$

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

D. None of these

Answer: B

Watch Video Solution

5. A light ray coming along the line $3x + 4y = 5$ gets reflected from the line $ax + by = 1$ and goes along the line $5x - 12y = 10$. Then, $a = \frac{64}{115}, b = \frac{112}{15}$ $a = \frac{14}{15}, b = -\frac{8}{115}$ $a = \frac{64}{115}, b = -\frac{8}{115}$ $a = \frac{64}{15}, b = \frac{14}{15}$

A. $a = 67/115, b = 112/15$

B. $a = 14/15, b = 8/115$

C. $a = 64/115, b = -8/115$

D. $a = 64/15, b = 14/15$

Answer: C

Watch Video Solution

6. A line AB makes zero intercepts on X-axis and Y-axis and it is perpendicular to another line $CD, 3x + 4y + 6 = 0$. The equation of line AB is

A. $y = 4$

B. $4x - 3y + 8 = 0$

C. $4x - 3y = 0$

D. $4x - 3y + 6 = 0$

Answer: C

Watch Video Solution

7. A light ray emerging from the point source placed at $P(2, 3)$ is reflected at a point Q on the y-axis. It then passes through the point $R(5, 10)$. The coordinates of Q are $(0, 3)$ (b) $(0, 2)$ $(0, 5)$ (d) none of these

A. (0,3)

B. (0,2)

C. (0,5)

D. None of these

Answer: C

Watch Video Solution

8. If (-4,5) is a vertex of a square and one of its diagonal is 7x-y+8-0.Find the equation of other diagonal

A. $x + 3y = 21$

B. $2x - 3y = 7$

C. $x + 7y = 31$

D. $2x + 3y + 21$

Answer: C

Watch Video Solution

9. If the lines $y = 3x + 1$ and $2y = x + 3$ are equally inclined to the line $y = mx + 4$, $\left(\frac{1}{2} < m < 3\right)$ then find the values m

A. $\frac{1}{7}(1 \pm 5\sqrt{3})$

B. $\frac{1}{7}(1 \pm 5\sqrt{5})$

C. $\frac{1}{7}(1 \pm 5\sqrt{2})$

D. $\frac{1}{7}(1 \pm 2\sqrt{5})$

Answer: C

Watch Video Solution

10. For which value of $'p', y^2 + xy + px^2 - x - 2y = 0$ represents a pair of straight lines

A. 2

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

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

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

Answer: C

Watch Video Solution

11. Let PQR be a right-angled isosceles triangle, right angled at $P(2, 1)$. If the equation of the line QR is $2x + y = 3$, then the equation representing the pair of lines PQ and PR is

$3x^2 - 3y^2 + 8xy + 20x + 10y + 25 = 0$

$3x^2 - 3y^2 + 8xy - 20x - 10y + 25 = 0$

$3x^2 - 3y^2 + 8xy + 10x + 15y + 20 = 0$

$3x^2 - 3y^2 - 8xy - 15y - 20 = 0$

A. $3x^2 - 3y^2 + 8xy + 20x + 10y + 25 = 0$

B. $3x^2 - 3y^2 + 8xy - 20x - 10y + 25 = 0$

C. $3x^2 - 3y^2 + 8xy + 10x + 15y + 20 = 0$

D. $3x^2 - 3y^2 - 8xy - 15y - 20 = 0$

Answer: B

Watch Video Solution

12. The number of lines that are parallel to $2x + 6y - 7 = 0$ and have an intercept 10 between the coordinate axes is

A. 1

B. 2

C. 4

D. Infinitely many

Answer: B

Watch Video Solution

13. A vertex of an equileteral triangle is (2;3) and the equation of the opposite sides is $x + y = 2$ .Find the equation of the other sides of triangle .

A. $y - 3 = \left(2 \pm \sqrt{3}(x - 2\right)$

B. $y + 3 = \left(2 \pm \sqrt{3}\right)(x + 2)$

C. $y = 3 = \left(\left(3 \pm \sqrt{2}\right)(x + 2)\right.$

D. $y - 3 = \left(3 \pm \sqrt{2}\right)(x - 2)$

Answer: A

Watch Video Solution

14. The value of λ for which the lines joining the point of intersection of curves C_1 and C_2 to the origin are equally inclined to the axis of x.

$C_1 : \lambda x^2 + 3y^2 - 2\lambda xy + 9x = 0, C_2 : 3x^2 - 4y^2 + 8xy - 3x = 0$

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

B. $\lambda = 12$

C. $\lambda = 1$

D. $\lambda = \frac{5}{6}$

Answer: B

Watch Video Solution

15. For $a > b > c > 0$ if the distance between (1,1) and the point of intersection of the lines ax + by +c=0 and bx + ay+c=0 is less than $2\sqrt{2}$ then

A. $a + b - c > 0$

B. $a - b + c < 0$

C. $a - b + c > 0$

D. $a + b - c < 0$

Answer: A

Watch Video Solution

16. Point $P(p, 0), Q(q, 0), R(0, p), S(0, q)$ from parallelogram rhombus cyclic quadrilateral (d) none of these

A. parallelogram

B. rhombus

C. cyclic quadrilateral

D. None of these

Answer: C

Watch Video Solution

17. Find the image of the point $(4, -13)$ in the line $5x + y + 6 = 0$.

A. (-1,-14)

B. (3,4)

C. (1,2)

D. (-4,13)

Answer: A

Watch Video Solution

18. If a pair of perpendicular straight lines drawn through the origin forms an isosceles triangle with the line $2x + 3y = 6$, then area of the triangle so formed is 36/13 (b) 12/17 (c) 13/5 (d) 17/14

A. 36/13

B. 44182

C. 13/5

D. 17/13

Answer: A

Watch Video Solution

19. The equation of straight line passing through $(-a, 0)$ and making a triangle with the axes of area T is

$2Tx + a^2y + 2aT = 0$ $2Tx - a^2y + 2aT = 0$

$2Tx - a^2y - 2aT = 0$ none of these

A. $2Tx + a^2y + 2aT = 0$

B. $2Tx - a^2y + 2aT = 0$

C. $2Tx - a^2 - 2aT = 0$

D. None of these

Answer: B

Watch Video Solution

20. Given a family of lines a(2x +y+4) + b(x-2y-3)=0 .The number of lines belonging to the family at a distance of $\sqrt{10}$ from point $(2, -3)$ is

A. 0

B. 1

C. 2

D. 4

Answer: B

Watch Video Solution

21. 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. 2

C. 5

D. 4

Answer: B

Watch Video Solution

22. 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

Watch Video Solution

23. 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. $2x^2 - xy - y^2 - 4x - y = 0$

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

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

D. None of these

Answer: B

Watch Video Solution

24. A ray of light coming fromthe point (1, 2) is reflected at a point A on the x-axis and then passes through the point (5,3). The coordinates of the point A is :

A. $\left(\frac{13}{5}, 0\right)$

B. $\left(\frac{5}{13}, 0\right)$

C. $(-7, 0)$

D. None of these

Answer: A

Watch Video Solution

25. Vertices of a variable triangle are $(3, 4), (5\cos\theta, 5\sin\theta)$ and $(5\sin\theta, -5\cos\theta)$, where $\theta \in R$. Locus of its orthocentre is

A. $(x+y-1)^2+(x-y-7)^2=100$

B. $(x+y-7)^2+(x-y-1)^2=100$

C. $(x+y-7)^2+(x+y-1)^2=100$

D. $(x+y-7)^2+(x-y+1)^2=100$

Answer: D

Watch Video Solution

26. 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

Watch Video Solution

27. A line L intersects three sides BC, CA and AB of a triangle in P,Q,R respectively, show that $\frac{BP}{PC} \cdot \frac{CQ}{QA} \cdot \frac{AR}{RB} = -1$

A. 1

B. 0

C. -1

D. None of these

Answer: C

Watch Video Solution

28. The distance of the line $2x + y = 3$ from the point (-1,3) in the direction whose slope is 1 is

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

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

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

D. $\frac{2\sqrt{5}}{3}$

Answer: C

Watch Video Solution

29. If the circumcenter of an acute-angled triangle lies at the origin and the centroid is the middle point of the line joining the points $\left(a^2+1, a^2+1\right)$ and $(2a, -2a)$, then find the orthocentre.

A. $y - 2ax = 0$

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

C. $y + x = 0$

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

Answer: D

Watch Video Solution

30. Given vertices $A(1, 1), B(4, -2) \& C(5, 5)$ of a triangle, find the equation of the perpendicular dropped from C to the interior bisector of the angle A.

A. $y - 5 = 0$

B. $x - 5 = 0$

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

D. None of these

Answer: B

Watch Video Solution