MATHS

BOOKS - OBJECTIVE RD SHARMA ENGLISH

STRAIGHT LINES

Illustration

1. (i) Find the gradient of a straight line which is passes through the point (-3. 6) and the mid point of (4,-5) and (-2, 9)

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

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

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

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

Answer: D

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2. The point P(a,b), Q(c,d), R(a,d) and S(c,b) , where a,b,c ,d are distinct real numbers, are

A. collinear

B. vertices of a square

C. vertices of a rhombus

D. concyclic

Answer: B

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3. Determine x so that the line passing through $(3, 4) and (x, 5)$ makes an angle of 135^0 angle with positive direction of $x - a\xi s.$

A. -2

B. 2

C. -1

D. 1

Answer: B

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4. If the points A(-2,-5), B(2,-2) and C(8,a) are collinear , then a =

A. $-5/2$

B. $5/2$

C. $3/2$

D. $1/2$

Answer: B

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5. If x_1, x_2, x_3 as well as y_1, y_2, y_3 are in G.P. with the same common ratio, then the points $(x_1, y_1), (x_2, y_2)$ and (x_3, y_3) (A) lie on a straight line (B) lie on a parabola (C) lie on a circle (D) are vertices of a triangle

A. lie on a straight line

B. lie on an ellipse

C. lie on a circle

D. are vertices of a triangle

Answer: A

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

A. clockwise rotation around origin through an angle α

B. anti-clockwise rotation around origin through an angle α

C. reflection in the line through origin with slope tan α

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

Answer: D

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

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

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

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

D. $a = -2b$

Answer: B

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8. Find the equation of a line which is equidistant from the lines $x = 4$ $and\ x\ = 8.$

A. x=2

B. x=6

C. y=2

D. y=6

Answer: A

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9. The orthocentre of the triangle formed by the lines $x = 2, y = 3$ and $3x + 2y = 6$ is at the point

A. (2,0)

B. (0,3)

C. (2,3)

D. none of these

Answer: C

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10. Write an equation representing a pair of lines through the point (a, b) and parallel to the coordinate axes.

A. $(x - a)(y + b) = 0$

B. $(a - b)(y - a) = 0$

C. $(x - a)(y - b) = 0$

D. $(x + a)(y - b) = 0$

Answer: C

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11. Let $P \equiv (-1, 0), Q \equiv (0, 0)$, and $R \equiv \left(3, 3\sqrt{3}\right)$ be three points.

Then the equation of the bisector of $\angle PQR$ is

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

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

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

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

Answer: C

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12. The equations of bisectors of the angles between the lines $|x| = |y|$ are

A. $y = \pm x, x = 0$

B. $x = \frac{1}{2}, y = \frac{1}{2}$

C. $y = 0, x = 0$

D. none of these

Answer: C

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13. A square of side a lies above the x-axis and has one vertex at the origin. This side passing through the origin makes an angle $\alpha(0 < \alpha < \pi/4)$ with the positive direction of the x-axis. The equation of its diagonal not passing through the origin is

A. $y(\cos\alpha + \sin\alpha) + x(\cos\alpha - \sin\alpha) = a$

B. $y(\cos\alpha - \sin\alpha) - x(\sin\alpha - \cos\alpha) = a$

C. $y(\cos\alpha + \sin\alpha) + x(\sin\alpha - \cos\alpha) = a$

D. $y(\cos\alpha + \sin\alpha) + x(\sin\alpha - \cos\alpha) = a$

Answer: A

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14. Consider the equation $y - y_1 = m(x - x_1)$. If $mandx_1$ are fixed and different lines are drawn for different values of $y_1,$ then (a) the lines will pass through a fixed point (b) there will be a set of parallel lines (c) all the lines intersect the line $x = x_1$ (d)all the lines will be parallel to the line $y = x_1$

A. the lines will pass through a single point

B. there will be one possible line only

C. there will be a set of parallel lines

D. none of these

Answer: C

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15. Let PS be the median of the triangle with vertices $P(2, 2), Q(6, -1)andR(7, 3)$ 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. $2x - 9y - 7 = 0$

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

C. $2x + 9y - 11 = 0$

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

Answer: D

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16. The line $\frac{x}{a} - \frac{y}{b} = 1$ cuts the x-axis at P. The equation of the line through P and perpendicular to the given line is

A. $x + y = ab$

B. $x + y = a + b$

C. $ax + by = a^2$

D. $bx + ay = b^2$

Answer: C

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17. If the foot of the perpendicular from the origin to a straight line is at $(3, -4)$, then find the equation of the line.

A. $3x + 4y = 25$

B. $3x - 4y + 25 = 0$

C. $4x + 3y - 25 = 0$

D. $4x - 3y + 25 = 0$

Answer: A

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18. Let $P \equiv (-1, 0), Q \equiv (0, 0)$, and $R \equiv \left(3, 3\sqrt{3}\right)$ be three points. Then the equation of the bisector of $\angle PQR$ is

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

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

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

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

Answer: C

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19. The point P(a,b) lies on the straight line $3x + 2y = 13$ and the point $Q(b, a)$ lies on the straight line $4x - y = 5$, then the equation of the line PQ is

A. x-y=5

B. $x + y = 5$

C. $x + y = -5$

D. $x - y = -5$

Answer: B

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20. The perpendicular bisector of the line segment joining $P(1, 4)$ and $Q(k, 3)$ has y - intercept -4 Then a possible value of k is

A. -2

B. -4

C. 1

D. 2

Answer: B

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21. A straight line through the point A (3,4) is such that its intercept between the axis is bisected at A. Find its equation.

A. $x + y = 7$

B. $3x - 4y + 7 = 0$

C. $4x + 3y = 24$

D. $3x + 4y = 25$

Answer: C

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22. The straight line $ax + by + c = 0$ and the coordinate axes form an isosceles triangle under which one of the following consitions ?

A. a,b,c are in G.P.

B. a,c,b are in G.P.

C. c,a,b are in G.P.

D. none of these

Answer: B

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23. A line forms a triangle of area $54\sqrt{3}square$ units with the coordinate axes. Find the equation of the line if the perpendicular drawn from the origin to the line makes an angle of 60^0 with the X-axis.

A. $\sqrt{3}x + y = 18$

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

C. $x + \sqrt{3}y = 18$

D. none of these

Answer: C

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

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

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

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

Answer: D

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25. Find the distance of the point $(2, 3)$ from the line $2x - 3y + 9 = 0$ measured along a line $x - y + 1 = 0$.

A. 4

B. $2\sqrt{2}$

C. $8\sqrt{2}$

D. $4\sqrt{2}$

Answer: D

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26. A line through the point A(2,4) intersects the line $x + y = 9$ at the point. The minimum distance of AP , is

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

B. $\frac{7}{\sqrt{2}}$

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

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

Answer: C

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27. The distance of the point (1,2) from the line $2x - 3y - 4 = 0$ in the direction of the line $x + y = 1$, is

A. $\sqrt{2}$

B. $5\sqrt{2}$

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

D. none of these

Answer: A

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28. 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. $\pi/6$ and $\pi/3$

B. $\pi/8$ and $3\pi/8$

C. $\pi/12$ and $5\pi/12$

D. none of these

Answer: C

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29. The point A(2,1) is translated parallel to the linen x-y=3 by a distance of 4 units. If the new position A' is in the third quadrant, then the coordinates of A' are

A. $(2+2\sqrt{2}, 1+2\sqrt{2})$

B. $(-2+\sqrt{2}, -1-2\sqrt{2})$

C. $(2-2\sqrt{2}, 1-2\sqrt{2})$

D. none of these

Answer: C

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30. A straight line through origin O meets the lines $3y = 10 - 4x \& 8x + 6y + 5 = 0$ at points A and B respectively. Then O divides the segment AB in the ratio:

A. $3:4$

B. $1:2$

C. $2:3$

D. $4:1$

Answer: D

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31. 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. $2x + 2y + \sqrt{16} - 1 = 0$

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

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

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

Answer: D

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32. A line passing through the point P(1,2) meets the line $x + y = 7$ at the distance of 3 units from P. Then the slope of this line satisfies the equation :

A. $8x^2 - 9x + 1 = 0$

B. $7x^2 - 18x + 7 = 0$

C. $16x^2 - 39x + 16 = 0$

D. $7x^2 - 6x - 7 = 0$

Answer: B

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33. If (a, a^2) falls inside the angle made by the linear equations $y = \frac{x}{2}, x >$ and $y = 3x, x > 0,$ then 'a' belong to

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

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34. Points (1,2) and (-2,1) are

A. on the same side of the $4x + 2y = 1$

B. on the line $4x + 2y = 1$

C. on the opposite side of $4x + 2y = 1$

D. none of these

Answer: C

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35. The range of θ in the interval $(0, \pi)$ such that the points (3,5) and $(\sin\theta, \cos\theta)$ lie on the same side of the line x+y-1=0 is

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

B. $\left(0, \frac{\pi}{4}\right)$

C. $\left(\frac{\pi}{4}, \frac{\pi}{2}\right)$

D. none of these

Answer: A

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36. Find the values of β so that the point $(0, \beta)$ lies on or inside the triangle having the sides $3x + y + 2 = 0$; $2x - 3y + 5 = 0$ *and* $x + 4y - 14 = 0$.

A. $\left[\frac{5}{3}, \infty\right)$

B. $\left(-\infty, \frac{7}{2}\right]$

C. $\left[\frac{5}{3}, \frac{7}{2}\right]$

D. none of these

Answer: C

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37. If the points $\left(a, a^2\right)$ and $(1, 2)$ lie in the same angular region between the lines $3x + 4y - 1 = 0$ and $2x + y - 3 = 0$, then

A. $a < -3$ or, $a > 1$

B. $a \in [-3, 1]$

C. $a < \frac{1}{4}$ or , $a > -1$

D. none of these

Answer: A

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38. If the point (a, a) is placed in between the lines $|x + y| = 4$, then find the values of a.

A. $|\alpha| = 4$

B. $|\alpha| = 2$

C. $|\alpha| < 2$

D. $|\alpha| < 4$

Answer: C

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39. Find the value of λ, if the lines 3x-4y-13=0, 8x-11y-33, and $2x - 3y + \lambda = 0$are concurrent.

A. 7

B. 6

C. -7

D. 4

Answer: C

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40. If the lines $ax + 2y + 1 = 0, bx + 3y + 1 = 0andcx + 4y + 1 = 0$ are concurrent, then a, b, c are in (a). A.P. (b). G.P. (c). H.P. (d). none of these

A. A.P.

B. G.P.

C. H.P.

D. none of these

Answer: C

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41. If the lines $x + ay + a = 0, bx + y + b = 0, cx + cy + 1 = 0 (a \neq b \neq c \neq 1)$ are concurrent then value of $\frac{a}{a-1} + \frac{b}{b-1} + \frac{c}{c-1} =$

A. -1

B. 0

C. 1

D. none of these

Answer: C

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42. If lines $px + qy + r = 0, qx + ry + p = 0$ and $rx + py + q = 0$ are concurrent, then prove that $p + q + r = 0 (where, p, q, r$ are distinct$)$.

A. $p + q + r = 0$

B. $p^2 + q^2 + r^2 = pq + qr + rp$

C. $p^3 + q^3 + r^3 = 3pqr$

D. none of these

Answer: C

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

A. $3bc - 2ab = 0$

B. $3bc + 2ab = 0$

C. $2bc - 3ad = 0$

D. $2bc + 3ad = 0$

Answer: A

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44. The lines $x + y = |a|$ and $ax - y = 1$ intersect each other in the first quadrant. Then the set of all possible values of a is the interval:

A. $[1, \infty)$

B. $(-1, \infty)$

C. $(-1, 1)$

D. $(0, \infty)$

Answer: A

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45. For $a > b > c > 0$, the distance between (1, 1) and the point of intersection of the lines ax+by+c =0 and bx+ay+c=0 is les 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

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46. The equation of the straight line passing through the point $\left(a\cos^3\theta, a\sin^3\theta\right)$ and perpendicular to the line $x\sec\theta + y\operatorname{cosec}\theta = a$ is (A) $x\cos\theta - y\sin\theta = a\cos 2\theta$ (B) $x\cos\theta + y\sin\theta = a\cos 2\theta$ (C) $x\sin\theta + y\cos\theta = a\cos 2\theta$ (D) none of these

A. $x\cos\theta - y\sin\theta = a\cos\theta$

B. $x\cos\theta - y\sin\theta = a\cos 2\theta$

C. $x\cos\theta - y\sin\theta = -a\cos 2\theta$

D. none of these

Answer: B

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47. If p is the length of the perpendicular from the origin to the line $\frac{x}{a} + \frac{y}{b} = 1$, then prove that $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$

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

B. $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$

C. $p = a + b$

D. $\frac{1}{p} = \frac{1}{a} + \frac{1}{b}$

Answer: B

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48. If p and q are respectively the perpendiculars from the origin upon the striaght lines, whose equations are $x\sec\theta + y\cos ec\theta = a$ and $x\cos\theta - y\sin\theta = a\cos 2\theta, then 4p^2 + q^2$ is equal to

A. $p^2 + p'^2 = a^2$

B. $p^2 + 4p'^2 = a^2$

C. $4p^2 + p'^2 = a^2$

D. $4p^2 + p'^2 = 4a^2$

Answer: C

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49. The Line L given by $\frac{x}{5} + \frac{y}{b} = 1$ passes through the point (13, 32). The line K is parallel to L and has the equation $\frac{x}{c} + \frac{y}{c} = 1$. Then the

distance between L and K is

A. $17/\sqrt{15}$

B. $23/\sqrt{17}$

C. $23/\sqrt{15}$

D. $\sqrt{17}$

Answer: B

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50. Show that the area of the parallelogram formed by the lines $2x - 3y + a = 0,\ 3x - 2y - a = 0,\ 2x - 3y + 3a = 0\ and\ 3x - 2y - 2a =$

A. $\frac{a^2}{5}$

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

C. $\frac{3a^2}{5}$

D. none of these

Answer: B

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51. Prove that the area of the parallelogram formed by the lines $x\cos\alpha + y\sin\alpha = p, x\cos\alpha + ys \in \alpha = q, x\cos\beta + y\sin\beta = randx\cos$

A. $\left|\frac{(p-q)(r-s)}{\cos(\alpha-\beta)}\right|$

B. $\left|\frac{(p-q)(r-s)}{\sin(\alpha+\beta)}\right|$

C. $\left|\frac{(p-q)(r-s)}{\sin(\alpha-\beta)}\right|$

D. $\left|\frac{(p-q)(r-s)}{\cos(\alpha+\beta)}\right|$

Answer: C

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52. Straight lines $\frac{x}{a}+\frac{y}{b}=1, \frac{x}{b}+\frac{y}{a}=1, \frac{x}{a}+\frac{y}{b}=2$ and $\frac{x}{b}+\frac{y}{a}=2$ form a

rhombus of area (in square units)

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

B. $\frac{ab}{a^2 + b^2}$

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

D. $\frac{a^2b^2}{|a^2 - b^2|}$

Answer: D

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53. Write the area of the figure formed by the lines $a|x| + b|y| + c = 0$.

A. $\frac{c^2}{|ab|}$

B. $\frac{2c^2}{|ab|}$

C. $\frac{c^2}{2|ab|}$

D. none of these

Answer: B

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54. The reflection of the point (4,-13) about the line $5x + y + 6 = 0$ is $(-1, -14)$ b. $(3, 4)$ c. $(0, -0)$ d. $(1, 2)$

A. (1,-14)

B. (6,-15)

C. (-1,-14)

D. none of these

Answer: C

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55. If the image of point $P(2, 3)$ in a line L is $Q(4, 5)$ then, the image of point $R(0, 0)$ in the same line is:

A. (3,2)

B. (-2,3)

C. (-3,-2)

D. (3,-2)

Answer: D

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56. The point (4,1) undergoes the following two successive transformations

(i) Reflection about the line $y = x$

(ii) Translation through a distance of 2 units along the positive x-axis.

The coordinates of the new point are

A. $\left(-\frac{1}{\sqrt{2}}, \frac{7}{\sqrt{2}} \right)$

B. $\left(-\frac{1}{2}, \frac{7}{\sqrt{2}} \right)$

C. $\left(\frac{7}{\sqrt{2}}, \frac{1}{2} \right)$

D. none of these

Answer: B

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A. (2,3)

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

C. (0,3$\sqrt{2}$)

D. none of these

Answer: C

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58. Line L has intercepts $aandb$ on the coordinate axes. When the axes are rotated through a given angle keeping the origin fixed, the same line

L has intercepts $pandq$. Then $a^2+b^2=p^2+q^2$ $\frac{1}{a^2}+\frac{1}{b^2}=\frac{1}{p^2}+\frac{1}{q^2}$ $a^2+p^2=b^2+q^2$ (d) $\frac{1}{a^2}+\frac{1}{p^2}=\frac{1}{b^2}+\frac{1}{q^2}$

A. $a^2+b^2=p^2+q^2$

B. $\frac{1}{a^2}+\frac{1}{b^2}=\frac{1}{p^2}+\frac{1}{q^2}$

C. $a^2+p^2=b^2+q^2$

D. $\frac{1}{a^2}+\frac{1}{p^2}=\frac{1}{b^2}+\frac{1}{q^2}$

Answer: B

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A. $1:2$

B. $2:1$

C. $4:2$

D. $4:3$

Answer: D

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60. The equations of the lines through $(-1, -1)$ and making angle 45° with the line $x + y = 0$ are given by

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

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

C. $xy + xy + y = 0$

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

Answer: D

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61. A vertex of an equilateral triangle is $2, 3$ and the opposite side is $x + y = 2$. Find the equations of other sides.

A. $(2 \pm \sqrt{3})x - y = 1 \pm 2\sqrt{3}$

B. $(2 \pm \sqrt{3})x - y = 1 \pm 2\sqrt{3}$

C. $(1 \pm 2\sqrt{3})x - y = 2 \pm \sqrt{3}$

D. $(2 \pm \sqrt{3})x + y = 1 \pm 2\sqrt{3}$

Answer: A

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A. $x - 7y + 13 = 0$ and $7x + y + 9 = 0$

B. $x + 7y - 13 = 0$ and $7x - y - 9 = 0$

C. $x - 7y + 13 = 0$ and $7x + y - 9 = 0$

D. $x - 7y - 13 = 0$ and $7x + y + 9 = 0$

Answer: C

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63. The straight line through the point of intersection of $ax + by + c = 0$ and $a'x + b'y + c' = 0$ are parallel to the y-axis has the equation

A. $x(ab' - a'b) + (cb' - c'b) = 0$

B. $x(ab' = a'b) + (cb' - c'b) = 0$

C. $y(a'b - ab') + (a'c - ac') = 0$

D. none of these

Answer: A

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64. The lines ax + by + c = 0, where 3a + 2b + 4c= 0, are concurrent at the point (a) $\left(\frac{1}{2}, \frac{3}{4}\right)$ (b) $(1, 3)$ (c) $(3, 1)$ (d) $\left(\frac{3}{4}, \frac{1}{2}\right)$

A. $(3/4, 1/2)$

B. $(1/2, 3/4)$

C. $(-3/4, -1/2)$

D. none of these

Answer: A

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65. If a, b, c are in $A.P$ then the lines represented by $ax + by + c = 0$ are

A. a single line

B. a family of concurrent lines

C. a family of parallel lines

D. none of these

Answer: B

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66. If $u = a_1x + b_1y + c_1 = 0, v = a_2x + b_2y + c_2 = 0,$ and $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2},$ then the curve $u + kv = 0$ is the same straight line u different straight line not a straight line none of these

A. u=0

B. a family of concurrent lines

C. a family of parallel lines

D. none of these

Answer: A

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67. If $u = a_1x + b_1y + c_1 = 0, v = a_2x + b_2y + c_2 = 0,$ and $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2},$ then the curve $u + kv = 0$ is the same straight line u different straight line not a straight line none of these

A. a family of concurrent lines

B. a family of parallel line

C. u=-0 or v=0

D. none of these

Answer: B

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68. The algebraic sum of perpendicular distances from $A(x_1, y_1)$, $B(x_2, y_2)$ and $C(x_3, y_3)$ to a variable line is zero, then all the such lines will always pass thorugh

A. the orthocentre of ΔABC

B. the centroid of ΔABC

C. the circumcentre of ΔABC

D. none of these

Answer: B

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69. If the point(p,5) lies on the parallel to y-axis and passing thorugh the intersection of the lines $2(a^2+1)x+by+4(a^3+a)=0$, the p is equal to

A. 3a

B. $-2a$

C. $-3a$

D. 2a

Answer: B

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70. Locus of the image of the point (2, 3) in the line $(2x - 3y + 4) + k(x - 2y + 3) = 0, k\varepsilon R$, is a :

(1) straight line parallel to x-axis. (2) straight line parallel to y-axis (3) circle of radius $\sqrt{2}$ (4) circle of radius $\sqrt{3}$

A. circle of radius $\sqrt{2}$

B. circle of radis $\sqrt{3}$

C. straight line parallel to x-axis

D. straight line parallel to y-axis

Answer: A

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71. For the straight lines 4x+3y-6 = 0 and 5x+12y+9 = 0, find the equation of the:

(i) bisector of the abtuse angle between them

(ii) bisector of the acute angle between them

(iii) bisector of the angle which contains (1,2)

(iv) bisector of the angle which contains (0,0)

A. $9x - 7y - 41 = 0$

B. $7x + 9y - 3 = 0$

C. $9x - 7y - 3 = 0$

D. $7x + \ + 9x - 41 = 0$

Answer: A

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72. The equation of the bisector of the acute angle between the lines $2x - y + 4 = 0$ and $x - 2y = 1$ is $x - y + 5 = 0$ $x - y + 1 = 0$ $x - y = 5$ (d) none of these

A. $x + y + 5 = 0$

B. $x - y + 1 = 0$

C. $x - y - 5 = 0$

D. none of these

Answer: B

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73. Find the bisector of the angle between the lines $2x + y - 6 = 0$ and $2x - 4y + 7 = 0$ which contains the point (1,2)

A. $6x - 2y - 5 = 0$

B. $2x + 6y - 19 = 0$

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

D. $2x + 6y + 19 = 0$

Answer: A

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74. Find the locus of the point of intersection of lines $x\cos\alpha + y\sin\alpha = a$ and $x\sin\alpha - y\cos\alpha = b(\alpha$ is a variable).

A. $x^2 + y^2 = a^2 - b^2$

B. $x^2 - y^2 = a^{20-b^2}$

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

D. none of these

Answer: C

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75. If O is the origin and Q is a variable points on $x^2 = 4y$. Find the locus of the mid pint of OQ.

A. $y^2 = 2x$

B. $y^2 = x$

C. $x^2 = y$

D. $x^2 = 2y$

Answer: D

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76. A variable line through the point $\left(\frac{6}{5}, \frac{6}{5}\right)$ cuts the coordinates axes in the point A and B. If the point P divides AB internally in the ratio $2:1$, show that the equation to the locus of P is :

A. $xy = 2x + y$

B. $5xy = 2x + y$

C. $5xy = 2(2x + y)$

D. $5xy = 2(x + 2y)$

Answer: C

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Illustration 18

1. The locus of a point which moves difference of its distance from two fixed straight which are at right angles is equal to the distance from another fixed straight line is

A. a stright line

B. a circle

C. a parabola

D. an ellipse

Answer: A

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Section I Solved Mcqs

1. If the quadrilateral formed by the lines ax+bc+c=0. a'x+b'y+c=0, ax+by+c'=0, a'x+b'y+c'=0 has perpendicular diagonal, then

A. $b^2 + c^2 = b^2 + c^2$

B. $c^2 + a^2 = c^2 + a^2$

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

D. none of these

Answer: C

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2. If the orthocentre of the triangle formed by the line $2x + 3y - 1 = 0, x + 2y - 1 = 0, ax + by - 1 = 0$ is at origin , then find (a,b)

A. (6,4)

B. $(- 3, 3)$

C. $(-8, 8)$

D. $(0, 7)$

Answer: C

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3. 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).(a, b) (b) (b, a) $(-a, -b)$ (d) none of these

A. (a,b)

B. (b, c)

C. (a, b)

D. $(-a, b)$

Answer: A

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4. Let the algebraic sum of the perpendicular distance from the points (2, 0), (0,2), and (1, 1) to a variable straight line be zero. Then the line passes through a fixed point whose coordinates are___

A. $(-1, 1)$

B. $(1, 1)$

C. $(1, -1)$

D. $(-1, -1)$

Answer: B

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5. If the point A is symmetric to the point $B(4, -1)$ with respect to the bisector of the first quadrant then AB is

A. $3\sqrt{2}$

B. $5\sqrt{2}$

C. $7\sqrt{2}$

D. $9\sqrt{2}$

Answer: B

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6. If the straight lines $ax + by + p = 0$ and $x\cos\alpha + y\sin\alpha = c$ enclose an angle $\pi/4$ between them and meet the straight line $x\sin\alpha - y\cos\alpha = 0$ in the same point , then

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

B. $a^2 + b^2 = c^2$

C. $a^2 + b^2 = 2c^2$

D. $a^2 + b^2 = 4$

Answer: B

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7. A and B are fixed points such that $AB = 2a$. The vertex C of ΔABC moves such that $\cot A + \cot B =$ constant. The locus of C is a

A. perpendicular to AB

B. parallel to AB

C. inclined at an angle A-B to AB

D. none of these

Answer: B

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8. Two vertices of a triangle are $(5, -1)$ and $(-2, 3)$ If the orthocentre of the triangle is the origin, find the coordinates of the third point.

A. $(4, 7)$

B. $-4, -7)$

C. $(2, -3)$

D. $(5, -1)$

Answer: B

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9. The area enclosed by $2|x| + 3|y| \leq 6$ is

A. 3

B. 12

C. 9

D. 24

Answer: B

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10. If two vertices of an equilateral triangle have integral coordinates, then the third vertex will have:

A. integral coordinates

B. coordinates which are rational

C. at lest one coordinate irrational

D. coordinates which are irrational

Answer: C

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11. The number of integral values of m for which the x-coordinate of the point of intersection of the lines $3x + 4y = 9$ and $y = mx + 1$ is also an integer is (a) 2 (b) 0 (c) 4 (d) 1

A. 2

B. 0

C. 4

D. 1

Answer: A

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12. The area of the parallelogram formed by the lines $y = mx, y = xm + 1, y = nx, andy = nx + 1$ equals. $\frac{|m+n|}{(m-n)^2}$ (b) $\frac{2}{|m+n|}$ $\frac{1}{(|m+n|)}$ (d) $\frac{1}{(|m-n|)}$

A. $\frac{|m+n|}{(m-n)^2}$

B. $\frac{2}{|m+n|}$

C. $\frac{1}{|m+n|}$

D. $\frac{1}{|m-n|}$

Answer: D

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13. The circumcentre of the triangle from by the lines $xy + 2x + 2y + 4 = 0$ and $x + y + 2 = 0$, is :

A. $(-1, 1-)$

B. $(0, -1)$

C. $(1, 1)$

D. $(-1, 0)$

Answer: A

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14. The lines $p(p^2 + 1)x - y + q = 0$ and $(p^2 + 1)^2 x + (p^2 + 1)y + 2q = 0$ are perpendicular to a common line for

A. no value of p

B. exactly one value of p

C. exactly two values of p

D. more than two value of p

Answer: B

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15. about to only mathematics

A. $1:2$

B. $3:4$

C. $2:1$

D. $4:3$

Answer: B

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16. The point (3,2) is reflected in the y-axis and then moved a distance of 5 units towards the negative side of y-axis . The coordinate of the point thus obtained , are

A. (3,-3)

B. (-3,3)

C. (3,3)

D. (-3,-3)

Answer:

Watch Video Solution

17. If a, b, c are in harmonic progression, then the straight line $\left(\left(\frac{x}{a}\right)\right)_{\frac{y}{b}} + \left(\frac{l}{c}\right) = 0$ always passes through a fixed point. Find that point.

A. (-1,2)

B. (1,-2)

C. (-1,-2)

D. (1,2)

Answer: B

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18. 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:

Watch Video Solution

19. If point $P(\alpha, \alpha^2 - 2)$ lies inside the triangle formed by the lines $x + y = 1, y = x + 1$ and $y = -1$ then $\alpha \in$

A. $(-\sqrt{3}, \sqrt{3})$

B. $\left(\frac{1-\sqrt{13}}{2}, -1\right) \cup \left(1, \frac{-1+\sqrt{13}}{2}\right)$

C. [-1,1]

D. $\left(\frac{1-\sqrt{13}}{2}, \frac{-1+\sqrt{13}}{2}\right)$

Answer: B

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20. $A(3, 4), B(0, 0)$ and $c(3, 0)$ are vertices of ΔABC. If 'P' is the point inside the ΔABC, such that $d(P, BC) \leq$ min. $\{d(P, AB), d(P, AC)\}$. Then the maximum of $d(P, BC)$ is.(where $d(P, BC)$ represent distance between P and BC).

A. 1

B. $1/2$

C. 2

D. none of these

Answer:

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21. 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 2/3 from it .

B. above the x-axis at a distance of 3/2 from it .

C. below the x-axis at a distance of 2/3 from it.

D. below the x-axis at a distance of 3/2 from it

Answer:

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22. If $P\left(1+\frac{t}{\sqrt{2}}, 2+t\sqrt{2}\right)$ is any point on a line, then the range of the values of t for which the point P lies between the parallel lines $x+2y=1 and 2x+4y=15.$ is `4(sqrt(2))/3

A. $\left(\frac{-4\sqrt{2}}{5}, \frac{5\sqrt{2}}{6}\right)$

B. $\left(0, \frac{5\sqrt{2}}{6}\right)$

C. $\left(\frac{-4\sqrt{2}}{5}, 0\right)$

D. none of these

Answer:

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23. If the point (a, a) is placed in between the lines $|x + y| = 4$, then find the values of a.

A. |a| =2

B. |a| =1

C. $|a| < 1$

D. $|a| < \frac{1}{2}$

Answer: C

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24. The side AB of an isosceles triangle is along the axis of x with vertices $A(-1, 0)$ and $AB = AC$. The equation of the side BC when $\angle A = 120^\circ$ and $BC = 4\sqrt{3}$ is:

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

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

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

D. none of these

Answer:

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25. Point $P(2, 4)$ is translated through a distance $3\sqrt{2}$ units measured parallel to the line $y - x - 1 = 0$ in the directionof decreasing ordinates to reach at Q. If R is the imageof Q with respect to the line $y - x - 1 = 0$, then thecoordinates of R are given by (1) $(5, 7)$ (2) $(- 1, 1)$ (3) $(6, 6)$ (4) $(0, 0)$

A. (-1,1)

B. (5,7)

C. (6,6)

D. (0,0)

Answer:

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26. If the distance of ny point (x,y) from the origin is defined as d(x,y) = max $\{|x|, |y|\}$,d(x,y)=a non -zero constant , then the locus is

A. a circle

B. a square

C. a triangle

D. none of these

Answer: B

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27. The equation $(1+2k)x+(1-k)y+k=0$, k k being parameter represents a family of lines. The line which belongs to this family and is at a maximum distance from the point (1, 4) is:

A. 4x - y + 1 = 0

B. 33x + 12y 7 = 0

C. 12 x + 33y = 7

D. none of these

Answer: C

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28. In the quadratic equation $ax^2 + bx + c = 0$, if $\Delta = b^2 - 4ac$ and $\alpha + \beta, \alpha^2 + \beta^2, \alpha^3 + \beta^3$ are in GP. where α, β are the roots of $ax^2 + bx + c = 0$, then

A. (1,-1)

B. (1,1)

C. (-1/6 , -7/6)

D. (1/6 , 7/6)

Answer: C

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29. One vertex of the equilateral triangle with centroid at the origin and one side as $x + y - 2 = 0$ is :

A. (-1,1)

B. (2,2)

C. (-2,-2)

D. none of these

Answer:

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30. Let $A(1, 2), B(3, 4)$ be two points and $C(x, y)$ be a point such that area of ΔABC is 3 sq. units and $(x - 1)(x - 3) + (y - 2)(y - 4) = 0$.

Then number of positions of C, in the xy plane is

A. 2

B. 4

C. 8

D. none of these

Answer:

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31. The co-ordinates of the four vertices of quadrilateral are $(-2, 4), (-1, 2), (1, 2)$ and $(2, 4)$, taken in order. The equation of the line through the vertex $(-1, 2)$ and dividing the quadrilateral in two`equal parts is:

A. x + 1 = 0

B. x + y = 1

C. x - y + 3 = 0

D. none of these

Answer:

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32. The bisector of the acute angle formed between the lines $4x - 3y + 7 = 0$ and $3x - 4y + 14 = 0$ has the equation

A. $x + y + 3 = 0$

B. $x - y - 3 = 0$

C. $x - y + 3 = 0$

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

Answer: C

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33. The equation of the bisector of that angle between the lines $x + y = 3$ and $2x - y = 2$ which contains the point (1,1) is

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

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

C. 3x = 10

D. none of these

Answer: A

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34. If the area of the parallelogram formed by the lines 2x - 3y + a = 0 , 3x - 2y - a = 0 , 2x - 3y + 3a = 0 and 3x - 2y - 2a = 0 is 10 square units , then a =

A. ± 1

B. $\pm$ 10

C. $\pm$ 5

D. none of these

Answer: C

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35. If a vertex of an equilateral triangle is the origin and the side opposite to it has the equation x+y=1, then orthocentre of the triangle is :

A. (1/3 , 1/3)

B. $\left(\sqrt{2}/3, \sqrt{2}/3\right)$

C. (2/3 , 2/3)

D. none of these

Answer:

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36. Let $A(3, 4)$ and $B(5, 8)$be two points. If C is a point on the x-axis such that $AC + BC$ is minimum then the co ordinates of C are

A. (5/3 , 0)

B. (1/3 , 0)

C. (3,0)

D. none of these

Answer:

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37. The equation of straight line equally inclined to the axes and equidistant from the point $(1, -2)$ and $(3, 4)$ is:

A. x + y + 1 = 0

B. x + y + 2 = 0

C. x - y - 2 = 0

D. x -y - 1 = 0

Answer: D

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38. The point $A(2, 1)$ is shifted by $3\sqrt{2}$ unit distance parallel to the line $x + y = 1$ in the direction of increasing ordinate to reach a point B. Find the image of B by the line $x + y = 1$.

A. (5,-2)

B. (-3,2)

C. (5,4)

D. (-1,4)

Answer:

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39. The equation of the line AB is $y = x$. If A and B lie on the same side of the line mirror $2x - y = 1$, then the equation of the image of AB is

A. x + y - 2 = 0

B. 8x + y - 9 = 0

C. 7x - y - 6 = 0

D. none of these

Answer:

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40. If a ray travelling along the line $x = 1$ gets reflected from the line x + y = 1, then the eqaution the line along which the reflected ray travels is

A. y = 0

B. x - y = 1

C. x = 0

D. none of these

Answer:

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41. Equation of the bisector of angle B of the triangle ABC is $y = x$. If A is $(2, 6)$ and B is $(1, 1)$; equation of side BC is (A) $2x + y - 3 = 0$ (B) $x - 5y + 4 = 0$ (C) $x - 6y + 5 = 0$ (D) none of these

A. 2x + y - 3 = 0

B. x - 5y + 4 = 0

C. x - 6y + 5 = 0

D. none of these

Answer:

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42. Let $A3(0, 4)$ and $Bs(21, 0) \in R$. Let the perpendicular bisector of AB at M meet the y-axis at R. Then the locus of midpoint P of MR is $y = x^2 + 21$

A. $x^2 + y^2 = \frac{1}{4}$

B. $(y - 2)^2 - x^2 = 4$

C. $y + x^2 = 2$

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

Answer: C

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43. Let A and B have coordinates (x_1, y_1) and (x_2, y_2) respectively . We define the distance between A and B as

d (A , B) = max $\{|x_2 - x_1|, |y_2 - y_1|\}$

If d (A, O) = 1 , where O is the origin , then the locus of A has an area of

A. 1sq. Unit

B. 2 sq. units

C. 4sq. units

D. 1/4 sq. units

Answer: C

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44. Number of integral points (integral points means both the co-ordinates should be integer) exactly in the interior of the triangle with vertices $(0, 0), (0, 21)$ and $(21, 0)$ is

A. 133

B. 190

C. 233

D. 105

Answer: B

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45. Prove that the locus of the centroid of the triangle whose vertices are $(a\cos t, a\sin t), (b\sin t, -b\cos t),$ and $(1, 0)$, where t is a parameter, is circle.

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

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

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

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

Answer:

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46. The locus of a point which moves such that difference of its distance from two fixed straight which are at right angles is equal to the distance from another fixed straight line is

A. a straight line

B. a circle

C. a parabola

D. an ellipse

Answer: A

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47. If the sum of the distances of a point from two perpendicular lines in a plane is 1, then its locus is

(a)a square (b) a circle (c) a straight line (d) two intersecting lines

A. a circle

B. an ellipse

C. a hyperbola

D. none of these

Answer:

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48. distance of the lines $2x - 3y - 4 = 0$ from the point $(1, 1)$ measured paralel to the line $x + y = 1$ is

A. $\sqrt{2}$

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

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

D. 6

Answer:

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

A. (1,6)

B. (1/2 , 5)

C. (5/6 , 6)

D. none of these

Answer:

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50. The co-ordinate axes are rotated about the origin O in the counter-clockwise direction through an angle 60° If p and q are the intercepts made on the new axes by a straight line whose equation referred to the original axes is x + y = 1 , then $\frac{1}{p^2} + \frac{1}{q^2} =$

A. 2

B. 3

C. 6

D. 8

Answer: A

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51. If the equation of the locus of a point equidistant from the points (a_1, b_1) and (a_2, b_2) is $(a_1 - a_2)x + (b_1 - b_2)y + c = 0$, then find the value of c.

A. $\sqrt{a_1^2 + b_1^2 - a_2^2 - b_2^2}$

B. $\frac{1}{2}(a_2^2 + b_2^2 - a_1^2 - b_1^2)$

C. $a_1^2 - a_2^2 + b_1^2 - b_2^2$

D. $\frac{1}{2}(a_1^2 + a_2^2 + b_1^2 + b_2^2)$

Answer: B

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52. Let $A(2, -3)$ and $B(-2, 1)$ be the vertices of ΔABC. If the centroid of the triangle moves on the line $2x + 3y = 1$, then find the locus of the vertex C.

A. 3x - 2y = 3

B. 2x - 3y = 7

C. 3x + 2y = 5

D. 2x + 3y = 9

Answer: D

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53. Find the equation of the straight line passing through the point (4,3) and making intercepts on the coordinate axes whose sum is -1.

A. $\frac{x}{2} - \frac{y}{3} = 1$ and $\frac{x}{-2} + \frac{y}{1} = 1$

B. $\frac{x}{2} - \frac{y}{3} = -1$ and $\frac{x}{-2} + \frac{y}{1} = -1$

C. $\frac{x}{2}+\frac{y}{3}=1$ and $\frac{x}{2}+\frac{y}{1}=1$

D. $\frac{x}{2}+\frac{y}{3}=-1$ and $\frac{x}{-2}+\frac{y}{1}=-1$

Answer: A

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54. about to only mathematics

A. hyperbola

B. a parabola

C. an ellipse

D. a straight line

Answer: D

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

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:

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56. IfA(2,-3) and B(-2, 1) are two vertices of a triangle and third vertex moves on the line 2x +3y 9,th the locus of the centroid of the triangle is 21. AIEEE-2011 (1) x-y=1 (2) 2x + 3y = 1 (3) 2x + 3y = 3 (4) 2x-3y = 1

A. 2x + 3y = 1

B. 2x + y = 3

C. 2x - 3y = 1

D. x - y = 1

Answer: A

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57. A ray of light along $x + \sqrt{3}y = \sqrt{3}$ gets reflected upon reaching x-axis, the equation of the reflected ray is:

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

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

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

D. $\sqrt{3}y = x - 1$

Answer: B

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58. 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

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59. For a point P in the plane, let $d_1(P) and d_2(P)$ be the distances of the point P from the lines $x - y = 0 and x + y = 0$ respectively. The area of

the region R consisting of all points P lying in the first quadrant of the plane and satisfying $2 \leq d_1(P) + d_2(P) \leq 4,$ is

A. 4 sq.units

B. 6 units

C. 8 sq. units

D. 2 sq. units

Answer: B

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60. The area of region bounded by the lines y=x,y=0 and $x = \sin^{-1}(a^4 + 1) + \cos^{-1}(a^4 + 1) - \tan^{-1}(a^4 + 1)$ is

A. $\frac{\pi}{8} - \frac{a^2}{4}$

B. $\frac{\pi^2}{8} - \frac{a^2}{2}$

C. $\frac{\pi^2}{16}$

D. $\frac{\pi^2}{32}$

Answer: D

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61. A ray of light is incident along a line which meets another line, $7x - y + 1 = 0$, at the point (0,1). The ray is then reflected from this point along the line, $y + 2x = 1$. Then the equation of the line of incidence of the ray of light is:

A. 41x + 38y - 38 = 0

B. 41 x - 38y + 38 = 0

C. 41x + 25y - 25 = 0

D. 41 x - 25y + 25 = 0

Answer: B

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62. 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?

A. (-3 , -8)

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

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

D. (-3 , -9)

Answer: B

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63. In a triangle ABC , right angled at the vertex A , if the position vectors of A , B and C are respectively $3\hat{i}+\hat{j}-\hat{k}, -\hat{i}+3\hat{j}+p\hat{k}$ and $5\hat{i}+q\hat{j}-4\hat{k}$, then the point (p,q) lies on a line

A. parallel to y-axis

B. making an acute angle with the positive direction of x-axis

C. parallel to x-axis

D. making an obtuse angle with the positive direction of x axis

Answer: B

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64. If a variable line drawn through the intersection of the line $\frac{x}{3}+\frac{y}{4}=1 \& \frac{x}{4}+\frac{y}{3}=1$, meets the coordinate axes at A and B, $(A \neq B)$, then the locus of the midpoint of AB is:

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

B. 6xy = 7(x + y)

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

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

Answer: A

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Section 1 Solved Mcqs Example

1. Two vertices of a triangle are (3,-2) and (-2,3) and its orthocentre is (-6,1) . Then the third vertex of this triangle can not lie on the line

A. $6x + y = 0$

B. $4x + y = 2$

C. $5x + y = 2$

D. $3x + y = 3$

Answer: C

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Section Ii Assertion Reason Type Mcqs

1. Statement -1 : The lines (a + b) x + 2(a - b) y = 2a are concurrent at the point (1, 1/2) .

Statement-2 : $L_1 + \lambda L_2 = 0$ represents the equation of family of lines passing through the intersection of the lines $L_1 = 0$ and $L_2 = 0$ for all non - zero finite value of λ

A. Statement -1 is True , Statement - 2 is true , Statement- 2 is a correct explanation for statement - 1

B. Statement-1 is True , Statement-2 is True , Statement -2 is not a correct explanation for Statement - 1 .

C. Statement-1 is True , Statement - 2 is False .

D. Statement - 1 is False , Statement -2 is True .

Answer: A

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2. Statement-1: Reflection of the point (-3, 2) in the line x + y = 0 is (-2, 3).Statement-2: The reflection of a point $P(\alpha, \beta)$ in the line ax+by+c=0 is the point $Q(\alpha', \beta')$if $\left(\frac{\alpha+\alpha'}{2}, \frac{\beta+\beta'}{2}\right)$ lies on the line

A. Statement -1 is True , Statement - 2 is true , Statement- 2 is a correct explanation for statement - 2

B. Statement-1 is True , Statement-2 is True , Statement -2 is not a correct explanation for Statement - 1 .

C. Statement-1 is True , Statement - 2 is False .

D. Statement - 1 is False , Statement -2 is True .

Answer: C

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3. Statement - 1 : If the perpendicular bisector of the line segment joining points A (a,3) and B(1,4) has y-intercept -4 , then $a = \pm 4$.

Statement- 2 : Locus of a point equidistant from two given points is the perpendicular bisector of the line joining the given points .

A. Statement -1 is True , Statement - 2 is true , Statement- 2 is a correct explanation for statement - 3

B. Statement-1 is True , Statement-2 is True , Statement -2 is not a correct explanation for Statement - 1 .

C. Statement-1 is True , Statement - 2 is False .

D. Statement - 1 is False , Statement -2 is True .

Answer: A

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4. STATEMENT-1: The lines $a_1x + b_1y + c_1 = 0 a_2x + b_2y + c_2 = 0, a_3x + b_3y + c_2 = 0$ are concurrent if $\begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix} = 0.$

STATEMENT-2: The area of the triangle formed by three concurrent lines is always zero.

A. Statement -1 is True , Statement - 2 is true , Statement- 2 is a correct explanation for statement - 4

B. Statement-1 is True , Statement-2 is True , Statement -2 is not a correct explanation for Statement - 1 .

C. Statement-1 is True , Statement - 2 is False .

D. Statement - 1 is False , Statement -2 is True .

Answer: A

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5. Statement -1 : The circumcentre of the triangle formed by the lines x + y = 0 , x - y = 0 and x + 5 = 0 (- 5 , 0) .

Statement-2 : Cicumcentre of a triangle lies inside the triangle

A. Statement -1 is True , Statement - 2 is true , Statement- 2 is a correct explanation for statement - 5

B. Statement-1 is True , Statement-2 is True , Statement -2 is not a correct explanation for Statement - 1 .

C. Statement-1 is True , Statement - 2 is False .

D. Statement - 1 is False , Statement -2 is True .

Answer: C

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6. Statement 1: Each point on the line $y - x + 12 = 0$ is equidistant from the lines $4y + 3x - 12 = 0, 3y + 4x - 24 = 0$ Statement 2: The locus of a point which is equidistant from two given lines is the angular bisector of the two lines.

A. Statement -1 is True , Statement - 2 is true , Statement- 2 is a correct explanation for statement - 6

B. Statement-1 is True , Statement-2 is True , Statement -2 is not a correct explanation for Statement - 1 .

C. Statement-1 is True , Statement - 2 is False .

D. Statement - 1 is False , Statement -2 is True .

Answer: A

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7. Prove that the locus of the centroid of the triangle whose vertices are $(a\cos t, a\sin t), (b\sin t, -b\cos t),$ and $(1, 0)$, where t is a parameter, is circle.

A. Statement -1 is True , Statement - 2 is true , Statement- 2 is a correct explanation for statement - 7

B. Statement-1 is True , Statement-2 is True , Statement -2 is not a correct explanation for Statement - 1 .

C. Statement-1 is True , Statement - 2 is False .

D. Statement - 1 is False , Statement -2 is True .

Answer: B

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8. Statement -1 : The line $3x + 2y = 24$ meets the coordinates axes at A and B , and the perpendicular bisector of AB meets the line through (0,-1) parallel to the x-axis at C . The area of Δ ABC is 91 square units .

Statement-2 : Area of the triangle with vertices at (a,0) , (0,b) and (a , b) is ab/2 sq. units .

A. Statement -1 is True , Statement - 2 is true , Statement- 2 is a correct explanation for statement - 8

B. Statement-1 is True , Statement-2 is True , Statement -2 is not a correct explanation for Statement - 1 .

C. Statement-1 is True , Statement - 2 is False .

D. Statement - 1 is False , Statement -2 is True .

Answer: B

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9. Statement - 1 : If non-zero numbers a , b , c are in H.P. , then the equation $\frac{x}{a}+\frac{y}{b}=\frac{1}{c}$ represents a family of concurrent lines .

Statement- 2 : A linear equation px + qy = 1 in x , y represents a family of straight lines passing through a fixed point iff there is a linear relation between p and q .

A. Statement -1 is True , Statement - 2 is true , Statement- 2 is a correct explanation for statement - 9

B. Statement-1 is True , Statement-2 is True , Statement -2 is not a correct explanation for Statement - 1 .

C. Statement-1 is True , Statement - 2 is False .

D. Statement - 1 is False , Statement -2 is True .

Answer: A

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10. Statement - 1 : Equations $\left(2 \pm \sqrt{3}\right)x - y = 1 \pm 2\sqrt{3}$ represent two sides of an equilateral triangle having one vertex (2 , 3) and x + y - 2 = 0 as the opposite side .

Statement - 2 : The equation of the lines passing through (x_1, y_1) and making constant angle α with the line y = mx + c are given by

$$y - y_1 = \frac{m \pm \tan\alpha}{1 \pm \tan\alpha}(x - x_1)$$

A. Statement -1 is True , Statement - 2 is true , Statement- 2 is a correct explanation for statement - 10

B. Statement-1 is True , Statement-2 is True , Statement -2 is not a correct explanation for Statement - 1 .

C. Statement-1 is True , Statement - 2 is False .

D. Statement - 1 is False , Statement -2 is True .

Answer: A

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11. Statement - 1 : For the straight lines 3x - 4y + 5 = 0 and 5x + 12 y - 1 = 0 , the equation of the bisector of the angle which contains the origin is 16 x + 2 y + 15 = 0 and it bisects the acute angle between the given lines .

statement - 2 : Let the equations of two lines be $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ where c_1 and c_2 are positive . Then , the bisector of the angle containing the origin is given by

$$\frac{a_1x + b_1y + c_1}{\sqrt{a_2^2 + b_1^2}} = \frac{a_2x + b_2y + c_2}{\sqrt{a_2^2 + b_2^2}}$$

If $a_1a_2 + b_1b_2 > 0$, then the above bisector bisects the obtuse angle between given lines .

A. Statement -1 is True , Statement - 2 is true , Statement- 2 is a correct explanation for statement - 11

B. Statement-1 is True , Statement-2 is True , Statement -2 is not a correct explanation for Statement - 1 .

C. Statement-1 is True , Statement - 2 is False .

D. Statement - 1 is False , Statement -2 is True .

Answer: D

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12. ABC is a triangle formed by the lines xy = 0 and x + y = 1 .

Statement - 1 : Orthocentre of the triangle ABC is at the origin .

Statement - 2 : Circumcentre of ΔABC is at the point (1/2 , 1/2) .

A. Statement -1 is True , Statement - 2 is true , Statement- 2 is a correct explanation for statement - 12

B. Statement-1 is True , Statement-2 is True , Statement -2 is not a correct explanation for Statement - 1 .

C. Statement-1 is True , Statement - 2 is False .

D. Statement - 1 is False , Statement -2 is True .

Answer: B

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13. The line $L_1 : y - x = 0$ and $L_2 : 2x + y = 0$ intersect the line $L_3 : y + 2 = 0$ at P and Q respectively. The bisector of the acute angle between L_1 and L_2 intersects L_3 at R. Statement-1 : The ratio $PR : RQ$ equals $2\sqrt{2} : \sqrt{5}$ Statement-2 : In any triangle, bisector of an angle divides the triangle into two similar triangles. Statement-1 is true, Statement-2 is true ; Statement-2 is correct explanation for Statement-1 Statement-1 is true, Statement-2 is true ; Statement-2 is not a correct explanation for Statement-1 Statement-1 is true, Statement-2 is false Statement-1 is false, Statement-2 is true

A. Statement -1 is True , Statement - 2 is true , Statement- 2 is a correct explanation for statement - 13

B. Statement-1 is True , Statement-2 is True , Statement -2 is not a correct explanation for Statement - 1 .

C. Statement-1 is True , Statement - 2 is False .

D. Statement - 1 is False , Statement -2 is True .

Answer: C

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14. The line $L_1 : y - x = 0$ and $L_2 : 2x + y = 0$ intersect the line $L_3 : y + 2 = 0$ at P and Q respectively. The bisector of the acute angle between L_1 and L_2 intersects L_3 at R. Statement-1 : The ratio $PR : RQ$ equals $2\sqrt{2} : \sqrt{5}$ Statement-2 : In any triangle, bisector of an angle divides the triangle into two similar triangles. Statement-1 is true, Statement-2 is true ; Statement-2 is correct explanation for Statement-1 Statement-1 is true, Statement-2 is true ; Statement-2 is not a correct explanation for Statement-1 Statement-1 is true, Statement-2 is false Statement-1 is false, Statement-2 is true

A. Statement -1 is True , Statement - 2 is true , Statement- 2 is a correct explanation for statement - 14

B. Statement-1 is True , Statement-2 is True , Statement -2 is not a correct explanation for Statement - 1 .

C. Statement-1 is True , Statement - 2 is False .

D. Statement - 1 is False , Statement -2 is True .

Answer: A

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Section Ii Assertion Reason Type Mcqs

1. Let L be the line y = 2x , in the two dimensional plane .

Statement 1 : The image of the point (0,1) in L is the point (4/5 , 3/5)

Statement 2 : The points (0,1) and (4/5 , 3/5) lie on opposite sides of the line L and are at equal distance from it .

A. Statement -1 is True , Statement - 2 is true , Statement- 2 is a correct explanation for statement - 15

B. Statement-1 is True , Statement-2 is True , Statement -2 is not a correct explanation for Statement - 1 .

C. Statement-1 is True , Statement - 2 is False .

D. Statement - 1 is False , Statement -2 is True .

Answer: A

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Exercise

1. about to only mathematics

A. a straight line parallel to x-axis

B. circle through origin

C. circle with centre at the origin

D. a straight line parallel to y-axis

Answer: D

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2. Find the locus of the mid-point of the portion of the line $x\cos\alpha + y\sin\alpha = p$ which is intercepted between the axes.

A. $x^2 + y^2 = 4p^2$

B. $\frac{1}{x^2} + \frac{1}{y^2} = \frac{4}{p^2}$

C. $x^2 + y^2 = \frac{4}{p^2}$

D. $\frac{1}{x^2} + \frac{1}{y^2} = \frac{2}{p^2}$

Answer: B

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3. Find the locus of the point of intersection of lines $x\cos\alpha + y\sin\alpha = a$ and $x\sin\alpha - y\cos\alpha = b$($\alpha$ is a variable).

A. $2\left(x^2 + y^2\right) = a^2 + b^2$

B. $x^2 - y^2 = a^2 - b^2$

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

D. none of these

Answer: C

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4. if x and y coordinates of a point P in $x-y$plane are given by $x=(u\cos\alpha)t, y=(u\sin\alpha)t-\frac{1}{2}gt^2$where t is a aprameter and u, α, g the constants. Then the locus of the point P is a parabola then whose vertex is:

A. a circle

B. a parabola

C. an ellipse

D. none of these

Answer: B

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5. If $A(\cos\alpha, \sin\alpha), B(\sin\alpha, -\cos\alpha), C(1, 2)$ are the vertices of ABC, then as α varies, find the locus of its centroid.

A. $x^2 + y^2 - 2x - 4y + 1 = 0$

B. $3(x^2 - y^2) - 2x - 4y + 1 = 0$

C. $x^2 + y^2 - 2x - 4y + 3 = 0$

D. none of these

Answer: B

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6. A and B are two fixed points. Draw the locus of a point P such that angle $APB = 90^\circ$.

A. a circle

B. an ellipse

C. a parabola

D. none of these

Answer: A

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7. If a variable line passes through the point of intersection of the line $x + 2y - 1 = 0$ and $2x - y - 1 = 0$ and meets the coordinate axes in A and B, then the locus of the mid-point of AB is:

A. x + 3y = 0

B. x + 3y = 10

C. x + 3y = 10xy

D. none of these

Answer: C

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8. A variable straight line is drawn through the point of intersection of the straight lines $\frac{x}{a}+\frac{y}{b}=1$ and $\frac{x}{b}+\frac{y}{a}=1$ and meets the coordinate axes at A and B. Show that the locus of the midpoint of AB is the curve $2xy(a+b)=ab(x+y)$

A. $\alpha\beta(x+y)=xy(\alpha+\beta)$

B. $\alpha\beta(x+y)=2xy(\alpha+\beta)$

C. $(\alpha+\beta)(x+y)=2\alpha\beta xy$

D. none of these

Answer: B

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9. The nearest point on the line $3x-4y=25$ from the origin is

A. (-4,5)

B. (3 , -4)

C. (3,4)

D. (3, 5)

Answer: B

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10. The distance between the lines $(x+7y)^2+4\sqrt{2}(x+7y)-42=0$ is_____

A. $4/5$

B. $4\sqrt{2}$

C. 2

D. $10\sqrt{2}$

Answer: A

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11. The image of the point (-1,3) by the line x - y = 0 , is

A. (3,-1)

B. (1 , -3)

C. (-1,-1)

D. (3 ,3)

Answer: b

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12. If $A(1, 1), B\left(\sqrt{3}+1, 2\right)$ and $C\left(\sqrt{3}, \sqrt{3}+2\right)$ are three vertices of a square, then the diagonal through B is

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

B. $y=0$

C. y = x

D. none of these

Answer: D

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13. If $(-4, 0)$ and $(1, -1)$ are two vertices of a triangle of area $4sq units$, then its third vertex lies on (a)$y = x$ (b) $5x + y + 12 = 0$ (c) $x + 5y - 4 = 0$ (d) $x + 5y + 12 = 0$

A. y = x

B. 5x + y + 12 = 0

C. x + 5y - 4 = 0

D. none of these

Answer: C

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14. If the line $x + y - 1 = \frac{\lambda}{2} = 0$ passing through the intersection of $x - y + 1 = 0$ and $3x + y - 5 = 0$ is perpendicular to one of them, then the value of λ is:

A. x + y + 3 = 0

B. x - y -3 = 0

C. x - 3y - 5 =0

D. x -3y + 5 = 0

Answer: D

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15. The distance between the lines $5x + 12y + 65 = 0$ and $5x + 12y - 39 = 0$ is :

A. 4

B. 16

C. 2

D. 8

Answer: D

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16. Prove that the locus of the centroid of the triangle whose vertices are $(a\cos t, a\sin t), (b\sin t, -b\cos t),$ and $(1, 0)$, where t is a parameter, is circle.

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: B

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17. The equation of the line with slope $-3/2$ and which in concurrent with the lines $4x = 3y - 7 = 0 \, and \, 8x + 5y - 1 = 0$ is $2\sqrt{2}$ b. 2 c. $\sqrt{2}$ d. 1

A. 3x + 2y - 2 = 0

B. 3x + 2y - 63 = 0

C. 2y - 3x -2 = 0

D. none of these

Answer: A

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18. The point of intersection of the lines $\frac{x}{a} + \frac{y}{b} = 1$ and $\frac{x}{b} + \frac{y}{a} = 1$ lies on

A. x - y = 0

B. $(x + y)(a + b) = 2ab$

C. $(lx + my)(a + b) = (l + m)ab$

D. all of these

Answer: D

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19. Find the equation of the bisector of the obtuse angle between the lines $3x - 4y + 7 = 0$ and $12x + 5y - 2 = 0$.

A. $99x - 27y - 81 = 0$

B. $11x - 3y + 9 = 0$

C. $21x + 77y - 101 = 0$

D. $21x + 77y + 101 = 0$

Answer: B

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20. If the equation of the locus of a point equidistant from the points (a_1, b_1) and (a_2, b_2) is $(a_1 - a_2)x + (b_1 - b_2)y + c = 0$, then find the value of c.

A. $a_1^2 - a_2^2 + b_1^2 - b_2^2$

B. $\sqrt{a_1^2 + b_1^2 - a_2^2 - b_2^2}$

C. $\frac{1}{2}(a_1^2 + a_2^2 + b_1^2 + b_2^2)$

D. $\frac{1}{2}(a_2^2 + b_2^2 - a_1^2 - b_1^2)$

Answer: D

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21. The equations of perpendicular bisectors o the sides AB and AC of a triangle ABC are $x - y + 5 = 0 \, and \, x + 2y = 0$ respectively. If the point $A \, is \, (1, \, -2),$ find the equation of the line BC.

A. 23x + 14y - 40 = 0

B. 23x + 14y + 40 = 0

C. 14x + 23 y -40 = 0

D. 14 x + 23y + 40 = 0

Answer: C

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22. If each of the points $(x_1, 4), (-2, y_1)$ lies on the line joining the points $(2, -1) and (5, -3)$, then the point $P(x_1, y_1)$ lies on the line. (a) $6(x+y)-25=0$ (b) $2x+6y+1=0$ (c) $2x+3y-6=0$ (d) $6(x+y)+25=0$

A. 6 (x +y) - 25 = 0

B. 2x + 6y + 1 = 0

C. 2 x + 3y - 6 = 0

D. 6(x + y) + 25 = 0

Answer: B

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23. Equation of the line passing through the point $\left(a\cos^3\theta, a\sin^3\theta\right)$ and perpendicular to the line $x\sec\theta + y\cos ec\theta = a$ is $x\cos\theta - y\sin\theta = a\sin 2\theta$.

A. $x\cos\theta + y\sin\theta = 2a\cos 2\theta$

B. $x\sin\theta - y\cos\theta = 2a\sin 2\theta$

C. $x\sin\theta + y\cos\theta = 2a\cos\theta$

D. none of these

Answer: D

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24. 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

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25. The straight line $x + y - 4 = 0, 3x + y - 4 = 0, x + 3y - 4 = 0$ form a triangle which is

A. right angled

B. equilateral

C. isosceles

D. none of these

Answer: C

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26. Prove that the lines $ax + by + c = 0, bx + cy + a = 0$ and $cx + ay + b = 0$ are concurrent if $a + b + c = 0$ or $a + b\omega + c\omega^2 + c\omega = 0$ where ω is a complex cube root of unity .

A. a + b = c

B. b + c = a

C. c + a = b

D. a + b + c = 0

Answer: D

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27. The equation of one side of a rectangle is $3x - 4y - 10 = 0$ and the coordinates of two of its vertices are $(-2, 1)$ and $(2, 4)$. Then, the area of the rectangle is

A. 20

B. 40

C. 10

D. 30

Answer: A

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28. Given the four lines with the equations $x + 2y - 3 = 0, 3x + 4y - 7 = 0$, $2x + 3y - 4 = 0, 4x + 5y - 6 = 0$ then:

A. concurrent

B. sides of a square

C. sides of a rhombus

D. none of these

Answer: D

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29. about to only mathematics

A. $3x + 2y \geq 0$

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

C. $2x - 3y + 12 \leq 0$

D. $-2x + y \geq 0$

Answer: A

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30. about to only mathematics

A. $7/\sqrt{5}$

B. $7/\sqrt{13}$

C. $\sqrt{5}$

D. $\sqrt{13}$

Answer: C

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31. Let the base of a triangle lie along the line x = a and be of length a. The area of this triangles is a^2, if the vertex lies on the line

A. x = -a, x = 2a

B. x = 0 , x = a

C. x = a/2 , x = -a

D. none of these

Answer: B

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32. The equation of straight line passing through point (1,2) and having intercept of length 3 between straight line $3x+4y=12$ and $3x+4y=24$ is

A. $7x + 24y - 55 = 0$

B. $24x + 7y - 38 = 0$

C. $24x - 7y - 10 = 0$

D. $7x - 24y + 41 = 0$

Answer: D

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33. The point (4,1) undergoes the following two successive transformations

(i) Reflection about the line $y = x$

(ii) Translation through a distance of 2 units along the positive x-axis.

The coordinates of the new point are

A. $(1/\sqrt{2}, 7/\sqrt{2})$

B. $(-2, 7\sqrt{2})$

C. $(-1/\sqrt{2}, 7/\sqrt{2})$

D. $(\sqrt{2}, 7\sqrt{2})$

Answer: C

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34. A line passes through the point (2,2) and is perpendicular to the lines $3x + y = 3$. Its y-intercept is $1/3$ b. 2/3 c. 1 d. 4/3

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

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

C. 1

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

Answer: D

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35. The coordinates of a point on the lin y = x where perpendicular distance from the line $3x + 4y = 12$ is units are

A. $\left(-\frac{8}{7}, -\frac{8}{7}\right), \left(-\frac{32}{7}, -\frac{32}{7}\right)$

B. $\left(\frac{8}{7}, \frac{8}{7}\right), \left(\frac{32}{7}, \frac{32}{7}\right)$

C. $\left(-\frac{8}{7}, -\frac{8}{7}\right), \left(\frac{32}{7}, \frac{32}{7}\right)$

D. none of these

Answer: C

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36. The point $P(1, 1)$ is transiated parallel to $2x = y$in the first quadrant through a unith distance. The coordinates of the point in new position are

A. $\left(1 \pm \frac{2}{\sqrt{5}}, 1 \pm \frac{1}{\sqrt{5}}\right)$

B. $\left(1 \pm \frac{1}{\sqrt{5}}, 1 \pm \frac{2}{\sqrt{5}}\right)$

C. $\left(\frac{1}{\sqrt{5}}, \frac{2}{\sqrt{5}}\right)$

D. $\left(\frac{2}{\sqrt{5}}, \frac{1}{\sqrt{5}}\right)$

Answer: B

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

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

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

D. none of these

Answer: A

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38. The limiting position of the point of intersection of the lines $3x + 4y = 1$ and $(1 + c)x + 3c^2y = 2$ as c tends to 1, is

A. (-5,4)

B. (5 , -4)

C. (4 , -5)

D. none of these

Answer: A

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39. Given three straight lines $2x + 11y - 5 = 0, 24x + 7y - 20 = 0,$ and $4x - 3y - 2 = 0$. Then, a)they form a triangle b)one line bisects the angle between the other two c) two of them are parallel

A. $2p_1 = p_2$

B. $p_1 = p_2$

C. $p_1 = 2p_2$

D. none of these

Answer: B

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40. P(2,1) , Q (4,-1) , R (3,2) are the vertices of a triangle and if through P and R lines parallel to opposite sides are drawn to intersect in S , then the area of PQRS , is

A. 6

B. 4

C. 8

D. 12

Answer: B

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41. If a line passes through the point (2,2) and encloses a triangle of area A square units with the coordinate axes , then the intercepts made by the line on the coordinate axes are the roots of the equations

A. $x^2 \pm Ax \pm 2A = 0$

B. $x^2 \pm Ax \pm 2A = 0$

C. $x^2 \pm 2Ax \pm A = 0$

D. $x^2 \pm 2Ax \pm A = 0$

Answer: A

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42. Points on the line $x + y = 4$ which are equidistant from the lines $|x| = |y|$, are

A. (4,0) , (0,4)

B. (-4,0), (0, -4)

C. (4,0) , (-4, 0)

D. none of these

Answer: A

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43. If AB=4 and the ends A, B move on the coordinate axes, the locus of the mid-point of AB

A. a straight line

B. a pair of straight lines

C. a circle

D. none of these

Answer: C

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44. A straight line L is perpendicular to the line $5x - y = 1$. The area of the triangle formed by line L, and the coordinate axes is 5. Find the equation of line L.

A. $x + 5y + 5 = 0$

B. $x + 5y \pm \sqrt{2} = 0$

C. $x + 5y \pm \sqrt{5} = 0$

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

Answer: D

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45. Let O be the origin. If $A(1, 0) and B(0, 1) and P(x, y)$ are points such that $xy > 0 and x + y < 1,$ then P

A. P lies either in side ΔOAB or in third quadrant

B. P cannot be inside ΔOAB

C. P lies inside the ΔOAB

D. none of these

Answer: A

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46. about to only mathematics

A. x - 3y - 7 = 0 or , 3x + y - 31 = 0

B. x - 3y - 31 = 0 or , 3x + y - 7 = 0

C. x - 3y - 31 = 0 or , 3x + y + 7 = 0

D. none of these

Answer: C

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47. The straight line passing through $P(x_1, y_1)$ and making an angle α with x-axis intersects $Ax + By + C = 0$ in Q then PQ =_____

A. $\left|\frac{Ax_1 + By_1 + C}{\sqrt{A^2 + B^2}}\right|$

B. $-\frac{Ax_1 + By_1 + C}{A\cos\alpha + B\sin\alpha}$

C. $\frac{Ax_1 + By_1 + C}{A\cos\alpha + B\sin\alpha}$

D. $-\frac{Ax_1 + By_1 + C}{A\sin\alpha + B\cos\alpha}$

Answer: B

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48. Find the value of λ, if the lines 3x-4y-13=0, 8x-11y-33, and $2x - 3y + \lambda = 0$are concurrent.

A. 20

B. -7

C. 7

D. -20

Answer: B

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49. The equation of line on which the perpendicular from the origin make 30^0 angle with the x-axis and which form a triangle of area $\frac{50}{\sqrt{3}}$ with the axes is a. $\sqrt{3}x + y - 10 = 0$ b. $\sqrt{3}x + y + 10 = 0$ c. $x + \sqrt{3}y - 10 = 0$ d. $x - \sqrt{3}y - 10 = 0$

A. $x + \sqrt{3}y \pm 10 = 0$

B. $\sqrt{3}x + y \pm 10 = 0$

C. $x \pm \sqrt{3}y - 10 = 0$

D. none of these

Answer: B

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50. The area (in square units) of the triangle formed by y-axis , the straight line L passing through (1,1) and (2,0) and the straight line perpendicular to the line L and passing through (1/2, 0) , is

A. $\frac{25}{8}$

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

C. $\frac{25}{16}$

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

Answer: C

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51. Find all points on $x + y = 4$ that lie at a unit distance from the line $4x + 3y - 10 = 0$.

A. (3,1) and (-7,11)

B. (-3,7) and (2,2)

C. (-3,7) and (-7,11)

D. none of these

Answer: A

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52. Find the equations of the lines through the point of intersection of the lines $x - 3y + 1 = 0 \, and \, 2x + 5y - 9 = 0$ and whose distance from

the origin is $\sqrt{5}$.

A. 2x - y = 5

B. x + 2y = 5

C. 2x + y = 5

D. x + 2y = 1

Answer: C

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53. 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

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54. The ratio in which the line segment joining (-1,1) and (5,7) is divided by the line $x + y = 4$ is

A. 2

B. $1/2$

C. 3

D. none of these

Answer: B

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55. The image of the point (1, 3) in the line $x + y - 6 = 0$ is

A. (3,5)

B. (5,3)

C. (1,-3)

D. (-1,3)

Answer: A

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56. A triangle ABC right angled at A has points A and B as (2, 3) and (0, -1) respectively. If BC = 5 units, then the point C is

A. (-4,2)

B. (4,2)

C. (3,-3)

D. (0,-4)

Answer: B

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57. The equation of the line passing though the intersection of $x - \sqrt{3}y + \sqrt{3} - 1 = 0$ and $x + y - 2 = 0$ and making an angle of 15° with the first line is

A. x - y = 0

B. x - y + 1 = 0

C. y = 1

D. $\sqrt{3}x - y + 1 - \sqrt{3} = 0$

Answer: A

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58. In a rhombus ABCD the diagonals AC and BD intersect at the point (3,4) . If the point A is (1,2) the diagonal BD has the equation

A. x - y - 1 = 0

B. x + y - 1 = 0

C. x - y + 1 = 0

D. x + y - 7 =0

Answer: D

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59. The distance between the pair of parallel line, $x^2 + 2xy + y^2 - 8ax - 8ay - 9a^2 = 0$ is

A. $2\sqrt{5}a$

B. $10\sqrt{a}$

C. $10a$

D. $5\sqrt{2}a$

Answer: D

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60. The ratio in which the line 3x - 2y + 5 = 0 divides the join of (6,-7) and (-2 , 3) is

A. $1:1$

B. $7:37$

C. $37:7$

D. none of these

Answer: C

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61. One vertex of the equilateral triangle with centroid at the origin and one side as $x+y-2=0$ is :

A. (-1,-1)

B. (2,2)

C. (-2,-2)

D. none of these

Answer: C

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62. The distance of the line x + y - 8 = 0 from (4,1) measured along the direction whose slope is -2 , is

A. $3\sqrt{5}$

B. $6\sqrt{5}$

C. $2\sqrt{5}$

D. none of these

Answer: A

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63. about to only mathematics

A. 1

B. 2

C. 3

D. 4

Answer: B

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64. The orthocentre of the triangle formed by the lines $x + y = 1, 2x + 3y = 6$ and $4x - y + 4 = 0$ lies in :

A. I quadrant

B. II quadrant

C. III quadrant

D. IV quadrant

Answer: A

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65. If each of the points $(x_1, 4), (-2, y_1)$ lies on the line joining the points $(2, -1) and (5, -3)$, then the point $P(x_1, y_1)$ lies on the line. (a) $6(x+y)-25=0$ (b) $2x+6y+1=0$ (c) $2x+3y-6=0$ (d) $6(x+y)+25=0$

A. x = 3y

B. x = - 3y

C. y = 2x + 1

D. 2x + 6y + 1 = 0

Answer: D

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66. The area bounded by the straight lines $y = 1$ and $\pm 2x + y = 2,$ in square units, is

A. $1/2$

B. 1

C. $3/2$

D. 2

Answer: A

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67. The locus of a point P which divides the line joining (1, 0) and $(2\cos\theta, \sin\theta)$ internally in the ratio 2 : 3 for all θ is

A. straight line

B. circle

C. pair of straight lines

D. parabola

Answer: B

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68. The area of triangle ABC is $20cm^2$. The coordinates of vertex A are $-5, 0)$ and those of B are $(3, 0)$. The vertex C lies on the line $x - y = 2$. The coordinates of C are

(a)$(5, 3)$ (b) $(-3, -5)$ $(-5, -7)$ (d) $(7, 5)$

A. (-7,-5) or (3,5)

B. (-3,-5) or (-5,7)

C. (7,5) or (3,5)

D. (-3,-5) , (7 , 5)

Answer: D

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69. Prove that the area of the parallelogram formed by the lines $x\cos\alpha + y\sin\alpha = p, x\cos\alpha + ys \in \alpha = q, x\cos\beta + y\sin\beta = randx\cos$

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

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

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

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

Answer: B

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70. Find the ratio in which the line 3x+4y+2 = 0 divides the distance between 3x+4y+5=0 and 3x+4y-5=0.

A. $7:3$

B. $3:7$

C. $2:3$

D. none of these

Answer: B

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71. If the extremities of the base of an isosceles triangle are the points (2a,0) and (0,a), and the equation of one of the sides x=2a, then the area of the triangle is

A. $5a^2$

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

C. $\frac{25a^2}{2}$

D. none of these

Answer: B

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72. The vertices of a $\triangle OBC$ are $O(0, 0), B(-3, -1), C(-1, -3)$. Find the equation of the line parallel to BC and intersecting the sides OB and OC and whose perpendicular distance from the origin is $\frac{1}{2}$.

A. $x + y + \frac{1}{2} = 0$

B. $x + y - \frac{1}{2} = 0$

C. $x + y - \frac{1}{\sqrt{2}} = 0$

D. $x + y + \frac{1}{\sqrt{2}} = 0$

Answer: D

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73. The area (in square units) of the quadrilateral formed by two pair of the lines $l^2x^2 - m^2y^2 - n(lx + my) = 0$ and $l^2x^2 - m^2y^2 + n(lx - my) = 0$, is

A. $\frac{n^2}{2|lm|}$

B. $\frac{n^2}{|lm|}$

C. $\frac{n}{2|lm|}$

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

Answer: A

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74. Find the equation of the bisector of the angle between the lines $x + 2y = 11 = 0$ and $3x - 6y - 5 = 0$ which contains the point $(1, -3)$

A. 3x=19

B. $3y = 7$

C. $3x = 19$ and $3y = 7$

D. none of these

Answer: A

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75. The line $3x + 2y = 24$ meets the y-axis at A and the x-axis at B. The perpendicular bisector of AB meets the line through $(0, -1)$ parallel to the x-axis at C. If the area of triangle ABC is A , then the value of $\frac{A}{13}$ is_____

A. 182 sq. units

B. 91 sq. units

C. 48 sq. units

D. none of these

Answer: B

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76. 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. (13/5,0)

B. (5/13,0)

C. (-7,0)

D. none of these

Answer: A

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77. If PM is the perpendicular from P(2,3) on the line $x + y = 3$, then the coordinate of M are

A. (2,1)

B. (-1,4)

C. (1,2)

D. (4,-1)

Answer: C

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78. The incentre of the triangle formed by the line $3x + 4y - 12 = 0$ with the coordinate axis is

A. (1/2,1/2)

B. (1/1)

C. (1,1/2)

D. (1/2,1)

Answer: B

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79. If one vertex of an equilateral triangle is at $(2. \ -1)$ 1base is $x + y - 2 = 0$, then the length of each side, is

A. $\sqrt{3/2}$

B. $\sqrt{2/3}$

C. $2/3$

D. $3/2$

Answer: B

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80. The area of the parallelogram formed by the lines $3x-4y+1=0, 3x-4y+3=0, 4x-3y-1=0$ and $4x-3y-2=0,$ is (A) $\frac{1}{7}squnits$ (B) $\frac{2}{7}squnits$ (C) $\frac{3}{7}squnits$ (D) $\frac{4}{7}squnits$

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

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

C. $\frac{3}{8}$

D. none of these

Answer: B

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81. Points A (1, 3) and C (5, 1) are opposite vertices of a rectangle ABCD. If the slope of BD is 2, then its equation is

A. $2x - y = 4$

B. $2x + y = 4$

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

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

Answer: A

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82. The line $x + 2y = 4$ is-translated parallel to itself by 3 units in the sense of increasing x and is then rotated by 30° in the clockwise

direction about the point where the shifted line cuts the x-axis.Find the equation of the line in the new position

A. $y = \tan(\theta - 30^\circ)\left(x - 4 - 3\sqrt{5}\right)$

B. $y = \tan(30^\circ - \theta)\left(x - 4 - 3\sqrt{5}\right)$

C. $y = \tan(\theta + 30^\circ)\left(x + 4 + 3\sqrt{5}\right)$

D. $y = \tan(\theta - 30^\circ)\left(x + 4 + 3\sqrt{5}\right)$

Answer: A

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83. The line PQ whose equation is x-y = 2 cuts the x-axis at P, and Q is (4,2). The line PQ is rotated about P through 45° in the anticlockwise direction. The equation of the line PQ in the new position is

A. $y = -\sqrt{2}$

B. $y = 2$

C. x=2

D. $x = -2$

Answer: C

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84. about to only mathematics

A. 4

B. -4

C. 2

D. none of these

Answer: B

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85. about to only mathematics

A. (2,0),(4,4)

B. (2,4),(4,0)

C. (-2,0),(4,-4)

D. (2,0),(-4,4)

Answer: A

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86. The vertices of a diagonal of a square are $(-2, 4)$ and $(-2, -2)$

Find the other vertices

A. (1,-1),(5,1)

B. (1,1),(5,-1)

C. (1,1),(-5,1)

D. none of these

Answer: C

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87. The equations of two sides of a square whose area is 25 sq.units are $3-4y=0$ and $4x+3y=0$. The equation of the other two sides of the square are

A. $3x-4y\pm 25=0, 4x+3y\pm 25=0$

B. $3x-4y\pm 05=0, 4x+3y\pm 5=0$

C. $3x-4y\pm 05=0, 4x+3y\pm \ =0$

D. none of these

Answer: A

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88. Centroid of the triangle, the equations of whose sides are $12x^2-20xy+7y^2=0$ and $2x-3y+4=0$ 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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89. If the lines $ax + 2y + 1 = 0, bx + 3y + 1 = 0 and cx + 4y + 1 = 0$ are concurrent, then a, b, c are in (a). A.P. (b). G.P. (c). H.P. (d). none of these

A. AP

B. GP

C. HP

D. none of these

Answer: A

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90. Two vertices of a triangle are $(5, -1)$ and $(-2, 3)$ If the orthocentre of the triangle is the origin, find the coordinates of the third point.

A. (4,7)

B. $(-4, -7)$

C. $(-4, 7)$

D. none of these

Answer: B

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91. If the foot of the perpendicular from the origin to a straight line is at $(3, -4)$, then find the equation of the line.

A. $3x - 4y = 25$

B. $3x - 4y + 25 = 0$

C. $4x + 3y - 25 = 0$

D. $4x - 3y + 25 = 0$

Answer: A

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92. A rectangle has two opposite vertices at the points $(1, 2)\ and\ (5, 5)$. If the other vertices lie on the line $x = 3$, find the equations of the sides of the rectangle.

A. (3,1), (3,3)

B. (3,1), (3,6)

C. (3,1),(3,4)

D. none of these

Answer: B

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93. The orthocentre of the triangle formed by the lines $xy = 0$ and $x + y = 1$ is $\left(\frac{1}{2}, \frac{1}{2}\right)$ (b) $\left(\frac{1}{3}, \frac{1}{3}\right)$ $(0, 0)$ (d) $\left(\frac{1}{4}, \frac{1}{4}\right)$

A. (1/2,1/2)

B. (1/3,1/3)

C. (0,0)

D. (1/4,1/4)

Answer: C

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94. A line passes through the point (2,2) and is perpendicular to the lines $3x + y = 3$. Its y-intercept is $1/3$ b. 2/3 c. 1 d. 4/3

A. $1/3$

B. $2/3$

C. 1

D. $4/3$

Answer: D

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95. A line passes through (2, 2) and is perpendicular to the line $3x + y = 3$. Its $y-$ intercept is:

A. $1/3$

B. $2/3$

C. 1

D. $4/3$

Answer: D

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96. Given three straight lines $2x + 11y - 5 = 0, 24x + 7y - 20 = 0,$ and $4x - 3y - 2 = 0$. Then, a)they form a triangle b)one line bisects the angle between the other two c) two of them are parallel

A. form a triangle

B. are only concurrent

C. are concurrent with one line bisecting the angle between the other two

D. none of these

Answer: C

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97. A line passes through the point of intersection of the line $3x + y + 1 = 0$ and $2x - y + 3 = 0$ and makes equal intercepts with axes. Then, equation of the line is

A. $5x + 5y - 3 = 0$

B. $x + 5y - 3 = 0$

C. $5x - y - 3 = 0$

D. $5x + 5y + 3 = 0$

Answer: A

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98. A straight line through the point $(2, 2)$ intersects the lines $\sqrt{3}x + y = 0$ and $\sqrt{3}x - y = 0$ at the point A and B, respectively. Then find the equation of the line AB so that triangle OAB is equilateral.

A. $x - 2 = 0$

B. $y - 2 = 0$

C. $x + y - 4 = 0$

D. none of these

Answer: B

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99. Find the image of the point (3,8) with respect to the line $x + 3y = 7$ assuming the line to be a plane mirror.

A. (1,4)

B. (4,1)

C. (-1,-4)

D. (-4,-1)

Answer: C

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100. If $a \neq b \neq c$ write the condition for which the equations $(b-c)x+(c-a)y+(a-b)=0\, and\, \left(b^3-c^3\right)x+\left(c^3-a^3\right)x=y+\left(c^3$ represent the same line.

A. a+b=-c

B. c+a=-b

C. b+c=-a

D. a+b+c=0

Answer: D

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101. The range of θ in the interval $(0, \pi)$ such that the points (3,5) and $(\sin\theta, \cos\theta)$ lie on the same side of the line x+y-1=0 is

A. $(0, \pi/2)$

B. $(0, \pi/4)$

C. $(\pi/4, \pi/2)$

D. none of these

Answer: A

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102. If $P(\sin\theta, 1/\sqrt{2})$ and $Q(1/\sqrt{2}, \cos\theta)$, $-\pi \leq \theta \leq \pi$ are two points on the same side of the line x-y=0, then θ belongs to the interval

A. $(-\pi/4, \pi/4) \cup (\pi/4, 3\pi/4)$

B. $(-\pi/4, \pi/4)$

C. $(\pi/4, \pi/4)$

D. none of these

Answer: A

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103. If the point $(1, \alpha)$ always remains in the interior of the triangle formed by the lines $y = x, y = 0$ and $x + y = 4$, then α lies in the interval

A. $(0, 1)$

B. $[0, 1]$

C. $[0, 4]$

D. none of these

Answer: B

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104. Let ABC be an isosceles triangle with $AB = BC$. If base BC is parallel to x-axis and m_1 and m_2 are the slopes of medians drawn through the angular points B and C, then

A. $m_1, m_2 = 2$

B. $m_1 + m_2 = 0$

C. $m_1 m_2 = 2$

D. $m_1 + 2m_2 = 0$

Answer: B

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105. If a, c, b are in G.P then the line $ax + by + c = 0$

A. has a fixed direction

B. always passes through a fixed point

C. forms a triangle with the axes whose area is constant

D. always cuts intercepts on the axes such that their sum is zero

Answer: C

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106. If the intercept made on the line y=mx by lines y=2 and y=6 is less than 5, then the range of values of m is

A. $(-\infty, -4/3) \cup (4/3, \infty)$

B. $(-4/3, 4/3)$

C. $(-3/4, 3/4)$

D. none of these

Answer: A

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107. If the line $3x + 4y - 24 = 0$ intersects the x-axis at the point A and the y-axis at the point B, then the incentre of the triangle OAB, where O is the origin, is:

A. $\sqrt{10}$

B. $2\sqrt{5}$

C. 3

D. 2

Answer: A

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108. The sides of a quadrilateral are given by $xy(x-2)(y-3)=0$. The equation of the line parallel to $x-4y=0$ which divides the quadrilateral into two equal regions, is:

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

B. $x-4y-5=0$

C. $4y=x+1$

D. 4y+1=x

Answer: A

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109. · The co-ordinates of foot of the perpendicular from the point $(2, 4)$ on the line $x + y = 1$ are:

A. (1/2,3/2)

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

C. (4/3,1/2)

D. (3/4,-1/2)

Answer: B

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110. Three vertices of a quadrilateral in order are $(6, 1)(7, 2)$ and $(-1, 0)$. If the area of the quadrilateral is 4 sq. unit. Then the locus of the fourth vertex has the equation.

A. x-7 y=1

B. x-7 y+15=0

C. x=7y+15=0

D. $(x-7y)^2+14(x-7y)-15=0$

Answer: C

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111. Find the range of $(\alpha, 2+\alpha)$ and $\left(\frac{3\alpha}{2}, a^2\right)$ lie on the opposite sides of the line $2x+3y=6$.

A. (-2,1)

B. $(-\infty, -2)\cup(0,1)$

C. $(-2,0)\cup(1,\infty)$

D. $(-1,0)\cup(2,\infty)$

Answer: B

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112. A point moves such that the area of the triangle formed by it with the points (1, 5) and $(3, -7) sq\dot{u}nits\cdot$ Then, find the locus of the point.

A. $6x + y - 32 = 0$

B. $6x - y + 32 = 0$

C. $x + 6y - 32 = 0$

D. $6x - y - 32 = 0$

Answer: A

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113. Find the coordinates of the orthocentre of the triangle whose vertices are (1, 2), (2, 3) and (4, 3).

A. (1/5,14/5)

B. (14/5,1/5)

C. (1/5,1/5)

D. (14/5,14/5)

Answer: A

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114. If the pair of straight lines $xy - x - y + 1 = 0$ & the line $ax + 2y - 3 = 0$ are concurrent then $a =$

A. -1

B. 0

C. 3

D. 1

Answer: D

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115. If (-2,6) is the image of the point (4,2) with respect to line L=0, then find the equation of line L.

A. $3x - 2y + 5$

B. $3x - 2y + 10$

C. $2x + 3y - 5$

D. $6x - 4y - 7$

Answer: A

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116. If the points $(1, 2)$ and $(3, 4)$ were to be on the opposite side of the $3x - 5y + \alpha = 0$, then:

A. $7 < a < 11$

B. a=7

C. a=1

D. $a < 7 \text{ or } a > 11$

Answer: D

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117. The coordinates of the image of the originf O with respect to the straight line $x + y + 1 = 0$ are

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

B. (-2,-2)

C. (1,1)

D. (-1,-1)

Answer: D

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118. A straight line of length 9 units slides with ends A, B always on x and y axes respectiv Locus of centroid of AOAB is

A. $x^2 + y^2 = 3$

B. $x^2 + y^2 = 9$

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

D. $x^2 + y^2 = 81$

Answer: B

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119. The area of the triangle formed by the axes & the line $(\cosh\alpha - \sinh\alpha)x + (\cosh\alpha + \sinh\alpha)y = 2$ in square units is

A. 4

B. 3

C. 2

D. 1

Answer: C

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120. A line passes through (1,0). The slope of the line, for which its intercept between $y = x - 2$ and $y = -x + 2$ subtends a right angle at the origin is

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

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

C. ± 1

D. none of these

Answer: D

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121. What is the y intercept of the line that is parallel to $y = 3x$ and which bisects the area of rectangle with corners at (0,0),(4,0),(4,2) and (0,2) ?

A. 0,-7

B. 0,-6

C. 0,-5

D. 0,-4

Answer: C

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122. Given $A \equiv (1, 1)$ and AB is any line through it cutting the x-axis at B. If AC is perpendicular to AB and meets the y-axis in C , then the equation of the locus of midpoint P of BC is $x + y = 1$ (b) $x + y = 2$ $x + y = 2xy$ (d) $2x + 2y = 1$

A. $x + y = 1$

B. $x + y = 2$

C. $x + y = 2xy$

D. $2x + 2y = 1$

Answer: C

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123. Consider two intersecting (non-perpendicular lines $L_1 = 0$ and $L_2 = 0$ and a point P_1. Image of P_1 and $L_1 = 0$ is P_2, image of P_2 in $L_2 = 0$ is P_3 , image of P_3 in L_1 =0 is P_4 and so on. Which of the following statements are incorrect ?

A. $\overrightarrow{P_3P_5} = \overrightarrow{P_4P_6}$

B. $\overrightarrow{P_1P_4} = \overrightarrow{P_2P_3}$

C. P_i are concylic

D. P_5 is P_{14}

Answer: D

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124. Through point $P(-1, 4)$, two perpendicular lines are drawn which intersect x-axis at Q and R. find the locus of incentre of ΔPQR. a. $x^2 + y^2 + 2x - 8y - 17 = 0$ b. $x^2 - y^2 + 2x - 8y + 17 = 0$ c. $x^2 + y^2 - 2x - 8y - 17 = 0$ d. $x^2 - y^2 + 8x - 2y - 17 = 0$

A. $x^2 + y^2 - 2x - 8y + 17 = 0$

B. $x^2 + y^2 + 2x - 8y + 17 = 0$

C. $x^2 - y^2 - 2x - 8y + 17 = 0$

D. $x^2 + y^2 - 2x + 8y + 17 = 0$

Answer: C

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125. A triangle is formed by the lines $x+y=0, x-y=0,$ and $lx+my=1.$ If $landm$ vary subject to the condition $l^2+m^2=1,$ then the locus of its circumcenter is $\left(x^2-y^2\right)^2=x^2+y^2$ $\left(x^2+y^2\right)^2=\left(x^2-y^2\right)\left(x^2+y^2\right)^2=4x^2y^2\left(x^2-y^2\right)^2=\left(x^2+y^2\right)^2$

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

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

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

D. $\left(x^2-y^2\right)^2=\left(x^2+y^2\right)^2$

Answer: A

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126. If x_1, y_1 are the roots of $x^2+8x-97=0, x_2, y_2$ are the roots of $4x^2+32x-997=0$ and x_3, y_3 are the roots of $9x^2+72x-9997=0.$ Then the point $(x_1, y_1), (x_2, y_2)$ and (x_3, y_3)

A. are collinear

B. form an equilateral triangle

C. form a right angled isosceles triangle

D. are concylic

Answer: A

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127. P is a point inside the triangle ABC. Lines are drawn through P, parallel to the sides of the triangle.The three resulting triangles with the vertex at P have areas $4, 9 \text{ and } 49sq.$ units. The area of the triangle ABC is -

A. $2\sqrt{3}$

B. 12

C. 24

D. 144

Answer: D

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128. If $ax^3 + by^3 + cx^2y + dxy^2 = 0$ represents three distinct straight lines, such that each line bisects the angle between other two, then which of the following is/are correct

A. $d^2 > 5bc$

B. $3b + c = 0$

C. $d^2 < 5bc$

D. $b + 3c = 0$

Answer: B

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129. If the line $lx + my + n = 0$ intersects the curve $ax^2 + 2hxy + by^2 = 1$ at P and Q such that the circle with PQ as a diameter passes through the origin, then $l^2 + m^2 =$

A. $n^2(a + b) = l^2 + m^2$

B. $l^2(a + b) = n^2 + m^2$

C. $m^2(a + b) = l^2 + n^2$

D. none of these

Answer: A

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130. The orthocentre of triangle with vertices $\left(2, \frac{\sqrt{3} - 1}{2}\right), \left(\frac{1}{2}, -\frac{1}{2}\right), \left(2, , -\frac{1}{2}\right)$

A. $\left(\frac{3}{2}, \frac{\sqrt{3} - 2}{6}\right)$

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

C. $\left(\frac{5}{4}, \frac{\left(\sqrt{3}-2\right)}{4}\right)$

D. ((1)/(2),-(1)/(2))`

Answer: B

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Chapter Test

1. The equation to a pair of opposite sides of a parallelogram are $x^2 - 5x + 6 = 0$ and $y^2 + 5 = 0$. The equations to its diagonals are $x + 4y = 13, y = 4x - 7$ (b) $4x + y = 13, 4y = x - 7$ $4x + y = 13, y = 4x - 7$ (d) $y - 4x = 13, y + 4x - 7$

A. $x + 4y = 13$ and $y = 4x - 7$

B. $4x + y = 13$ and $4y = x - 7$

C. $4x + y = 13$ and $y = 4x - 7$

D. $y - 4x = 13$ and $y + 4x = 7$

Answer: C

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2. The distance between the parallel lnes $y = 2x + 4$ and $6x - 3y - 5$ is

(A) 1 (B) $\frac{17}{\sqrt{3}}$ (C) $7\frac{\sqrt{5}}{15}$ (D) $3\frac{\sqrt{5}}{15}$

A. $17/\sqrt{3}$

B. 1

C. $3/\sqrt{5}$

D. $17\sqrt{15}/15$

Answer: D

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3. P is a point on either of the two lines $y - \sqrt{3}|x| = 2$ at a distance of 5 units from their point of intersection . The coordinates of the foot of the

perpendicular from P on the bisector of the angle between them are

A. $\left(0, \frac{4+5\sqrt{3}}{2}\right)$ or , $\left(0, \frac{4-5\sqrt{3}}{2}\right)$ depending on which the point P is taken.

B. $\left(0, \frac{4+5\sqrt{3}}{2}\right)$

C. $\left(0, \frac{4-5\sqrt{3}}{2}\right)$

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

Answer: B

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4. If one diagonal of a square is along the line $x = 2y$ and one of its vertex is $(3, 0)$, then its sides through the vertex are given by the equations -

A. $y - 3x + 9 = 0, 3y + x - 3 = 0$

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

C. $y-3x+3=0, 3y-x+3=0$

D. $y-3x+3=0, 3y+x+9=0$

Answer: A

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5. The line which is parallel to x-axis and crosses the curve $y=\sqrt{x}$ at an angle of 45°, is

A. x=1/4

B. $y=1/4$

C. $y=1/2$

D. $y=1$

Answer: C

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6. $P(3, 1), Q(6, 5)$ and $R(x, y)$ are three points such that PRQ is a right angle and the area of ΔRQP is 7 sq.unit. Find the number of such points R.

A. 0

B. 1

C. 2

D. 4

Answer: C

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7. Find the equation of the straight line which passes through the point $(1 - 2)$ and cuts off equal intercepts from axes.

A. $x + y = 1$

B. $x - y = 1$

C. $x + y + 1 = 0$

D. $x - y - 2 = 0$

Answer: C

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8. What is the equation of the straight line which is perpendicular to $y = x$ and passes through (3, 2) ?

A. $x - y = 5$

B. $x + y = 5$

C. $x + y = 1$

D. $x - y = 1$

Answer: B

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

A. $3/2$

B. $3/10$

C. 6

D. none of these

Answer: B

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10. The equation of the line passing through the point $(1, 2)$ and perpendicular to the line $x + y + 1 = 0$ is

A. $y - x + 1 = 0$

B. $y - x - 1 = 0$

C. $y - x + 2 = 0$

D. $y - x - 2 = 0$

Answer: B

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11. The straight lines $x + y = 0, 3x + y - 4 = 0$ and $x + 3y - 4 = 0$ form a triangle which is (A) isosceles (B) right angled (C) equilateral (D) scalene

A. isosceles

B. equilateral

C. right angled

D. none of these

Answer: A

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12. Triangle formed by $x^2 - 3y^2 = 0$ and $x = 4$ is

A. isosceles

B. equilateral

C. right angled

D. none of these

Answer: B

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13. 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: D

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14. the lines $(p+2q)x+(p-3q)y=p-q$ for different values of $p\&q$ passes trough the fixed point is:

A. (3/2,5/2)

B. (2/5,2/5)

C. (3/5,3/5)

D. (2/5,3/5)

Answer: D

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15. Write the distance between the lines $4x+3y-11=0\ and\ 8x+6y-15=0.$

A. $7/2$

B. 4

C. $7/10$

D. none of these

Answer: C

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16. If the diagonals of a parallelogram ABCD are along the lines $x + 5y = 7$ and $10x - 2y = 9$, then ABCD must be a

A. rectangle

B. square

C. cyclic quadrilateral

D. rhombus

Answer: D

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17. The straight lines $x + y - 4 = 0, 3x + y - 4 = 0$ and $x + 3y - 4 = 0$ form a triangle, which is

A. isosceles

B. right angled

C. equilateral

D. none of these

Answer: A

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18. Write the coordinates of the orthocentre of the triangle formed by points (8,0), (4,6) and (0,0)

A. (4,8/3)

B. (3,4)

C. (4,3)

D. (-3,4)

Answer: A

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19. A point equidistant from the line $4x + 3y + 10 = 0, 5x - 12y + 26 = 0$ and $7x + 24y - 50 = 0$is

A. (1,-1)

B. (1,1)

C. (0,0)

D. (0,1)

Answer: C

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20. The number of values of a for which the lines $2x + y - 1 = 0$, $ax + 3y - 3 = 0,$ and $3x + 2y - 2 = 0$ are concurrent is (a).0 (b) 1 (c) 2 (d) infinite

A. all a

B. a=4 only

C. $-1 \leq a \leq 3$

D. $a > 0$ only

Answer: A

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

A. $\pi/3$

B. $\pi/2$

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

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22. The equation of the sides of a triangle are $x-3y=0, 4x+3y=5$ and $3x+y=0$. The line $3x-4y=0$ passes through:

A. the incentre

B. the centroid

C. the circumcentre

D. the orthocentre , of the triangle

Answer: D

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23. A straight line through $P(1, 2)$ is such that its intercept between the axes is bisected at P its equation :

A. $x + 2y = 5$

B. $x - y + 1 = 0$

C. $x + y - 3 = 0$

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

Answer: D

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24. Two points $(a, 0)$ and $(0, b)$ are joined by a straight line. Another point on this line , is (A)$(3a, -2b)$ (B) $\left(a^2, ab\right)$ (C) $(-3a, 2b)$ (D) (a, b)

A. $(3a, -2b)$

B. (a^2, ab)

C. $(-3a, 2b)$

D. (a,b)

Answer: A

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25. If the line $y = mx$ meets the lines $x + 2y - 1 = 0$ and $2x - y + 3 = 0$ at the same point, then m is equal to

A. 1

B. -1

C. 2

D. -2

Answer: B

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26. The equations $ax + by + c = 0$ and $dx + ey + f = 0$ represent the same straight line if and only if

A. $\frac{a}{d} = \frac{b}{c}$

B. $c = f$

C. $\frac{a}{d} = \frac{b}{e} = \frac{c}{f}$

D. $a = d, b = e, c = f$

Answer: C

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27. If the line segment joining (2,3) and (-1,2) is divided internally in the ratio 3:4 by the line $x + 2y = \lambda$, then λ=

A. $\frac{41}{7}$

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

C. $\frac{36}{7}$

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

Answer: A

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28. A point moves in the xy-plane such that the sum of its distance from two mutually perpendicular lines is always equal to 3. The area of the locus of the point is

A. 18 sq. units

B. 9/2 sq. units

C. 9 sq. units

D. none of these

Answer: A

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29. The vertices of a triangle are (0,3) ,(-3,0) and (3,0) . The coordinates of its orthocentre are

A. (0,2)

B. (0,-3)

C. (0,3)

D. (0,-2)

Answer: C

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30. The lines $x\cos\alpha + y\sin\alpha = P_1$ and $x\cos\beta + y\sin\beta = P_2$ will be perpendicular, if :

A. $\alpha \pm \beta = \frac{\pi}{2}$

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

C. $|\alpha - \beta| = \frac{\pi}{2}$

D. $\alpha = \beta$

Answer: C

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31. Family of lines $x \sec^2 \theta + y \tan^2 \theta - 2 = 0$ for different real θ, is

A. not concurrent

B. concurrent at (1,1)

C. concurrent at (2,-2)

D. concurrent at (-2,2)

Answer: C

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32. If the equation $x^2 + (\lambda + \mu)xy + \lambda uy^2 + x + \mu y = 0$ represents two parallel straight lines, then prove that $\lambda = \mu$.

A. (3,-1)

B. $-3, 1$

C. (1,1)

D. none of these

Answer: A

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33. The area of a pentagon whose vertices are (4,1) (3,6) , (-5,1) , (-3,-3) and (-3,0) , is

A. 30 sq. units

B. 60 sq. units

C. 9 sq. units

D. none of these

Answer: A

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34. The foot of the perpendicular on the line $3x + y = \lambda$ drawn from the origin is C. If the line cuts the x and the y-axis at $AandB$, respectively, then $BC : CA$ is $1 : 3$ (b) $3 : 1$ (c) $1 : 9$ (d) $9 : 1$

A. $1 : 3$

B. $3 : 1$

C. $1 : 9$

D. $9 : 1$

Answer: D

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