MATHS

BOOKS - HIMALAYA MATHS (KANNADA ENGLISH)

COORDINATE SYSTEMS, LOCUS AND STRAIGHT LINES

Question Bank

1. The ratio in which the point (-1,4) divides the line joining (-7,1) and (3,6) is

A. 2 :1

B. 3: 1

C. 1: 2

D. 3: 2

Answer: D

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2. The point which divides the join of (1,2) and (3,4) externally in the ratio 1: 1

A. lies in the 1 st rant

B. lies in the 2 nd rant

C. lies in the 3rd rant

D. cannot be found

Answer: D

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3. The ratio in which the y -axis divides the line segment joining (-4,2) and (8,3) is

A. 0.043055555555556

B. 0.085416666666667

C. -2: 3

D. 1:2

Answer: A

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4. The ratio in which x -axis divides the line segment joining (3,6) and (12,-3) is

A. 0.084027777777778

B. 1: 2

C. 2: 1

D. -1: 2

Answer: A

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5. The ratio in which (-3,4) divides the line joining (1,2) and (7,-1) is

A. 2: 5 externally

B. 5: 2 internally

C. 1: 5 externally

D. 1: 5 internally

Answer: A

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6. The points $(a, 2a), (-2, 6)$ and (3,1) are collinear then $a =$

A. 1) $\frac{3}{4}$

B. 2) $\frac{4}{3}$

C. 3)3

D. 4)4

Answer: B

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7. $\begin{bmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{bmatrix} = 0$is the condition that the points $(x_i, y_j), i = 1, 2, 3$

A. form an equilateral triangle

B. are collinear

C. form a angled triangle

D. (x_2, y_2) is the | point of the line joining (x_1, y_1) and (x_3, y_3)

Answer: B

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8. The value of λ for which the lines $3x + 4y = 5$, $5x + 4y = 4$ and $\lambda x + 4y = 6$ meet at a point is

A. 2

B. 1

C. 4

D. 3

Answer: B

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9. Area of the parallelograms formed by the lines

$4y - 3x - a = 0, 3y - 4x + a = 0$

$4y - 3x - 3a = 0, 3y - 4x + 2a = 0$

A. a^2

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

C. $\frac{2a^2}{7}$

D. $\frac{2a^2}{9}$

Answer: C

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

A. (0,-2)

B. (0,2)

C. (0,3)

D. (0,-3)

Answer: C

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11. The fourth vertex of the square formed by points (2,1),(4,3),(-2,5) is

A. (2,3)

B. (-3,3)

C. (-4,3)

D. (4,3)

Answer: C

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12. Three vertices of a parallelogram taken in order are (-1,-6),(2,-5) and (7,2), The fourth vertex is

A. (1,4)

B. (1,1)

C. (4,4)

D. (4,1)

Answer: D

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13. The vertices of a triangle are (0, 0), (3, 0) and (0, 4). Its orthocentre is at:

A. (0,0)

B. $\left(1, \frac{4}{3}\right)$

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

D. (0,4)

Answer: A

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14. The points $(3, 2), (-3, 2), (0, h)$ are the vertices of an equilateral triangle. If $h \leq 0$ then the value of h is

A. $2-\sqrt{27}$

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

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

D. none

Answer: C

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15. The area of the quadrilateral formed by (2,-1) , (4,3),(-1,2) and (-3,-2) is

A. 54

B. 36

C. 18

D. 9

Answer: C

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16. If $(-2, 2), (1, 0), (x, 0), (1, y)$ form a parallelogram then $(x, y) =$

A. (-4,-2)

B. (4,-2)

C. (-4,2)

D. (4,2)

Answer: D

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17. The mid points of BC, CA and AB of the triangle ABC are $D = (1, 2), E = (4, 3)$ and $F = (6, 4)$ then $A =$

A. (6,5)

B. (6,6)

C. (3,-3)

D. (9,5)

Answer: D

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18. The extremities of a diagonal of a parallelogram are (3,-4) and (-6,5) . If the third vertex is (-2,1) then the fourth vertex is

A. (1,0)

B. (-1,0)

C. (1,1)

D. (-1,-1)

Answer: B

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19. Mid points of the sides AB and AC of a triangle ABC are (-3,-5) and (3,3) respectively then the length of BC is

A. 15

B. 10

C. 20

D. 30

Answer: C

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20. $A = (3, 5), B = (-5, -4)$ and $C = (7, 10)$ are the vertices of a parallelogram $ABCD$ =

A. (15,19)

B. (-15 , 19)

C. (15,-19)

D. (-15,-19)

Answer: A

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21. The base vertices of an isosceles triangle are (7,9) and (3,-7), then the third vertex is

A. (13,1) or (-3,3)

B. (13,-1) or (3,-3)

C. (13,-1) or (-3,3)

D. (13,1) or (3,3)

Answer: C

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22. The one of the possible third vertex of the equilateral triangle whose two vertices are (3,4) and (-2,3)

A. $\left(\frac{1-\sqrt{3}}{2}, \frac{7+5\sqrt{3}}{2}\right)$

B. $\left(\frac{1-\sqrt{3}}{2}, \frac{7-5\sqrt{3}}{2}\right) \cdot 0$

C. $\left(\frac{1+\sqrt{3}}{2}, \frac{7+5\sqrt{3}}{2}\right)$

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

Answer: B

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23. The points (4,-1),(7,9) and (4,11) are the mid points of the sides of the triangle. Then the centroid is

A. (5,-3)

B. (5, 3)

C. $\left(-5, \frac{19}{2}\right)$

D. $\left(5, \frac{19}{2}\right)$

Answer: D

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24. The vertices of a triangle are (0,0),(0,2) and (2,0) .The distance between the circumcentre and orthocentre is

A. 0

B. $\sqrt{2}$

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

D. 1

Answer: B

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25. Two opposite vertices of a square are (1,-2) and (-5,6), then the other two vertices are

A. (2,5),(-6,-1)

B. (-2,5),(6,1)

C. (2,-5),(6,-1)

D. none of these

Answer: A

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26. The length of the line segment joining A(2,3) and B is 10 units . If absc is a of B is 10, its ordinate can be

A. 3 or 9

B. 3 or -9

C. -3 or 9

D. -3 or -9

Answer: B

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27. The image of the point $P(3, 5)$ w.r.t the line $y = x$ is the point Q and the image of Q along the line $y = 0$ is the point $R(a, b)$, then $(a, b) =$

A. (5,3)

B. (5,-3)

C. (-5,3)

D. (-5,-3)

Answer: B

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28. The centroid of the triangle ABC is (2,3) and $A = (4, 2), B = (4, 5)$, then the area of the triangle ABC

A. 6

B. 9

C. 8

D. 5

Answer: B

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29. The circumcentre and the centroid of a triangle are (6,2) and (3,3) then orthocentre is

A. (9,5)

B. (3,-1)

C. (-3,1)

D. (-3,5)

Answer: D

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30. The orthocentre and centroid of a triangle are (-3,5),(3,3) then the circumcentre is

A. (6,2)

B. (0,8)

C. (6,-2)

D. (0,4)

Answer: A

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31. If the points (1, 2) and (3, 4) were to be on the same side of the line $3x - 5y + a = 0$, then :

A. $7 < a < 11$

B. $a = 7$

C. $a = 1$

D. $a < 7$ or $a > 11$

Answer: D

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32. A (1, 3) and C(7, 5) are two opposite vertices of a square. The equation of a side thro' A is :

A. $x + 2y - 7 = 0$ or $2x - y + 1 = 0$

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

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

D. none of 'these

Answer: A

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33. One of the equations of the lines passing through the point (3, -2) and inclined at 60° to the line $\sqrt{3}x + y = 1$ is :

A. $y + 2 = 0$

B. $x - 3 = 0$

C. $x + y = 1$

D. $x + y = 1$

Answer: A

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34. The equation of the diagonal through the origin of the rilateral formed by $x = 0, y = 0\ x + y = 1$ and $6x + y = 3$ is

A. $3x - 2y = 0$

B. $3x - y = 0$

C. $x - y = 0$

D. $3x - 4y = 0$

Answer: A

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35. The area of the triangle whose sides are along $x = 0, y = 0$ and $4x + 5y = 20$ is

A. 20

B. 10

C. $\frac{1}{10}$

D. $\frac{1}{20}$

Answer: B

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36. If a, b, c are in A. P., then st. line $ax + by + c = 0$ will always pass through a fixed point whose co-ordinates are:

A. (1,-2)

B. (-1,2)

C. (1,2)

D. (-1,-2)

Answer: A

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37. 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. 3

D. infinitely many

Answer: B

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38. The inclination of the line through (-3,6) and the midpoint of the line joining the point (4,-5) and (-2,9) is

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

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

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

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

Answer: D

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39. A line through the point $A(2, 0)$ which makes an angle of 30° with the positive direction of x -axis is rotated about A thro' an angle 15° in the clockwise direction. The equation of the line in the new position is

A. $\left(2-\sqrt{3}\right)x - y - 4 + 2\sqrt{3} = 0$

B. $\left(2-\sqrt{3}\right)x + y - 4 + 2\sqrt{3} = 0$

C. $\left(2-\sqrt{3}\right)x - y + 4 + 2\sqrt{3} = 0$

D. $\left(2-,\sqrt{3}\right)x + y + 4 - 2\sqrt{3} = 0$

Answer: A

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40. The equation of the line which makes an angle 15° with the positive direction of x -axis and cuts an intercept of length 4 on the negative direction of y-axis is

A. $\left(2-\sqrt{3}\right)x-y-4=0$

B. $\left(2-\sqrt{3}\right)x+y-4=0$

C. $\left(2+\sqrt{3}\right)x-y-4=0$

D. $\left(2+\sqrt{3}\right)x+y-4=0$

Answer: A

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41. Distance between the lines $3x+4y=9$ and $6x+8y=15$ is

A. A: $\frac{6}{5}$

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

C. C: $\frac{3}{12}$

D. D: 6

Answer: B

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

A. $3x - 2y + 5$

B. $3x - 2y + 10$

C. $2x + 3y - 5$

D. $6x - 4y - 7$

Answer: A

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43. The reflection of the point (-3,4) in the line $x - y = 0$ is

A. (3,-4)

B. (4,-3)

C. (-3,-4)

D. (-4,3)

Answer: B

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44. The reflection of the point (2,-5) along the line $x + y = 0$ is

A. (-2,5)

B. (-5,2)

C. (5,-2)

D. (2,5)

Answer: C

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45. The co-ordinates of the image of the origin O. w.r.t. st. line $x + y + 1 = 0$ are :

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

B. (-2,-2)

C. (1,1)

D. (-1,-1)

Answer: D

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46. The centroid of a triangle formed by the points (0, 0), $(\cos\theta, \sin\theta)$ and $(\sin\theta, -\cos\theta)$ lies on the line $y = 2x$. Then θ is :

A. $\tan^{-1} 2$

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

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

D. $\tan^{-1}(-3)$

Answer: D

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47. Foot of the perpendicular from (-2,-1) on to the line $3x + 2y - 5 = 0$ is

A. (-1,4)

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

C. (1,1)

D. (3,-2)

Answer: C

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48. The equation of base of an equilateral triangle is $x + y = 2$ and vertex is (2, -1). Then the length of the side of the triangle equals:

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

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

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

D. $\sqrt{6}$

Answer: B

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49. The medians AD and BE of a triangle with vertices A (0, b), B(0, 0) and C(a, 0) are perpendicular ot each other if :

A. $ab = 1$

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

C. $a = \frac{b}{2}$

D. $b = \frac{a}{2}$

Answer: B

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50. The equation of the line through (2,3) and parallel to $2x - 3y + 1 = 0$ is

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

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

C. $2x - 3y - 5 = 0$

D. $2x - 3y + 5 = 0$

Answer: D

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51. The equation of the line whose intercepts on $x =$ axis and y -axis are respectively twice and thrice of those by the line $3x + 4y = 12$ is

A. $9x - 8y = 72$

B. $9x + 8y = 72$

C. $8x + 9y = 72$

D. $8x - 9y = 72$

Answer: B

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52. Equation of the bisector of the obtuse angle between the lines $4x + 3y - 6 = 0$ and $5x + 12y + 9 = 0$ is

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

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

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

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

Answer: C

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53. The equations of the bisector of the acute angle between the lines $3x + 4y - 11 = 0$ and $12x - 5y - 2 = 0$ is

A. $11x + 3y + 17 = 0$

B. $11x + 3y - 17 = 0$

C. $11x - 3y + 17 = 0$

D. $11x - 3y - 17 = 0$

Answer: B

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54. A point moves such that the area of the triangle formed by it with the points (1,5) and (3,-7) is + 21 sq. units. The locus of the point is

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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55. The locus of the point equidistant from (1,-1) and (-1,1) is

A. $x + y = 0$

B. $x - y = 0$

C. $2y - x = 0$

D. $x + 2y = 0$

Answer: B

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56. The locus of the point whose distance from x -axis is twice its distance from y -axis is

A. $y = x$

B. $y = 2x$

C. $x = y'$

D. $x = 2y$

Answer: B

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57. Locus of a point which moves such that its distance from the X-axis is twice its distance from the line x-y=0 is

A. $x = 2y$

B. $y = 2x$

C. $x + y = 3$

D. none of these

Answer: A

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58. A straight rod of length 9 units slides with its ends A, B always on the X and Y-axis respectively . Then the locus of the centroid of ΔOAB 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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59. 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 is :

A. $p^2\left(x^2 + y^2\right) = 4xy$

B. $p\left(x^2 + y^2\right) = 4x^2y^2$

C. $p^2(x + y) = x^2y^2$

D. $p^2\left(x^2 + y^2\right) = 4x^2y^2$

Answer: D

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60. The locus of the point $x = a\cos\theta, y = b\sin\theta$ is

A. $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$

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

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

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

Answer: B

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61. The locus of the point $x = a(\cos\theta + \sin\theta)\ y = b(\cos\theta - \sin\theta)$ is

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

B. $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 2$

C. $\frac{x^2}{a^2} + \frac{y^2}{b^2} = \frac{1}{2}$

D. $\frac{x^2}{a^2} + \frac{y^2}{b^2} = \frac{1}{3}$

Answer: B

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62. The locus of the point $x = a + b\cos\theta\, y = b + a\sin\theta$ is

A. circle

B. ellipse

C. parabola

D. hyperbola

Answer: B

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63. The locus of the point $x = a + \sec\theta\, y = b + a\tan\theta$ is

A. circle

B. ellipse

C. parabola

D. hyperbola

Answer: D

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64. The locus of the point $\left(a\cos^3\theta, a\sin^3\theta\right)$ is

A. $x^{\frac{2}{3}} - y^{\frac{2}{3}} = a^{\frac{2}{3}}$

B. $x^{\frac{2}{3}} + y^{\frac{2}{3}} = a^{\frac{2}{3}}$

C. $x^{\frac{2}{3}} + y^{\frac{2}{3}} = a^{\frac{3}{2}}$

D. $x^{\frac{3}{2}} + y^{\frac{1}{2}} = a^{\frac{1}{2}}$

Answer: B

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65. The locus of the point $\left(a + bt, b - \frac{a}{t}\right)$, where t is the parameter is

A. $(x - a)(y - b) = ab$

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

C. $(x-a)(y+b)=ab$

D. $(x-a)(b-y)=ab$

Answer: D

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66. A line segment AB of length ' a ' moves with its ends on the axes. The locus of the point P which divides the line in the ratio 1: 2 is

A. $9x^2+4y^2=a^2$

B. $9\left(y^2+4x^2\right)=-4a^2$

C. $9\left(x^2+4y^2\right)=4a^2$

D. $9x^2+9y^2=4a^2$

Answer: C

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67. Distance between the parallel lines $3x + 4y + 7 = 0$ and $6x + 8y + k = 0$ is 4 . Then $k =$

A. 54,26

B. -54,26

C. 54,-26

D. -54,-26

Answer: C

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68. Equation of the line cutting off an intercept 2 from the negative direction of the axis of y and inclined at 30° to the positive direction of axis of $x,$ is

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

B. $y - x + 2 = 0$

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

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

Answer: D

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69. Equation of the line perpendicular to $y = x$ and passing through (3,2) is

A. $x - y = 5$

B. $x + y = 5$

C. $x + y = 1$

D. $x - y = 1$

Answer: B

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70. The length of the perpendicular from the point $(a\cos\alpha, a\sin\alpha)$ upon the line $y = x\tan\alpha + c, c \leq 0,$ is

A. c

B. $c\sin^2\alpha$

C. $c\cos\alpha$

D. $c\sec^2\alpha$

Answer: C

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71. If the quadrilateral formed by the lines

$ax + by + c = 0, a'x + b'y + c = 0$

$ax + by + c' = 0, a'x + b'y + c' = 0$ have perpendicular diagonals, then

A. $b^2 + c^2 = (b')^2 + (c')^2$

B. $c^2 + a^2 = (c')^2 + (a^r)^2$

C. $a^2 + b^2 = (a')^2 + (b')^2$

D. $b^2 + c^2 = (b')^2 + (a')^2$

Answer: C

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72. If the algebraic sum of the perpendicular distances from the points (2, 0), (0, 2) and (1, 1) to a variable st. line be zero, then the line passes thro' the point :

A. (-1,1)

B. (1,1)

C. (1,-1)

D. (-1,-1)

Answer: B

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

A. 18 sq. units

B. $\frac{9}{2}$ sq. units

C. 7 sq. units

D. $\frac{7}{2}$ sq. units

Answer: B

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74. The incentre of the triangle formed by the axes and the line $\frac{x}{4}+\frac{y}{3}=1$ is

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

B. $\left(\frac{12}{7+\sqrt{7}}, \frac{12}{7+\sqrt{7}}\right)$

C. $\left(\frac{4}{3}, 1\right)$

D. (1,1)

Answer: D

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75. The incentre of the triangle formed by $\frac{x}{a}+\frac{y}{b}=1$ is

A. $\left(\frac{a}{2}, \frac{b}{2}\right)$

B. $\left(\frac{ab}{a+b+\sqrt{ab}}, \frac{ab}{a+b+\sqrt{ab}}\right)$

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

D. $\left(\frac{ab}{a+b+\sqrt{a^2+b^2}}, \frac{ab}{a+b+\sqrt{a^2+b^2}}\right)$

Answer: D

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

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

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

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

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

Answer: A

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77. If $A = (6, 3), B = (-3, 5), C = (4, -2)$ and $D = (x, 3x)$ are four points, if $\frac{ar(\Delta DBC)}{ar(\Delta ABC)} = \frac{1}{2}$, then $x =$

A. $\frac{11}{8}$

B. $\frac{8}{11}$

C. 3

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

Answer: A

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78. The point whose abscissa is equal to its ordinate and which is equidistant from $A(4, 0)$ and $B(0, 5)$ is

A. (2,2)

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

C. $\left(\frac{9}{2}, \frac{9}{2}\right)$

D. (-5,5)

Answer: C

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79. $A(3, -4)$ and $B(-4, 3)$ are the vertices of a triangle ABC. If the centroid of this triangle moves on the line $3x - 2y = 4$ then the locus of the vertex C is the line

A. $2x + 3y = 13$

B. $3x + 2y = 13$

C. $3x - 2y = 13$

D. $2x - 3y = 13$

Answer: C

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80. A square of side 2 units lie above the x -axis and has one vertex at the origin. The side passing through the origin makes an angle 30° with the positive direction of x -axis. The equation of its diagonal not passing through the origin is

A. $(\sqrt{3}+1)y+(\sqrt{3}-1)x=4$

B. $(\sqrt{3}-1)y-(\sqrt{3}-1)x=4$

C. $(\sqrt{3}+1)y-(\sqrt{3}-1)x=4$

D. $(\sqrt{3}+1)y+(1+\sqrt{3})x=4$

Answer: A

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81. A line meets the axes at P and Q such that the centroid of the triangle OPQ is (h, h). The equation of the line PQ is

A. $x-y=3h$

B. $x+y=2h$

C. $x + y = 3h$

D. $x + y = h$

Answer: C

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82. A point (3,-2) undergoes the following transformations (i) reflection about the line $y = x$ (ii) translation through a distance 3 units along -ve y-axis then the co-ordinates of final position of the point is

A. (-2,0)

B. (3,-1)

C. (-2,6)

D. (-1,3)

Answer: A

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83. If (x, y) represents a point on a plane then $\begin{bmatrix} 2 & -1 & 3 \\ 1 & 2 & -1 \\ x & y & 1 \end{bmatrix} = 0$ represents

A. a line parallel to x -axis

B. a line parallel to y -axis

C. a line through (0,0)

D. a line with numerically equal intercepts on the axes

Answer: D

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84. The equation of the diagonal through the origin of the quadrilateral formed by $x = 0, y = 0, 3x + y = 1$ and $4x + y = 7$ is

A. $6x + 17y = 0$

B. $17x - 6y = 0$

C. $6r - 17y = 0$

D. $17x + 6y = 0$

Answer: D

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85. If a, b, c are in A. P., then st. line $ax + by + c = 0$ will always pass through a fixed point whose co-ordinates are:

A. (1,-2)

B. (-1,2)

C. (1,2)

D. (-1,-2)

Answer: A

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86. If the lines $x + 2ay + a = 0, x + 3by + b = 0$ and $x + 4cy + c = 0$ are concurrent, then a, b, c are in:

A. A.P

B. H.P

C. G .P

D. none of these

Answer: B

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87. A line passing through $P(3, 4)$ meets the x -axis and y -axis at A and B respectively. If O is the origin, then locus of the centre of the circum centre of ΔOAB is

A. $4x^{-1} + 3y^{-1} = 2$

B. $3x^{-1} + 4y^{-1} = 1$

C. $3x^{-1} + 4y^{-1} = 2$

D. $4x^{-1} + 3y^{-1} = 1$

Answer: C

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88. If two vertices of an equilateral triangle have integral co-ordinates, then the third vertex will have :

A. integral coordinates

B. coordinates which are rational

C. at least one coordinate irrational

D. coordinates, which are irrational

Answer: C

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89. If two sides of a triangle are represented by :

$2x - 3y + 4 = 0$ and $3x + 2y - 3 = 0$, then its orthocentre lies on the line :

A. $x - y + \frac{8}{15} = 0$

B. $4x + 3y + \frac{5}{13} = 0$

C. $9x - y + \frac{9}{13} = 0$

D.

Answer: C

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90. The distance of the point (1, 2) from the line $x + y = 0$ measured parallel to the line $3x - y = 2$ is :

A. $\frac{3\sqrt{2}}{8}$

B. $\frac{3\sqrt{10}}{4}$

C. 10

D. $5\sqrt{5}$

Answer: B

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91. A and B are two fixed points. The locus of the point P such that $A\widehat{P}B$ is a right angle is

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

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

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

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

Answer: A

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92. Equation of the bisector of the obtuse angle between the lines $4x + 3y - 6 = 0$ and $5x + 12y + 9 = 0$ is

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

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

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

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

Answer: A

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93. If one of the diagonals of a square is along the line $x = 2y$ and one of its vertices is $(3, 0)$, then its sides through this 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. $y - 3x + 9 = 0, 3y - x + 3 = 0$

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

Answer: A

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94. The line parallel to the x axis and passing through the intersection of the lines

$ax + 2by + 3b = 0$ and bx -2ay-3a=0

where (a,b) $\neq$ (0,0) is

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

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

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

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

Answer: D

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95. If the point P (x, y) is equidistant from the points A (a + b, b - a) and B(a -b, a + b). Prove that bx = ay.

A. $ax = by$

B. $bx = ay$

C. $ax + by = 0$

D. $bx + ay = 0$

Answer: B

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96. If the points $\left(a^2, 0\right)$, $\left(0, b^2\right)$ and (1,1) are collinear then

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

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

C. $a^2 + b^2 = 1$

D. $a + b = 1$

Answer: A

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97. The vertices of a triangle are at $(0, 0)$, $(a, 0)$ and $(0, b)$. The distance between the circumcentre and the orthocentre is

A. $\sqrt{a^2 + b^2}$

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

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

D. $\frac{1}{4}\sqrt{a^2 + b^2}$

Answer: B

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98. The number of points equidistant to three given distinct non-collinear points is

A. 0

B. 1

C. 2

D. infinite

Answer: B

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99. The points Q, R and S lie on the line joining $P(a, x)$ and $T(b, y)$ such that $PQ = QR = RS = ST$ then $\left(\frac{5a + 3b}{8}, \frac{5x + 3y}{8}\right)$ is the mid point of the segment

A. PQ

B. QR

C. RS

D. ST

Answer: B

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100. The x-co-ordinate of the incentre of the triangle that has the co-ordinates of mid-points of its sides as (0, 1), (1, 1) and (1, 0) is :

A. $2+\sqrt{2}$

B. $1+\sqrt{2}$

C. $2-\sqrt{2}$

D. $1-\sqrt{2}$

Answer: C

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101. The area of the figure formed by $a|x| + b|y| + c = 0$ is

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

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

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

D. $c^2 \cdot |ab|$

Answer: B

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102. Area of the parallelogram formed by the lines $2x - 3y + a = 0, 3x - 2y - a = 0, 2x - 3y + 3a = 0$ and $3x - 2y - 2c = 0$ is 10 sq. units, then $a =$

A. ±1

B. ±10

C. ±5

D. none of these

Answer: C

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

A. 45°

B. 135°

C. -45°

D. -135°

Answer: A

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

A. $aa' + bb' = 0$

B. $ab' = ba'$

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

D. $ab' + ba' = 0$

Answer: A

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105. The equation of the line passing through (1, 2) and perpendicular to $x + y + 7 = 0$ 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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106. The distance of the point $P(1, -3)$ from the line $2y - 3x = 4$ is

A. 13

B. $\frac{7\sqrt{13}}{13}$

C. $\sqrt{13}$

D. none of these

Answer: C

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107. The coordinates of the foot of the perpendicular from the point (2,3) on the line $x + y - 11 = 0$ is

A. (-6,5)

B. (5,6)

C. (-5,6)

D. (6,5)

Answer: B

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108. The intercept cut off by a line from y-axis is twice than that of from x -axis and the line passes through the point $(1, 2)$. The equation of the line is

A. $2x + y = 4$

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

C. $2x - y = 4$

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

Answer: A

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109. A straight line through P(1,2) is such that the intercept between the axes is bisected at p then the equation of the straight line is

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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110. The reflection of the point (4, -13) in the line $5x + y + 6 = 0$ is :

A. (-1,-14)

B. (3,4)

C. (0,0)

D. (1,2)

Answer: A

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111. A point moves such that its distance from the point (4,0) is half that of its distance from the line $x = 16$. The locus of the point is

A. $3x^2 + 4y^2 = 192$

B. $4x^2 + 3y^2 = 192$

C. $x^2 + y^2 = 192$

D. none of these

Answer: A

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112. A line cutting off intercept -3 from the y -axis and the tangent of the angle to the x -axis is $\frac{3}{5}$, its equation -is

A. $5y - 3x + 15 = 0$

B. $3y - 5x + 15 = 0$

C. $5y - 3x - 15 = 0$

D. none of these

Answer: A

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113. Slope of a line which cuts off intercepts of equal lengths on the axes is

A. -1

B. 0

C. 2

D. $\sqrt{3}$

Answer: A

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114. The equation of the line passing through the point (3,2) and perpendicular to the line $y = x$ is

A. $x - y = 5$

B. $x + y = 5$

C. $x + y = 1$

D. $x - y = 1$

Answer: B

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115. Equation of the line passing through the point (1,2) and perpendicnlar 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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116. The tangent of angle between the lines whose intercepts on the axes are $a, \ -b$ and $b, \ -a$ respectively, is

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

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

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

D. none of thesc

Answer: C

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117. If the line $\frac{x}{a} + \frac{y}{b} = 1$ passes through the points (2,-3) and $(4, -5)$, then (a, b) is

A. (1,1)

B. (-1,1)

C. (1,-1)

D. (-1,-1)

Answer: D

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118. The distance of the point of intersection of the lines $2x - 3y + 5 = 0$ and $3x + 4y = 0$ from the line $5x - 2y = 0$ is

A. $\frac{130}{17\sqrt{29}}$

B. $\frac{13}{7\sqrt{29}}$

C. $\frac{130}{7}$

D. none of these

Answer: A

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119. One of the equations of the lines passing through the point (3, -2) and inclined at 60° to the line $\sqrt{3}x + y = 1$ is :

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

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

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

D. none of these

Answer: A

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120. The equation of the lines passing through the point (1,0) and at a distance $\frac{\sqrt{3}}{2}$ from the origin, are

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

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

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

D. none of these

Answer: A

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121. Derive an expression for the distance between two parallel lines $y = mx + c_1$ and $y = mx + c_2$.

A. $\frac{c_1 - c_2}{\sqrt{m^2 + 1}}$

B. $\frac{|c_1 - c_2|}{\sqrt{1 + m^2}}$

C. $\frac{c_2 - c_1}{\sqrt{1 + m^2}}$

D. $\underline{0}$

Answer: B

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122. The co-ordinates of the foot of perpendicular from the point (2, 3) on the line $y = 3x + 4$ are given by:

A. $\left(\frac{37}{10}, -\frac{1}{10}\right)$

B. $\left(-\frac{1}{10}, \frac{37}{10}\right)$

C. $\left(\frac{10}{37}, -10\right)$

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

Answer: B

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123. If the co-ordinates of the middle point of the portion of the line intercepted between the co-ordinate axes is (3, 2), then the equation of the line will be:

A. $2x + 3y = 12$

B. $3x + 2y = 12$

C. $4x - 3y = 6$

D. $5x - 2y = 10$

Answer: A

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124. Equation of the line passing through (1, 2) and parallel to the line $y = 3x - 1$ is :

A. $y + 2 = x + 1$

B. $y + 2 = 3(x + 1)$

C. $y - 2 = 3(x - 1)$

D. $y - 2 = x - 1$

Answer: C

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125. Equation of diagonals of the square formed by the lines:

$x = 0, y = 0, x = 1$ and $y = 1$ are:

A. $y = x, y + x = 1$

B. $y = x, x + y = 2$

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

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

Answer: A

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126. For specifying a straight line, how many geometrical parameters should be known?

A. 1

B. 2

C. 4

D. 3

Answer: B

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127. The point (4, 1) undergoes the following transformations:

(i) reflection about the line y = x (ii) translation through a distance of 2 units along the positive x-axis. Then the final co-ordinates of the point are :

A. (4,3)

B. (3,4)

C. (1,4)

D. $\left(\frac{7}{2}, \frac{7}{2}\right)$

Answer: B

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

A. (1,-1)

B. (1,1)

C. (0,0)

D. (0,1)

Answer: C

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

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

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

C. 1

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

Answer: D

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130. The ratio in which the line $3x + 4y + 2 = 0$ divides the distance between the lines $3x + 4y + 5 = 0$ and $3x + 4y - 5 = 0$ is :

A. 1: 2

B. 0.12986111111111

C. 0.085416666666667

D. 0.086805555555556

Answer: B

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131. 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. $(2, -2)$

Answer: B

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

A. a square

B. a circle

C. a parabola

D. an ellipse

Answer: A

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133. The locus of the point which moves such that the ratio of its distance from two fixed point in the plane is always a constant $K(<1)$ is

A. a parabola

B. an ellipse

C. a circle

D. a hyperbola

Answer: C

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134. A point (-4,5) is the vertex of a square and one of its diagonals is $7x-y+8=0$. The equation of the other diagonals is

A. $7x-y+23=0$

B. $x+7y=31$

C. $x-7y=37$

D. none of these

Answer: B

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135. The equation of a straight line passing through the point (-5, 4) and which cuts off an intercept of $\sqrt{2}$ units between the lines $x + y + 1 = 0$ and $x + y - 1 = 0$ is :

A. $x - 2y + 13 = 0$

B. $2x - y + 14 = 0$

C. $x - y + 9 = 0$

D. $x - y + 10 = 0$

Answer: C

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136. The three lines $ax + by + c = 0, bx + cy + a = 0$ and $cx + ay + b = 0$ are concurrent only when

A. $a + b + c = 1$

B. $a^2 + b^2 + c^2 = ab + bc + ca$

C. $a^3 + b^3 + c^3 = 3abc$

D. $a^3 + b^3 + c^3 = abc$

Answer: C

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137. If the equation $x^2 + y^2 + 2gx + 2fy + 1 = 0$ represents a pair of lines then

A. $f^2 - g^2 = 1$

B. $f^2 + g^2 = 1$

C. $g^2 - f^2 = 1$

D. $f^2 + g^2 = \frac{1}{2}$

Answer: B

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138. A line makes zero intersects on x axis and y axis and it is prependicular to the line $3x + 4y + 6 = 0$ then its equation is

A. $y = x$

B. $4x - 3y = 0$

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

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

Answer: B

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139. If p is the length of the perpendicular from the origin on the line whose intercepts on the axes are a and b, then

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

B. $p^2 = a^2 - b^2$

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

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

Answer: C

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140. The locus of a point which is equidistant from $(a + b, a - b)$ and $(a - b, a + b)$ is

A. $ax + by = 0$

B. $x - y = 0$

C. $x + y = 0$

D. $bx - ay = 0$

Answer: B

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141. What is the equation of the locus of a point which moves such that 4 times its distance from the x axis is the square of its distance from the origin?

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

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

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

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

Answer: B

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142. Equation of the straight line making equal intercepts on the axes and passing through the point (2,4) is

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

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

C. $x + y - 6 - 0$

D. $x + 2y - 10 - 0$

Answer: C

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143. Equation of the straight line making equal intercepts on the axes and passing through the point (2,4) is

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

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

C. $x + y - 6 = 0$

D. $x + 2y - 10 = 0$

Answer: C

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144. If the area of the triangle with vertices (x, 0). (1.1) and (0.2) is 4 square units then a value of

A. -2

B. $\cdots 4$

C. -6

D. 8

Answer: C

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145. If (0,-1) and (0,3) are two vertices of a square, the other two vertices are

A. (0,1),(0,-3)

B. (3,-1),(0,0)

C. (2,1),(-2,1)

D. (2,2),(1,1)

Answer: C

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146. The equation to the line bisecting the join of (3,-4) and (5,2) and having its intercepts on the x-axis and the y-axis in the ratio 2:1 is...

A. $x + y - 3 = 0$

B. $2x - y = 9$

C. $x + 2y = 2$

D. $2x + y = 7$

Answer: C

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147. If the lines $x + 3y - 9 = 0, 4x + by - 2 = 0$ and $2x - y - 4 = 0$ are concurrent, then b equals

A. 5

B. -5

C. 0

D. 1

Answer: B

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148. The co-ordinates of the foot of the perpendicular drawn from the point (3, 4) on the line $2x + y - 7 = 0$ is

A. (1,5)

B. $\left(\frac{9}{5}, \frac{17}{5}\right)$

C. (c) (1,-5)

D. (-5,1)

Answer: B

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149. The coordinates of the circumcentre of the triangle with vertices (2,3),(4,-1) and (4,3) are

A. (2,3)

B. (1,3)

C. (3,1)

D. (3,2)

Answer: C

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150. The orthocentre of the triangle formed by $A(1, 2), B(-2, 2), C(1, 5)$ is

A. (1,5)

B. (-2,2)

C. (0,3)

D. (1,2)

Answer: D

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151. The medians AD and BE of a triangle with vertices A (0, b), B(0, 0) and C(a, 0) are perpendicular ot each other if :

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

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

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

D. $b = a$

Answer: B

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152. The lines $2x + 11y - 5 = 0, 4x - 3y - 2 = 0$ and $24x + 7y - 20 = 0$

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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153. A st. line through the point (2, 2) intersects the lines $\sqrt{3}x + y = 0$ and $\sqrt{3}x - y = 0$ at the points A and B. The equation to the line AB so that the triangle OAB is equilateral is :

A. $x - 2 = 0$

B. $y - 2 = 0$

C. $x + y - 4 = 0$

D. none of these

Answer: B

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154. A triangle with vertices (4, 0), (-1, -1), (3, 5) is :

A. isosceles and angled

B. isosceles but not angled

C. angled but not isosceles

D. neither angled nor isosceles

Answer: A

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155. 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 line

B. lie on the ellipse

C. lie on a circle

D. are vertices of a triangle

Answer: A

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

A. $y(\cos\alpha + \sin\alpha) + x(\cos\alpha - \sin\alpha) = 4a$

B. $y(\cos\alpha - \sin\alpha) - x \cdot (\sin\alpha - \cos\alpha) = 4a$

C. $y(\cos\alpha + \sin\alpha) + x(\sin\alpha - \cos\alpha) = 4a$

D. $y(\cos\alpha + \sin\alpha) + x^{-}(\sin\alpha + \cos\alpha) = 4a$

Answer: A

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157. 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 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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158. Locus of centroid of the triangle whose vertices are $(a\cos t, a\sin t), (b\sin t, -b\cos t)$ and (1, 0), where t is a parameter, is :

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

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

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

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

Answer: C

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159. The equation of the straight line passing through the point (4, 3) and making intercepts on the co-ordinate axes whose sum is -1 is :

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: D

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

A. $3x + 2y = 5$

B. $2x - 3y = 7$

C. $2x + 3y = 9$

D. $3x - 2y = 3$

Answer: C

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161. If a vertex of a triangle is (1, 1) and the mid-points of two sides through this vertex are (-1, 2) and (3, 2), then the centroid of the triangle is :

A. $\left(-\frac{1}{3}, \frac{7}{3}\right)$

B. $\left(-1, \frac{7}{3}\right)$

C. $\left(\frac{1}{3}, \frac{7}{3}\right)$

D. $\left(1, \frac{7}{3}\right)$

Answer: D

Watch Video Solution

162. If non-zero numbers a, b, c are in H.P., then the straight line $\frac{x}{a}+\frac{y}{b}+\frac{1}{c}=0$ always passes through a fixed point. That point is :

A. (-1,-2)

B. (-1,2)

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

D. (1,-2)`

Answer: D

Watch Video Solution

163. A straight line through the point A(3, 4) is such that its intercept between the axes is bisected at A. Its equation is :

A. $3x + 4y = 25$

B. $x + y = 7$

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

D. $4x + 3y = 24$

Answer: D

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

A. $(3, \infty)$

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

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

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

Answer: B

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

A. $2x - 9y - 7 = 0$

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

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

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

Answer: D

Watch Video Solution

166. Area of the parallelogram formed by the lines $y = mx, y = mx + 1, y = nx$ and $y = nx + 1$ equals :

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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167. The number of integer values of m for which the x-co-ordinates 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

Answer: A

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168. The incentre of the triangle with vertices $(1, \sqrt{3}), (0, 0)$ and $(2, 0)$ is :

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

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

C. `((2)/(3), (sqrt(3))/(2))

D. (1, (1)/(sqrt(3)))`

Answer: D

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169. A straight line through the origin O meets the parallel lines $4x + 2y = 9$ and $2x + y + 6 = 0$ at points P and Q respectively. Then the point O divides the segment PQ in the ratio :

A. 0.043055555555556

B. 0.12777777777778

C. 0.084027777777778

D. 0.16875

Answer: B

Watch Video Solution

170. Let P(-1, 0), Q(0, 0) and $R\left(3, 3\sqrt{3}\right)$ be three points. Then the equation of the bisector of the 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: D

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171. Orthocentre of triangle whose vertices are (0, 0), (3, 4), (4, 0) is :

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

B. $\left(\frac{5}{4}, 3\right)$

C.

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

Answer: C

Watch Video Solution

172. Triangle is formed by the co-ordinates (0, 0), (0, 21) and (21, 0). Find the number of integral co-ordinates strictly inside the triangle (integral co-ordinates has both x and y) :

A. 190

B. 305

C. 181

D. 206

Answer: A

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173. The lines $y = mx, y + 2x = 0, y = 2x + k$ and $y + mx = k$ form a rhombus if m is equal to :

A. -1

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

C. 1

D. 2

Answer: D

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174. The lines $x + (a-1)y + 1 = 0$ and $2x + a^2y - 1 = 0$ are perpendicular if

A. $|a| = 2$

B. $0 < a < 1$

C. $-1 < a < 0$

D. $a = -1$

Answer: D

Watch Video Solution

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

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

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

C. 1

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

Answer: D

Watch Video Solution

176. If $P = (1, 0), Q = (-1, 0)$ and $R = (2, 0)$ are three given points, then the locus of S satisfying the relation $SQ^2 + SR^2 = 2SP^2$ is

A. a line parallel to x -axis

B. a circle through the origin

C. a circle with centre at the origin

D. a line parallel to y -axis

Answer: D

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177. If $P(1, 2), Q(4, 6), R(5, 7)$ and $S(a, b)$ are the vertices of a parallelogram $PQRS$, then

A. $a = 2, b = 4$

B. $a = 3, b = 4$

C. $a = 2, b = 3$

D. $a = 3, b = 5$

Answer: C

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178. The diagonals of a parallelogram $PQRS$ are along the lines $x + 3y = 4$ and $6x - 2y = 7$. Then $PQRS$ must be

A. rectangle

B. square

C. cyclic quadrilateral

D. rhombus

Answer: D

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179. If the vertices P, Q, R are rational points which of the following points of the triangle PQR is (are) always rational point(s)?

A. centroid

B. incentre

C. circumcentre

D. orthocentre

Answer: A

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180. If the lines $x - y - 1 = 0, 4x + 3y = k$ and $2x - 3y + 1 = 0$ are concurrent then $k =$

A. 1

B. -1

C. 25

D. 5

Answer: C

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181. The centroid of a triangle formed by the points (0, 0), $(\cos\theta, \sin\theta)$ and $(\sin\theta, -\cos\theta)$ lies on the line $y = 2x$. Then θ is :

A. $\tan^{-1} 2$

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

C. $\tan^{-1}(-3)$

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

Answer: C

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182. The orthocentre of the triangle formed by (8,0) , (4,6) with the origin is

A. $\left(4, \frac{8}{3}\right)$

B. (3,-4)

C. (4,3)

D. (3,4)

Answer: A

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183. The foot of the perpendicular from (-2,3) to the line $2x - y - 3 = 0$ is

A. (-2,3)

B. (2,1)

C. (3,2)

D. (1,2)

Answer: B

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184. The locus of the point of the portion of the line $x\cos\alpha - y\sin\alpha = p$ which is intercepted between the axes is

A. $p^2\left(x^2+y^2\right) = 4xy$

B. $p\left(x^2+y^2\right) = 4x^2y^2$

C. $p^2(x+y) - x^2y^2$

D. $p^2\left(x^2+y^2\right) = 4x^2y^2$

Answer: D

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185. The value of λ for which the lines $3x+4y=5$, $5x+4y=4$ and $\lambda x+4y=6$ meet at a point is

A. 2

B. $\underline{1}$

C. 4

D. 3

Answer: A

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186. Three vertices of a parallelogram taken in order are (-1,-6),(2,-5) and (7,2), The fourth vertex is

A. (1,4)

B. (1,1)

C. (4,4)

D. (4,1)

Answer: D

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187. The angle between the lines $2x - y + 3 = 0$ and $x + 2y + 3 = 0$ is

A. 90°

B. 60°

C. 45°

D. 30°

Answer: A

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188. The centroid of the triangle is (2,7) and two of its vertices are (4,8) and (-2,6) and third vertex is

A. (0,0)

B. (4,7)

C. (7,4)

D. (7,7)

Answer: B

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189. The inclination of the line through (-3,6) and the midpoint of the line joining the point (4,-5) and (-2,9) is

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

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

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

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

Answer: D

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190. A point moves such that the area of the triangle formed by it with the points (1,5) and (3,-7) is + 21 sq. units. The locus of the point is

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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191. The area bounded by the curves $x + 2|y| = 1$ and $x = 0$ is

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

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

C. 1

D. 2

Answer: B

Watch Video Solution

192. The foot of the perpendicular from the point (2,4) upon $x + y = 4$ is

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

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

C. $\left(\frac{4}{3}, \frac{1}{2}\right)$

D. $\left(\frac{3}{4}, -\frac{1}{2}\right)$

Answer: B

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193. A (1, 3) and C(7, 5) are two opposite vertices of a square. The equation of a side thro' A is :

A. $x + 2y - 7 = 0$ or $2x - y + 1 = 0$

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

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

D. none of these

Answer: A

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194. Distance between the parallel lines $y = 2x + 7$ and $y = 2x + 5$ is

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

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

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

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

Answer: C

Watch Video Solution

195. Orthocentre of the triangle formed by the lines $x + y = 1$ and $xy = 0$ is

A. (0,0)

B. (0,1)

C. (1,0)

D. (-1,1)

Answer: A

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196. The area of the triangle with vertices at (-4,1) , (1,2),(4,-3) is

A. 17

B. 16

C. 15

D. none of these

Answer: D

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197. Find the area of the triangle Δ ABC with A(a,b+c), B(b,c+a), and C(c, a+b).

A. 0

B. $a+b+c$

C. $ab+bc+ca$

D. none of these

Answer: A

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198. $A(-1,1), B(5,3)$ are opposite vertices of a square in the xy plane. The equation of the other diagonal (not passing through A, B) of the

square is given by

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

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

C. $y + 3x - 8 = 0$

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

Answer: C

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199. A straight line through P(1,2) is such that the intercept between the axes is bisected at p then the equation of the straight line is

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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200. The equations to the sides of a triangle are $x + 2y = 0, 4x + 3y = 5$ 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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201. 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. $\frac{\pi}{3}$

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

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

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

Answer: A

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202. The lines $2x + y - 1 = 0, ax + 3y - 3 = 0$ and $3x + 2y - 2 = 0$ are concurrent

A. for all ' a '

B. for $a^s = 4$ only

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

D. for $a > 0$ only

Answer: A

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

A. (1,-1)

B. (1,1)

C. (0,0)

D. (0,1)

Answer: C

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204. The area of the triangle formed by the coordinate axes and the line $4x + 5y = 20$ is (in square units)

A. 5

B. 10

C. 15

D. 20

Answer: B

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205. The angle between the lines formed by joining the points (2,-3),(-5,1) and (7,-1),(0,3) is

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

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

C. 0

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

Answer: C

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206. The variable line $\frac{x}{a}+\frac{y}{b}=1$ is such that $a+b=10$. The locus of the midpoint of the portion of the intercepted between the axes is

A. $x+y=10$

B. $10x+5y=1$

C. $x+y=5$

D. $5x+10y=1$

Answer: C

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207. If $A = (-3, 4), B = (-1, -2), C = (5, 6), D = (x, -4)$ are vertices of a quadrilateral such that $\triangle ABD = 2\Delta ACD$, then $x =$

A. 6

B. 9

C. 69

D. 96

Answer: C

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208. The angle between the lines $x\cos\alpha + y\sin\alpha = a$ and $x\sin\beta - y\cos\alpha = a$ is

A. $\alpha + \beta$

B. $\alpha - \beta$

C. $\alpha\beta$

D. $2\alpha - \beta$

Answer: B

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209. The coordinates of the foot of the perpendicular from the point (2,3) on the line $x + y - 11 = 0$ is

A. $\left(\frac{81}{25}, \frac{92}{25}\right)$

B. $\left(\frac{92}{25}, \frac{81}{25}\right)$

C. $\left(\frac{46}{25}, \frac{54}{25}\right)$

D. $\left(-\frac{81}{25}, \frac{92}{25}\right)$

Answer: A

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210. If $2x + 3y + 4 = 0$ is the perpendicular bisector of the segment joining the points $A(1, 2)$ and $B(\alpha, \beta)$ then the value of $\alpha + \beta$ is

A. $-\frac{81}{13}$

B. $-\frac{136}{13}$

C. $-\frac{135}{13}$

D. $-\frac{134}{13}$

Answer: A

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211. The point of intersection of the lines $\frac{x+1}{3} = \frac{y+3}{5} = \frac{z+5}{7}$ and $\frac{x-2}{1} = \frac{y-4}{3} = \frac{z-6}{5}$ is

A. 2

B. 3

C. -2

D. -3

Answer: B

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212. If non-zero numbers a, b, c are in H.P., then the straight line $\frac{x}{a}+\frac{y}{b}+\frac{1}{c}=0$ always passes through a fixed point. That point is :

A. (k, k)

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

C. (1,1)

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

Answer: B

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213. $A = (-9, 0)$ and $B = (-1, 0)$ are two points. If $P(x, y)$ is a point such that $3PB = PA$, then the locus of P is

A. 1)$x^2 - y^2 = 9$

B. 2)$x^2 - y^2 = -9$

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

D. 4)$x^2 + y^2 = 3$

Answer: C

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214. Let a and b non zero reals such that $a \neq b$ then the equation of the line passing through the origin and the point of intersection of $\frac{x}{a} + \frac{y}{b} = 1$ and $\frac{x}{b} + \frac{y}{a} = 1$ is

A. $ax + by = 0$

B. $bx + ay = 0$

C. $y - x = 0$

D. $x + y = 0$

Answer: C

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215. The reflection of the point (6,8) in the line $x = y$ is

A. (4,2)

B. (-6,-8)

C. (-8,-10)

D. (8,6)

Answer: D

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216. The equation of the line passing through the intersection of the lines $x + 2y + 3 = 0$ and $3x + 4y + 7 = 0$ and parallel to $y - x = 8$ is

A. $x - y = 0$

B. $x' + y = 2$

C. $x + y + 2 = 0$

D. $x + y + 1 = 0$

Answer: C

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217. If the lines $y = 4 - 3x$, $ay = x + 10$ and $2y + bx + 9 = 0$ represent the three consecutive sides of a rectangle, then $ab =$

A. 18

B. -3

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

D. $-\frac{1}{3}$

Answer: A

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218. The equation of the line making an intercept of 3 units on Y -axis and inclined at 45° to the X -axis is

A. $y = x - 1$

B. $y = x + 3$

C. $y = 45x + 3$

D. $y = x + 45$

Answer: B

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219. The ratio in which the line $y = x$ divides the segment joining (2,3) and (8,6) is

A. 0.043055555555556

B. 2:1

C. 0.04375

D. 1:2

Answer: A

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220. If the points (1, 2) and (3, 4) were to be on the same side of the line $3x - 5y + a = 0$, then :

A. (a) $7 < a < 11$

B. (b) $a = 7$

C. (c) $a = 1$

D. (d) $a < 7$ or $a > 11$

Answer: D

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221. The vertices of a triangle are (6, 0), (0, 6) and (6, 6). The distance between its circumcentre and centroid is :

A. $2\sqrt{2}$

B. 2

C. $\sqrt{2}$

D. 1

Answer: C

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222. If the point $x_1 + t(x_2 - x_1), y_1 + t(y_2 - y_1)$ divides the join of (x_1, y_1) and (x_2, y_2) internally then

A. $t < 0$

B. $0 < t < 1$

C. $t > 1$

D. $t = 1$

Answer: B

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223. The co-ordinates of the image of the origin O. w.r.t. st. line $x + y + 1 = 0$ are :

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

B. (-2,-2)

C. (1,1)

D. (-1,-1)

Answer: D

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224. A straight rod of length 9 units slides with its ends A, B always on the X and Y-axis respectively . Then the locus of the centroid of ΔOAB 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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225. The area of the triangle formed by the axes and the lines $(\cosh\alpha - \sinh\alpha)x + (\cosh\alpha + \sinh\alpha)y = 2$ in square units is

A. 4

B. 3

C. 2

D. 1

Answer: C

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226. The incentre of the triangle formed by the lines $x + y = 1, x = 1, y = 1$ is

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

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

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

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

Answer: C

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227. The lines $2x+3y=6, 2x+3y=8$ cut the x -axis at A, B respectively. A line ' P drawn through the point (2,2) meets the $x-$ axis at $C,$ in such a way that abscissa of A, B and C are in A.P. Then the equation of the line ' P is

A. $2x+3y=10$

B. $3x+2y=10$

C. $2x-3y=10$

D. $3x-2y=10$

Answer: A

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228. For all value of a and b the line $(a+2b)x+(a-b)y+(a+5b)=0$passes through the point,

A. (-1,2)

B. (2,-1)

C. (-2,1)

D. (1,-2)

Answer: C

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229. If a line perpendicular to $2x-3y+7=0$ forms a triangle with the coordinate axes whose area is 3 sq. units, then the equation of the line(s) is

A. $3x + 2y = \pm 7$

B. $3x + 2y = \pm 6$

C. $3x + 2y = \pm 8$

D. $3x + 2y = \pm 4$

Answer: B

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

A. $6x - 4y - 7$

B. $2x + 3y - 5$

C. $3x - 2y + 5$

D. $3x - 2y + 10$

Answer: C

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231. If the lines $4x + 3y - 1 = 0, x - y + 5 = 0$ and $kx + 5y - 3 = 0$ are concurrent, then $k =$

A. 4

B. 5

C. 6

D. 7

Answer: C

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232. The point P is equidistant from $A(1, 3)$ $B(-3, 5)$ and $C(5, -1)$. Then $PA =$

A. 5

B. $5\sqrt{5}$

C. 25

D. $5\sqrt{10}$

Answer: C

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233. Suppose A, B are two points on $2x - y + 3 = 0$ and $P(1, 2)$ is such that $PA = PB$, then the mid point of AB is

A. $\left(-\frac{1}{5}, \frac{13}{5}\right)$

B. $\left(-\frac{7}{5}, \frac{9}{5}\right)$

C. $\left(\frac{7}{5}, -\frac{9}{5}\right)$

D. $\left(-\frac{7}{5}, -\frac{9}{5}\right)$

Answer: A

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234. The distance between the points $(a\cos\theta, a\sin\theta)$ and $(a\cos\varphi, a\sin\varphi)$ is $2a$, then $\theta =$

A. $2n\pi \pm \pi + \varphi, n \in z$

B. $n\pi + \frac{\pi}{2} + \varphi, n \in z$

C. $n\pi - \varphi\, n \in z$

D. $2n\pi + \varphi, n \in z$

Answer: A

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235. If a point P moves such that its distance from the point $A(1, 1)$ and the line $x + y + 2$ are equal then the locus is

A. a straight line

B. a pair of straight line

C. a parabola

D. an ellipse

Answer: C

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236. The area of the triangle formed by the lines $x = 0, y = 0$ and $3x + 4y = 12$ is (in square units)

A. 3

B. 4

C. 6

D. 12

Answer: C

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237. If PM is the perpendicular from $P(2, 3)$ onto the line $x + y = 3$, then the coordinates of M are

A. (2,1)

B. (-1,4)

C. (1,2)

D. (4,-1)

Answer: C

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238. The equation of the line perpendicular to $5x - 2y = 7$ and passing through the point of intersection of the lines $2x + 3y = 1$ and $3x + 4y = 6$ is

A. $2x + 5y + 17 = 0$

B. $2x + 5y - 17 = 0$

C. $2x - 5y + 17 = 0$

D. $2x - 5y = 17$

Answer: A

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239. The lines $x - y - 2 = 0$ and $x + y - 4 = 0$ and $x + 3y = 6$ meet in the common point

A. (1,2)

B. (2,2)

C. (3,1)

D. (1,1)

Answer: C

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240. The consecutive sides of a parallelogram are $4x + 5y = 0$ and $7x + 2y = 0$. One diagonal of the parallelogram is $11x + 7y = 9$. If the other diagonal is $ax + by + c = 0$, then

A. $a = -1, b = -1, c = 2$

B. $a = 1, b = -1, c = 0$

C. $a = -1, b = -1, c = 0$

D. $a = 1, b = 1, c = 1$

Answer: B

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241. A point (-4,5) is the vertex of a square and one of its diagonals is $7x - y + 8 = 0$. The equation of the other diagonals is

A. $x + 3y - 21$

B. $2x3y - 7$

C. $x + 7y = 31$

D. $2x \mid 3y = 21$

Answer: C

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242. The centroid of the triangle ABC where A= (2,3), B= (8,10) and C= (5,5) is

A. (6,5)

B. (5,6)

C. (15,18)

D. (6,6)

Answer: B

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243. A variable line $\frac{x}{a}+\frac{y}{b}=1$ is such that a+b=4. The locus of the midpoint of the portion of the line intercepted between the axes is

A. $x+y=8$

B. $x+y=4$

C. $x+y=2$

D. $x+y=1$

Answer: C

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244. The foot of the perpendicular from the point (2,4) upon $x+y=4$ is

A. (1,3)

B. (3,-1)

C. (2,2)

D. (4,0)

Answer: A

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245. The vertices of triangle ar (6,0),(0,6) and (6,6). The distance between its circumcentre and cenroid is

A. 1

B. $2\sqrt{2}$

C. 2

D. $\sqrt{2}$

Answer: D

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246. The line joining $A(2, -7)$ dand $B(6, 5)$ is divided into 4 equal parts by the points P,Q and R such that $AQ = RP = QB$. The midpoint of PR

is

A. (8,-2)

B. (4,-1)

C. (-8,1)

D. (4,12)

Answer: B

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247. Locus of a point which moves such that its distance from the X-axis is twice its distance from the line x-y=0 is

A. $x^2 + 4xy - y^2 = 25$

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

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

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

Answer: B

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248. The points A(1,2),B(2,4) and C(4,8) form a/an

A. isosceles triangle

B. equilateral triangle

C. straight line

D. angled triangle

Answer: C

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249. If the line through $A \equiv (4, -5)$ is inclined at an angle 45° with the positive direction of the x-axis, then the co-ordinates of the two points on opposite sides of A at a distance $3\sqrt{2}$ are :

A. (7,2),(1,8)

B. (7,2),(1,-8)

C. (7,-2),(1,-8)

D. (7,2),(-1,8)

Answer: C

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250. If the straight line $ax + by + c = 0$ always passes through (1, -2), then a, b, c are in:

A. H.P

B. A.P

C. G.P

D. none of these

Answer: B

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251. The incentre of the triangle with vertices $\left(1, \sqrt{3}\right), (0, 0)$ and $(2, 0)$ is :

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

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

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

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

Answer: D

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252. Let $0 < \alpha < \pi/4$ be a fixed angle. If $P = (\cos\theta, \sin\theta)$ and $Q = (\cos(\alpha - \theta), \sin(\alpha - \theta))$, then Q is obtained from P by:

A. clockwise rotation around origin through an angle α

B. anticlockwise rotation around origin through angle α

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

D. reflection in the line through origin with slope $\tan\left(\frac{\alpha}{2}\right)$

Answer: D

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253. 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. (a) lie on a line

B. (b) lie on an ellipse

C. (c) lie on a circle

D. (d) are vertices of a triangle

Answer: A

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254. The number of integral points (integral points means both the coordinates of the point 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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255. Orthocentre of triangle whose vertices are (0, 0), (3, 4), (4, 0) is :

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

B. (3,12)

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

D. (3,9)

Answer: C

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256. Let $O(0, 0), P(3, 4), Q(6, 0)$ be the vertices of the triangle OPQ. The point R inside the triangle OPQ is such that the triangle OPR, PQR and OQR are of equal area. The coordinates of R are

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

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

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

D. $\left(\frac{4}{3}, \frac{2}{3}\right)$

Answer: C

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257. Consider three points $P \equiv (-\sin(\beta-\alpha), -\cos\beta), Q \equiv (\cos(\beta-\alpha), \sin\beta)$ and $R \equiv (\cos\beta -$, where $0 < \alpha, \beta, \theta < \frac{\pi}{4}$. Then:

A. P lies on the line segment RQ

B. Q lies on the line segment PR

C. R lies on the line segment QR

D. P, Q, R are non collinear

Answer: D

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

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

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

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

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

Answer: B

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259. 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 is :

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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260. A line L has intercepts a and b on the coordinate axes, when the axes are rotated through an angle θ keeping the origin fixed, the same line L has intercept p and q

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. $a^2 + p^2 = \ddot{b}^2 + q^2$

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

Answer: B

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261. A straight line through the point A(3, 4) is such that its intercept between the axes is bisected at A. Its equation is :

A. $x + y = 7$

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

C. $4x + 3y = 24$

D. $3x + 4y = 25$

Answer: C

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262. 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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263. 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 $\frac{x}{c}+\frac{y}{3}=1$. Then the distance between L and K is :

A. $\frac{17}{\sqrt{15}}$

B. $\frac{23}{\sqrt{17}}$

C. $\frac{23}{\sqrt{15}}$

D. $\sqrt{17}$

Answer: B

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264. Angles made with the x -axis by two lines drawn through the point (1,2) and cutting the line $x + y = 4$ at a distance $\frac{\sqrt{6}}{3}$ from the point (1,2) are

A. $\frac{\pi}{6}$ and $\frac{\pi}{3}$

B. $\frac{\pi}{8}$ and $\frac{3\pi}{8}$

C. $\frac{\pi}{12}$ and $\frac{5\pi}{12}$

D. none of these

Answer: C

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265. If a, b, c be in A.P, then $ax + by + c = 0$ represents

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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266. The circumcentre and the centroid of a triangle are (6,2) and (3,3) then orthocentre is

A. (-3,5)

B. (-3,1)

C. (3,-1)

D. (9,5)

Answer: A

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

A. a circle

B. an ellipse

C. a hyperbola

D. none of these

Answer: D

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268. Let p, q, r be distinct positive numbers. Three lines $px + qy + r = 0, qx + ry + p = 0$ and $rx + py + q = 0$ are concurrent, if

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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269. Let $0 \leq \theta \leq \frac{\pi}{2}$ and $x = X\cos\theta + Y\sin\theta$ $y = X\sin\theta - Y\cos\theta$ such that $x^2 + 4xy + y^2 = aX^2 + bY^2$ where a, b are constants, then

A. $a = -1, b = 3, \theta = \frac{\pi}{4}$

B. $a = 1, b = -3, \theta = \frac{\pi}{3}$

C. $a = 3, b = -1, \theta = \frac{\pi}{4}$

D. $a = 3, b = -1, \theta = \frac{\pi}{3}$

Answer: C

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270. The equation of a line passing through the point of intersection of $x - y + 1 = 0$ and $3x + y - 5 = 0$ and perpendicular to one of them 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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271. 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 sq. units

B. `40 sq. units

C. 10 sq. units

D. 30 sq. units

Answer: A

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

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

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

C. 1

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

Answer: D

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273. The range of values of θ in the interval $(0, \pi)$ such that the points (3,2) and $(\cos\theta, \sin\theta)$ 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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274. If the point (a, a) falls between the lines $|x + y| = 2$, then :

A. $|a| = 2$

B. $|a| = 1$

C. $|a| < 1$

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

Answer: C

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275. If the point $P(a, b)$ lies on the line $3x + 2y = 13$ and the point $Q(b, a)$ lies on the 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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276. The bisector of the acute angle formed between the linex $4x - 3y + 7 = 0$ 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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277. Circumcentre of the triangle formed 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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278. Point Q is symmetric to $P(4, -1)$ with respect to the bisector of the first quadrant. Then, length of PQ is

A. $3\sqrt{2}$

B. $5\sqrt{2}$

C. $7\sqrt{2}$

D. $9\sqrt{2}$

Answer: B

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279. The coordinate 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 line whose equation referred to the original axes is $x + y = 1$ then $\frac{1}{p^2} + \frac{1}{q^2} =$

A. 2

B. 4

C. 6

D. 8

Answer: A

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280. The area of the quadrilateral formed by two pairs of lines $l^2x^2 - m^2y^2 - n(lx + my) = 0$ and $l^2x^2 - m^2y^2 - n(Lx - my) = 0$ is

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

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

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

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

Answer: A

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281. The transformed equation of $x^2 + 6xy + 8y^2 = 10$ when the axes are rotated through an angle $\frac{\pi}{4}$ is

A. $15x^2 - 14xy + 3y^2 = 20$

B. $15x^2 + 14xy - 3y^2 = 20$

C. $15x^2 + 14xy + 3y^2 = 20$

D. $15x^2 - 14xy - 3y^2 = 20$

Answer: C

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282. The value of k for which the lines $2x - 3y + k = 0, 3x - 4y - 13 = 0, 8x - 11y - 33 = 0$ are concurrent is

A. 20

B. -7

C. 7

D. -20

Answer: B

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283. The transformed equation of $3x^2 + 3y^2 + 2xy - 2 = 0$ when the coordinate axes are rotated through an angle of 45° is

A. $X^2 + 2y^2 = 1$

B. $2X^2 + Y^2 = 1$

C. $X^2 + r^2 = 1$

D. $X^2 + 3Y^2 = 1$

Answer: B

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284. The distance of the line $2x - 3y = 4$ from the point (1,1) measured parallel to the line $x + y = 1$ is

A. $\sqrt{2}$

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

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

D. 6

Answer: A

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285. The base vertices of an isosceles triangle PQR are $Q = (1, 3)$ and $R = (-2, 7)$. The vertex P can be

A. (1,6)

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

C. $\left(\frac{5}{6}, 6\right)$

D. none of these

Answer: C

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286. A ray of light coming from the point (1, 2) is reflected at a point A on the x-axis and then passes through the point (5, 3). The co-ordinates of the point A are :

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

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

C. (-7,0)

D. none of these

Answer: A

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287. The equation of the bisectors of the angles between the linex $|x| = |y|$ 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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288. Orthocentre of the triangle formed by the lines $x + y = 1$ and $xy = 0$ is

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

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

C. (0,0)

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

Answer: C

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289. If the points $A(1, 1), B(-1, -1), C = \left(-\sqrt{3}, \sqrt{3}\right)$ are the vertices of a triangle, then the triangle is

A. angled

B. isosceles

C. equilateral

D. none of these

Answer: C

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

A. angled

B. equilateral

C. isosceles

D. none of these

Answer: C

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291. The lines $ax + by = c, bx + cy = a$ and $cx + ay = b$ are concurrent, if

A. $a + b = c$

B. $b + c = a$

C. $c + a = b$

D. $a + b + c = 0$

Answer: D

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292. The area enclosed within the curve $|x| + |y| = 1$ is

A. 1 sq. unit

B. 2 sq. unit

C. 3 sq. unit

D. `4 sq, unit

Answer: B

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293. The equation of the bisector of the acute angle between the lines $3x - 4y + 7 = 0$ and $12x + 5y - 2 = 0$ is

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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294. Locus of centroid of the triangle whose vertices are $(a\cos t, a\sin t), (b\sin t, -b\cos t)$ and (1, 0), where t is a parameter, is :

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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295. If the foot of the perpendicular from the origin to a line is at the point (3,-4) , then the equation of the line is

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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296. 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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297. One of the possible condition for the three points $(a, b), (b, a)$ and $(a^2, -b^2)$ to be collinear is

A. $a - b = 2$

B. $a + b = 2$

C. $a = 1 + b$

D. $a = 1 - b$

Answer: C

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