MATHS

BOOKS - MBD MATHS (ODIA ENGLISH)

STRAIGHT LINES

Question Bank

1. Find the distance between the following pairs of points. (3,4) , (2,1).

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2. Find the distance between the following pairs of points. (-1,0) , (5,3) .

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3. If the distance between the points (3,a) and (6,1) is 5, find the value of a.

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4. Find the coordinates of the point which divides the line segment joining the points A (4,6),B (-3,1) in the ratio 2:3 internally.

Find also the coordinates of the point which divides $\overline{AB}$ in the same ratio externally.

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5. Find the coordinates of the mid-point of the following pairs of points .(-7,3), (8,-4) .

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6. Find the coordinates of the mid-point of the following pairs of points .(3/4,-2),(-5/2,1).

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7. Find the area of triangle whose vertices are (1,2), (3,4),(1/2,1/4).

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8. If the area of the triangle with vertices (0,0), (1,0),(0,a) is 10 units, find the value of a.

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9. Find the value of a so that the points (1,4), (2,7),(3,a) are collinear.

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10. Find the slope of the lines whose inclinations are given.30° .

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11. Find the slope of the lines whose inclinations are given.45°.

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12. Find the slope of the lines whose inclinations are given.60°.

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13. Find the slope of the lines whose inclinations are given.135°.

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14. Find the inclination of the lines whose slopes are given below. $\frac{1}{\sqrt{3}}$.

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15. Find the inclination of the lines whose slopes are given below. 1.

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16. Find the inclination of the lines whose slopes are given below. $\sqrt{3}$.

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17. Find the inclination of the lines whose slopes are given below. -1.

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18. Find the angles between the pair of lines whose slopes are , $\frac{1}{\sqrt{3}}$,1.

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19. Find the angles between the pair of lines whose slopes are , $\sqrt{3}$,-1 .

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20. Show that the points (0,-1),(-2,3),(6,7) and (8,3) are vertices of a rectangle.

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21. Show that the points (1,1),(-1,-1) and $(-\sqrt{3}, \sqrt{3})$ are the vertices of an equilateral triangle.

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22. Find the coordinates of the point P(x,y) which is equidistant from (0,0), (32,10) and (42,0).

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23. If the points (x,y) are equidistant from the points (a+b,b-a) and (a-b,a+b),prove that bx = ay.

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24. The coordinates of the vertices of a triangle are $(\alpha_1, \beta_1), (\alpha_2, \beta_2)$ and (α_3, β_3) Prove that the coordinates of its centroid are $(\alpha_1 + \alpha_2 + \alpha_3)/(3)$,$(\beta_1 + \beta_2 + \beta_3)/(3)$.

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25. Two vertices of a triangle are (0,-4) and (6,0).If the medians meet at the point (2,0), find the coordinates of the third vertex.

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26. If the point (0,4) divides line segment joining (-4,10) and (2,1) internally, find the point which divides it externally in these same ratio.

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27. Find the ratios in which the line segment joining (-2,-3) and (5,4) is divided by the coordinate axes and hence find the coordinates of these points.

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28. In a triangle one of the vertices is at (2,5) and the centroid of the triangle is at (-1,1). Find the coordinates of the midpoint of the side opposite to the given angular point.

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29. Find the coordinates of the vertices of a triangle whose sides have mid points at (2,1), (-1,3) and (-2,5).

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30. If the vertices of a triangle have their coordinates given by rational numbers,prove that the triangle cannot be equilateral.

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31. Prove that the area of any triangle is equal to four times the area of the triangle formed by joining the mid points of its sides.

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32. Find the condition that the point (x,y) may lie on the line joining (1,2) and (5,-3).

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33. Show that the three distinct points $(a^2, a)(b^2, b)$ and (c^2, c) can never be collinear.

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34. If A,B,C are points (-1,2),(3,1) and (-2,-3) respectively, show that the points which divide BC, CA, AB in the ratios (1:3), (4:3) and (-9,:4) respectively are collinear.

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35. Prove analytically : The line segment joining the midpoints of two sides of a triangle is parallel to the third and half of its length.

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36. Prove analytically : The altitudes of a triangle are concurrent.

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37. Prove analytically : The perpendicular bisector of the sides of a triangle are concurrent.

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38. Prove analytically : An angle in a semicircle is a right angle.

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39. Fill in the blanks in each of the following, using the answers given against each of them :

The slope and x-intercept of the line $3x-y+k=0$ are equal if $k=$ _____ .

A. 0

B. -1

C. 3

D. -9

Answer: D

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40. Fill in the blanks in each of the following, using the answers given against each of them :

The lines 2x - 3y + 1 = 0 and 3x+ ky - 1 = 0 are perpendicular to each other if k = _____ .

A. 2

B. 3

C. -2

D. -3

Answer: A

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41. Fill in the blanks in each of the following, using the answers given against each of them :

The lines 3x + ky - 4 = 0 and k - 4y - 3x = 0 are coincident if k = _____ .

A. 1

B. -4

C. 4

D. -1

Answer: C

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42. Fill in the blanks in each of the following, using the answers given against each of them :

The distance between the lines $3x - 1 = 0$ and $x + 3 = 0$ is _____ units.

A. 4

B. 2

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

D. $\frac{10}{3}$

Answer: D

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43. Fill in the blanks in each of the following, using the answers given against each of them :

The angle between the lines $x = 2$ and $x - \sqrt{3}y + 1 = 0$ is _____

A. 30°

B. 60°

C. 120°

D. 150°

Answer: B

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44. State with reasons which of following are true or false :

The equation x= k represents a line parallel to x - axis for all real values of k.

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45. State with reasons which of following are true or false :

The line, y + x + 1 = 0 makes an angle 45° with y- axis.

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46. State with reasons which of following are true or false :

The lines represented by $2x - 3y + 1 = 0$ and 3x + 2y - k = 0 are perpendicular to each other for positive values of k only.

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47. State with reasons which of following are true or false :

The lines represented by px + 2y - 1 = 0 and 3x + py + 1 = 0 are not coincident for any value of 'p' .

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48. State with reasons which of following are true or false :

The equation of the line whose x - and y - intercepts are 1 and -1 respectively is x - y + 1 = 0.

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49. State with reasons which of following are true or false :

The point (-1, 2) lines on the line 2x +3y - 4 = 0.

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50. State with reasons which of following are true or false :

The equation of line through (1, 1) and (-2, -2) is $y = -2x$.

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51. State with reasons which of following are true or false :

The line through (1, 2) perpendicular to y = x is y + x - 2 = 0.

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52. State with reasons which of following are true or false :

The lines $\frac{x}{a}+\frac{y}{b}=1$ and y/a - x/b = 1 are intersecting but not perpendicular to each other.

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53. State with reasons which of following are true or false :

The points (1, 2) and (3, -2) are on the opposite sides of the line 2x + y = 1.

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54. A point P(x,y) is such that its distance from the fixed point $(\alpha, 0)$ is equal to its distance from y-axis. Prove that the equation of the locus is given by, $y^2 = \alpha(2x - \alpha)$.

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55. Find the locus of the point P(x,y) such that the area of the triangle PAB is 5, where A is the point (1,-1) and B is the point (5,2).

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56. A point is such that its distance from the point (3,0) is twice its distance from the point (-3,0). Find the equation of the locus.

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57. Obtain the equation of straight lines : Passing through (1,-1) and making an angle 150°.

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58. Obtain the equation of straight lines : Passing through (-1,2) and making intercept 2 on the y-axis.

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59. Obtain the equation of straight lines : Passing through the points (2,3) and (-4,1) .

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60. Obtain the equation of straight lines : Passing through (-2,3) and sum of whose intercepts in 2.

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61. Obtain the equation of straight lines : Whose perpendicular distance from origin is 2 such that the perpendicular from origin has indication 150.

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62. Obtain the equation of straight lines : Bisecting the line segment joining (3,-4) and (1,2) at right angles.

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63. Obtain the equation of straight lines : Bisecting the line segment joining (a,0) and (0,b) at right angles.

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64. Obtain the equation of straight lines : Bisecting the line segment joining $(a, b), (a', b')$ and (-a,b) , $(a', -b')$.

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65. Obtain the equation of straight lines : Passing through origin and the points of trisection of the portion of the line $3x + y - 12 = 0$ intercepted between the coordinate axes.

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66. Obtain the equation of straight lines : Passing through $(-4,2)$ and parallel to the line $4x-3y = 10$

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67. Obtain the equation of straight lines : Passing through the point $\left(a\cos^3\theta, a\sin^3\theta\right)$ and perpendicular to the straight line $x\sec\theta + y\cos ec\theta = \alpha$.

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68. Obtain the equation of straight lines : Which passes through the point (3,-4) and is such that its portion between the axes is divided at this point internally in the ratio 2:3 .

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69. Obtain the equation of straight lines : which passes through the point (α, β) and is such that given point bisects its portion between the co-ordinate axies.

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70. Find the equation of the line which is parallel to the line 3x + 4y + 7 = 0 and is at a distance 2 from it.

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71. Find the equation of the line passing through the intersection of $2x-y-1 = 0$ and $3x-4y+6 = 0$ and parallel to the line $x + y -2 = 0$.

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72. Find the equation of the line passing through the point of intersection of lines $x +$

$3y + 2 = 0$ and $x-2y-4 = 0$ and perpendicular to the line $2y + 5x - 9 = 0$.

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73. Find the equation of the line passing through the point of intersection of lines $x + 3y - 1 = 0$ and $3x-y+1 = 0$ and the centroid of the triangle whose vertices are the points $(3,-1)$ $(1,3)$ and $(2,4)$.

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74. If $lx + my + 3 = 0$ and $3x - 2y - 1 = 0$ represent the same line,find the values of l and m.

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75. Find the equation of sides of a triangle whose vertices are at (1,2),(2,3) and (-3,-5).

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76. Find the coordinate of the circumcentre and incentre of the triangle formed by lines $3x - y = 5$, $x + 2y = 4$ and $5x + 3y + 1 = 0$.

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77. Find the equations of straight lines passing through the point (3,-2) and making angle 45° with the line $6x + 5y = 1$.

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78. Two straight lines are drawn through the point (3,4) inclined at an angle 45° to the line x - y - 2 = 0. Find their equations and obtain the area included by the above three lines.

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79. Show that the area of the triangle formed by the line given by the equations

`y = m_1x + c_1 , y = m_2x + c_2 and x = 0 is 1/2 (c_1-c_2)^2/[m_2-m_1]

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80. Find the equation of lines passing through origin and perpendicular to the lines $3x + 2y - 5 = 0$ and $4x + 3y = 7$. Obtain the co-ordinate of the points where these perpendiculars meet the given lines . Prove that the equation of line passing through these two points is $23x + 11y - 35 = 0$.

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81. Find the length of perpendicular drawn from the point (-3,-4) to the straight line whose equation is $12x - 5y + 65 = 0$.

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82. Find the perpendicular distances of the point (2,1) from the parallel lines $3x-4y+4 = 0$ and $4y-3x+5 = 0$. Hence find the distance between them.

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83. Find the distance of the point (3,2) from the line $x + 3y - 1 = 0$ measured parallel to the line $3x - 4y + 1 = 0$

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84. Find the distance of the point (-1,-2) from the line $x + 3y - 7 = 0$ measured parallel to the line $3x + 2y - 5 = 0$.

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85. Find the distance of the line passing through the points $(a\cos\alpha, a\sin\alpha)$ and $(a\cos\beta, a\sin\beta)$ from the origin.

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86. Find the length of perpendiculars drawn from the origin on the side of the triangle whose vertices are A(2,1),B(3,2) and C(-1,-1).

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87. Show that the product of perpendicular from the points $\left(\pm \sqrt{a^2 - b^2}, 0 \right)$ upon the straight line $\frac{x}{a}\cos\theta + \frac{y}{b}\sin\theta = 1 is b^2$.

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88. Show that the lengths of perpendiculars drawn from any point of the straight line 2x + 11y -5 = 0 on the lines 24x + 7y - 20 = 0 and 4x - 3y -2 = 0 are equal to each other.

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89. If p and p' are the length of perpendicular drawn from the origin upon the lines

$x \sec \alpha + y \operatorname{cosec} \alpha = 0$ and

$x \cos \alpha - y \sin \alpha - a \cos 2\alpha = 0$

Prove that , $4p^2 + p'^2 = a^2$

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90. Obtain the equation of the lines passing through the foot of the perpendicular from (h,k) on the line Ax + By + C = 0 and bisecting

the angle between the perpendicular and the given line.

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91. Find the direction in which a straight line must be drawn through the point (1,2) such that its point of intersection with the line x + y -4 = 0 is at a distant $\frac{1}{3}\sqrt{6}$ from this point.

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92. A triangle has its vertices at P(1,-1),Q(3,4) and R(2,5). Find the equation of altitudes through P and Q and obtain the coordinate of their point of intersection.(This point is called ortho-centre of the triangle.)

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93. Show that the line passing through (6,0) and (-2,-4) is concurrent with the lines.

$2x-3y-11=0$ and $3x-4y=16$.

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94. Show that the lines $lx + my + n = 0$, $mx + ny + l = 0$ and $nx + ly + m = 0$ are concurrent, if $l + m + n = 0$.


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95. Obtain the equation of the bisector of the acute angle between the pair of lines. $X + 2y = 1$, $2x + y + 3 = 0$


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96. Obtain the equation of the bisector of the acute angle between the pair of lines. 3x - 4y = 5 , 12y - 5x = 2.

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97. Find the area of the region bounded by the line $y = 3x + 2$, x-axis and the ordinates $x = -1$ and $x = 1$.

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98. Find the coordinate of the circumcentre and incentre of the triangle formed by lines 3x - y = 5 , x + 2y = 4 and 5x + 3y + 1 = 0.

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99. Find the equation of the lines represented by the following equation $4x^2 - y^2 = 0$

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100. Find the equation of the lines represented by the following equation $2x^2 - 5xy - 3y^2 = 0$

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101. Find the equation of the lines represented by the following equation $x^2 + 2xy\sec\theta + y^2 = 0$

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102. Find the equation of the lines represented by the following equation $3x^2 + 4xy = 0$

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103. From the equations which represents the following Pair of lines. ,

y = mx , y = nx

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104. From the equations which represents the following Pair of lines

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

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105. From the equations which represents the following Pair of lines

$2x - 3y + 1 = 0$, $2x + 3y + 1 = 0$

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106. From the equations which represents the following Pair of lines

x = y , x + 2y + 5 = 0

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107. Which of the following equations represent pair of lines ?

$2x^2 - 6y^2 + 3x + y + 1 = 0$

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108. Which of the following equations represent pair of lines ?

$10x^2 - xy - 6y^2 - x + 5y - 1 = 0$

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109. Which of the following equations represent pair of lines ?

xy + x + y + 1 = 0

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110. For what value of λ do the following equations represent pair of straight lines?

$$\lambda x^2 + 5xy - 2y^2 - 8x + 5y - \lambda = 0$$

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111. For what value of λ do the following equations represent pair of straight lines?

$$x^2 - 4xy - y^2 + 6x + 8y + \lambda = 0$$

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112. Obtain the value of λ for which the pair of straight lines represented by $3x^2 - 8xy + \lambda y^2 = 0$ are perpendicular to each other.

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113. Prove that a pair of lines through origin perpendicular to the pair of lines represented by $px^2 + 2qxy + ry^2 = 0$ is given by $rx^2 - 2qxy + py^2 = 0.$

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114. Obtain the condition that a line of the pair of lines

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

Coincides with to a line of the pair of lines

$px^2 + 2qxy + ry^2 = 0$

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115. Obtain the condition that a line of the pair of lines

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

Coincides with to a line of the pair of lines

$px^2 + 2qxy + ry^2 = 0$

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116. Find the acute angle between the pair of lines given by :

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

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117. Find the acute angle between the pair of lines given by :

$2x^2 + xy - 3y^2 + 3x + 2y + 1 = 0$

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118. Find the acute angle between the pair of lines given by :

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

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119. Write down the equation of pair of bisectors of the following pair of lines :

$x^2 - y^2 = 0$

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120. Write down the equation of pair of bisectors of the following pair of lines :

$4x^2 - xy - 3y^2 = 0$

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121. Write down the equation of pair of bisectors of the following pair of lines : $x^2 \cos\theta + 2xy - y^2 \sin\theta = 0$

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122. Write down the equation of pair of bisectors of the following pair of lines : $x^2 - 2xy\tan\theta - y^2 = 0$

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

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124. Transform the equaton :

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

by shifting the origin to (1,2) and keeping the axes parallel.

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125. Transform the equation :

$2x^2 + 3y^2 + 4xy - 12x - 14y + 20 = 0$

when referred to parallel axes through (2,1).

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126. Find the measure of rotation so that the equation $x^2 - xy + y^2 = 5$ when transformed does not contain xy- term.

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127. What does the equation x + 2y - 10 = 0 become when the origin is changed to (4,3)?

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