



MATHS

BOOKS - A N EXCEL PUBLICATION

STRAIGHT LINES

Question Bank

1. Draw a quadrilateral in the cartesian plane whose vertices are

$(-4, 5)$, $(0, 7)$, $(5, -5)$ and $(-4, -2)$.

also, find its area.



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2. The base of an equilateral triangle with side $2a$ lies along the y - axis such that the midpoint of the base is at the origin. Find vertices of the triangle.



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3. Find the distance between $P(x_1, y_1)$ and $Q(x_2, y_2)$ when PQ is parallel to the y-axis.



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4. Find the distance between $P(x_1, y_1)$ and $Q(x_2, y_2)$ when PQ is parallel to the X-axis.



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5. Find a point on the x-axis, which is equidistant from the points (7,6) and (3,4)



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6. Find the slope of a line, which passes through the origin and the mid point of the line segment joining the points P(0,-4) and B (8,0)



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7. Without using the pythagoras theorem show that the points $(4,4)$, $(3,5)$ and $(-1, -1)$ are the vertices of a right angled triangle.



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8. Find the slope of the line, which makes' angle of 30° with the positive direction of y-axis measured anticlockwise.



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



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10. Without using distance formula, show that $(-2, -1)$, $(4,0)$, $(3, 3)$ and $(-3,2)$ are the vertices of a parallelogram.



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11. Find the angle between the positive x-axis and the line joining the points (3,-1) and (4,-2).



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12. The slope of a line is double of the slope of another line. If tangent of the angle between them is $\frac{1}{3}$ find the slopes of the lines.



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13. A line passes through (x_1, y_1) and (h, k) . if the slope of the line is m , show that

$$k - y_1 = m(h - x_1)$$



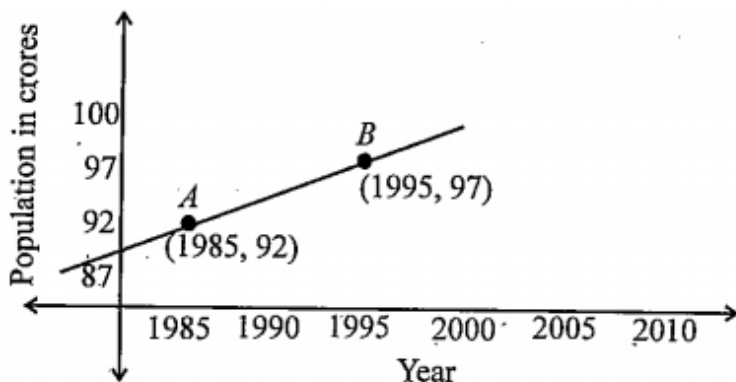
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14. If three points $(h, 0)$, (a, b) and $(0, k)$ lie on a line, show that $\frac{a}{h} + \frac{b}{k} = 1$



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15. Consider the following population and year graph (see figure). Find the slope of the line AB and using it, find what will be the population in the year 2010?



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16. Find the slope of the line joining $(x, -1)$ and $(2, 1)$



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17. Find the slope of the line joining $(2, 1)$ and $(4, 5)$



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



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19. Consider the line passing through the points $(3,4)$ and $(x,5)$ Find the slope of the line



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20. Consider the line passing through the points $(3,4)$ and $(x,5)$ if the line makes an angle of 135° with positive direction of x-axis, find the value of x .



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21. Find the slope of the line through $(3,y)$ and $(2,7)$



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22. Find the slope of the line passing through $(-1,4)$ and $(0,6)$



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23. If the lines passing through $(3,y)$ and $(2,7)$ are parallel to the line through $(-1, 4)$ and $(0, 6)$ find the value of y



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24. If the lines passing through $(3,y)$ and $(2,7)$ are perpendicular find the value of y



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25. Consider the triangle with vertices $A(4,4)$, $B(3,5)$ and $C(-1,-1)$ Using pythagoras theorem prove that $\triangle ABC$ is right angled.



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26. Without using the pythagoras theorem show that the points $(4,4)$, $(3,5)$ and $(-1, -1)$ are the vertices of a right angled triangle.



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27. Consider a quadrilateral whose vertices are $A (-4,2)$, $B (2,6)$, $C (8,5)$ and $D (9,7)$ Find the mid point of the sides of the quadrilateral.



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28. Consider a quadrilateral whose vertices are A (- 4,2), B (2,6), C (8,5) and D (9,7) Find the mid point of the sides of the quadrilateral.



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29. Find the equation of a line that has y-intercept 5 and is perpendicular to the line joining (2, -3) and (4,2)



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30. Find the equation of the perpendicular bisector of the line segment joining the points A (2,3) and B (6, -5).



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31. In what ratio is the line joining the points (4, -5) and (2,3) divided by the line passing through the points (6,8) and (-3,-2).



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32. Find the equation to the straight line which passes through the point (5,6) and has intercepts on the axes equal in magnitude and both positive.



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33. The $\perp r$ distance of a line from the origin is 5 cms and its slope is -1 . find the equation of the line



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34. Write the equation for x- axis and y-axis.



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35. Find the equation of the line passing through $(-4,3)$ and with slope $\frac{1}{2}$



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36. Find the equation of the line passing through $(0,0)$ with slope m .



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37. Find the equation of the line passing through $(2, 2\sqrt{3})$ and inclined with the x-axis at an angle of 75°



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38. Find the equation of the line intersecting the x-axis at a distance of 3 units to the left of origin with slope -2.



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39. Find the equation of the line intersecting the y-axis at a distance of 2 units above the origin and making an angle of 30° with the positive direction of the x-axis.



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40. Find the equation of the line passing through $(-1,1)$ and $(2, -4)$



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41. Find the equation the following lines satisfying the given conditions.

perpendicular distance from origin is 5 units and the angle the perpendicular makes with the positive direction of x-axis is 30° .



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42. The vertices of $\triangle PQR$ are P (2, 1), Q (-2, 3) and R (4, 5). Find the equation of the median through the vertex R.



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43. Find the equation of the line passing through the point (-3, 5) and perpendicular to the line through the points (2, 5) and (-3, 6).



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44. A line perpendicular to the line segment joining the points $(1,0)$ and $(2,3)$ divides it in the ratio $1:n$. find the equation of the line.



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45. Find the equation of the line that cut off equal intercepts on the coordinate axis and passes through the point $(2,3)$



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46. Find the equation of the line passing through the point $(2,2)$ and cutting off intercepts on the axis whose sum is 9.



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47. Find the equation of the line through the point $(0,2)$ making an angle $\frac{2\pi}{3}$ with the positive x-axis, also find the equation of the line parallel to it and crossing the y-axis at a distance 2 units below the origin.





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48. The perpendicular from the origin to a line meets it at the point $(-2,9)$, find the equation of the line.



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49. The length L (in cms) of a copper rod is a linear function of its celsius temperature C . in an experiment, if $L = 124.942$ when $C = 20$ and $L = 125.134$ when $C = 110$ express L in terms of C .



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50. The owner of a milk store finds that he can sell 980 litres of milk each week at Rs. 14/litre and 1220 litres of milk each week at Rs. 16/litre. Assuming a linear relationship between selling price and demand, how many litres could he sell weekly at Rs.17/litre.



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51. P(a,b) is the mid-point of a line segment between axis. Show that equation of the line is

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



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52. Point R (h,k) divides the line segment between the axes in the ratio 1:2. find the equation of the line.



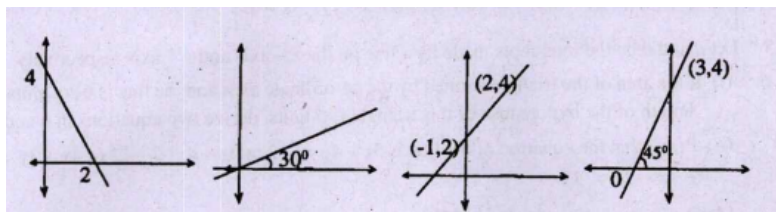
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53. By using the concept of equation of a line, prove that the three points $(3,0)$, $(-2,-2)$ and $(8,2)$ are collinear.



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54. Look at the following figures. By observing the figures write down their cartesian equations



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55. What is the geometric property possessed by the straight lines of each system given by

$$y = mx + 8$$



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56. What is the geometric property possessed by the straight lines of each system given by

$$y = 6x + 8$$



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57. What is the geometric property possessed by the straight lines of each system given by

$$9x + 6y = k$$



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58. What is the geometric property possessed by the straight lines of each system given by

$$y + 4 = m(x - 5)$$



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59. What is the geometric property possessed by the straight lines of each system given by

$$1 = \frac{x}{a} + \frac{y}{3}$$



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60. What is the geometric property possessed by the straight lines of each system given by

$$(4x + 3y + 2) + k(3x + 7y) = 0$$



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61. Find the slope of the line joining the points $(a \cos \theta, b \sin \theta)$ and $(a \cos \phi, b \sin \phi)$



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62. If the line joining the points $(a \cos \theta, b \sin \theta)$ and $(a \cos \phi, b \sin \phi)$. Prove that the equation of this line is

$$\frac{x}{a} \cos \frac{\theta + \phi}{2} + \frac{y}{b} \sin \frac{\theta + \phi}{2} = \cos \frac{\theta - \phi}{2}$$



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63. Find the equation of the line joining the points $(2,3)$ and $(4,1)$



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64. Find the co-ordinates of the point which divides the line joining the points $(-3,4)$ and $(-1,-2)$ in the ratio $l : m$



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65. Find the ratio of division in the point of division lies on the line in



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66. Consider the points A (2,3) and B (6,5) Find the co-ordinates of the mid point of the segment joining A and B



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67. Consider the points A (2,3) and B (6,5) find the slope of AB



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68. Consider the points A (2,3) and B (6,5) What is the slope of a line perpendicular to AB?



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69. Consider the points A (2,3) and B (6,5) Find the equation of the perpendicular bisector of the line segment AB



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70. Let a and b be the intercepts made by a line on the x-axis and y-axis respectively If the area of the triangle formed by the co-ordinate axes and the line is 6 sq. units and the length

of the hypotenuse of this triangle is 5 units,
derive two equations in a and b



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71. Let a and b be the intercepts made by a line on the x-axis and y-axis respectively. If the area of the triangle formed by the coordinate axis and the line is 6 square units and length of the hypotenuse is 5 units. Prove that the equation of the line is $3x + 4y = 12$ or $3x + 4y = -12$ or $4x + 3y = 12$ or $-4x - 3y = 12$



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72. Suppose that two opposite vertices of a square are $(1,2)$ and $(5,8)$ Find the co-ordinates of its other two vertices



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73. Suppose that two opposite vertices of a square are $(1,2)$ and $(5,8)$ Find the equations of the sides of the square



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74. Consider the points P (2,4) and Q (-2,5) Find the slope of PQ



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75. Consider the points P (2,4) and Q (-2,5) Find the mid point of PQ Hence, find the equation of the perpendicular bisector of PQ



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76. Suppose $D(2,1)$, $E(-5,7)$, $F(-5,-5)$ are the midpoints of the sides AB , BC and CA of the triangle ABC . Find the slope of DF , DE and EF .



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77. Suppose $D(2,1)$, $E(-5,7)$, $F(-5,-5)$ are the midpoints of the sides AB , BC and CA of the triangle ABC . Find the equation of the sides AB , BC and CA .



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78. Reduce the equation $\sqrt{3}x + y + 2 = 0$ to :
slope - intercept form and find slope and y -
intercept ,



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79. Reduce the equation $\sqrt{3}x + y + 2 = 0$ to :
intercept form and find intercepts on the axes:



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80. Reduce the equation $\sqrt{3}x + y + 2 = 0$ to :

the normal form and find p and α



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81. If p be the measure of the perpendicular segment from the origin on the line whose intercepts on the axis are a and b show that

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



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82. Find the distance of the point $(-2, 3)$ from the line $x - y = 5$.



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83. Find the distance of the point $(4, 2)$ from the line joining $(4, 1)$ and $(2, 3)$.



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84. Reduce the following equations into slope intercept form and find their slopes and the y-intercepts.

i) $x + 7y = 0$

ii) $6x + 3y - 5 = 0$

(iii) $y = 0$



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85. Reduce the equation $6x + 3y - 5 = 0$ into slope intercept form and hence find its slope

and y-intercept



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86. Reduce the following equation into slope intercept form and find their slopes and the y-intercepts $x + 7y = 0$



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87. Find the x and y intercepts of the line $3x + 4y - 12 = 0$



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88. Find the slope, x-intercept and y-intercept of the following lines.

$$4x - 3y = 6$$



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89. Reduce the following equation into slope intercept form and find their intercepts on the axes. $3y + 2 = 0$



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90. Reduce of the following equation into normal form. Find their perpendicular distance from the origin and angle between perpendicular and the positive x-axis.

$$x - \sqrt{3}y + 8 = 0$$



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91. Reduce the following equation into normal form. Find their perpendicular distance from

the origin and angle between perpendicular
and the positive x-axis. $y - 2 = 0$



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92. Reduce the following equation into normal
form. Find their perpendicular distance from
the origin and angle between perpendicular
and the positive x-axis. $x - y = 4$



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93. Find the distance of the point $(-1,1)$ from the line $12(x + 6) = 5(y - 2)$



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94. Find the points on the x -axis, whose distance from the line $\frac{x}{3} + \frac{y}{4} = 1$ are 4 units.



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95. Find the distance between the parallel lines $15x + 8y - 34 = 0$ and $15x + 8y + 31 = 0$



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96. Find the distance between the parallel lines $l(x + y) + p = 0$ and $l(x + y) - r = 0$



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97. Find the equation of the line parallel to the line $3x - 4y + 2 = 0$ and passing through the point $(-2,3)$.



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98. Find the equation of the line perpendicular to the line $x - 7y + 5 = 0$ and having x-intercept 3.



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99. Find angles between the lines

$$\sqrt{3}x + y = 1 \text{ and } x + \sqrt{3}y = 1$$



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100. The line through the points $(h,3)$ and $(4,1)$ intersects the line $7x - 9y - 19 = 0$ at right angle.

find the value of h .



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101. Prove that the line through the point (x_1, y_1) and parallel to the line $Ax + By + C = 0$ is $A(x - x_1) + B(y - y_1) = 0$



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102. Two lines passing through the point $(2,3)$ intersect each other at an angle of 60° . If slope of one line is 2, find equation of the other line.



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103. Find the equation of the right bisector of the line segment joining the points (3,4) and (-1,2)



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104. Find the co-ordinates of the foot at the perpendicular from the point (-1,3) to the line $3x - 4y - 16 = 0$



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105. The perpendicular from the origin to a line $y = mx + c$ meets it at the point $(-1,2)$. Find the values of m and c .



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106. If p and q are the lengths of the perpendiculars from the origin to the lines

$$x \cos \theta - y \sin \theta = k \cos 2\theta \quad \text{and}$$

$x \sec \theta + y \csc \theta = k$ respectively prove that

$$p^2 + 4q^2 = k^2$$





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107. In the triangle ABC with vertices A (2,3), B (4, -1) and C (1,2), find the equation and length of altitude from the vertex A.



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108. Consider a line with equation $x - \sqrt{3}y + 4 = 0$ Reduce the given equation into slope-intercept form and find the slope and y - intercept of the line



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109. Consider a line with equation $x - \sqrt{3}y + 4 = 0$ Reduce the given equation into slope-intercept form and find the slope and y - intercept of the line



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110. Consider a line with equation $x - \sqrt{3}y + 4 = 0$ Reduce the given equation

into normal form and find the length of the perpendicular from the origin on the line and the angle made by this perpendicular with the x- axis.



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111. Find the length of the perpendicular from the origin to the line $2x - y + 3 = 0$



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112. Find the length of the perpendicular from the origin to the line $x - 4y - 7 = 0$



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113. Which of the above lines is farther from the origin ?



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114. Consider the points A (2,4) and B (3,-1) By two point form find the equation of the line AB. Hence find the x - intercept and y-intercept of the line AB.



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115. Complete the following table

Equation of a line	Slope of the line	y - intercept of the line	x - intercept of the line
$2x + 3y - 6 = 0$	----	----	----
$3x - 2y - 1 = 0$	----	----	----
$4x + 6y + 1 = 0$	----	----	----
$-3x + 4y - 4 = 0$	----	----	----



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116. Prove that $2x + 3y - 6 = 0$ and $3x - 2y - 1 = 0$
are perpendicular



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117. Prove that $2x + 3y - 6 = 0$ and $4x + 6y + 1 = 0$
are parallel



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118. Suppose a line cuts off intercept 4 on the x-axis and the line makes angle 60° with the positive direction of the x-axis. Find the coordinates of a point on the line



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119. Suppose a line cuts off intercept 4 on the x-axis and the line makes angle 60° with the positive direction of the x-axis. Find the slope of the line. Hence find the equation of the line.





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120. Consider a triangle ABC with vertices A (2,5), B (-4,9) and C (-2,-1) Find the co-ordinates of the mid points of AB, BC and AC



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121. Consider a triangle ABC with vertices A (2,5), B (-4,9) and C (-2,-1) Find the equations of the medians of the triangle



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122. Consider the points A (1,2) and B (2,3)

Let P and Q be the points of trisection of the segment joining A and B Find the co-ordinates of P and Q



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123. Consider the points A (1,2) and B (2,3)

Let P and Q be the points of trisection of the segment joining A and B Find the equation of

the line passing through P and perpendicular to AB



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124. Consider the points A (1,2) and B (2,3)

Let P and Q be the points of trisection of the segment joining A and B Find the equation of the line passing through Q and perpendicular to AB



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125. What is the distance of the point (h,k) from the line $9x + 40y + 21 = 0$?



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126. If (h,k) lies on $9x + 40y - 20 = 0$, what is the value of $9h + 40k$?



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127. Find the distance between the parallel lines $9x + 40y + 21 = 0$ and $9x + 40y - 20 = 0$.



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128. Let A (5,2), B (3,-3) and C (-4,3) be the vertices of a Δ ABC. Find the equation of BC



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129. Let A (5,2), B (3,-3) and C (-4,3) be the vertices of a Δ ABC Find the length of the altitude from A to BC



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130. Suppose that the line $x - 2y + 3 = 0$ is rotated through a right angle about its point intersection with the line $3x + y + 2 = 0$ Find the slope of the line in the new position



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131. Suppose that the line $x - 2y + 3 = 0$ is rotated through a right angle about its point intersection with the line $3x + y + 2 = 0$ Find the slope of the line in the new position



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132. Consider the points A (5,1) ,B (1,-1) and C (11,4) Raju proved A,B,C are collinear by finding the equation of AB. write the steps written by Raju.



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133. Consider the points A (5,1) ,B (1,-1) and C (11,4) Saji proved A,B and C are collinear by using slope. Write the steps written by Saji.



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134. Consider the points A (5,1) ,B (1,-1) and C (11,4) Ram proved A,B,C are collinear by using

distance formula. Write the steps written by

Ram



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135. Consider the points A (5,1) ,B (1,-1) and C (11,4) Neelima proved A,B,C are collinear by using area of ABC. Write the steps written by Neelima.



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136. Complete the following table

Example 2: (i) Complete the following table

Equation of the line	Slope of the line	y-intercept of the line	x-intercept of the line	Length of the perpendicular from the origin on the line
$3x + 2y - 12 = 0$
$3x - 4y + 5 = 0$



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137. Reduce the lines $3x - 4y + 4 = 0$ and $4x - 3y + 12 = 0$ to the normal form and hence determine which line is nearer to the origin.



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138. A straight line has equation $6x - 4y + 9 = 0$(1) Write down its slope Find the slope of lines parallel and perpendicular to (1)



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139. A straight line has equation $6x - 4y + 9 = 0$(1) Write down its slope, Write down the equation of the lines through (1,2), parallel and perpendicular to (1)



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140. Find the point of intersection of the straight line $\frac{x}{a} + \frac{y}{b} = 1$ and $\frac{x}{b} + \frac{y}{a} = 1$



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141. Consider a triangle whose sides are $y = x$, $y = 2x$ and $y = 3x + 4$ Find the co-ordinates of the vertices of the triangle.



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142. Consider a triangle whose sides are $y = x$, $y = 2x$ and $y = 3x + 4$ Find the centroid of the triangle.



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143. Consider a triangle whose sides are $y = x$, $y = 2x$ and $y = 3x + 4$ Find the area of the triangle.



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144. Find the values of k for which the line $(k-3)x - (4 - k^2)y + k^2 - 7k + 6 = 0$ is parallel to the x-axis



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145. Find the values of k for which the line $(k - 3)x - (4 - k^2)y + k^2 - 7k + 6 = 0$ is parallel to the y-axis



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146. Find the values of k for which the line $(k - 3)x - (4 - k^2)y + k^2 - 7k + 6 = 0$ is passing through the origin



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147. Find the values of θ and p , if the equation $x \cos \theta + y \sin \theta = p$ is the normal form of $\sqrt{3}x + y + 2 = 0$



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148. Find the equation of the lines, which cuts off intercepts on the axes whose sum and product are 1 and - 6 respectively.



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149. What are the points on the y-axis whose distance from the line $\frac{x}{3} + \frac{y}{4} = 1$ is 4 units.



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150. Find perpendicular distance from the origin of the line joining the points $(\cos \theta, \sin \theta)$ and $(\cos \phi, \sin \phi)$



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151. Find the equation of the line parallel to y-axes and drawn through the point of intersection of the lines $x - 7y + 5 = 0$ and $3x + y = 0$



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152. Find the equation of a line drawn perpendicular to the line $\frac{x}{4} + \frac{y}{6} = 1$ through the point where it meets the y-axis.



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153. Find the area of the triangle formed by the lines $y - x = 0$, $x + y = 0$ and $x - k = 0$



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154. Find the value of p so that the three lines $3x + y - 2 = 0$, $px + 2y - 3 = 0$ and $2x - y - 3 = 0$ may intersect at a point.



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155. If three lines whose equations are $y = m_1x + c_1$, $y = m_2x + c_2$ and $y = m_3x + c_3$ are concurrent, then show that $m_1(c_2 - c_3) + m_2(c_3 - c_1) + m_3(c_1 - c_2) = 0$



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156. Find the equation of the lines through $(3,2)$ which makes an angle 45° with the line $x - 2y = 3$



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157. Find the equation of the line passing through the point of intersection of the lines $4x + 7y - 3 = 0$ and $2x - 3y + 1 = 0$ that the equal intercepts on the axis.



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158. Show that the equation of the line passing through the origin and making an angle θ with the line $y = mx + c$ is

$$\frac{y}{x} = \frac{m + \tan \theta}{1 - m \tan \theta} \quad \text{or} \quad \frac{y}{x} = \frac{m - \tan \theta}{1 + m \tan \theta}$$



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159. In what ratio the line joining $(-1,1)$ and $(5,7)$ is divided by the line $x + y = 4$?



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160. Find the distance of the line $4x + 7y + 5 = 0$ from the point $(1,2)$ along the line $2x - y = 0$



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161. The hypotenuse of a right angled triangle has its ends at the points $(1,3)$ and $(-4,1)$. Find the equation of the legs (perpendicular sides) of the triangle.



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



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163. If the lines $y = 3x + 1$ and $2y = x + 3$ are equally inclined to the

line $y = mx + 4$ $\left(\frac{1}{2} < m < 3\right)$ then the

values of m are



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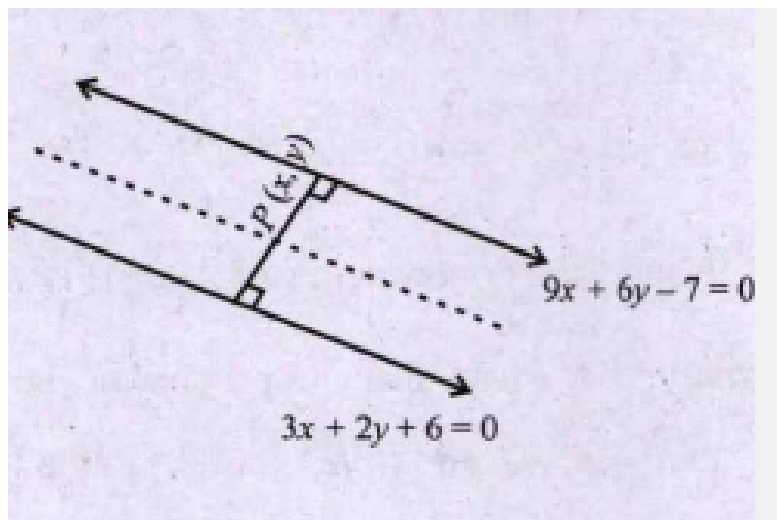
164. If the sum for the perpendicular distance of variable point P (x,y) from the lines $x + y - 5 = 0$ and $3x - 2y + 7 = 0$ is always 10. show that P must move on a line.



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165. Find the equation of the line which is equidistant from the parallel lines

$$9x + 6y - 7 = 0 \text{ and } 3x + 2y + 6 = 0$$



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166. A ray of light passing through the point (1,2) reflects on x-axis at the point A and the reflected ray passes through the point (5,3). Find the co-ordinates of A.



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167. A person standing at the junction (crossing) of two straight lines represented by the equations $2x - 3y + 4 = 0$ and $3x + 4y - 5 = 0$ wants to reach the path whose equation is $6x - 7y + 8 = 0$ in the least time. Find the equation of the path that he should follow.



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