



MATHS

BOOKS - MODERN PUBLICATION

STRAIGHT LINES

Example

1. Plot the points $(2,3)$, $(-2,3)$, $(-2,-3)$, $(2,-3)$, $(0,5)$, $(-2,0)$.

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2. If three vertices of a rectangle are $(0,0)$, $(2, 0)$, and $(0, 3)$, find the coordinates of the fourth vertex?

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

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4. Find the distance between the pair of points $(5, -12)$, $(9, -9)$.

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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. Determine, by distance formula whether the points $(0, 0)$, $(3, 2)$, $(9, 6)$ lie on line ?

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7. Show that $(8, 2)$, $(5, -3)$ and $(0,0)$ are the vertices of an isosceles triangle.

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

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9. Find the coordinates of a point which divides externally the line joining $(1, -3)$ and $(-3, 9)$ in the ratio $1 : 3$.

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

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11. The vertices of a quadrilateral are at $(-2, 4)$, $(1, 3)$, $(4, 3)$ and $(1, 2)$. Show that the quadrilateral is a parallelogram.

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12. Find the point of intersection of the medians of the triangle with vertices at $(-1, 0)$, $(5, -2)$ and $(8, 2)$.

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13. Find the area of the triangle whose vertices are $(3, 8)$, $(-4, 2)$ and $(5, 1)$.

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14. Show that the following triple of points are collinear : (2, 4), (0, 1), (4, 7).



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



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16. 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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17. Prove that in a right angled triangle the mid-point of the hypotenuse is equidistant from its vertices.

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18. Find the equation of the set of all points equidistant from the point $(4, 2)$ and the x-axis.

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19. Find the equation of the set of points such that the sum of its distances from $(0, 2)$ and $(0, -2)$ is 6.

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20. A point moves such that the sum of its distance from two fixed points $(ae, 0)$ and $(-ae, 0)$ is always, $2a$. Prove that the equation of the locus is

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1, \text{ where } b^2 = a^2(1 - e^2)$$



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21. The Slope m of a line is given by : $m = \sqrt{3}$. Find its inclination.



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22. The slope of the line passing through the points (3,-2) and (-1,4) is:



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23. Find the slope of the line passing through the points :

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



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24. Determine λ , so that 2 is the slope of the line through (2,5) and $(\lambda, 3)$



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25. A line passes through (x_1, y_1) and (h, k) . If slope of the line is m , show that $k - y_1 = m(h - x_1)$.



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26. State whether the two lines in the following problem is parallel, perpendicular or neither parallel nor perpendicular :
through $(5, 6)$ and $(2, 3)$, through $(9, -2)$ and $(6, -5)$.



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27. State whether the two lines in the following problem is parallel, perpendicular or neither parallel nor perpendicular :
Through $(2, -5)$ and $(-2, 5)$, through $(6, 3)$ and $(1, 1)$.



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28. Line through the points $(-2,6)$ and $(4,8)$ is perpendicular to the line through the points $(8,12)$ and $(x,24)$. Find the value x .

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29. Show that the points $(1,1)$, $(2,3)$ and $(3,5)$ are collinear.

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30. A quadrilateral has the vertices at the points $(-4,2)$, $(2,6)$, $(8,5)$ and $(9,-7)$. Show that the mid-points of the sides of the quadrilateral are the vertices of a parallelogram.

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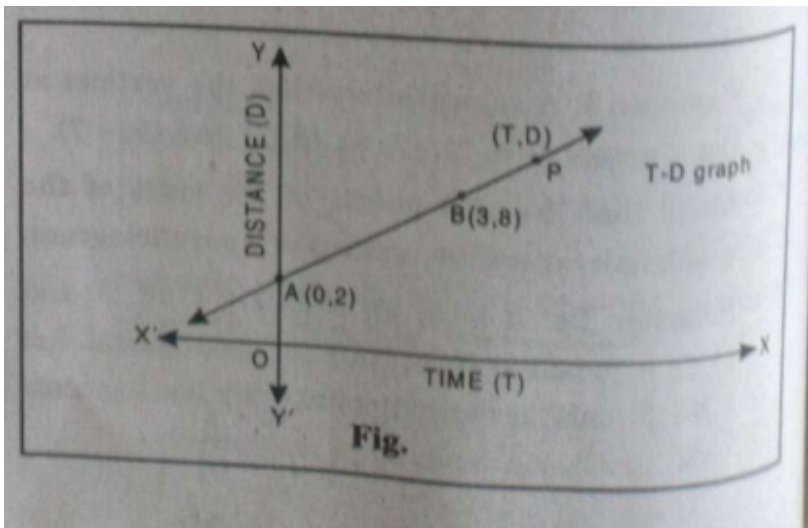
31. Without using the distance formula, show that $(-2,-1)$, $(4,0)$, $(3,3)$ and $(-3,2)$ are the vertices of a parallelogram.

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32. If A (2,0), B (0, 2) and C (0,7) are three vertices, taken in order, of an isosceles trapezium ABCD In which AB is parallel to DC. Obtain the coordinates of D.

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33. In the figure, time- distance graph of a linear relation is given :



Two positions of time and distance recorded as: When $T = 0$, $D = 2$ and when $T = 3$, $D = 8$.

Using the concept of slope, find the law of motion i.e. how distance depends upon time.

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34. Find the equation of the straight line, which is parallel to x-axis and 2 units above it.

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35. Find the equation of the straight line, which is parallel to y-axis and 3 units to the right of it.

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36. Find the equation of the line, which is parallel to y-axis and passing through the point (3, - 4).

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37. Find the equation of the st. line passing through the point $(4, 3)$ with slope 2.

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38. Find the equation of the straight line bisecting the segment joining the points $(5,3)$ and $(4,4)$ and making an angle of 45° the positive direction of X- axis .

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39. Find the equation of the st. line passing through points $(0, -4)$ and $(-6, 2)$.

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40. Find the equations of the sides of the triangle whose vertices are $(-1, 8)$, $(4, -2)$ and $(-5, -3)$.

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

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42. $A(-3, -1)$ and $B(2, 2)$ are two adjacent vertices and $O(3, 0)$ is the point of intersection of the diagonals of a parallelogram $ABCD$. Write down the equations of the four sides of the parallelogram.

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43. Show that the points $(1, 4)$, $(3, -2)$ and $(-3, 16)$ are collinear and find the equation of the st. line in which they lie.

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44. Find the equation of the st. line with slope 3 and y-intercept - 2.

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45. Find the equation of a line through the origin, which makes an angle of 45° with the positive direction of x-axis.

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46. Write the equation of the line for which $\tan \theta = \frac{1}{2}$, where θ is the inclination of the line and y-intercept is $-\frac{3}{2}$.

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47. Write the equation of the line for which $\tan \theta = \frac{1}{2}$, where θ is the inclination of the line and x-intercept is 4.

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48. Find the equations of the lines passing through the point (2, 2) such that the sum of their intercepts on the axes is 9.

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49. Find the equations of the lines which cut off intercepts on the axes whose sum and product are 1 and -6 respectively.

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50. Find the equation of the line through (2,3) so that the segment of the line intercepted between the axes is bisected at this point

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51. Find the perpendicular form of the equation of the lines from the given values of p and α :

$$p=3 \text{ and } \alpha = 45^\circ.$$

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52. Find the perpendicular form of the equation of the lines from the given values of p and α :

$$p=5 \text{ and } \alpha = 135^\circ.$$

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53. If p is the length of perpendicular from the origin to the line whose intercepts on the axes are a and b , then show that $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$.

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54. Find the equation of a st. line, which passes through the point $(-2,3)$ and makes an angle of 60° with the positive direction of x -axis.

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55. The length L (in centimetres) 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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56. Find the distance of the line $4x - y = 0$ from the point P (4, 1) measured along the line making an angle of 135° with the positive x-axis.

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57. Find the equation of the st. line through (3, 4) and (2, -1).

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58. Reduce the equation to $\sqrt{3}x + y + 1 = 0$ to the form $y = mx + c$ and hence find the slope, the inclination to the x-axis and the intercept on the y-axis.

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59. Find the slope and y-intercept of the st. line $5x + 6y = 7$.

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60. Reduce the equation $2x-7y+3=0$ to the intercept form and hence find the intercepts on the axes.

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61. Equation of a line is $3x-4y+10=0$. Find its : slope .

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62. Equation of a line is $3x-4y+10=0$. Find its : x and y-intercepts.

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63. Reduce the equation $\sqrt{3}x + y - 8 = 0$ into normal form and find : length of the perpendicular from origin to the line.

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64. Reduce the equation $\sqrt{3}x + y - 8 = 0$ into normal form and find :
angle between the normal and positive x-axis.



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65. Find the angle between the straight lines : $y - \sqrt{3}x - 5 = 0$ and
 $\sqrt{3}y - x + 6 = 0$.



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66. Two lines Passing through the point (2, 3) make an angle of 45° . If the
slope of one of the lines is 2, find the slope of the other.



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67. Determine the angle B of the triangle with vertices A (- 2, 1), B (2, 3)
and C (- 2, - 4).



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68. Find the angle between the lines joining the points $(0,0)$, $(2,3)$ and $(2, -2)$, $(3, 5)$



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69. The line $7x-9y-19 = 0$ is perpendicular to the line through the points $(h, 3)$ and $(4, 1)$. Find the value of h .



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70. Find the equation of the st. line through the origin making angle of 60° with the st. line $x + \sqrt{3}y + 3\sqrt{3} = 0$.



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71. Find the equation of a line passing through the point (0,1) and parallel to : $3x - 2y + 5 = 0$.

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

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

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





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75. Assuming that straight line works as the plane mirror for a point, find the image of the point (1, 2) in the line $x-3y+4=0$.



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76. For the triangle ABC whose vertices are A (-2, 3), B (4, - 3) and C (6, 5), find the equation of :
the perpendicular bisector of the side BC.



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77. For the triangle ABC whose vertices are A (-2, 3), B (4, - 3) and C (6, 5), find the equation of :
the altitude from A.



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78. For the triangle ABC whose vertices are A (-2, 3), B (4, - 3) and C (4, 5), find the equation of :
the st. line through A parallel to the opposite side BC.

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79. Find the point of intersection of the st. lines $x - 4y = 3$ and $6x - y = 11$.

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80. If $3x - by + 2 = 0$ and $9x + 3y + a = 0$ represent the same straight line, find the values of a and b.

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81. The sides of quadrilateral taken in order, are given by
 $3x + 11y - 65 = 0$, $5x + y - 39 = 0$, $-x + 5y + 13 = 0$ and $11x - 3y +$

. Find the co-ordinates of the vertices of the quadrilateral.



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82. Find the point of intersection of the medians of the triangle with vertices at $(-1, 0)$, $(5, -2)$ and $(8, 2)$.



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83. Find the coordinates of the foot of perpendicular from a point $(-1, 3)$ to the line $3x - 4y - 16 = 0$.



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84. Find the centroid and incentre of the triangle whose vertices are $(1, 2)$, $(2, 3)$ and $(3, 4)$.



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85. The vertices of a triangle are $(4, -3)$, $(-2, 1)$ and $(2, 3)$. Find the coordinates of the circumcentre of the triangle. [Circumcentre is the point of concurrence of the right-bisectors of the sides of a triangle.]



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86. Show that the area of the triangle formed by the lines whose equations are : $y = m_1x + c_1$, $y = m_2x + c_2$ and $x=0$ is : $\frac{(c_1 - c_2)^2}{2|m_1 - m_2|}$.



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87. Prove that the three st. lines : $2x - 3y = 7$, $3x - 4y = 13$ and $8x - 11y = 33$ meet in a point.



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88. Show that the perpendicular bisectors of the sides of the triangle with vertices $(7, 2)$, $(5, -2)$ and $(-1, 0)$ are concurrent. Also find the co-ordinates of the point of concurrence (circumcentre).

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89. Prove analytically that the altitudes of a triangle are concurrent.

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90. The line-segment joining the mid-points of two sides of a triangle is parallel to the third side and Of it.

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91. The diagonals of a rectangle are of the equal length.

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92. The diagonals of a rhombus are perpendicular to each other .

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93. Prove that the figure formed by joining the points of the adjacent sides of a quadrilateral parallelogram.

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94. Find the distance between two Parallel lines :

$$y = mx + c_1 \text{ and } y = mx + c_2.$$

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95. Find the distance between two Parallel lines :

$$ax + by + c_1 = 0 \text{ and } ax + by + c_2 = 0.$$

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96. Find the distance between the st. line $4x + 3y - 5 = 0$ and the point $(-2, -1)$.



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97. Find the perpendicular distance of the point (b, a) from the st. line

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



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98. Find the point on the x-axis, whose distances from the line

$$\frac{x}{3} + \frac{y}{4} = 1$$
 are 4 units.



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99. Show that the origin is equidistant from the three straight lines : $4x + 3y + 10 = 0$, $5x - 12y + 26 = 0$ and $7x + 24y = 50$.

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100. Find the distance between the parallel lines : $3x - 4y + 5 = 0$ and $3x - 4y + 7 = 0$.

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101. Prove that st. line $5x - 2y - 1 = 0$ is mid-parallel to the st. lines : $5x - 2y - 9 = 0$ and $5x - 2y + 7 = 0$.

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102. Two sides of a square lie on the lines $x+y-1=0$ and $x+y+2$ then its area is:



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103. Prove that the parallelogram formed by the lines

$\frac{x}{a} + \frac{y}{b} = 1$, $\frac{x}{b} + \frac{y}{a} = 1$, $\frac{x}{a} + \frac{y}{b} = 2$ and $\frac{x}{b} + \frac{y}{a} = 2$ is a rhombus.



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104. Show that the path of a moving point such that its distance from the

lines : $3x - 2y = 5$ and $3x + 2y = 5$ are equal, is a straight line.



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105. Find the equations of the bisectors of the angles formed by the lines

:

$3x - 4y + 12 = 0$ and $4x + 3y + 2 = 0$.



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106. Find the equations of the bisectors of the angles, between the lines through $(0, 0)$ with slopes 1 and 2.

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107. Find the equations of the bisectors of the internal angles of the triangle whose sides are :
 $3x + 4y - 6 = 0$, $12x - 5y - 3 = 0$, $4x - 3y + 12 = 0$.

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108. Find the equations of the bisectors of the interior angles of the triangle whose vertices are $A(0, 0)$, $B(4, 0)$ and $C(0, 3)$ and prove that they are concurrent.

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109. Find the new co-ordinates of the points :

(1,1) when the origin is shifted to the point (-3, -2) by translation of axes.

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110. Find the new co-ordinates of the points :

(5,0) when the origin is shifted to the point (-3, -2) by translation of axes.

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111. Find the new co-ordinates of the points :

(- 2, 1) when the origin is shifted to the point (-3, -2) by translation of axes.

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112. Find the transformed equation of the curve :

$x^2 + y^2 + 4x - 6y + 16 = 0$ when the origin is shifted to the point

$(-2,3)$.



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113. On shifting the origin to the point $(1, -1)$, the axes remaining parallel to the original axes the equation of a curve becomes : $4x^2 + y^2 + 3x - 4y + 2 = 0$. Find its original equation.



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114. Find the point to which the origin should be shifted so that the equation : $y^2 - 6y - 4x + 13 = 0$ is transformed to form : $y^2 + Ax = 0$.



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115. Prove that the slope of a straight line is invariant under the translation of axes.



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116. Write the equations for the family of lines with slope 3.

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117. Write the equations for the family of lines with x-intercept 2.

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118. Write the equations for the family of lines perpendicular to $2x - 5y - 6 = 0$.

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119. Find the equation of the line passing through the point of intersection of $x + 2y = 5$ and $x - 3y = 7$, and passing through the point : $(0, -1)$.

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120. Find the equation of the line passing through the point of intersection of $x + 2y = 5$ and $x - 3y = 7$, and passing through the point : $(2, -3)$.

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121. Find the equation of the line passing through the intersection of the lines $x+2y-3=0$ and $4x-y+7=0$ and which is parallel to $5x+4y-20=0$.

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122. Find the equation of the line passing through the intersection of the lines $2x+3y-4=0$ and $x-5y+7=0$ that has its x-intercept equal to -4 .

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1. What is the slope of the line whose inclination is :

0° ?

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2. What is the slope of the line whose inclination is :

60° ?

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3. What is the slope of the line whose inclination is :

45° ?

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4. What is the slope of the line whose inclination is :

90° ?



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5. What is the slope of the line whose inclination is :

120° ?



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6. What is the slope of the line whose inclination is :

150° ?



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



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8. Find the inclination of the line whose slope is :

1.



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9. Find the inclination of the line whose slope is :

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



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10. Find the inclination of the line whose slope is :

3.



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11. Find the inclination of the line whose slope is :

0.



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12. Find the angle between x-axis and the line joining the points (3,-1) and

(4, -2).



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13. Find the slope of the line through the points :

(1, 2), (4, 2).



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14. Find the slope of the line through the points :

(0, - 4), (- 6, 2).





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15. Find the slope of the line through the points $(4, -6)$ $(-2, -5)$



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16. Find the slope of the line through the points :

$(4, 6)$, $(2, 12)$



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17. Find the slope of the line through the points :

$(3, -2)$, $(3, 4)$.



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18. 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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19. What acute angle does a line of slope $-\frac{2}{3}$ make with a vertical line ?

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20. Show that the line joining the points (2, -3) and (-5, 1) is parallel to the line joining (7, -1) and (0,3)

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21. Show that the line joining (2, -3) and (-5, 1) is :
perpendicular to the line joining (4, 5) and (0, -2).

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22. Three points P (h, k), Q(x_1, y_1) and R (x_2, y_2) lie on a line. Show that :

$$(h - x_1)(y_2 - y_1) = (k - y_1)(x_2 - x_1).$$



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23. Show that the line :

through (0, 0) and (2, 3) is parallel to the line through (2, 2) and (4, 5) .



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24. Show that the line :

through (- 2, 6) and (4, 8) is perpendicular to the line through (8, 12) and (4, 24).



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25. Show that the line :

through $(2, -3)$ and $(-1, 2)$ is perpendicular to the line joining $(3, 7)$ and $(-2, 4)$.



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26. State whether the two lines of the following problem is parallel, perpendicular or neither parallel nor perpendicular :

Through $(8, 2)$ and $(-5, 3)$, through $(16, 6)$ and $(3, 15)$



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27. State whether the two lines of the following problem is parallel, perpendicular or neither parallel nor perpendicular :

Through $(9, 5)$ and $(-1, 1)$, through $(8, -3)$ and $(3, -5)$.



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28. State whether the two lines of the following problem is parallel, perpendicular or neither parallel nor perpendicular :

Through $(-2, 6)$ and $(4, 8)$, through $(8, 12)$ and $(4, 24)$.



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29. What is the value of y so that the line through $(3, y)$ and $(2, 7)$ is parallel to the line through $(-1, 4)$ and $(0, 6)$?



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



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



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32. If three points A(h,0), B(a, b) and C(0, k) lie on line, show that

$$\frac{a}{h} + \frac{b}{k} = 1.$$



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33. If points (a, 0), (0, b) and (x, y) are collinear, then write correct answer from the following :



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34. Find the equation of the line, which is parallel to x-axis at a distance of
:
4 units above it.



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35. Draw the graph of the equations represented by a straight line which is parallel to the x-axis and at a distance of 3 units below it.

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36. Find the equation of the line, which is parallel to y-axis at a distance of
:
2 units to the right of it.

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37. Find the equation of the line, which is parallel to y-axis at a distance of
:
4 units to the left of it.

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38. Find the equation of the line parallel to x-axis and :
passing through the point (3, -4).

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39. Write the equation of the line which is parallel to x-axis and passing
through
(0,2)

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40. Find the equation of the line parallel to x-axis and :
has Intercept on the y-axis as -2.

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41. Find the equations of the lines parallel to axes and passing through $(-2, 3)$.

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42. Find the equation of the line perpendicular to the x-axis and :
passing through the origin.

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43. Find the equation of the line perpendicular to the x-axis and :
passing through the point $(-1, -1)$.

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44. Find the equation of the line perpendicular to the x-axis and :
passing through the point $\left(-3, \frac{1}{2}\right)$.



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45. Find the equation of the straight line perpendicular to y-axis and :
passing through the origin.

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46. Find the equation of the straight line perpendicular to y-axis and :
passing through the point (- 2, -3).

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47. Find the value of k for which the line

$$(k - 3)x - (4 - k^2)y + k^2 - 7k + 6 = 0.$$

(a) parallel to x-axis (b) parallel to y-axis.

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48. Find the value of k for which the line

$$(k - 3)x - (4 - k^2)y + k^2 - 7k + 6 = 0.$$

(a) parallel to x-axis (b) parallel to y-axis.



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49. 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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50. Find the equation of the st. line of the following problem :

Through the point $(-1, -2)$ with slope $\frac{4}{7}$.



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51. Find the equation of the st. line of the following problem :

Through the point $(-2, 3)$ with slope -4 .



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52. Find the equation of the line which satisfying the given conditions:

passing through the point $(-4, 3)$ with slope $\frac{1}{2}$.



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53. Find the equation of the st. line of the following problem :

Through the point $(\sqrt{2}, 2\sqrt{2})$ with slope $\frac{2}{3}$.



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54. Find the equation of the line which satisfying the given conditions:

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



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55. Find the equation of the line, which intersects :

the x-axis at a distance of 3 units to the left of origin with slope -2 .



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56. Find the equation of the line which satisfying the given conditions:

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



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57. Show that the st. line, which passes through the point $(4,12)$ and makes an angle $\tan^{-1} 3$ with the x-axis passes through the origin.



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58. Find the equation of the st. line passing through points :

(2,3) and (5,-2).



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59. Find the equation of the st. line passing through points :

(1,-1) and (3,5).



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60. Find the equation of the st. line passing through points :

(-1,-2) and (-5,-2).



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



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62. Find the equation of the st. line passing through points :

(0,-3) and (5,0).

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63. The vertices of a 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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64. The vertices of a 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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65. Be 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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66. Show that the points $(at_1^2, 2at_1)$, $(at_2^2, 2at_2)$ and $(a,0)$ are collinear if

$$t_1 t_2 = -1.$$

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67. Find the equations of the straight lines which pass through the origin and trisect the portion of the st. line $\frac{x}{a} + \frac{y}{b} = 1$, which is intercepted between the axis.

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68. A line passing through the point $(3, 0)$ makes an angle 30° with the positive direction of x-axis. If this line is rotated through an angle of 15° in clockwise direction, find its equation in new position.

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69. The mid-points of the sides of a triangle are (2,1), (-5,7), (-5, -5). Find the equations of the sides.

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70. Find the equation of the st. line :
with slope 5 and y-intercept = 5.

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71. Find the equation of the st. line :
with slope 3 and y-intercept = -4 .

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72. Find the equation of the st. line :
with slope $\frac{1}{2}$ and y-intercept = -5.





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73. Find the equation of the st. line :

with slope 3 and y-intercept = - 2.



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74. Find the equation of the line, which makes intercepts -3 and 2 on the x and y-axis respectively.



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75. Find the equations of the bisectors of the angle between the coordinate axes.



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76. Find the equation of the line, which cuts off intercept 4 on the x-axis and makes an angle 60° with positive direction of the x-axis.

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77. Find the equation of the st. line, which passes through the point (0, 1) and has an inclination of 60° .

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78. Find the equation of the straight line, which passes through (2,2) and is inclined to x-axis at 45° .

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79. Find the equation of the line, which intersects :
the x-axis at a distance of 3 units to the left of origin with slope -2.





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80. Find the equation of the line which satisfying the given conditions:
intersecting the y-axis at a distance of 2 units above the origin and
making an angle of 30° with positive direction of the x-axis.



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81. Find the equation of a straight line cutting off an intercept -2 from the
y-axis and being equally inclined to the axes.



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82. Find the equation of a line that cuts off equal intercepts on the co-
ordinate axes and passes through the point (5, 6).



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83. Find the equation of a line that cuts off equal intercepts on the coordinate axes and passes through (2, 3).

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84. Find the st. lines through (5,3), which cut the axes so that the intercepts are equal in magnitude.

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85. Obtain the perpendicular form of the equation of st. lines from the given values of p and α : $p = 5, \alpha = 30^\circ$.

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86. Obtain the perpendicular form of the equation of st. lines from the given values of p and α : $p = 1, \alpha = 90^\circ$.

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87. Obtain the perpendicular form of the equation of st. lines from the given values of p and α : $p = 4, \alpha = 15^\circ$.

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88. Find the equation of the line through $(-2,1)$ in symmetrical form when the angle made by the line with positive direction of x-axis is 45° .

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89. Find the equations of the st. lines, which pass through the point $(3, 4)$ and have intercepts on the axes :
equal in magnitude but opposite in sign .

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90. Find the equations of the st. lines, which pass through the point (3, 4) and have intercepts on the axes :
such that their sum is 14.



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91. P (a, b) is the mid-point of a line segment between axes. Show that equation of the line is $\frac{x}{a} + \frac{y}{b} = 2$.



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92. Find the equation of the straight line, which passes through the point (1, 4) and is such that the segment of the line intercepted between the axes is divided by the point in the ratio 1: 2.



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93. Point R (h,k) divides a line segment between the axes in the ratio 1 : 2.

Find the equation of the line.

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94. Find the equation of the straight line for which : $p = 2, \cos \alpha = \frac{3}{5}$.

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95. Find the equation of the st. line, which has length of perpendicular segment from the origin to the line 4 units and the inclination of the perpendicular segment with the positive direction of x-axis is 30° .

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96. The perpendicular distance of a st. line from the origin is 5cm and its slope is -1. Find the equation of the st. line .





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97. Find the equation of a st. line through the point A (3, 4) and is inclined to the x-axis at an angle of $\frac{3\pi}{4}$. Find also the co-ordinates of two points on it on opposite sides of A at a distance $\sqrt{2}$ from it .



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98. A st. line is drawn through the point $P(\sqrt{3}, 2)$ making an angle of $\frac{\pi}{6}$ with positive direction of the x-axis. If it meets the st. line $\sqrt{3}x - 4y + 8 = 0$ in Q, find the length of [PQ].



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99. 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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100. Find the equation of the straight line bisecting the segment joining the points (5,3) and (4,4) and making an angle of 45° the positive direction of X- axis .



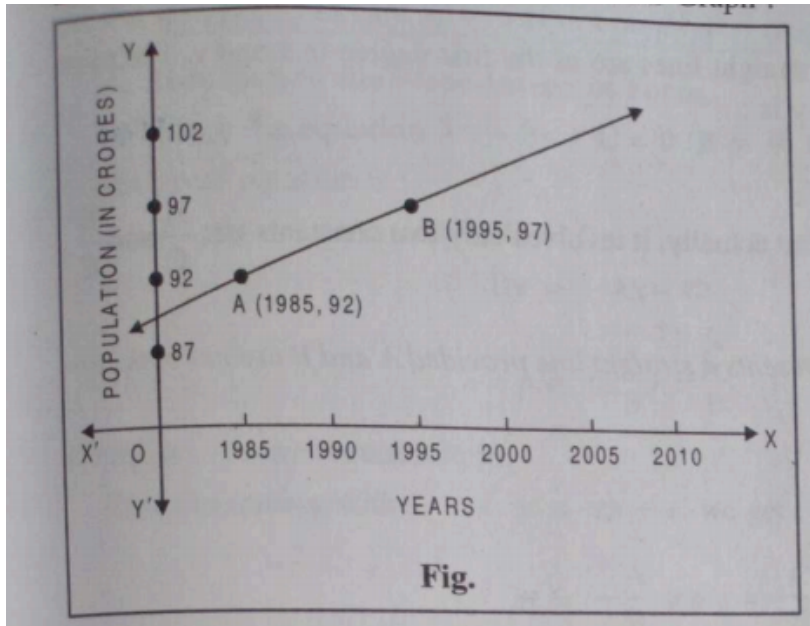
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101. Find the locus of middle points of the variable line $x \cos \alpha + y \sin \alpha - p = 0$ intercepted by the axes given that p remains constant .



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102. Consider the following Population-Year Graph :



Find the slope of the line AB and using it, find what will be the population in the year 2010 ?

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103. 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 linear relationship between selling price and demand, how many litres could he sell weekly at Rs. 17/litre?



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104. The Fahrenheit temperature F and absolute temperature K satisfy a linear equation. Given that $K = 273$ when $F = 32$ and that $K = 373$ when $F = 212$. Express K in terms of F and find the value of F , when $K = 0$.



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105. Find the equation of the straight line through two points :
 $(0, 2)$ and $(0, 4)$.



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106. Find the equation of the straight line through two points :
 $(2, 6)$ and $(2, 5)$.



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107. Reduce the following into slope-intercept form and find their slopes and y-intercepts :

$$y = 0.$$



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108. Reduce the following into slope-intercept form and find their slopes and y-intercepts :

$$x + 7y = 0.$$



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109. Reduce the following into slope-intercept form and find their slopes and y-intercepts :

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



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110. Reduce the following into slope-intercept form and find their slopes and y-intercepts :

$$7x + 3y - 6 = 0.$$



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111. Reduce the following into slope-intercept form and find their slopes and y-intercepts :

$$2x - 4y = 5.$$



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112. Reduce the following into slope-intercept form and find their slopes and y-intercepts :

$$6x + 3y - 5 = 0.$$



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113. Find the slope and y-intercept of the st. line of the following :

$$x + y = 0.$$



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114. Find the slope and y-intercept of the st. line of the following :

$$y + 2 = 0.$$



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115. Find the slope and y-intercept of the st. line of the following :

$$\frac{y}{x} = 2.$$



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116. Find the slope and y-intercept of the st. line $5x + 6y = 7$.



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117. Reduce the following equations into intercept form and find their intercepts on the axes.

$$3x + 2y - 12 = 0$$



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118. Reduce the following equations into intercept form and find their intercepts on the axes.

$$4x - 3y = 6$$



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119. Reduce the equation $x + 2y = 3$ to the intercept form .



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120. Find the inclination to the x-axis of the lines :

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

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121. Find the inclination to the x-axis of the lines :

$$x \cos \alpha + y \sin \alpha = p.$$

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122. Find the intercepts on the axes made by the straight lines :

$$2x - 3y + 6 = 0.$$

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123. Find the intercepts on the axes made by the straight lines :

$$x \cos \alpha + y \sin \alpha = \sin 2\alpha.$$





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124. Show that the equation $lx + my = 1$ ($l \neq 0, m \neq 0$) represents a straight line.



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125. The slope of line which cuts off intercepts of equal lengths on the axis is:



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126. Find the slope of a straight line, which cuts off from the axes : intercepts equal in magnitude but opposite in sign.



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127. Reduce the following to the perpendicular form and find p :

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



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128. Reduce the following to the perpendicular form and find p :

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



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129. Reduce the following to the perpendicular form and find p :

$$x - 4 = 0.$$



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130. Reduce the following to the perpendicular form and find p :

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



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131. Reduce the following to the perpendicular form and find p :

$$3x - 4y + 10 = 0.$$

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132. Reduce the following to the normal form. Find their perpendicular-distances from the origin and angle between perpendicular and the positive x-axis.

$$x - y = 4.$$

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133. Reduce the following to the normal form. Find their perpendicular-distances from the origin and angle between perpendicular and the positive x-axis.

$$y - 2 = 0.$$



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

$$(i) x - \sqrt{3}y + 8 = 0 \quad (ii) x - y = 4.$$



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



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136. A line forms a triangle with co-ordinate axes. If the area of this triangle is $54\sqrt{3}$ square units and the perpendicular drawn from the origin to the line makes an angle of 60° with the x-axis, find the equation of the line.



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137. Write the slope of the st. line, which is perpendicular to $x + 2y = 4$.



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138. Find the acute angles between the st. lines :

$$2x - y + 3 = 0 \text{ and } x + y - 2 = 0.$$



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139. Find the acute angles between the st. lines :

$$y - 3x - 5 = 0 \text{ and } 3y - x + 6 = 0.$$



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140. Find the acute angles between the st. lines :

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

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141. Find the acute angles between the st. lines :

$$y - \sqrt{3}x - 5 = 0 \text{ and } 3y - x + 6 = 0.$$

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142. Find the tangent of the angle between the lines whose intercepts on the axes are respectively, p,-q and q, -p.

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143. Prove that the angle between the st. lines :
 $(a + b)x + (a - b)y = 2ab$ and $(a - b)x + (a + b)y = 2ab$ is

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

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144. Find the measure of the angle A of the $\triangle ABC$ with vertices A (2, 3), B (-2, 2) and C(0, 2).

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145. The line through (4, 3) and (-6, 0) intersects the line $5x + y = 0$. Find the angles of intersection.

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146. The angle between two lines is $\frac{\pi}{4}$ and the slope of one of them is $\frac{1}{2}$. Find the slope of the other line

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147. 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 line.

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148. Find the angle between the diagonals of parallelogram ABCD whose vertices are A (0, 2), B (2, - 1), C (4, 0) and D (2, 3).

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149. Find the equation of the st. line joining the points (3, -1) and (2, 3). Also find the equation of another st. line perpendicular to this st. line and passing through (5, 2).

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150. Find the equations of the st. lines which pass through $(4, 5)$ and make angle 45° with the st. line $2x + y + 1 = 0$.

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151. Find the equations of the lines, which pass through the point $(4, 5)$ and make equal angles with the lines $5x - 12y + 6 = 0$ and $3x = 4y + 7$.

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152. Find the equations of the lines through the point $(3, 2)$ which make acute angle 45° with the line $x - 2y = 3$.

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153. Find the equation of the st. line that has y -intercept 4 and is parallel to the st. line $2x - 3y = 7$.





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154. Find the equation of a line that has x-intercept 3 and perpendicular to the line $x - 7y + 5 = 0$.



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155. Find the equation of the lines through $(-2, -1)$ and are : parallel to line $x = 0$.



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156. Find the equation of the lines through $(-2, -1)$ and are : perpendicular to the line $y = x$.



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

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158. Find the equation of the line parallel to the line $3x-4y+2=0$ and passing through the point $(-2,5)$.

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159. Find the equation of the line perpendicular to the line $x-2y+3=0$ and having intercept 3 on x-axis.

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160. Find the equation of the line that is parallel to $2x+5y=7$ and passes through the mid-point of the line joining $(2,7)$ and $(-4,1)$.





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161. Find the equation of the perpendicular bisector of the st. line segment whose end points are $(0, 5)$ and $(-4, 1)$.



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162. Prove that the equation of the st. line parallel to $Ax + By + C = 0$ and passing through (x_1, y_1) is $A(x - x_1) + B(y - y_1) = 0$.



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163. Prove that the equation of the st. line perpendicular to $Ax + By + C = 0$ and passing through (x_1, y_1) is $Bx - Ay = Bx_1 - Ay_1$.



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164. Find the equation of the st. line going through the point (1,-2) and perpendicular to $x - 2y + 3 = 0$.

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165. Find the equation of a line passing through (4,5) and perpendicular to the line $2x + 3y = 5$.

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166. Find the equation of a line perpendicular to $2x + 4y - 9 = 0$ and Passing through the point $\left(\frac{1}{2}, \frac{3}{2}\right)$.

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167. Find the equation of the line Perpendicular to the line $x - 7y + 5 = 0$ and having x-intercept 4.

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168. Find the equation of a line that is perpendicular to $3x + 2y = 8$ and passes through the mid-point of the line segment joining : (5, - 2) and (2, 2).

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169. Find the equation of a line that is perpendicular to $3x + 2y = 8$ and passes through the mid-point of the line segment joining : (2, 7) and (- 4, 1).

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170. Find the equation of the right-bisector of the line segment joining the points (1, 0) and (2, 3).

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

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172. Find the equation of the line, which is perpendicular to $5x - 2y = 7$ and passes through the mid-point of the line joining $(2, 7)$ and $(-4, 1)$.

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173. Find the equation of a st. line drawn at right angles to the st. line $\frac{x}{a} + \frac{y}{b} = 1$ through the point, where it meets the x-axis.

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174. 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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175. The perpendicular from the origin to a line meet at the point $(-2, 9)$, find the equation of the line.



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



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



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



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179. Show that the equation of the line through the origin and making an angle θ with the line $y = mx + c$ is :
$$\frac{y}{x} = \frac{m \pm \tan \theta}{1 + m \tan \theta} .$$



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180. If the lines $y = 3x + 1$ and $2y = x + 3$ are equally inclined to the line $y = mx + 4$, find the value of m .



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181. Let ABC be a triangle with $A(-1, -5)$, $B(0,0)$ and $C(2,2)$ and let D be the middle point of BC Find the equation of the perpendicular drawn from B to Ad

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

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183. What are inclinations to the x-axis of the st. lines : $y = \frac{1}{3}x\sqrt{3} + 3$ and $y = \sqrt{3}x + 3$? Show that the st. line $y = x + 3$ bisects the angle between them.

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184. Prove that the points $(2, -1)$, $(0, 2)$, $(3, 3)$ and $(5, 0)$ are the vertices of a parallelogram. Also find the angle between its diagonals.

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185. Prove that the diagonals of the parallelogram formed by the four straight lines : $\sqrt{3}x + y = 0$, $\sqrt{3}y + x = 0$, $\sqrt{3}x + y = 1$ and $\sqrt{3}y + x + 1$ are at right angle to one another.

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186. The equations of three lines are given by : $15x - 8y + 1 = 0$, $12x + 5y - 3 = 0$ and $21x - y - 2 = 0$. Show that the third line bisects the angle between the other two lines.

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187. The three sides AB, BC, CA of a triangle are $5x - 3y + 2 = 0$, $x - 3y - 2 = 0$ and $x + y - 6 = 0$ respectively. Find equation of the altitude through the vertex A.



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188. 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 of 2 units below the origin.



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189. Find the point of intersection of the straight lines :

$$2x + 3y - 6 = 0, 3x - 2y - 6 = 0.$$



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190. Find the point of intersection of the straight lines :

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



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191. Find the point of intersection of the straight lines :

$$\frac{x}{3} - \frac{y}{4} = 0, \frac{x}{2} + \frac{y}{3} = 1.$$



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192. Two lines cut the axis of x at distances of 4 and -4 and the axis of y at distances 2 and 6 respectively. Find the co-ordinates of their point of intersection.



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193. If $ax-2y-1=0$ and $6x-4y+b=0$ represent the same line, find the values of a and b .

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194. The line $2x-3y=4$ is perpendicular bisector of the line AB . If the coordinates of A are $(-3,1)$. Find the coordinates of B .

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195. Show that the straight lines : $x-y-1=0$, $4x + 3y = 25$ and $2x-3y + 1 = 0$ are concurrent.

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196. For what value of K are the three st. lines :
 $2x+y-3=0$, $5x + ky-3=0$ and $3x-y-2=0$ are concurrent ?

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197. For what value of K are the three st. lines :

$3x+y-2=0$, $kx+ 2y-3=0$ and $2x-y-3=0$ are concurrent ?

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198. If the 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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199. Find the condition that the st. lines :

$p_1x + q_1y = 1$, $p_2x + q_2y = 1$ and $p_3x + q_3y = 1$ be concurrent, show

that the point (p_1, q_1) , (p_2, q_2) and (p_3, q_3) are collinear.

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200. Find the foot of the perpendicular from the point $(-1, 2)$ on the straight line $x - y + 5 = 0$.

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201. Prove that the diagonals of the parallelogram formed by the four lines : $\frac{x}{a} + \frac{y}{b} = 1$, $\frac{x}{b} + \frac{y}{a} = 1$, $\frac{x}{a} + \frac{y}{b} = -1$ and $\frac{x}{b} + \frac{y}{a} = -1$ are at right angles .

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202. Prove that the following lines are concurrent. Also, find the point of concurrence :

$$5x - 3y = 1, 2x + 3y = 23, 42x + 21y = 257 .$$

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203. Prove that the following lines are concurrent. Also, find the point of concurrence :

$$2x + 3y - 4 = 0, x - 5y + 7 = 0, 6x - 17y + 24 = 0.$$



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204. The sides of a triangle are given by : $x-2y+9=0$, $3x + y-22 =0$ and $x + 5y+2=0$. Find the vertices of the triangle.



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205. Obtain the co-ordinates of the feet of perpendiculars drawn from the origin upon the lines $3x - 5y + 2 = 0$ and $4x - 3y + 5 = 0$ and show that the equation of the st. line joining these feet is $26x + 53y = 11$.



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206. Vertices of a triangle are $(-1, 3)$, $(2, -1)$, $(0, 0)$. Find its orthocentre.

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207. A triangle is determined by the lines : $y+x-6=0$, $3y-x + 2 = 0$, $3y = 5x + 2$.

Find the co-ordinates of its orthocentre.

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208. Two vertices of a triangle are $(3, -1)$ and $(-2, 3)$ and its orthocentre is at the origin. Find the co-ordinates of the third vertex.

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209. Find the co-ordinates of the incentre of the triangle formed by the lines $y - 15 = 0$, $12y - 5x = 0$ and $4y + 3x = 0$.

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210. Find the co-ordinates of the circumcentre of the triangle whose vertices are :

$(-2, 2)$, $(2, -1)$ and $(4, 0)$.



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211. Find the co-ordinates of the circumcentre of the triangle whose vertices are :

$(1, 2)$, $(3, -4)$ and $(5,-6)$.



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



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213. Prove analytically that the : medians of a triangle are concurrent.



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214. Prove analytically that the altitudes of a triangle are concurrent.



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215. The co-ordinates of points A, B and C are $(1, 2)$, $(-2, 1)$ and $(0, 6)$ respectively. Verify that the medians of the triangle ABC are concurrent. Also, find the co-ordinates of the point of concurrence (centroid).



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216. Prove that the diagonals of a square are equal.



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217. Which of the following statements are True or False :

The diagonals of a parallelogram bisect each other.



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218. Say True or False:

The diagonals of a square are perpendicular to one another.



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219. If two medians of a triangle are equal, prove that the triangle is isosceles.



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220. Prove that the median from the vertex of an isosceles triangle is the bisector of the vertical angle.



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221. If the diagonals of a parallelogram are perpendicular, then it is a rhombus.



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222. Which of the following statements are True or False :

If the diagonals of a parallelogram are equal then it is a rectangle.



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223. Classify the following pairs of lines as coincident, parallel, perpendicular or intersecting :

$$6x + 14y - 16 = 0, 12x + 28y - 32 = 0.$$



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224. Classify the following pairs of lines as coincident, parallel, perpendicular or intersecting :

$$3x - 4y = 8, 3x + 4y = 11.$$

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225. Classify the following pairs of lines as coincident, parallel, perpendicular or intersecting :

$$5x - 2y = 7, 2y - 5x = -7.$$

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226. Classify the following pairs of lines as coincident, parallel, perpendicular or intersecting :

$$4x + 7y = 19, 7x - 4y = -2.$$

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227. Classify the following pairs of lines as coincident, parallel, perpendicular or intersecting :

$$x - 2y = 7, 4y - 2x = 13.$$



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228. Find the distance between the line and the point of the following :

$$3x + 4y - 5 = 0, (-3, 4).$$



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229. Find the distance between the line and the point of the following :

$$12x - 5y - 7 = 0, (3, -1).$$



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230. Find the distance between the line and the point of the following :

$$12(x + 6) = 5(y - 2), (-1, 1).$$

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231. Find the distance between the line and the point of the following :

$$3x - 4y - 26 = 0(3, -5).$$

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232. Find the distance between the line and the point of the following :

$$x + y = 0, (0, 0).$$

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233. Find the distance between the line and the point of the following :

$$y = 4, (2, 3).$$





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234. Which of the st. lines $2x - y + 3 = 0$ and $x - 4y - 7 = 0$ is farther from the origin ?



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



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



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237. The vertices of a triangle are A (-2, 1), B (6, -2) and C (4, 3). Find the lengths of the altitudes of the triangle.

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

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239. If p is the length of perpendicular from the origin to the line whose intercepts on the axes are a and b , then show that $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$.

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240. If p and q are respectively the perpendiculars from the origin upon the straight lines, whose equations are

$x \sec \theta + y \csc \theta = a$ and $x \cos \theta - y \sin \theta = a \cos 2\theta$, then $4p^2 + q^2$ is equal to

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241. If p and q are the lengths of perpendicular from origin to the lines $x \cos \theta - y \sin \theta = k \cos 2\theta$ and $x \sec \theta + y \csc \theta = k$ respectively.

Prove that $p^2 + 4q^2 = k^2$.

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242. Find the length of the perpendicular from the vertex B of $\triangle ABC$ to the median through C if A is $(-10, -13)$, B is $(-2, 3)$ and C is $(2, 1)$.

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243. Find the distance between the parallel lines :

$4x - 3y - 9 = 0$ and $4x - 3y - 24 = 0$.



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244. Find the distance between the parallel lines

(i) $15x + 8y - 34 = 0$ and $15x + 8y + 31 = 0$.



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245. Find the distance between the parallel lines :

$l(x + y) + p = 0$ and $lx + ly - r = 0$.



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246. The perpendicular distance of a st. line from the origin is 5cm and its slope is -1. Find the equation of the st. line .



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247. If sum of the perpendicular distances of a 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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248. Find the equation of the line which is equidistant from parallel lines $9x + 6y - 7 = 0$ and $3x + 2y + 6 = 0$.



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249. Prove that the product of the lengths of the perpendiculars drawn from the points $(\sqrt{a^2 - b^2}, 0)$ and $(-\sqrt{a^2 - b^2}, 0)$ to the line $\frac{x}{a} \cos \theta + \frac{y}{b} \sin \theta = 1$ is b^2 .



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250. If $5x - 12y + 26 = 0$ and $5x - 12y - 65 = 0$ are the equations of a pair of opposite sides of a square, show that its area is 49 square units.

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251. Find the equations of the bisectors of the angles formed by the following pairs of lines :

$$x + 2y + 3 = 0 \text{ and } 2x + y - 2 = 0.$$

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252. Find the equations of the bisectors of the angles formed by the following pairs of lines :

$$3x + 4y + 13 = 0 \text{ and } 12x - 5y + 32 = 0.$$

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253. Find the equations of the bisectors of the angles formed by the following pairs of lines :

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



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254. Find the equations of the bisectors of the angles formed by the following pairs of lines :

$$4x+3y-5=0 \text{ and } 5x + 12y-41=0.$$



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255. Find the equations of the bisectors of the angles formed by the following pairs of lines :

$$y - b = \frac{2m}{1 - m^2}(x - b) \text{ and } y - b = \frac{-2m}{1 - m^2}(x + b)$$



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256. Prove that the bisectors of the angles formed by pairs of lines are perpendicular to each other :

$$x+2y+3=0 \text{ and } 2x+y-2=0.$$



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257. Prove that the bisectors of the angles formed by pairs of lines are perpendicular to each other :

$$3x+4y+13=0 \text{ and } 12x-5y+32=0.$$



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258. Prove that the bisectors of the angles formed by pairs of lines are perpendicular to each other :

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



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259. Find the equations of the bisectors of the angles formed by the following pairs of lines :

$$4x+3y-5=0 \text{ and } 5x + 12y-41=0.$$



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260. Find the equations of the bisectors of the angles formed by the following pairs of lines :

$$y - b = \frac{2m}{1 - m^2}(x - b) \text{ and } y - b = \frac{-2m}{1 - m^2}(x + b)$$



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261. Find the equations of the bisectors of the internal angles of the triangles, the sides of which have the equations :

$$3x+5y= 15, x+y = 4 \text{ and } 2x+y=6.$$



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262. Find the equations of the bisectors of the internal angles of the triangle whose sides are :

$$3x + 4y - 6 = 0, 12x - 5y - 3 = 0, 4x - 3y + 12 = 0.$$

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263. Find the equations of the straight lines passing through the foot of the perpendicular from the point $(2,3)$ upon the straight line $4x + 3y + 5 = 0$ and bisecting the angles between the perpendicular and the given straight line.

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264. Find the new coordinates of the points in each of the following cases if the origin is shifted to point $(-3, -2)$ by a translation of axes.

(i) $(1, 1)$ (ii) $(0, 1)$

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265. Find the new co-ordinates of the following points when the origin is shifted to the point $(-3, -2)$ by a translation of axes : $(-1, -2)$.



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266. Find the new co-ordinates of the following points when the origin is shifted to the point $(-3, -2)$ by a translation of axes : $(3, -5)$.



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267. Find the new co-ordinates of the point $(3, -4)$ when the origin is shifted to $(1, 2)$ by translation of axes.



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268. Find the transformed equation of the st. line $2x - 3y + 5 = 0$ when the origin is shifted to the point $(3, -1)$ after translation of axes.



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269. Prove that the equations of the st. lines $x+y-1=0$ and $x-y-1=0$ can be written as $x+y=0$ and $x-y=0$ by shifting the origin to a suitable point.

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270. Find what the following equations become when the origin is shifted to the point $(1, 1)$

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

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271. Find the transformed equations of the following when the origin is shifted to the point $(1, 1)$ by a translation of axes :

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

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272. Find what the following equations become when the origin is shifted to the point (1, 1)

$$xy - x - y + 1 = 0$$



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273. Find the transformed equations of the following when the origin is shifted to the point (1, 1) by a translation of axes :

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



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274. Find the transformed equation of the curve : $y^2 - 4x + 4y + 8 = 0$, when the origin is shifted to (1, -2).



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275. Find the point to which the origin should be shifted after a translation of axes so that the following equations will have no first degree terms :

$$x^2 - 12x + 4 = 0.$$



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276. Find the point to which the origin should be shifted after a translation of axes so that the following equations will have no first degree terms :

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



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277. Find the point to which the origin should be shifted after a translation of axes so that the following equations will have no first degree terms :

$$x^2 + y^2 - 4x - 8y + 3 = 0.$$



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278. Find the point so that the equation :
 $12x^2 - 10xy + 2y^2 + 11x - 5y + 2 = 0$ referred to parallel axes through it may transform into one from which terms of the first degree in x and y are absent.



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279. Simplify the equation $x^2 + y^2 + 8x - 6y - 25 = 0$ to the form $Ax^2 + By^2 = K$, by shifting the origin to a suitable point.



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280. Verify that the area of the triangle with vertices $(2, 3)$, $(5, 7)$ and $(-3, -1)$ remains invariant under the translation of axes when the origin is shifted to the point $(-1, 3)$.



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281. Find the equation of the family of lines satisfying the following condition :

passing through the origin .

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282. Find the equation of the family of lines satisfying the following condition :

parallel to the line $3x + 4y + 5 = 0$.

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283. Find the equation of the family of lines satisfying the following condition :

having slope 5.

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284. Find the equation of the family of lines satisfying the following condition :

having y- intercept 4.

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285. Find the equation of the lines passing through the point of intersection of $x+2y=5$ and $x-3y=7$ and passing through :

(1,0).

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286. Find the equation of the line passing through the point of intersection of $x + 2y = 5$ and $x - 3y = 7$, and passing through the point : (0,

-1).

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287. Find the equation of the lines passing through the point $(-4,5)$ and the point of intersection of the lines $4x-3y+7=0$ and $2x+3y+5=0$.



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288. Find the equation of the line through the intersection of lines $3x + 4y = 7$ and $x - y + 2 = 0$ and whose slope is 5.



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289. Find the equation of the lines passing through the intersection of $3x+4y=7$ and $x-y+2=0$ and with slope : 3.



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290. Find the equation of the lines passing through the intersection of the lines : $3x+7y-7=0$ and $x-y+2=0$ and with slope 5.



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291. Find the equation of the line passing through the intersection of the lines $2x+3y-4=0$ and $x-5y+7=0$ that has its x-intercept equal to -4.

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292. Find the equation of the line passing through the point of intersection of the lines $4x + 7y - 3 = 0$, $2x - 3y + 1 = 0$ that has equal intercepts on the axes.

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293. Find the equation of the straight line parallel to the y-axis and drawn through the intersection of the lines : $x-7y+5=0$ and $3x+y=0$.

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294. Find the equation of the straight line parallel to the y-axis and drawn through the intersection of the lines : $x-7y+5=0$ and $3x+y=0$.

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295. Find the equation of the line passing through the intersection of the lines : $x+2y-3=0$ and $4x-y+7=0$ and which is parallel to $y-x+10=0$.

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296. Find the equation of the lines passing through the point of intersection of : $5x-3y=1$ and $2x+3y=23$ and perpendicular to the line whose equation is : $x-2y=3$.

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297. Find the equation of the lines passing through the point of intersection of : $5x-3y=1$ and $2x+3y=23$ and perpendicular to the line

whose equation is : $y=0$.

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298. Find the equation of the lines passing through the point of intersection of : $5x-3y=1$ and $2x + 3y = 23$ and perpendicular to the line whose equation is : $x = 0$.

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299. Find the equation of the lines passing through the point of intersection of : $5x-3y=1$ and $2x + 3y = 23$ and perpendicular to the line whose equation is : $5x - 3y = 1$.

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300. Find the equation of the line perpendicular to the line $2x+y -1 = 0$ through the intersection of the lines $x+2y -1= 0$ and $y=x$.



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301. Find the equation of a straight line passing through the point of intersection of the lines : $3x + y - 9 = 0$ and $4x + 3y - 7 = 0$ and perpendicular to the line $5x - 4y + 1 = 0$.



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302. Find the equation of the straight line passing through the intersection of : $x + 2y - 3 = 0$ and $3x + 4y - 7 = 0$ and perpendicular to $x + 3y + 4 = 0$.



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303. Find the equation of a line passing through the intersection of the lines $2x + 3y - 2 = 0$ and $x - 2y + 1 = 0$ and having x-intercept equal to 3.



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304. Find the equation line which passes through the intersection of the straight lines ,

$3x - 4y + 1 = 0$ and $5x + y - 1 = 0$ and cuts off equal intercepts from the axes .



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