



MATHS

BOOKS - V PUBLICATION

STRAIGHT LINES

Questionbank

1. Find the slope of a line which passes through the points $(3, 2)$ and $(-1, 5)$



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2. Find the slope of the lines passing through the points

(3,-2) and (-1,4)



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3. If the angle between two lines is $\frac{\pi}{4}$ and slope of one of the lines is $\frac{1}{2}$, find the slope of the other line.



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4. 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 of x .



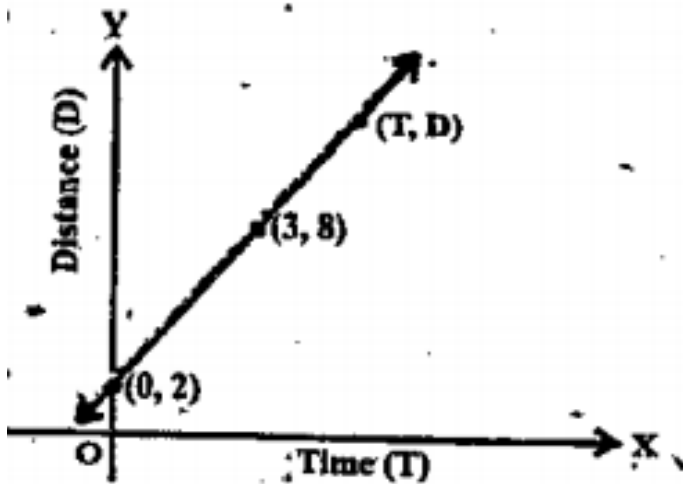
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5. Three points $P(h, k)$, $Q(x_1, y_1)$ and $R(x_2, y_2)$ lie on a line. Show that

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


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6. In the Figure, time and distance graph of a linear motion is given. Two positions of time and distance are recorded as, when $T = 0, D = 2$. and when $T = 3, D = 8$. Using the concept of slope, find law of motion, i.e., how distance depends upon time.



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7. 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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8. 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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9. Find the distance between $P(x_1, y_1)$ and $Q(x_2, y_2)$ when : (i) PQ is parallel to the y axis, (ii) PQ is parallel to the x - axis.



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



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11. 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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12. 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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13. Find the slope of the line, which makes' angle of 30° with the positive direction of y-axis measured anticlockwise.



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



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



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



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17. 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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18. 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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19. 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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20. Find the equations of the lines parallel to axes and passing through $(-2, 3)$



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21. Find the equation of the line through $(-2, 3)$ with slope -4



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22. Find the equation of the line passing through the two points $(1,-1)$ and $(3,5)$.



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23. Write the equation of the line for which $\tan \theta = \frac{1}{2}$, where θ is the inclination of the line and (i) y - intercept is $-\frac{3}{2}$ (ii) x -intercept is 4 .



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24. Find equation of the line which makes intercepts -3 and 2 on the X and Y axes respectively. Find its slope.



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25. Find the equation of the line whose perpendicular distance from origin is 4 units and the angle which the normal makes with positive direction of x - axis is 15°



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26. 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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27. In exercise 1 to 8 find the equation of the line which satisfy the given conditions.

Write the equations for the x -and y axes.



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

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



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



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30. 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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31. 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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32. 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 positive direction of the x -axis



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33. Find the equation the following lines satisfying the given conditions.
passing through the point $(-1,1)$ and $(2,-4)$.



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





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36. 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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37. 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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38. 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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39. 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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40. 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 line parallel to it and crossing the y -axis at a distance of 2 units. below the origin.



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41. 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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42. 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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43. 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 be sell weekly at Rs. 17/litre?



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44. $P(a,b)$ 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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45. 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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46. 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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47. Consider the equation of the line

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

Find its

x and y intercepts.



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48. Reduce the equation $\sqrt{3}x + y - 8 = 0$ into normal form. Find the values of p and ω .



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49. Find the angles between the lines

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



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50. Show that two lines $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$. where $b_1, b_2 \neq 0$ are:

(i) Parallel if $\frac{a_1}{b_1} = \frac{a_2}{b_2}$, and

(ii) Perpendicular if $a_1a_2 + b_1b_2 = 0$



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





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52. Find the distance of the point $(3,-5)$ from the line $3x - 4y - 26 = 0$



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53. Find the distance between the parallel lines.

$$3x - 4y + 7 = 0 \text{ and } 3x - 4y + 5 = 0$$



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54. 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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55. Reduce the following equations into intercept form and find their intercepts on the

axes.

(i) $3x + 2y - 12 = 0$

ii) $4x - 3y = 6$

iii) $3y + 2 = 0$



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56. Reduce the equation $x - y = 4$ into normal form.



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57. Find the distance between the given point and the line.

Line $12(x + 6) = 5(y - 2)$ and point $(-1,1)$



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



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59. Find the distance between parallel lines

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

ii) $l(x + y) + p = 0$ and $l(x + y) - r = 0$



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



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62. Find the slope of the straight lines

$$\sqrt{3}x + y = 1, x + \sqrt{3}y = 1$$

Also find the angles between them.



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63. 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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64. 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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65. Find the equation of the perpendicular bisector of the line segment joining the points $(3, 4)$ and $(-1, 2)$



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



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67. 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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68. 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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69. 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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70. If the lines

$$2x + y - 3 = 0, 5x + ky - 3 = 0 \quad \text{and}$$

$$3x - y - 2 = 0$$
 are concurrent, find the value

of k .



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71. 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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72. Assume that straight lines work 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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73. Show that the path of a moving point such that its distance from two lines $3x - 2y = 5$ and $3x + 2y = 5$ are equal is a straight line.



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74. 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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75. 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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76. Find the points on the x -axis, whose distances from the line $\frac{x}{3} + \frac{y}{4} = 1$ are 4

units.



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



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



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80. Find the value of p so that the three lines

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

$2x - y - 3 = 0$ may intersect at one point.



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81. If three lines whose equations are

$$y = m_1x + c_1, y = m_2x + c_2 \quad \text{and}$$

$y = m_3x + c_3$ 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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82. Find the equation of the lines through the point $(3, 2)$ which make an angle 45° with the line $x - 2y = 3$



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83. 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 has equal intercepts on the axes.



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



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85. 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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86. Consider the line $x + 3y - 7 = 0$

Find the image of the point $(3,8)$ with respect to the given line.



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



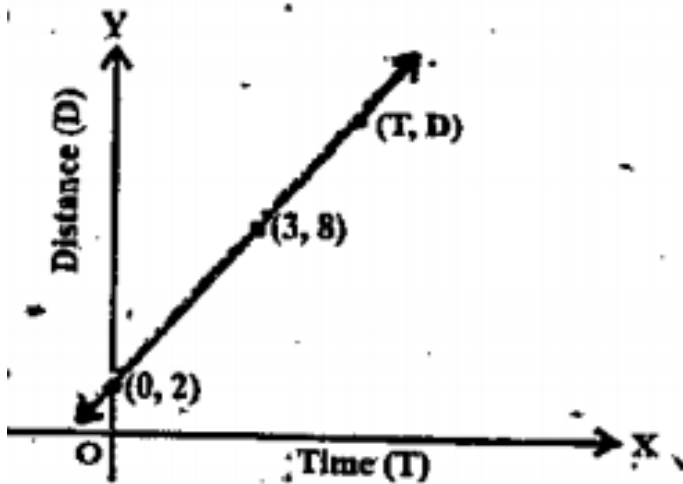
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88. A person standing at the junction (crossing) of two straight paths represented by the equations $2x - 3y + 4 = 0$ and $3x + y - 5 = 0$ wants to reach the path whose equation is $6x - 7y + 8 = 0$ in the least time. Find equation of the path that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



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89. In the Figure, time and distance graph of a linear motion is given. Two positions of time and distance are recorded as, when $T = 0, D = 2$. and when $T = 3, D = 8$. Using the concept of slope, find law of motion, i.e., how distance depends upon time.



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90. If the slope of the line joining $(2, 5)$ and $(3, \lambda)$ is -2 , find the value of λ .



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91. Find the slope of the line passing through the points $(1, 6)$ and $(-4, 2)$.



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92. 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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93. If the medians from A and B of the triangle with vertices $A(0, b)$, $B(0, 0)$ and $C(a, 0)$ are mutually perpendicular then show that $a = \pm \sqrt{2}b$





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94. 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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95. Find the equation of the straight line which makes angle 30° with positive direction of x - axis and cuts intercept 5 on the y - axis



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96. Find the equation of the line which makes intercepts - 4 and 5 on the axes



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97. Find the equation of the line for which $p = 5$ and $\alpha = 135^\circ$. Also sketch the line.



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98. Reduce the equation $\sqrt{3}x + y - 8 = 0$

into normal form. Find the values of p and ω .



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99. Which of the lines $2x + 7y - 9 = 0$ and

$4x - y + 11 = 0$ is farther from the point

$(2, 3)$?



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