

# Latex Assignment1

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## Example:-1-25 (10.7)

- Find the slope of lines:
  - Passing through the points  $(3, -2)$  and  $(-1, 4)$
  - Passing through the points  $(3, -2)$  and  $(7, -2)$
  - passing through the points  $(3, -2)$  and  $(3, 4)$
  - Making inclination of  $60^\circ$  with the positive direction of x-axis.
- 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.
- 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  $x$ .
- Three points  $(h, k)$ ,  $Q(x_1, y_1)$  and  $R(x_2, y_2)$  lie on a line. Show that  $(h - x_1)(y_2 - y_1) = (k - y_1)(x_2 - x_1)$ .
- In Fig. ??, time and distance graph of a linear motion is given. Two positions of line and distance are recorded as, when  $T = 0, D = 2$  and when  $T = 3, D = 8$ . Use the concept of slope, find law of motion i.e, how distance depends upon time.
- Find the equations of the lines parallel to axes and passing through  $(2, 3)$ .
- Find the equation of the line through  $(-2, 3)$  with slope  $-4$
- Write the equation of the line through the points  $(1, -1)$  and  $(3, 5)$ .
- Write the equation of the lines for which  $\tan \theta = \frac{1}{2}$ , where  $\theta$  is the inclination of the line and
  - y-intercepts is  $\frac{-3}{2}$
  - x-intercept is 4.
- Find the equation of the lines which makes intercepts  $-3$  and  $2$  on the x- and y-axes respectively.

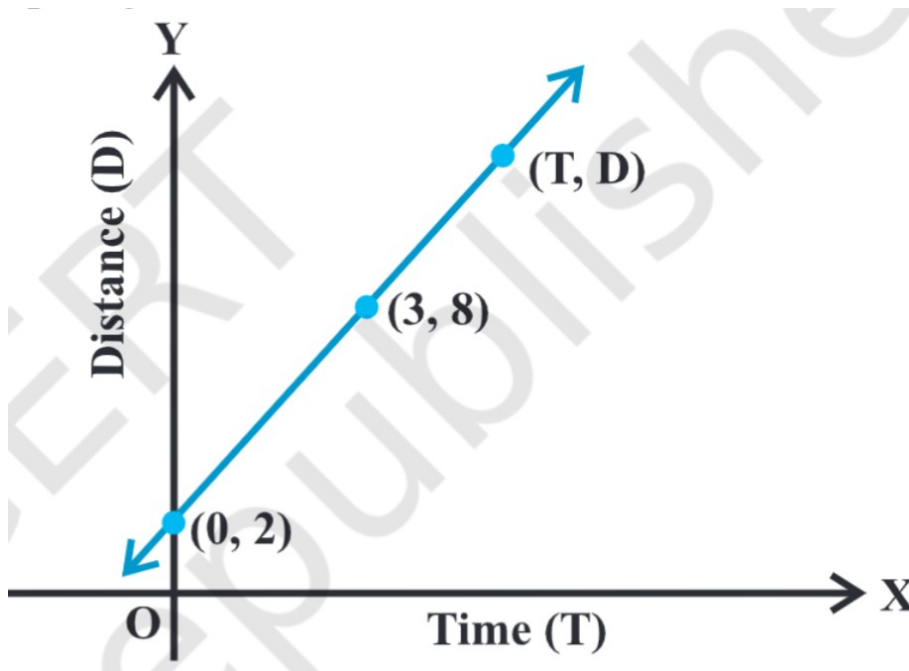


Figure 1: 10.9

11. Find the equation of the line whose perpendicular distance from the origin is 4 units and the angle which the normal makes with positive direction of x-axis is  $15^\circ$ .
12. 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  $K = 0$ .
13. Equation of a line is  $3x - 4y + 10 = 0$ , Find its
  - (i) Slope
  - (ii) x and y-intercepts.
14. Reduce the equation  $\sqrt{3}x + y - 8 = 0$  into normal form. Find the values of  $p$  and  $\omega$ .
15. Find the angle between the lines  $y - \sqrt{3}x - 5 = 0$  and  $\sqrt{3}y - x + 6 = 0$ .
16. Show that two lines  $a_1x + b_1y + c_1 = 0$  and  $a_2x + b_2y + c_2 = 0$  where  $b_1b_2 - 2 \neq 0$  are:
  - (a) parallel if  $\frac{a_1}{b_1} = \frac{a_2}{b_2}$  and
  - (b) Perpendicular if  $a_1a_2 - b_1b_2 = 0$ .

17. Find the equation of a line perpendicular to the line  $x + 2y + 3 = 0$  and passing through the point  $(1, -2)$ .
18. Find the distance of the point  $(3, -5)$  from the line  $3x - 4y - 26 = 0$ .
19. Find the distance between the parallel lines  $3x - 4y + 7 = 0$  and  $3x - 4y + 5 = 0$ .
20. If the lines  $2x + y - 3 = 0$ ,  $5x + ky - 3 = 0$  and  $3x - y - 2 = 0$  are concurrent, find the value of  $k$ .
21. Find the distance of the line  $4x - y - 0$  from the point  $p(4, 1)$  measured along the line making an angle of  $135^\circ$  with the positive x-axis.
22. Assuming that straight lines work as the plane mirror for a point, find the image of the point  $(1, 2)$  in the line  $x - 3y + 4 = 0$ .
23. Show that the area of the triangle formed by the lines  $y = m_1x + c_1$ ,  $y = m_2x + c_2$  and  $x = 0$  is  $\frac{c_1 - c_2}{2|m_1 - m_2|}$ .
24. A line is such that its segment between the lines  $5x - y + 4 = 0$  and  $3x + 4y - 4 = 0$  is bisected at the point  $(1, 5)$ . Obtain its equation.
25. Show that the path of a moving point such that its distances from two lines  $3x - 2y = 5$  and  $3x + 2y = 5$  are equal is a straight line.