

# LATEX ASSIGNMENT

ANAND

29-08-2023

## EXERCISE 11.10.4

- Find the values of  $K$  for which the line  $(K - 3)x - (4 - k^2)y + k^2 - 7k + 6 = 0$  is
  - Parallel to the  $x$  axis.
  - Parallel to the  $y$  axis.
  - Passing through the origin.
- Find the values of  $\theta$  and  $p$ , if the equation  $x \cos \theta + y \sin \theta = P$  is the normal form of the line  $\sqrt{3}x + y + 2 = 0$ .
- Find the equations of the lines, which cut-off intercepts on the axes whose sum and product are 1 and  $-6$ , respectively.
- What are the points on the  $y$  axis whose distance from the line  $\frac{x}{3} + \frac{y}{4} = 1$  is 4 units.
- Find perpendicular distance from the origin to the line joining the points  $(\cos \theta \sin \theta)$  and  $(\cos \phi, \sin \phi)$ .
- 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  $3x + y = 0$ .
- Find 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.
- Find the area of the triangle formed by the lines  $y - x = 0$ ,  $x + y = 0$  and  $x - k = 0$ .
- Find the value of  $p$  so that the three lines  $3x + y - 2 = 0$ ,  $Px + 2y - 3 = 0$  and  $2x - y - 3 = 0$ ,  $Px + 2y - 3 = 0$  and  $2x - y - 3 = 0$  may intersect at one point.
- If three lines when equation are  $y = m_1x + c_1$ ,  $y = m_2x + c_2$  and  $y = m_3x + c_3$  are concurrent, then show that  $m_1(c_2 - c_3) + m_2(c_3 - c_1) + m_3(c_1 - c_2) = 0$
- Find the equation of the lines through the point  $(3,2)$  which make an angle of  $45^\circ$  with the line  $x - 2y = 3$

12. 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.
13. Show that the equation of the line passing through the origin and making an angle  $\theta$  with the line  $y = mx + c$  is  $\frac{y}{x} = \frac{m \pm \tan \theta}{1 \mp \tan \theta}$
14. In What ratio, the line joining  $(-1, 1)$  and  $(5, 7)$  is divided by the line  $x + y = 4$ ?
15. Find the distance of the line  $4x + 7y + 5 = 0$  from the point  $(1, 2)$  along the line  $2x - y = 0$ .
16. Find the direction in which a straight line must be drawn through the point  $(-1, 2)$  so that the point of intersection with the line  $x + y = 4$  may be at a distance of 3 units from this point.
17. The hypotenuse of a right angled triangle has its ends at the points  $(1, 3)$  and  $(-4, 1)$ . Find an equation of the legs (perpendicular sides) of the triangle.
18. Find the image of the point  $(3, 8)$  with respect to the line  $x + 3y = 7$  assuming the line to be a plane mirror.
19. If the lines  $y = 3x + 1$  and  $2y = x + 3$  are equally inclined to the line  $y = mx + 4$ . Find the value of  $m$ .
20. If sum of the perpendicular distance 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.
21. Find equation of the line which is equidistant from parallel lines  $9x + 6y = -7$  and  $3x + 2y + 6 = 0$ .
22. A ray of the 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  $A$ .
23. 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  $b^2$ .
24. A person standing at the junction (crossing) of two straight paths represented by the equations  $2x - 3y + 4 = 0$  and  $3x + 4y - 5 = 0$  and  $3x + 4y - 5 = 0$  wants to reach the path whose equation is  $6x - 7y + 8 = 0$  in the least time. Find the equation of the path that he should follow.