Worksheet

Topic: - Straight Line (Advanced/HOTS)

1. If p and q are the lengths of perpendiculars from the origin to the lines $x \cos \theta - y \sin \theta = k \cos 2\theta$ and $x \sec \theta + y \, cosec \, \theta = k$, respectively, prove that $p2 + 4q2 = k2$.

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

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

4. If the lines $2x + y - 3 = 0$, $5x + ky - 3 = 0$ and $3x - y - 2 = 0$ are concurrent, find the value of k.

5. Find the distance of the line $4x - y = 0$ from the point $(4, 1)$ measured along the line making an angle of $135°$ with positive x- axis.

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

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

8. 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.

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

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