MATHEMATICS (WORKSHEET), CLASS - XI

Chapter – **Straight Lines**

01. If A is a point on the X-axis with abscissa – 5 and B is a point on the Y-axis with ordinate 8. Find the distance AB

02. If the points $A(-2,-1), B(1,0), C(x,3)$ and $D(1,y)$ are the vertices of a parallelogram, find the values of x and y (without using distance formula)

03. Find the area of ΔABC the mid-points of whose sides AB, BC, and CA are $D(3,-1), E(5,3)$ and $F(1,-3)$, respectively.

04. If four points $A(6,3), B(-3,5), C(4,-2)$ and $D(x,3x)$ are given in such a way $\frac{\Delta DBC}{\Delta ABC}=\frac{1}{2}$, then find x.

05. The area of a triangle is 5 sq units and two of its vertices are (2, 1) and (3, -2). If the third vertex is (x, y), where $y = x+3$, then find the coordinates of the third vertex.

06. The slope of a line is double the slope of another line. If tangent of the angle between them is $\frac{1}{3}$, then find the slope of the lines.

07. 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)?

08. Without using the Pythagoras theorem, show that A(4, 4), B(3, 5) and C(-1, 1) are the vertices of a right-angled triangle.

09. If three points (h, 0), (a, b) and (0, k) lie on a line, show that $\frac{a}{h}+\frac{b}{k}=1$

10. By using the slope method, find the value of x for which points A(5, 1), B(1, -1) and C (x, 4) are collinear.

11. Find the slope of a line, which passes through the origin and mid-point of the line segment joining the points P(0, -4) and Q (8, 0).

12. Find the equation of the perpendicular bisector of the line segment joining the points A(2, 3) and B(6, -5)

13. Two lines passing through the point (2, 3) intersect each other at an angle of 60^0. If the slope of one line is 2, then find the equation of the other line.

14. Find the equations of the altitudes of the triangle whose vertices are $A(7,-1), B(-2,8)$ and $C(1,2)$

15. The length L (in centimeters) 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.

16. Find the equation of the line intersecting the X-axis at a distance of 3 units to the left of origin with slope-2.

17. Find the equation of the lines which cuts-off intercepts on the axes whose sum and product are 1 and -6 respectively.

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

19. Find the equation of the line passing through the point of intersection of $2x + y = 5$ and $x + 3y + 8 = 0$ parallel to the line $3x + 4y = 7$

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

21. Prove that the lines $3x + y - 14 = 0$, $x - 2y = 0$ and $3x - 8y + 4 = 0$ are concurrent.

22. Find the equation of the line passing through (1, 2) perpendicular to $x + y + 7 = 0$

23. Find the coordinates of the foot of perpendiculars from the point (2, 3) on the line $y = 3x + 4$.

24. Find the equation of the straight line passing through the point of intersection of the lines $5x - 6y - 1 = 0$ $3x + 2y + 5 = 0$ and perpendicular to the line $3x - 5y + 11 = 0$.

25. Find the angle between the lines $\sqrt{3}x + y = 1$ $x + \sqrt{3} = 1$ and.

26. Reduce the equation $x - \sqrt{3}y + 8 = 0$ into normal form. Find the perpendicular distance from the origin and angle between perpendicular and the positive X=axis

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

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

29. If p and q are the lengths of perpendiculars from the origin to the lines $x\cos\theta - y\sin\theta = k\cos 2\theta$ $x\sec\theta + y\operatorname{cosec}\theta = k$ and, respectively. Prove that $p^2 + 4q^2 = k^2$.

30. If the sum of perpendicular distances of the variable point $P(x, y)$ from the lines $x + y - 5 = 0$ $3x - 2y + y = 0$ and is always 10. Show that P must move on a line.

31. Find the points on the line $x + y = 4$ which lie at a unit distance from the line $4x + 3y = 10$.

32. Find the equation of the lines passing through the point (1, 0) and at a distance $\frac{\sqrt{3}}{2}$ from the origin.

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

34. Find the new coordinates of the point (3, -4) if the origin is shifted to (1, 2) by a translation.

35. If the axes are shifted to the point (-1, 3) without rotation, then transform the equation of a line $y+3x=2$ into new axes.