

Straight Lines for ICSE and CBSE

1. Show that the equation of the straight line joining the points (x_1, y_1) and (x_2, y_2) can be expressed in the form: $(x - x_2)(y - y_1) = (x - x_1)(y - y_2)$.
2. Find the equation of the straight line which passes through the intersection of the straight line $2x + 3y = 5$ and $3x + 5y = 7$ and makes equal positive intercepts upon the co-ordinates axes. Ans: $x + y = 3$
3. A straight line forms a right-angled triangle with the axes of co-ordinates. If the hypotenuse is 13 units and the area of the triangle is 30 sq. units, find the equations of the straight line. Ans: $\frac{x}{\pm 5} + \frac{y}{\pm 12} = 1$
4. A straight line has slope $\frac{3}{4}$ and it passes through the point $(-2, -5)$. Find the co-ordinates of a point B on this line where $AB = 10$ units. Ans: $(-10, -11), (6, 1)$
5. Find the orthocenter of the triangle whose vertices are $(2, 7), (-6, 1)$ and $(4, -5)$. Ans: $\left(-\frac{10}{9}, \frac{49}{27}\right)$
6. Show that the equation of the straight line passing through $(a \cos^3 \theta, a \sin^3 \theta)$ and perpendicular to the straight line $x \sec \theta + y \operatorname{cosec} \theta = a$ is $x \cos \theta - y \sin \theta = a(\cos^2 \theta - \sin^2 \theta)$
7. The equations of two adjacent sides of a parallelogram are $4x + 5y = 0$ and $7x + 2y = 0$. If the equation of its one diagonal be $11x + 7y = 9$, find the equation of its other diagonal.
8. The line $3x + 2y - 24 = 0$ meets the y-axis at A and the x-axis at B. The perpendicular bisector of AB meets the line $y = -1$ at C. Prove that $\angle ACB$ is a right angle.
9. Find the area of the parallelogram formed by the lines $y = mx, y = mx + 1, y = nx$ and $y = nx + 1$. Ans: $\frac{1}{|m - n|} \text{sq. units}$
10. Find the point of intersection of the lines $(a + b)x + (a - b)y - 2ab = 0$ and $(a - b)x + (a + b)y - 2ab = 0$.

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