

**DPP-02****SLOPE OF LINE & ANGLE BETWEEN TWO LINES**

1. The line joining the points $(x, 2x)$ and $(3, 5)$ makes an obtuse angle with the positive direction of the x -axis. Then find the values of x .
2. If the line passing through $(4, 3)$ and $(2, k)$ is parallel to the line $y = 2x + 3$, then find the value of k .
3. Triangle ABC lies in the cartesian plane and has an area of 70 sq. units. The coordinates of B and C are $(12, 19)$ and $(23, 20)$, respectively. The line containing the median to the side BC has slope -5 . Find the possible coordinates of point A.
4. ABCD is a rhombus of side 10 units where slope of AB is $4/3$ and slope of AD is $3/4$. If coordinates of A are $(0, 0)$, then find the coordinates of B, C and D.
5. The line joining the points A(2, 1), and B(3, 2) is perpendicular to the line $(a^2)x + (a + 2)y + 2 = 0$. Find the values of a .
6. Find the angle between the line joining the points $(1, -2)$, $(3, 2)$ and the line $x + 2y - 7 = 0$.
7. The orthocenter of $\triangle ABC$ with vertices B($1, -2$) and C($-2, 0$) is H($3, -1$). Find the vertex A.
8. The medians AD and BE of the triangle with vertices A($0, b$), B($0, 0$) and C($a, 0$) are mutually perpendicular. Prove that $a^2 = 2b^2$.

LOCUS

9. Find the locus of a point whose distance from $(a, 0)$ is equal to its distance from the y -axis.
10. The coordinates of the points A and B are $(a, 0)$ and $(-a, 0)$, respectively. If a point P moves so that $PA^2 - PB^2 = 2k^2$, when k is constant, then find the equation to the locus of the point P.
11. Let A($2, -3$) and B($-2, 1$) be the vertices of $\triangle ABC$. If the centroid of the triangle moves on the line $2x + 3y = 1$. then find the locus of the vertex C.
12. Q is a variable point whose locus is $2x - 3y - 4 = 0$; corresponding to a particular position of Q, P is the point of section of OQ, O being the origin, such that OP: PQ = 3: 1. Find the locus of P.
13. Find the locus of the middle point of the portion of the line $x \cos \alpha + y \sin \alpha = p$ which is intercepted between the axes, given that p remains constant.
14. Find the locus of the point of intersection of lines $x \cos \alpha + y \sin \alpha = a$ and $x \sin \alpha - y \cos \alpha = b$ (a is a variable).
15. A point moves such that the area of the triangle formed by it with the points $(1, 5)$ and $(3, -7)$ is 21 sq. units. Then, find the locus of the point.
16. A variable line through point P($2, 1$) meets the axes at A and B. Find the locus of the circumcenter of triangle OAB (where O is the origin).
17. A straight line is drawn through P($3, 4$) to meet the axis of x and y at A and B, respectively. If the rectangle OACB is completed, then find the locus of C.



ANSWER KEY

1. $x \in (5/2, 3)$ 2. -1
3. (15,32) or (20,7) 4. B(6,8), C(14,14), D(8,6)
5. $a = 2, -1$ 6. $\pi/2$
7. $(3/7, -34/7)$ 9. $y^2 - 2ax + a^2 = 0$
10. $2ax + k^2 = 0$ 11. $2x + 3y = 9$
12. $2x + 3y + 3 = 0$ 13. $\frac{1}{x^2} + \frac{1}{y^2} = \frac{4}{p^2}$
14. $x^2 + y^2 = a^2 + b^2$ 15. $6x + y = 32$ or $6x + y = -10$
16. $x + 2y - 2xy = 0$ 17. $\frac{3}{x} + \frac{4}{y} = 1$