

I. Slope of a Line

1. Find the slope of the line joining the points:

- (a) (-7, -4) and (-5, 2) (b) (2, 3) and (1, 1) (iii) (7, 4) and (5, -2)

2. Find the angle of inclination of the line joining the points (5, 3) and (-8, 3).

II. Equation of a Straight Line

1. A straight line is inclined at 135° with the x-axis and it passes through (3, -4). Find its equation.

2. Find the equation a straight line having an inclination 45° with the x-axis and it passing through (1, 2).

3. Find the equation to the line having:

- (i) y-intercept -1 and slope $\frac{1}{2}$. (ii) y-intercept 3 and slope $\frac{1}{4}$. (iii) y-intercept -1 and slope 1.

4. Find the equation of the line joining the points (3, -1) and (-4, 5).

5. Find the equation of the line through the points (5, -4) and (-2, 3). Find its slope.

6. Find the equation of the straight line with x intercept 5 and passing through the point (-1, 2).

7. Find the equation of the straight line which cuts off an intercept 4 on the x axis and passes through the point (2, -3).

8. Find the equation of the straight line which cuts off an intercept 3 on the x axis and passes through the point (1, -2).

9. A (3, 7), B (-5, -1) and C (-9, 11) are the vertices of a triangle. Find the equation of the median through A.

10. If (1, -1), B (-2, 1) and C (3, 5) are the vertices of a triangle, find the equation of the median through B.

11. A (2, 6), B (4, 0) and C (8, 2) are the vertices of a triangle. Find the equation of the median through A.

12. A (3, 4), B (5, 6) and C (-1, -2) are the vertices of a triangle. Find the equation of the median through A.

13. The x-intercept of a line is 3 times the y-intercept. The line passes through (-6, 3). Find its equation.

14. The straight line through (4, 3) makes intercepts 4a and 3a on the x and y axes respectively, find the value of a.

15. If a straight line cuts the coordinate axes at A and B and if (3, 2) is the mid-point of AB, find the equation of AB.

16. The x-intercept of a line is 3 times the y-intercept. The line passes through (-2, 3). Find its equation.

17. Find the equation of a line which passes through the point (-4, 5) and whose intercepts are equal in magnitude but opposite in sign.

18. A line passes through (-5, 6) and makes on the axes positive intercepts whose sum is equal to 8. Find its equation.

19. A straight line cuts off a positive x-intercept which is double the positive y-intercept. Find the equation of the line if it passes through the point (1, 2).

20. Find the equation of a line that makes equal intercepts with the coordinate axes and passes through (1, 2).

III. Finding Slope and Intercepts from the equation of a line

- Express the equation of the line $2x + 5y + 3 = 0$ in intercept form and hence find its intercepts made on the axes.
Also find the slope of the line.
- Express the equation of the line $3x + 4y - 12 = 0$ in intercept form and hence find its intercepts made on the axes.
- Find the slopes and intercepts made on the axes by the line $3x + 4y - 15 = 0$.
- Find (i) the slopes and (ii) the intercepts made on the axes by the line $x - 3y + 5 = 0$.

IV. Angle between two lines

- Find the angle between the lines $A_1x + B_1y + C_1 = 0$ and $A_2x + B_2y + C_2 = 0$ and hence deduce the condition for parallelism and perpendicularity.
- Find the acute angle between the lines whose slopes are $\frac{-1}{2}$ and $\frac{1}{3}$.
- Find the acute angle between the lines whose slopes are $\sqrt{3}$ and $\frac{1}{\sqrt{3}}$.
- Find the acute angle between the lines $2x - y + 3 = 0$ and $3x - 3y + 4 = 0$.
- Find the acute angle between the lines $2x - y + 1 = 0$ and $2x - 6y + 5 = 0$.
- Find the angle between the lines $x - y + 1 = 0$ and $\sqrt{3}x + y + \sqrt{2} = 0$.
- Find the angles of the triangle having vertices (3, 2), (5, -4) and (1, -2).
- Show that the lines $7x - y + 3 = 0$ and $x + 7y - 2 = 0$ are perpendicular.
- Show that the points (7, -2), (3, 5) and (-5, 19) are collinear.
- Prove that the points (3, -5), B (-5, -4), C (7, 10) and (15, 9) taken in order are the vertices of a parallelogram.
- Find the value of k, if the lines $x + 3y + 7 = 0$ and $kx - 7y + 1 = 0$ are parallel.
- Find the value of p, if $(2p + 1)x - (5 - p)y = 8$ and $(5p - 1)x - (p + 1)y = 3$ are parallel.
- Find the value of q, if $8qx + (2 - 3q)y + 1 = 0$ and $qx + 8y + 7 = 0$ are perpendicular.

V. Equation of a line parallel/perpendicular to a given line

- Find the equation of the line parallel to $3x - y + 5 = 0$ and passing through (3, -2).
- Find the equation of the line parallel to $2x - 3y + 8 = 0$ and passing through the point (1, 1).
- Find the equation of the line which passes through (4, 5) and is parallel to the straight line $3x - 2y + 5 = 0$.

- Find the equation of the line passing through the point (2, -1). And perpendicular to $4x + 3y = 5$.
- Find the equation of the line passing through the point (4, 5) which is (i) parallel and (ii) perpendicular to the line $2x + 3y = 4$.

VI. Point of intersection and concurrency of lines

- Find the point of intersection of the lines, $2x + y + 1 = 0$ and $x + 2y - 1 = 0$.
- Find the point of intersection of the lines, $2x - 3y = 11$ and $3x + 4y = 8$.
- Find the point of intersection of the straight lines $y = 4 - x$ and $y = 2x + 3$.
- Show that the three lines $3x + 4y = 13$, $2x - 7y + 1 = 0$ and $5x - y = 14$ are concurrent.
- Show that the point of intersection of the lines $5x + 2y = 12$ and $3x - 8y + 2 = 0$ lies on $2x + 3y = 7$.
- Show that the three lines $2x - 3y - 7 = 0$, $3x - 4y - 10 = 0$ and $8x + 11y - 5 = 0$ are concurrent.
- Find the value of k for which the lines: $5x + 2y - 4 = 0$, $2x + ky + 11 = 0$ and $3x - 4y - 18 = 0$ are concurrent.
- Find the value of k for which the lines: $3x + y - 2 = 0$, $kx + 2y - 3 = 0$ and $2x - y - 3 = 0$ are concurrent.
- Find the equation of the line through the point of intersection of the lines $x - y + 1 = 0$ and $2x + 3y + 2 = 0$ and parallel to the line $x + y - 6 = 0$.
- Find the equation of the line through the point of intersection of the lines $x + 2y + 1 = 0$ and $y = x + 7$ and parallel to the line $5x - 2y + 11 = 0$.
- Find the equation of the line through the intersection of the lines $x + y - 1 = 0$ and $2x - y - 5 = 0$ and perpendicular to the line $3x + 2y + 2 = 0$.
- Find the equation of the line through the intersection of the lines $2x + 3y = 1$ and $3x + 4y = 6$ and perpendicular to the line $5x - 2y = 7$.
- Find the equation of the line through the intersection of the lines $x + y - 1 = 0$ and $x - 2y - 7 = 0$ and perpendicular to the line $2x + y + 7 = 0$.
- Find the equation of the line through the intersection of the lines $2x - y - 3 = 0$ and $x - 2y + 1 = 0$ and (i) parallel and (ii) perpendicular to the line $x - y = 5$.

VII. Additional questions(parallel/perpendicular/point of intersection)

1. Find the foot of the perpendicular from $(-1, 2)$ on the line $2x - 3y = 5$.
2. Find the foot of the perpendicular from $(-3, 2)$ on the line $2x + 3y - 13 = 0$.
3. Find the foot of the perpendicular from the origin to the line $3x - 2y - 13 = 0$.
4. A $(-2, 3)$, B $(4, -3)$ and C $(3, 5)$ are the vertices of a triangle. Find the equation of the line through A and parallel to BC.
5. A $(2, 6)$, B $(4, 0)$ and C $(8, 2)$ are the vertices of a triangle. AD is drawn perpendicular to BC.
 - (i) Find the slope of BC,
 - (ii) Hence write down the equation of BC,
 - (iii) Using the equation BC, find the equation of AD, (iv) Obtain the co-ordinates of D.
6. A $(2, 0)$, B $(0, 8)$ and C $(6, 4)$ are the vertices of a triangle. D and E are the middle points of BC and AC respectively.
 - (i) Find the coordinates of D and E.
 - (ii) Show that AB and DE are parallel.
 - (iii) Find the equation of AD and BE.
 - (iv) Hence find the coordinates of the centroid of the triangle.