Chapter 10

STRAIGHT LINES

SLOPE OF A LINE : m = tanθ if θ is the angle of inclination.

m = $\frac{y_2-y_1}{x_2-x_1}$ if (x_1, y_1) and (x_2, y_2) are two points on the line.

SLOPE of a horizontal line is 0 and vertical line is not defined.

If m_1 and m_2 are slopes of L_1 and L_2 respectively.

$L_1 \parallel L_2 \rightarrow m_1 = m_2$

$L_1 \perp L_2 \rightarrow m_1 \times m_2 = -1$

Acute angle between L_1 and L_2

$\tan\theta = \left|\frac{m2-m1}{1+m1 \times m2}\right|$ $as\ 1+m_1m_2 \neq 0\ and$ the obtuse angle $\emptyset = 180-\theta.$

EQUATION OF STRAIGHT LINE

x-axis → y = 0

y-axis → x = 0

|| to x-axis → y = b

|| to y-axis → x = a

Having slope m and making an intercept c on y-axis→ y = mx+c

Making intercepts a and b on the x-axis and y-axis → $\frac{x}{a}+\frac{y}{b} = 1$

passing through (x_1, y_1) and (x_2, y_2) → $y - y_1 = \frac{y_2-y_1}{x_2-x_1}(x-x_1)$

Having normal distance from orgin P and angle between the normal and positive x-axis ω → x cos ω + y sinω = P.

General form → Ax + By + C = 0

Distance of a point (x_1, y_1) from a line ax + by + c = 0 is $\left|\frac{ax_1+by_1+c}{\sqrt{a^2+b^2}}\right|$

TEXT BOOK QUESTIONS

* → Exercise 10.1 → Qns 5,8,9

* → Exercise 10.2 → Qns 7,8,9,10,11,16

* → Exercise 10.3 → Qns 3,4,5,7,8,9,10,12,16

* → MiscExercis→ Qns 1,6,7,8,9,12,14,15,23

** → Exercise 10.1 → Qns 11,13

** → Exercise 10.2 → Qns 12,13,15,18,20

** → Exercise 10.3 → Qns 13,14,17,18

** → Misc Exercise → Qns 3,4,11,18,19

** → Example → 2,3,13,14,15,17,19,20,23

Misc Example →23

EXTRA/ HOT QUESTIONS

1. Find the equation of the line through (4,-5) and parallel to the line joining the points (3,7) & (-2,4).

   (Ans.3x-5y-37=0)

2. If A(1,4) , B(2,-3) and C(-1,-2) are the vertices of a triangle ABC . find
   a) The equation of the median through A
   b) The equation of the altitude through A
   c) The right bisector of side BC
3. Find the equation of the straight line which passes through (3,-2) and cuts off positive intercepts on the x axis and y axis which are in the ratio 4:3
4. Reduce the equation 3x-2y+4 =0 to intercept form. Hence find the length of the segment intercepted between the axes.
5. Find the image of the point (1,2) in the line x-3y+4 =0
6. If the image of the point (2,1) in a line is (4,3) .Find the equation of the line.

7. Find the equation of a line passing through the point (-3,7) and the point of intersection of the lines 2x-3y+5 = 0 and 4x+9y = 7.

   (Ans.8x+3y+3=0)

8. Find the equation of straight lines which are perpendicular to the line

12x+5y = 17 and at a distance of 2 units from the point (-4,1)

(ans. 5x-12y+6=0 & 5x-12y+58=0)

9.The points A(2,3) B(4,-1) & C(-1,2) are the vertices of a triangle. Find the length of perpendicular from A to BC and hence the area of ABC (Ans.$\frac{14}{\sqrt{34}}$ units & 7 sq.units)

10. Find the equation of straight line whose intercepts on the axes are thrice as long as those made by 2x +11y = 6

(Ans.2x+11y =18)