

# 4.12.28

AI25BTECH11023 - Pratik R

## QUESTION

The value of the  $\lambda$ , if the lines  $(2x + 3y + 4) + \lambda(6x - y + 12) = 0$  are

- |   |                               |
|---|-------------------------------|
| 1. parallel to $Y$ axis is              | a) $\lambda = -\frac{3}{4}$   |
| 2. perpendicular to $7x + y - 4 = 0$ is | b) $\lambda = -\frac{1}{3}$   |
| 3. passes through $(1, 2)$ is           | c) $\lambda = -\frac{17}{41}$ |
| 4. parallel to $X$ axis is              | d) $\lambda = 3$              |

TABLE 0: 1

## Solution:

Equation of line is given by

$$(2 + 6\lambda \quad 3 - \lambda)\mathbf{x} = -4 - 12\lambda \quad (0.1)$$

$$\Rightarrow \mathbf{n}^T \mathbf{x} = c; \quad (0.2)$$

where  $\mathbf{n}^T = (2 + 6\lambda \quad 3 - \lambda)$   
and  $c = -4 - 12\lambda$ .

1) If the line is parallel to  $Y$  axis

$$\mathbf{n}^T \mathbf{e}_2 = 0 \quad (1.1)$$

$$3 - \lambda = 0 \quad (1.2)$$

$$\lambda = 3 \quad (1.3)$$

2) If the line is perpendicular to  $7x + y - 4 = 0$ , that is,  $\mathbf{n}_1^T = (7 \quad 1)$

$$\mathbf{n}_1^T \mathbf{n} = 0 \quad (2.1)$$

$$41\lambda = -17 \quad (2.2)$$

$$\lambda = \frac{-17}{41} \quad (2.3)$$

3) If the line passes through  $P(1, 2)$

$$\mathbf{n}^T \mathbf{P} = c \quad (3.1)$$

$$16\lambda = -12 \quad (3.2)$$

$$\lambda = \frac{-3}{4} \quad (3.3)$$

4) If the line is parallel to X axis

$$\mathbf{n}^T \mathbf{e}_1 = 0 \quad (4.1)$$

$$2 + 6\lambda = 0 \quad (4.2)$$

$$\lambda = \frac{-1}{3} \quad (4.3)$$

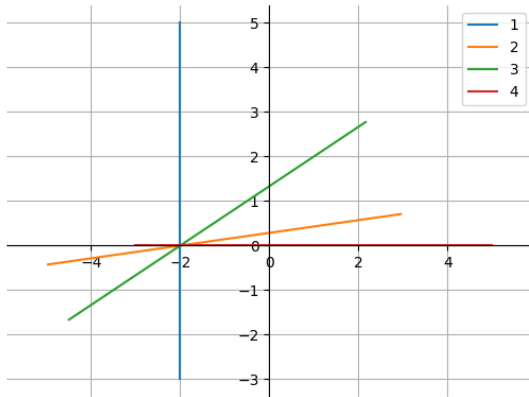


Fig. 4.1: plane