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Pratik R-AI25BTECH11023

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# Question

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

# Table

- |                                         |                               |
|-----------------------------------------|-------------------------------|
| 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: 1

# Solution

Equation of line is given by

$$(2 + 6\lambda \quad 3 - \lambda) x = -4 - 12\lambda \quad (1)$$

$$\implies n^\top x = c; \quad (2)$$

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

# Option 1

If the line is parallel to Y axis

$$n^T e_2 = 0 \quad (3)$$

$$3 - \lambda = 0 \quad (4)$$

$$\lambda = 3 \quad (5)$$

## Option 2

If the line is perpendicular to  $7x + y - 4 = 0$ , that is,  $n_1^\top = (7 \ 1)$

$$n_1^\top n = 0 \quad (6)$$

$$41\lambda = -17 \quad (7)$$

$$\lambda = \frac{-17}{41} \quad (8)$$

## Option 3

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

$$n^T P = c \quad (9)$$

$$16\lambda = -12 \quad (10)$$

$$\lambda = \frac{-3}{4} \quad (11)$$

## Option 4

If the line is parallel to X axis

$$n^T e_1 = 0 \quad (12)$$

$$2 + 6\lambda = 0 \quad (13)$$

$$\lambda = \frac{-1}{3} \quad (14)$$



