

4.12.28

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Question

The value of the λ , 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

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

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

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

Option 1

If the line is parallel to Y axis

$$\mathbf{n}^\top \mathbf{e}_2 = 0 \quad (3)$$

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

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

Option 2

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

$$\mathbf{n}_1^\top \mathbf{n} = 0 \quad (6)$$

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

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

Option 3

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

$$\mathbf{n}^\top \mathbf{P} = c \quad (9)$$

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

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

Option 4

If the line is parallel to X axis

$$\mathbf{n}^\top \mathbf{e}_1 = 0 \quad (12)$$

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

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

plot

