

5.8.3

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Question

5 pencils and 7 pens together cost ₹50, whereas 7 pencils and 5 pens together cost ₹46. Find the cost of one pencil and that of one pen.

Converting to Equations:

Let the cost of one pencil be x , pen be y .

$$5x + 7y = 50 \quad (1)$$

$$7x + 5y = 46 \quad (2)$$

Forming Augmented Matrix:

$$\left(\begin{array}{cc|c} 5 & 7 & 50 \\ 7 & 5 & 46 \end{array} \right) \quad (3)$$

Row Operation and Reduction:

$$\left(\begin{array}{cc|c} 5 & 7 & 50 \\ 7 & 5 & 46 \end{array} \right) \xrightarrow{R_2 \rightarrow R_2 - \frac{7}{5}R_1} \left(\begin{array}{cc|c} 5 & 7 & 50 \\ 0 & -4.8 & -24 \end{array} \right) \quad (4)$$

Back Substitution:

$$-4.8y = -24 \implies y = 5 \quad (5)$$

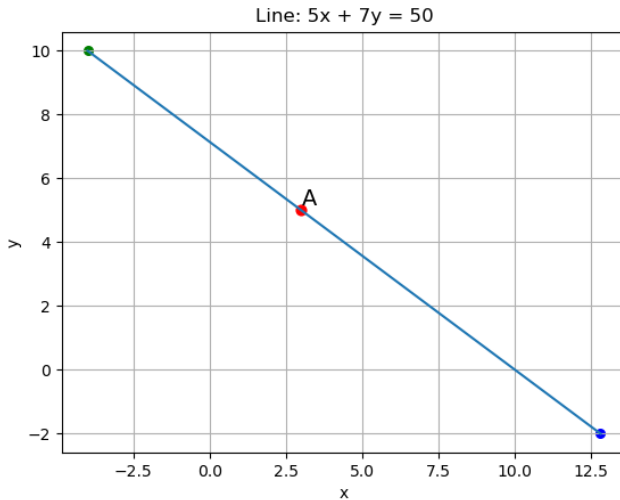
$$5x + 7y = 50 \implies 5x + 35 = 50 \implies x = 3 \quad (6)$$

Final Solution:

$$\mathbf{x} = \begin{pmatrix} 3 \\ 5 \end{pmatrix} \quad (7)$$

Cost of one pencil is ₹3 and one pen is ₹5.

Plot



For Codes, refer to the URL below:

<https://github.com/Aditya-Mishra11005/ee1030-2025/tree/main/ee25btech11005/matgeo/5.8.3/Codes>