

5.8.3

Aditya Mishra-EE25BTECH11005

October 10, 2025

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 .

$$\begin{cases} 5x + 7y = 50 \\ 7x + 5y = 46 \end{cases}$$

Forming Augmented Matrix:

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

Row Operation and Reduction:

$$\left(\begin{array}{cc|c} 5 & 7 & 50 \\ 7 & 5 & 46 \end{array} \right) \xrightarrow{R_2 \rightarrow R_2 - \frac{7}{5}R_1} \left(\begin{array}{cc|c} 5 & 7 & 50 \\ 0 & -4.8 & -24 \end{array} \right) \quad (1)$$

Back Substitution:

From second row: $-4.8y = -24 \implies y = 5$

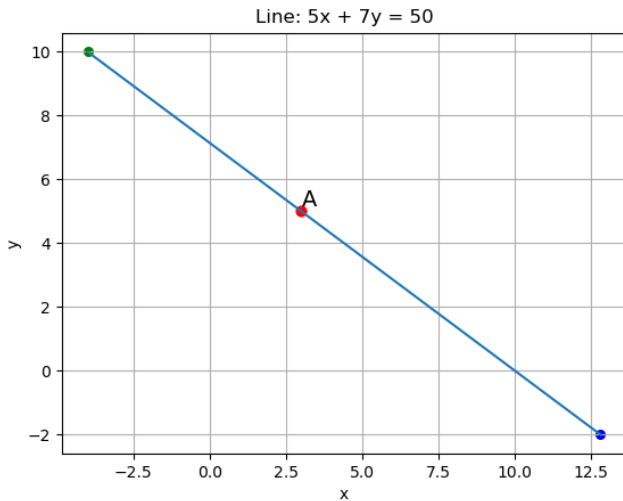
From first row: $5x + 7y = 50 \implies 5x + 35 = 50 \implies x = 3$

Final Solution:

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

$$\mathbf{x} = \begin{pmatrix} 3 \\ 5 \end{pmatrix}$$

Plot



For Codes, refer to the URL below:

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