

5.8.38

EE25BTECH11041 - Naman Kumar

Question:

Alwar tells his daughter, “Seven years ago, I was seven times as old as you were then. Also, three years from now, I shall be three times as old as you will be” Represent this situation algebraically and graphically.

Solution:

x	age of daughter
y	age of dad

TABLE I

from given statements, we can write

$$y - 7 = 7 \times (x - 7) \quad \& \quad y + 3 = 3 \times (x + 3) \quad (1)$$

$$7x - y = 42 \quad \& \quad 3x - y = -6 \quad (2)$$

This can be written as

$$\begin{pmatrix} 7 & -1 \\ 3 & -1 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 42 \\ -6 \end{pmatrix} \quad (3)$$

$$\mathbf{Ax} = \mathbf{c} \quad (4)$$

Row reduced form of $[\mathbf{A}|\mathbf{I}]$

$$\left(\begin{array}{cc|c} 7 & -1 & 42 \\ 3 & -1 & -6 \end{array} \right) \xrightarrow{R_2 - \frac{3}{7}R_1} \left(\begin{array}{cc|c} 7 & -1 & 42 \\ 0 & -\frac{4}{7} & -24 \end{array} \right) \quad (5)$$

$$\xrightarrow{\frac{-7}{4}R_2} \left(\begin{array}{cc|c} 7 & -1 & 42 \\ 0 & 1 & 42 \end{array} \right) \quad (6)$$

Therefore

$$\begin{pmatrix} 7 & -1 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 42 \\ 42 \end{pmatrix} \quad (7)$$

$$\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 12 \\ 42 \end{pmatrix} \quad (8)$$

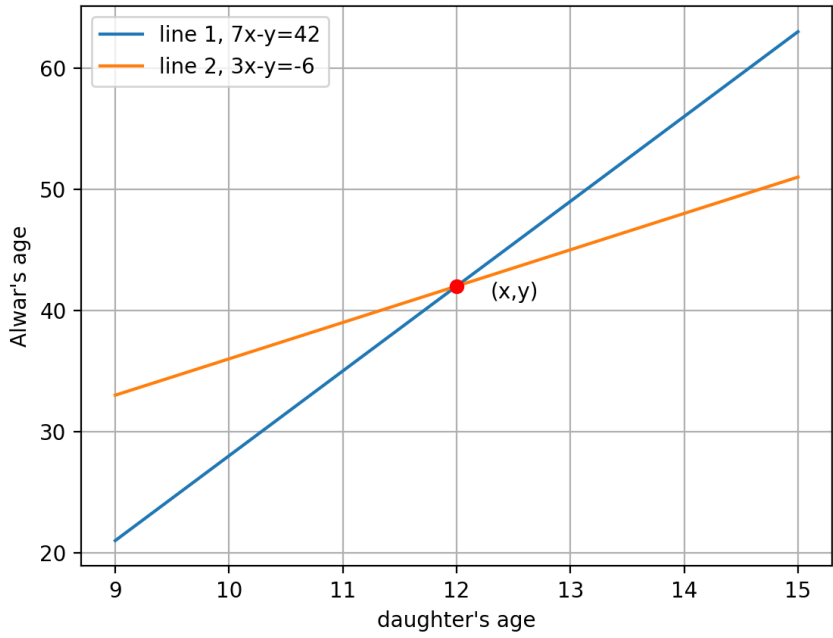


Fig. 1