

**Question**

The system of linear equations

$$4x + 2y = 7$$

$$2x + y = 6$$

has

- a) a unique solution
- b) no solution
- c) infinite number of solutions
- d) exactly two distinct solutions

**solution:**

Given linear equations are

$$(4 \quad 2) \begin{pmatrix} x \\ y \end{pmatrix} = 7 \quad (1)$$

$$(2 \quad 1) \begin{pmatrix} x \\ y \end{pmatrix} = 6 \quad (2)$$

Equations (1) and (2) can be written as

$$\begin{pmatrix} 4 & 2 \\ 2 & 1 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 7 \\ 6 \end{pmatrix} \quad (3)$$

Forming the augmented matrix

$$\left( \begin{array}{cc|c} 4 & 2 & 7 \\ 2 & 1 & 6 \end{array} \right) \xrightarrow{R_2 \rightarrow R_2 - \frac{1}{2} \times R_1} \left( \begin{array}{cc|c} 4 & 2 & 7 \\ 0 & 0 & \frac{5}{2} \end{array} \right) \quad (4)$$

As in the augmented matrix the entries of second row are 0 their linear combination should also give 0 but it is  $\frac{5}{2}$  which is a contradiction

$\Rightarrow$  So, the given system of linear equations has no solution

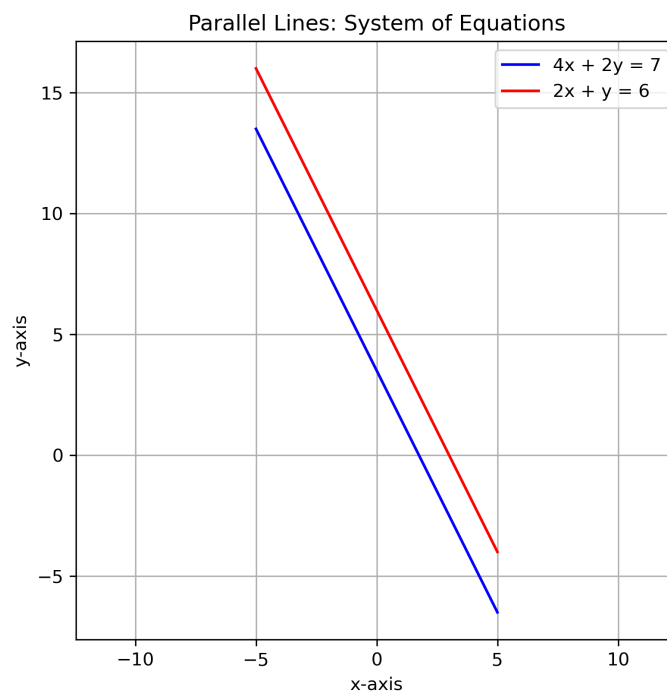


Fig. 4