Pair of linear equation in two variables

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Class 10th Maths - Chapter 3

This is Problem-1 from Exercise 3.4

1. Solve the following pair of linear equations by elimination method and substitution method:

$$x + y = 5 \tag{1}$$
$$2x - 3y = 4 \tag{2}$$

Solution:
The equations can be written as:

$$\begin{pmatrix} 1 & 1 & 5 \\ 2 & -3 & 4 \end{pmatrix} \tag{3}$$

$R_1 \to 3R_1 + R_2$
we get,

$$\begin{pmatrix} 5 & 0 & 19 \\ 2 & -3 & 4 \end{pmatrix} \tag{4}$$

$R_1 \to \frac{R_1}{5}$

$$\begin{pmatrix} 1 & 0 & \frac{19}{5} \\ 2 & -3 & 4 \end{pmatrix} \tag{5}$$

$$R_2 \to R_2 - 2R_1$$

$$\begin{pmatrix} 1 & 0 & \frac{19}{5} \\ 0 & -3 & \frac{-18}{5} \end{pmatrix} \tag{6}$$

$$R_2 \to \frac{R_2}{-3}$$

$$\begin{pmatrix} 1 & 0 & \frac{19}{5} \\ 0 & 1 & \frac{6}{5} \end{pmatrix} \tag{7}$$

Therefore,

$$x = \frac{19}{5} \tag{8}$$

$$y = \frac{6}{5} \tag{9}$$