

Answer on Question #58059 – Math – Linear Algebra

Question

6. Solve for x and y: $3x + 4y = 9$, $2x + 3y = 8$

$x = 7.5, y = -4.5$

$x = 7.0, y = -4.5$

$x = 4.5, y = -7.5$ $x = 7.5, y = -4.1$

Solution

$$\begin{cases} 3x + 4y = 9 \\ 2x + 3y = 8 \end{cases}$$

$$3(3x + 4y) - 4(2x + 3y) = 3(9) - 4(8)$$

$$x = -5 \rightarrow y = \frac{9 - 3 \cdot (-5)}{4} = 6$$

Answer: $x = -5, y = 6$.

Question

9. Solve the set of linear equations by the matrix method: $a+3b+2c=3$, $2a-b-3c= -8$, $5a+2b+c=9$. Solve for c

2

1

5

7

Solution

$$\begin{cases} a + 3b + 2c = 3 \\ 2a - b - 3c = -8 \\ 5a + 2b + c = 9 \end{cases} \rightarrow \begin{pmatrix} 1 & 3 & 2 & 3 \\ 2 & -1 & -3 & -8 \\ 5 & 2 & 1 & 9 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 3 & 2 & 3 \\ 2 & -1 & -3 & -8 \\ 5 & 2 & 1 & 9 \end{pmatrix} \xrightarrow{R_2 = r_2 - 2r_1} \begin{pmatrix} 1 & 3 & 2 & 3 \\ 0 & -7 & -7 & -14 \\ 5 & 2 & 1 & 9 \end{pmatrix} \xrightarrow{R_3 = r_3 - 5r_1} \begin{pmatrix} 1 & 3 & 2 & 3 \\ 0 & -7 & -7 & -14 \\ 0 & -13 & -9 & -6 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 3 & 2 & 3 \\ 0 & -7 & -7 & -14 \\ 0 & -13 & -9 & -6 \end{pmatrix} \xrightarrow{R_3 = 7r_3 - 13r_2} \begin{pmatrix} 1 & 3 & 2 & 3 \\ 0 & -7 & -7 & -14 \\ 0 & 0 & 28 & 140 \end{pmatrix}$$

$$28c = 140 \rightarrow c = \frac{140}{28} = 5$$

Answer: 5.

Remark. Parts 7, 8, 10 are not properly written, therefore we can't solve them.