Assignment No.4

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1 QUESTION No.2.1

Check which of the following are solutions of the equation

$$\begin{pmatrix} 1 & -2 \end{pmatrix} \mathbf{x} = 4 \qquad (1.0.1)$$

$$(a)\begin{pmatrix} 0 \\ 2 \end{pmatrix} (b)\begin{pmatrix} 4 \\ 0 \end{pmatrix} (c)\begin{pmatrix} 2 \\ 0 \end{pmatrix} (d)\begin{pmatrix} \sqrt{2} \\ 4\sqrt{2} \end{pmatrix} (e)\begin{pmatrix} 1 \\ 1 \end{pmatrix} \qquad (1.0.2)$$

2 SOLUTION

Given $\begin{pmatrix} 1 & -2 \end{pmatrix}$x=4
let 'y' be the solution then equation be

$$\boxed{\mathbf{y} = \begin{pmatrix} 1 & -2 \end{pmatrix} \mathbf{x}} \qquad (2.0.1)$$

Substitute

$$\mathbf{x} = \begin{pmatrix} 0 \\ 2 \end{pmatrix} in (2.0.1) \qquad (2.0.2)$$

$$\mathbf{y} = \begin{pmatrix} 1 & -2 \end{pmatrix} \begin{pmatrix} 0 \\ 2 \end{pmatrix} \qquad (2.0.3)$$

$$\boxed{\mathbf{y} = -4} \qquad (2.0.4)$$

Substitute

$$\mathbf{x} = \begin{pmatrix} 4 \\ 0 \end{pmatrix} in (2.0.1) \qquad (2.0.5)$$

$$\mathbf{y} = \begin{pmatrix} 1 & -2 \end{pmatrix} \begin{pmatrix} 4 \\ 0 \end{pmatrix} \qquad (2.0.6)$$

$$\boxed{\mathbf{y} = 4} \qquad (2.0.7)$$

Substitute

$$\mathbf{x} = \begin{pmatrix} 2 \\ 0 \end{pmatrix} in (2.0.1) \qquad (2.0.8)$$

$$\mathbf{y} = \begin{pmatrix} 1 & -2 \end{pmatrix} \begin{pmatrix} 2 \\ 0 \end{pmatrix} \qquad (2.0.9)$$

$$\boxed{\mathbf{y} = 2} \qquad (2.0.10)$$

Substitute

$$\mathbf{x} = \begin{pmatrix} \sqrt{2} \\ 4\sqrt{2} \end{pmatrix} in (2.0.1) \qquad (2.0.11)$$

$$\mathbf{y} = \begin{pmatrix} 1 & -2 \end{pmatrix} \begin{pmatrix} \sqrt{2} \\ 4\sqrt{2} \end{pmatrix} \qquad (2.0.12)$$

$$\boxed{\mathbf{y} = -7\sqrt{2}} \qquad (2.0.13)$$

Substitute

$$\mathbf{x} = \begin{pmatrix} 1 \\ 1 \end{pmatrix} in (2.0.1) \qquad (2.0.14)$$

$$\mathbf{y} = \begin{pmatrix} 1 & -2 \end{pmatrix} \begin{pmatrix} 1 \\ 1 \end{pmatrix} \qquad (2.0.15)$$

$$\boxed{\mathbf{y} = -1} \qquad (2.0.16)$$

$\therefore$ x=$\begin{pmatrix} 4 \\ 0 \end{pmatrix}$ is the solution of the equation $\begin{pmatrix} 1 & -2 \end{pmatrix}$x=4

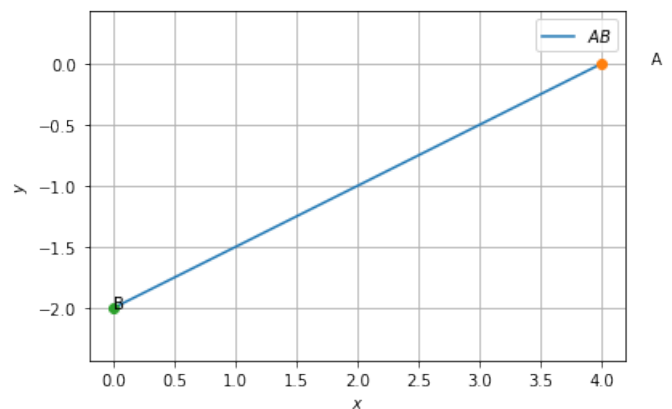Fig. 2.1: Solution