

4.3.37

EE25BTECH11047 - RAVULA SHASHANK REDDY

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Question: Find the equation of the line passing through the points

$$\mathbf{A} = \begin{pmatrix} 1 \\ 2 \end{pmatrix}, \quad \mathbf{B} = \begin{pmatrix} 3 \\ 6 \end{pmatrix}.$$

Solution:

$$(\mathbf{A} \quad \mathbf{B})^T \mathbf{n} = \begin{pmatrix} c \\ c \end{pmatrix} \quad (1)$$

$$\begin{pmatrix} 1 & 2 \\ 3 & 6 \end{pmatrix} \mathbf{n} = \begin{pmatrix} 0 \\ 0 \end{pmatrix} \quad (2)$$

$$\begin{pmatrix} 1 & 2 & 0 \\ 3 & 6 & 0 \end{pmatrix} \xrightarrow{R_2 - 3R_1} \begin{pmatrix} 1 & 2 & 0 \\ 0 & 0 & 0 \end{pmatrix} \quad (3)$$

$$n_1 + 2n_2 = 0 \quad (4)$$

Let $n_2 = 1$

$$n_1 = -2, \quad (5)$$

$$\mathbf{n} = \begin{pmatrix} -2 \\ 1 \end{pmatrix} \quad (6)$$

Equation of a Line is

$$\mathbf{n}^T \mathbf{x} = c \quad (7)$$

$$\begin{pmatrix} -2 & 1 \end{pmatrix} \begin{pmatrix} 1 \\ 2 \end{pmatrix} = c \quad (8)$$

$$c = 0 \quad (9)$$

$$\begin{pmatrix} -2 & 1 \end{pmatrix} \mathbf{x} = 0 \quad (10)$$

$$-2x + y = 0 \quad (11)$$

$$\boxed{y = 2x} \quad (12)$$

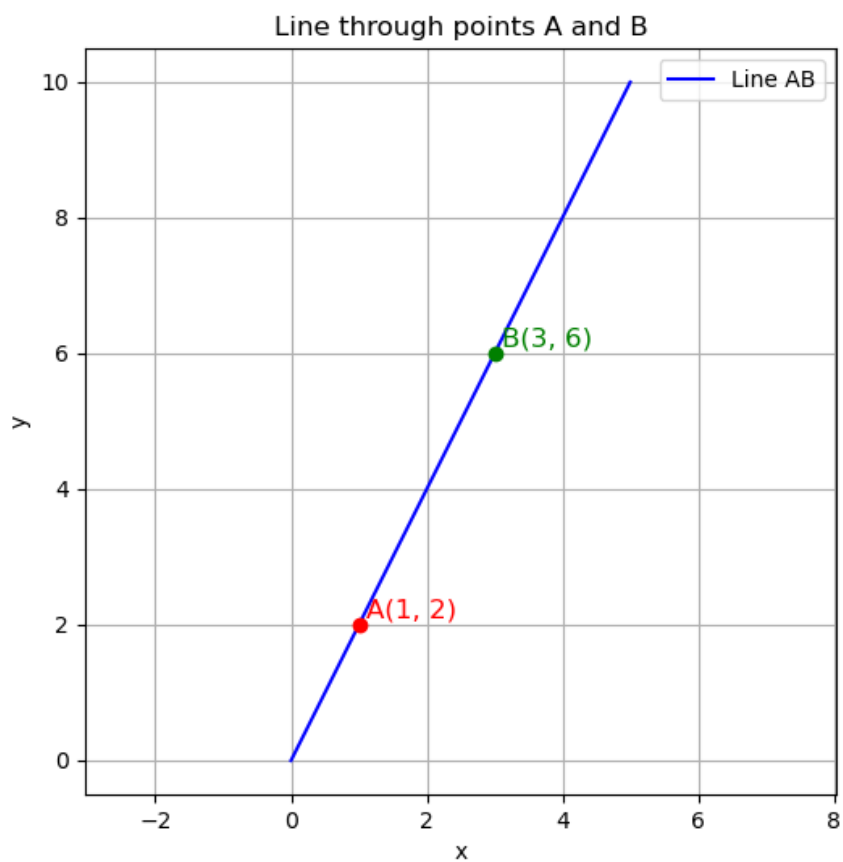


Figure 1: Caption