

# 1.9.15

EE24BTECH11012 - Bhavanisankar G S

## QUESTION

If  $\mathbf{a}$ ,  $\mathbf{b}$ ,  $\mathbf{c}$  are position vectors of the points  $\mathbf{A} \begin{pmatrix} 2 \\ 3 \\ -4 \end{pmatrix}$ ,  $\mathbf{B} \begin{pmatrix} 3 \\ -4 \\ -5 \end{pmatrix}$ , and  $\mathbf{C} \begin{pmatrix} 3 \\ 2 \\ -3 \end{pmatrix}$  respectively,

then  $|\mathbf{a} + \mathbf{b} + \mathbf{c}|$  is equal to

## SOLUTION

Variable name	Description	Formula
A	<b>2, 3, -4</b>	$ \mathbf{a}, \mathbf{b}, \mathbf{c}  = \sqrt{a^2 + b^2 + c^2}$
B	<b>3, -4, -5</b>	$ \mathbf{A} + \mathbf{B} + \mathbf{C}  = ?$
C	<b>3, 2, -3</b>	.

TABLE 0: Variables Used

Let

$$\mathbf{A} = \begin{pmatrix} 2 \\ 3 \\ -4 \end{pmatrix} \quad (0.1)$$

$$\mathbf{B} = \begin{pmatrix} 3 \\ -4 \\ -5 \end{pmatrix} \quad (0.2)$$

$$\mathbf{C} = \begin{pmatrix} 3 \\ 2 \\ -3 \end{pmatrix} \quad (0.3)$$

$$\Rightarrow \mathbf{A} + \mathbf{B} + \mathbf{C} = \begin{pmatrix} 8 \\ 1 \\ -12 \end{pmatrix} \quad (0.4)$$

$$\left| \begin{pmatrix} a \\ b \\ c \end{pmatrix} \right| = \sqrt{a^2 + b^2 + c^2} \quad (0.5)$$

$$\Rightarrow |\mathbf{a} + \mathbf{b} + \mathbf{c}| = \sqrt{209} \quad (0.6)$$

$$(0.7)$$

Hence, the answer to the given question is  $\sqrt{209}$ .

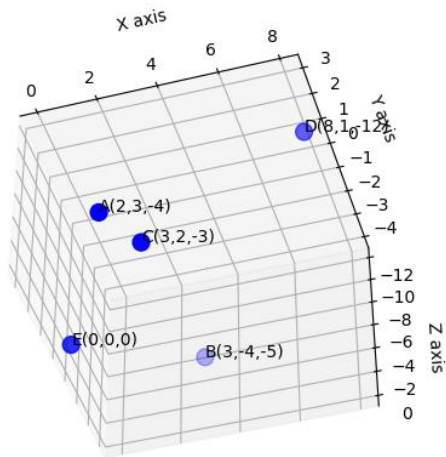


Fig. 0.1: A plot of the points given with the origin