

Question

Write down the sum $\mathbf{a} + \mathbf{b}$ and difference $\mathbf{a} - \mathbf{b}$ of the vectors:

(i) $\mathbf{a} = 3\mathbf{i} - 2\mathbf{j} + \mathbf{k}$ $\mathbf{b} = -\mathbf{i} - 2\mathbf{j} + 3\mathbf{k}$

(ii) $\mathbf{a} = -\mathbf{i} + 2\mathbf{j} - \mathbf{k}$, $\mathbf{b} = 2\mathbf{i} - 4\mathbf{j} + 2\mathbf{k}$

Answer

(i) $\mathbf{a} + \mathbf{b} = 3\mathbf{i} - 2\mathbf{j} + \mathbf{k} - \mathbf{i} - 2\mathbf{j} + 3\mathbf{k} = 2\mathbf{i} - 4\mathbf{j} + 4\mathbf{k}$

$$\mathbf{a} - \mathbf{b} = 3\mathbf{i} - 2\mathbf{j} + \mathbf{k} - (-\mathbf{i} - 2\mathbf{j} + 3\mathbf{k}) = 4\mathbf{i} - 2\mathbf{k}$$

(ii) $\mathbf{a} + \mathbf{b} = -\mathbf{i} + 2\mathbf{j} - \mathbf{k} + 2\mathbf{i} - 4\mathbf{j} + 2\mathbf{k} = \mathbf{i} - 2\mathbf{j} + \mathbf{k}$

$$\mathbf{a} - \mathbf{b} = -\mathbf{i} + 2\mathbf{j} - \mathbf{k} - (2\mathbf{i} - 4\mathbf{j} + 2\mathbf{k}) = -3\mathbf{i} + 6\mathbf{j} - 3\mathbf{k}$$