

Answer on Question #77672 Physics / Other

1. a) Calculate the volume of a parallelepiped whose sides are given by the vectors

$$\vec{a} = 3\hat{i} + 2\hat{j} + \hat{k}, \vec{b} = -\hat{i} + 3\hat{j} \text{ and } \vec{c} = 2\hat{i} + 2\hat{j} + 5\hat{k}$$

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Solution:

$$\vec{a} = 3\hat{i} + 2\hat{j} + \hat{k}$$

$$\vec{b} = -\hat{i} + 3\hat{j}$$

$$\vec{c} = 2\hat{i} + 2\hat{j} + 5\hat{k}$$

The volume of a parallelepiped

$$V = \text{mod} \begin{vmatrix} a_x & a_y & a_z \\ b_x & b_y & b_z \\ c_x & c_y & c_z \end{vmatrix} = \text{mod} \begin{vmatrix} 3 & 2 & 1 \\ -1 & 3 & 0 \\ 2 & 2 & 5 \end{vmatrix} = 47$$

Answer: 47

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