

Please attempt the following questions in preparation for the online session on 9th March.

Vectors

Q1. Given $\mathbf{u} = \begin{pmatrix} 3 \\ -2 \end{pmatrix}$ and $\mathbf{v} = \begin{pmatrix} 8 \\ -4 \end{pmatrix}$.

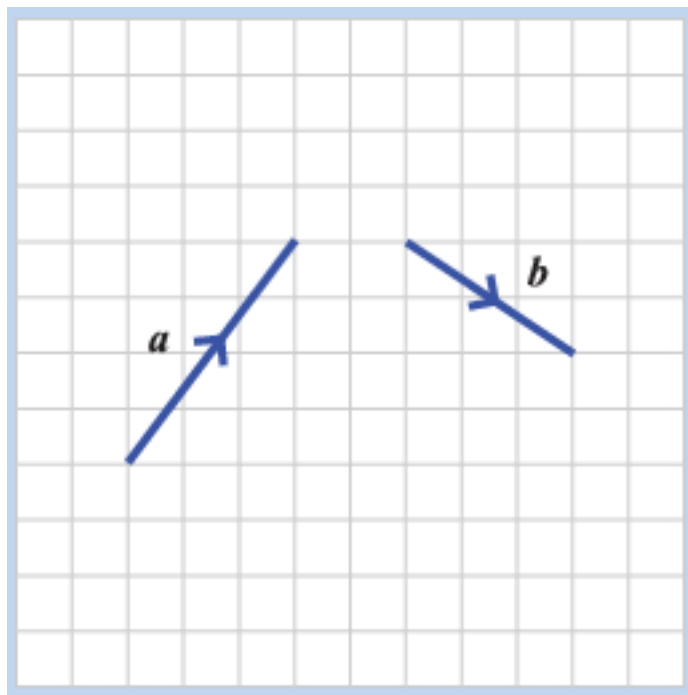
Find the resultant vector $5\mathbf{v} - 2\mathbf{u}$.

Q2. Given $\mathbf{a} = \begin{pmatrix} 1 \\ -1 \\ 2 \end{pmatrix}$ and $\mathbf{b} = \begin{pmatrix} -6 \\ 2 \\ -4 \end{pmatrix}$.

Find the resultant vector $\mathbf{a} - \frac{1}{2}\mathbf{b}$.

Q3. The diagram shows the vectors \mathbf{a} and \mathbf{b} .

Sketch the resultant vector $3\mathbf{b} - \mathbf{a}$?

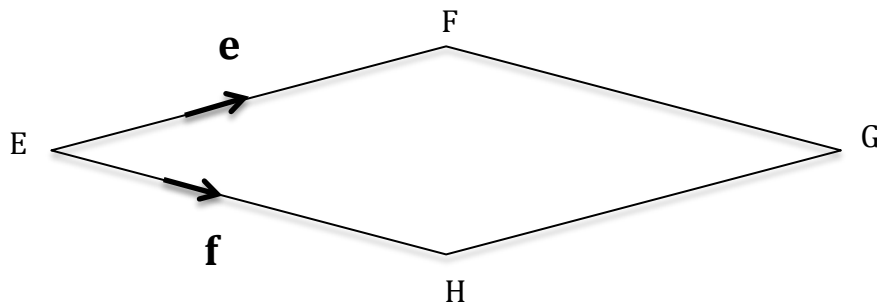


Q4. $\mathbf{a} = \begin{pmatrix} 4 \\ -3 \\ 7 \end{pmatrix}$ and $\mathbf{b} = \begin{pmatrix} -1 \\ 2 \\ -3 \end{pmatrix}$

Find $|\mathbf{a} - 2\mathbf{b}|$.

Q5. EFGH is a rhombus.

Express each of the following displacements in terms of vectors \mathbf{e} and \mathbf{f} .



(a) \overrightarrow{EF}

(b) \overrightarrow{HG}

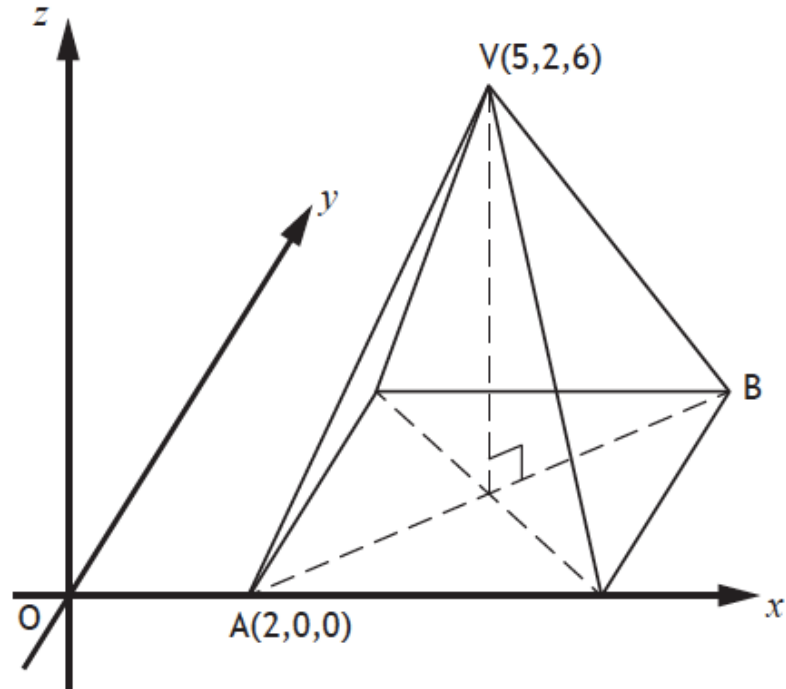
(c) \overrightarrow{EG}

(d) \overrightarrow{HF}

Q6. The diagram shows a rectangular based pyramid, relative to coordinate axes.

A is the point $(2,0,0)$

V is the point $(5,2,6)$



(a) What are the coordinates of B?

(b) What is the length of the edge AV of the pyramid?