

VECTOR ALGEBRA

Answer ALL questions in the spaces provided for your answers.

Where your answer is a fraction, write it as $\frac{1}{3}$; $-\frac{1}{3}$; $\frac{5}{4}$ or $-\frac{7}{2}$ where appropriate.

1. Given that $\underline{a} = \begin{pmatrix} 5 \\ 2 \end{pmatrix}$, $\underline{b} = \begin{pmatrix} 6 \\ 0 \end{pmatrix}$ and $\underline{c} = \begin{pmatrix} -3 \\ -2 \end{pmatrix}$, determine:

(a) $\underline{a} + \underline{b} = \left(\begin{array}{c} \\ \end{array} \right)$

(e) $\underline{a} - 3\underline{b} - 4\underline{c} = \left(\begin{array}{c} \\ \end{array} \right)$

(b) $\underline{a} - \underline{b} = \left(\begin{array}{c} \\ \end{array} \right)$

(f) $\frac{1}{2}\underline{b} = \left(\begin{array}{c} \\ \end{array} \right)$

(c) $2\underline{a} - \underline{b} + \underline{c} = \left(\begin{array}{c} \\ \end{array} \right)$

(g) $\frac{1}{3}\underline{c} = \left(\begin{array}{c} \\ \end{array} \right)$

(d) $3\underline{a} - 2\underline{b} - \underline{c} = \left(\begin{array}{c} \\ \end{array} \right)$

2. Given that $\underline{a} = \begin{pmatrix} 2 \\ 5 \end{pmatrix}$, $\underline{b} = \begin{pmatrix} 3 \\ -3 \end{pmatrix}$ and $\underline{c} = \begin{pmatrix} 4 \\ 6 \end{pmatrix}$, determine the following vectors:

(a) $\underline{a} + \underline{b} = \left(\begin{array}{c} \\ \end{array} \right)$

(e) $3\underline{a} - \underline{b} + 2\underline{c} = \left(\begin{array}{c} \\ \end{array} \right)$

(b) $\underline{a} + \underline{b} + \underline{c} = \left(\begin{array}{c} \\ \end{array} \right)$

(f) $\frac{1}{2}\underline{a} - \underline{b} + \underline{c} = \left(\begin{array}{c} \\ \end{array} \right)$

(c) $2\underline{a} + \frac{1}{3}\underline{b} = \left(\begin{array}{c} \\ \end{array} \right)$

(g) $\underline{a} - \underline{b} + \underline{c} = \left(\begin{array}{c} \\ \end{array} \right)$

(d) $\underline{a} - \frac{2}{3}\underline{b} + \frac{1}{2}\underline{c} = \left(\begin{array}{c} \\ \end{array} \right)$

(h) $\underline{a} + \underline{b} - \underline{c} = \left(\begin{array}{c} \\ \end{array} \right)$