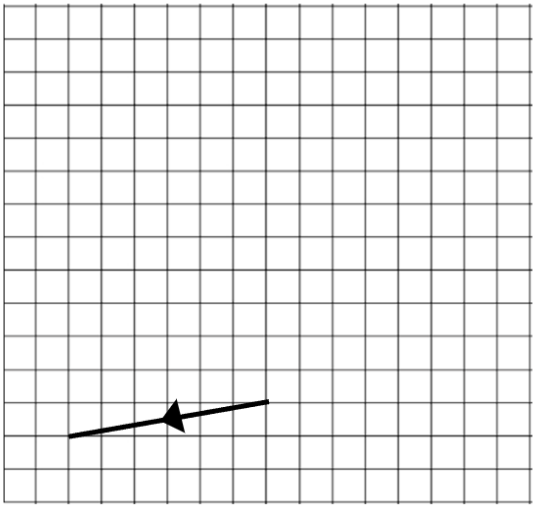
Basic Vectors Exam Practice

Q1. a) On the grid below draw the following vectors:

i) $\begin{pmatrix} 3 \\ -2 \end{pmatrix}$ (ii) $\begin{pmatrix} 4 \\ 1 \end{pmatrix}$



(2 marks)

b) Write down the vector which has been already draw on the grid

(2 marks)

Q2. We define the following column vectors as follows:

$\mathbf{a} = \begin{pmatrix} 14 \\ -9 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} -5 \\ 11 \end{pmatrix}$

a) Work out $-2\mathbf{b}$

(2 marks)

b) Work out $2\mathbf{a} - 4\mathbf{b}$

(3 marks)

c) Find the vector **c** which has length 1.5 times that of vector **a**, and is in the opposite direction to **a**

(2 marks)

Q3. Let P be the point (12, –14) and Q be the point (27, –3).

(a) Write down as a column vector $\overrightarrow{QP}$

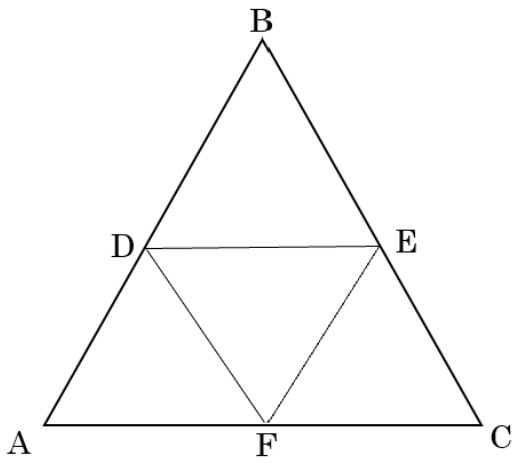
(2 marks)

(b) A ship sets off from port, which has co-ordinates (-4, 12), and then sets sail on a vector $\begin{pmatrix} 20 \\ -11 \end{pmatrix}$ in order to reach an oil rig.

Write down the co-ordinates of the oil rig..

(2 marks)

Q4. ABC is an equilateral triangle containing 4 equilateral triangles. D is a mid-point of AB, E is a mid-point of BC, and F is a mid-point of AC.



Let $\overrightarrow{AB} = \boldsymbol{a}$ and $\overrightarrow{AC} = \boldsymbol{c}$.

(i) Find in terms of **a** and **c**, an expression for $\overrightarrow{BD}$

(1 mark)

(ii) Find in terms of **a** and **c**, a factorised expression for $\overrightarrow{AE}$

(2 marks)

(iii) Let P be the mid-point of BE. Find in terms of **a** and **c**, an expression for $\overrightarrow{PF}$, simplifying your answer

(2 marks)