1. Nov/2020/Paper_21/No.9

(a) H is the point (5, 2) and J is the point (−3, 6).

(i) Find $\overrightarrow{HJ}$.

$\overrightarrow{HJ} = \begin{pmatrix} \\ \end{pmatrix}$ [1]

(ii) Calculate the magnitude of $\overrightarrow{HJ}$.

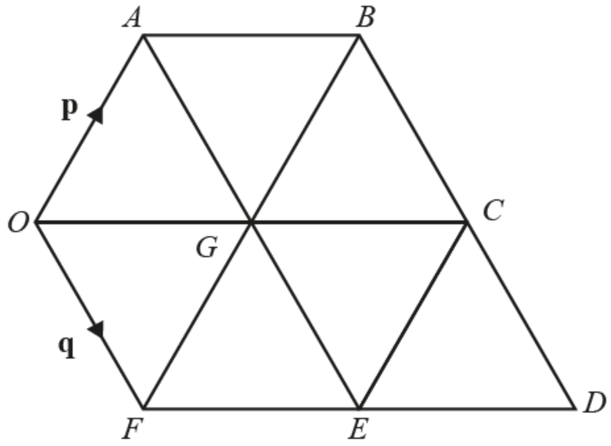
.... [2]

(iii) M is the midpoint of HJ.

Find the position vector of M.

$\begin{pmatrix} \\ \end{pmatrix}$ [2]

(b)



The diagram shows a shape made from seven identical equilateral triangles.
$\overrightarrow{OA} = \mathbf{p}$ and $\overrightarrow{OF} = \mathbf{q}$.

(i) Express, as simply as possible, in terms of **p** and/or **q**

(a) $\overrightarrow{FB}$,

$\overrightarrow{FB} =$ .... [1]

(b) $\overrightarrow{FE}$.

$\overrightarrow{FE} =$ .... [1]

(ii) X is a point on FB and $FX : XB = 3 : 1$.

Express $\overrightarrow{OX}$, as simply as possible, in terms of **p** and/or **q**.

$\overrightarrow{OX} =$ .... [2]

(iii) Y is a point on BD.
Quadrilateral $OXYF$ is a trapezium.

Express $\overrightarrow{XY}$, as simply as possible, in terms of **p** and/or **q**.

$\overrightarrow{XY} =$ .... [3]

2. Nov/2020/Paper_22/No.8

(a) H is the point $(-7, 4)$ and $\overrightarrow{HJ} = \begin{pmatrix} 10 \\ -6 \end{pmatrix}$.

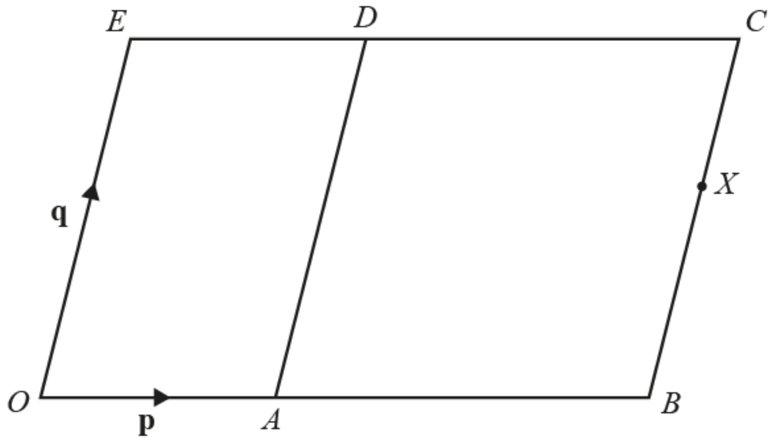
(i) Calculate the magnitude of $\overrightarrow{HJ}$.

.... [2]

(ii) Given that $\overrightarrow{HK} = 3\overrightarrow{HJ}$, find the coordinates of point K.

(...................... , ...) [2]

(b)



NOT TO SCALE

The diagram shows a parallelogram *OBCE*.
$\overrightarrow{OA} = \mathbf{p}$ and $\overrightarrow{OE} = \mathbf{q}$.
AD is parallel to *OE* and *OA* : *AB* = 1 : 3.
X is a point on *BC* such that *BX* : *XC* = 3 : 2.

Express, as simply as possible, in terms of **p** and/or **q**

(i) $\overrightarrow{OC}$,

$\overrightarrow{OC}$ = ... [1]

(ii) $\overrightarrow{AX}$,

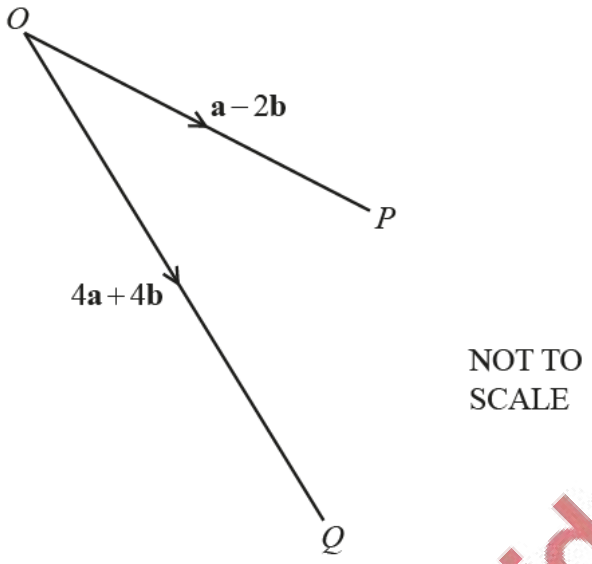
$\overrightarrow{AX}$ = ... [2]

(iii) $\overrightarrow{EX}$.

$\overrightarrow{EX}$ = ... [2]

3. June/2020/Paper_11/No.25

O, P and Q are points as shown in the diagram.

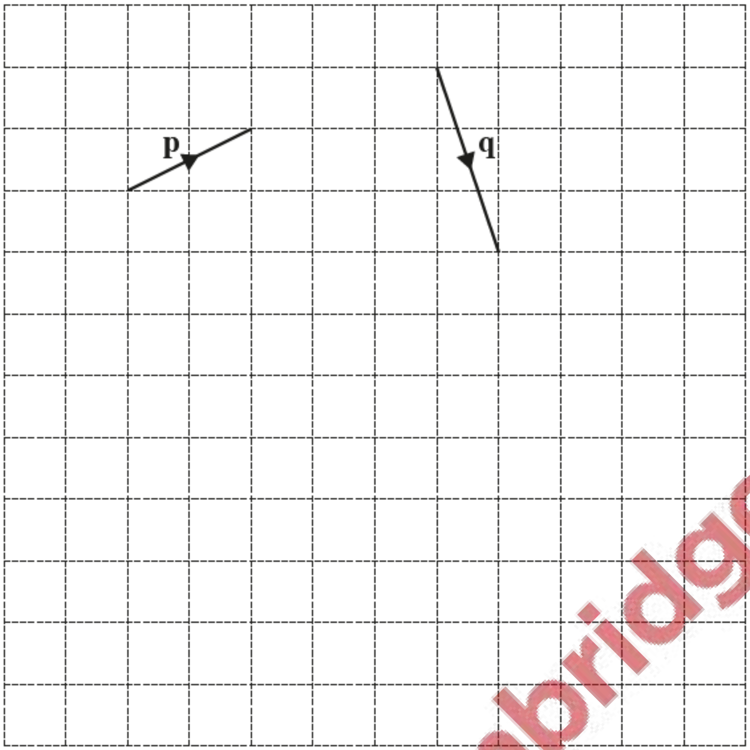


$\overrightarrow{OP} = \mathbf{a} - 2\mathbf{b}$ and $\overrightarrow{OQ} = 4\mathbf{a} + 4\mathbf{b}$.

Express $\overrightarrow{PQ}$, as simply as possible, in terms of $\mathbf{a}$ and $\mathbf{b}$.

$\overrightarrow{PQ}$ = ... [2]

4. June/2020/Paper_12/No.19



Vectors **p** and **q** are shown on the grid.

On the grid, draw the vector

(a) 3**p**, [1]

(b) **q** − **p**. [1]