Vectors in two dimensions – 2021 O Level Math D

1. Nov/2021/Paper_11/No.15

The point A has position vector $\begin{pmatrix} 3 \\ -7 \end{pmatrix}$ and $\overrightarrow{AB} = \begin{pmatrix} -5 \\ 12 \end{pmatrix}$.

(a) Find the coordinates of point B.

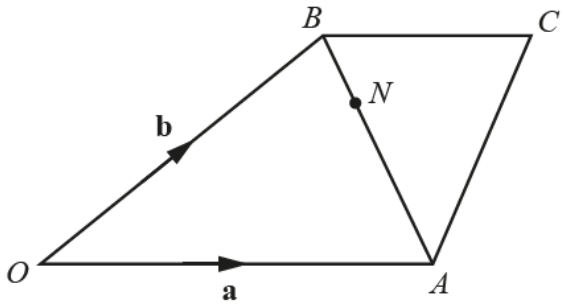
(....., ...) [2]

(b) Find $\left|\overrightarrow{AB}\right|$.

$\left|\overrightarrow{AB}\right|$ = ... units [2]

2. Nov/2021/Paper_22/No.7b

(b)



NOT TO SCALE

$OACB$ is a quadrilateral and N is a point on AB.
$\overrightarrow{OA} = \mathbf{a}$ and $\overrightarrow{OB} = \mathbf{b}$.
$\overrightarrow{OA} = 2\overrightarrow{BC}$ and $BN : NA = 1 : 3$.

Find, in terms of **a** and **b**, in its simplest form

(i) $\overrightarrow{AB}$,

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

(ii) $\overrightarrow{NC}$.

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

3. June/2021/Paper_21/No.10

(a) $\overrightarrow{AB} = \begin{pmatrix} -3 \\ 5 \end{pmatrix}$

(i) Calculate $\left|\overrightarrow{AB}\right|$.

$\left|\overrightarrow{AB}\right| =$ ..... [2]

(ii) $\overrightarrow{AC} = \begin{pmatrix} 6 \\ 2 \end{pmatrix}$ and C is the point $(10, -1)$.

(a) Find the coordinates of the point A.

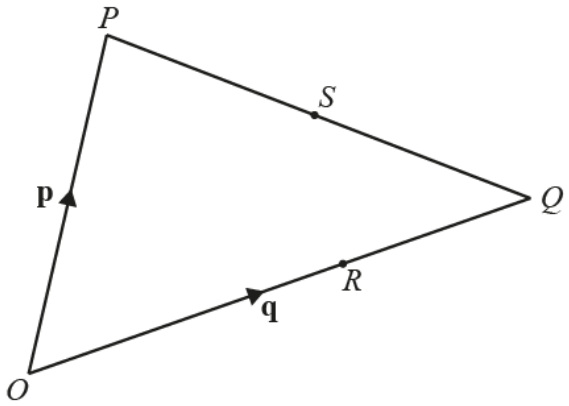
(..... , ...) [1]

(b) B is the midpoint of AD.

Find the coordinates of the point D.

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

(b)



NOT TO SCALE

The diagram shows triangle OPQ.
$\overrightarrow{OP} = \mathbf{p}$ and $\overrightarrow{OQ} = \mathbf{q}$.
R is the point on OQ such that $OR = 2RQ$.
S is the midpoint of PQ.

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

(i) $\overrightarrow{PQ}$,

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

(ii) $\overrightarrow{OS}$,

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

(iii) $\overrightarrow{SR}$.

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

4. June/2021/Paper_22/No.12

(a) A is the point $(2, 3)$ and B is the point $(3, -5)$.

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

$\overrightarrow{AB} = \begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [2]

(ii) $\overrightarrow{BC} = \begin{pmatrix} -4 \\ 3 \end{pmatrix}$

Find the coordinates of C.

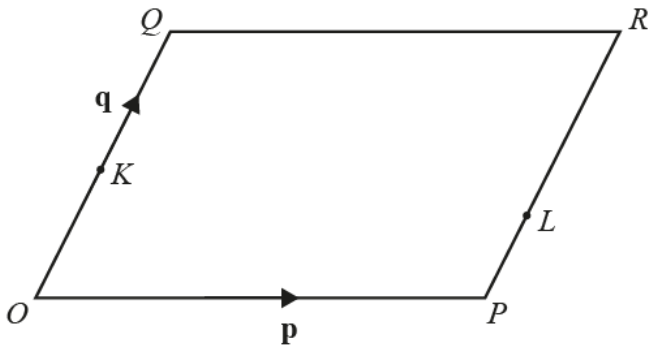
(....., ...) [1]

(iii) $\left|\overrightarrow{AD}\right| = \sqrt{74}$ and $D = (-3, n)$.

Find the possible values of n.

$n =$ ..... or $n =$ ..... [3]

(b)



NOT TO SCALE

$OQRP$ is a parallelogram.
$\overrightarrow{OP} = \mathbf{p}$ and $\overrightarrow{OQ} = \mathbf{q}$.
K is the midpoint of OQ and L is a point on PR.
$\overrightarrow{KL} = \mathbf{p} - \frac{1}{10}\mathbf{q}$.

Find $PL : LR$.

..... : ..... [3]