BGCSE EXTENDED – Vectors

1. The vectors p and q are defined as $p = \begin{pmatrix} -7 \\ 24 \end{pmatrix}$ and $q = \begin{pmatrix} 12 \\ -5 \end{pmatrix}$.

   Find the column vector for

   (i)   3q,   Ans: _____   [1]

   (ii) p – q   Ans: _____   [1]

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2. The vectors **p** and **q** are defined as $\mathbf{p} = \begin{pmatrix} 12 \\ -5 \end{pmatrix}$ and $\mathbf{q} = \begin{pmatrix} -6 \\ 5 \end{pmatrix}$.

   Calculate

   (i)   the column vector $\mathbf{p} + 2\mathbf{q}$,   Ans: _____   [2]

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3. $\overrightarrow{OA}$ and $\overrightarrow{OB}$ are position vectors relative to the origin O.

   Given the points $A(3, -1)$ and $B(-1, 2)$

   (a) write $\overrightarrow{OA}$ and $\overrightarrow{OB}$ as column vectors,   Ans: _____   [2]

   (b) express $\overrightarrow{AB}$ as a column vector,   Ans: _____   [2]

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4. The graph shows the position vectors $\overrightarrow{OX}$ and $\overrightarrow{OY}$.

   (a) Write down the column vectors for $\overrightarrow{OX}$ and $\overrightarrow{OY}$.

        Ans: _____

   (b) Express $\overrightarrow{XY}$ as a column vector.

        Ans: _____
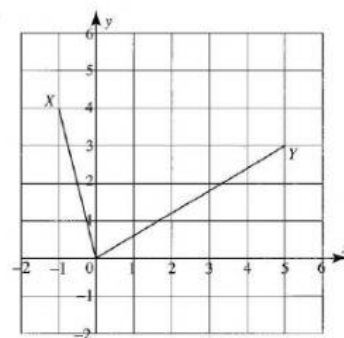
5.(a) Write and simplify an expression in terms of a, b and/or c fo

   (i) $\overrightarrow{AC}$ Ans: _____

   (ii) $\overrightarrow{BX}$ Ans: _____

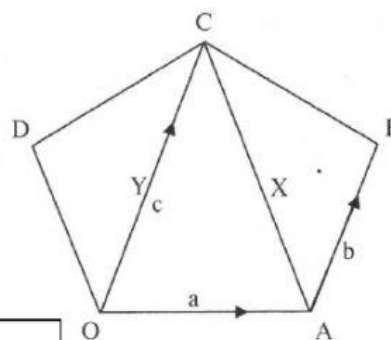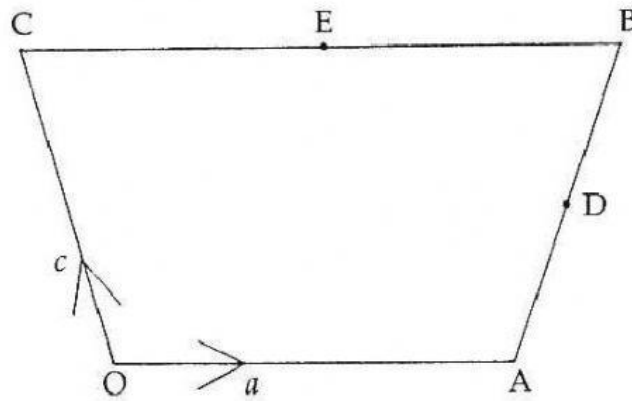   (iii) $\overrightarrow{XY}$ Ans: _____

(b) State two geometrical properties of XY and OA.

   Ans: 1. _____   Ans: 2. _____

6.

not to scale

In the figure, OABC is a trapezium with OA = a, OC = c and CB is paralled to, and twice the length of OA. The points D and E are the mid-points of AB and CB respectively.

(a)   Find, in terms of a and/or c

(i) $\overrightarrow{CB}$,   Ans: [1]

(ii) $\overrightarrow{CA}$,   Ans: [1]

(iii) $\overrightarrow{AB}$,   Ans: [1]

(iv) $\overrightarrow{DB}$,   Ans: [1]

(v) $\overrightarrow{AE}$.   Ans: [1]

(b)   Express $\overrightarrow{ED}$ in terms of a and c.   Ans: [2]

(c)   State two geometrical relationships between CA and ED, giving reasons for your answers.   Ans: Ans: [4]

(d)   Give the special name of the quadrilaterial OAEC.   [1]
Ans: