



Lite GCSE Maths

Vectors

Name: _____

Class: _____

Author:

Date:

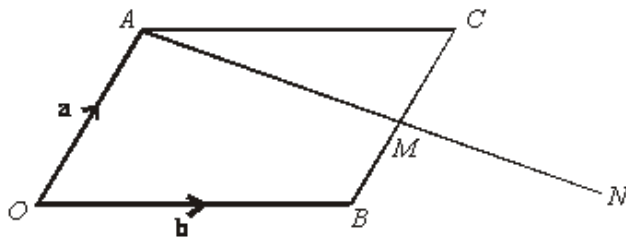
Time: 37

Marks: 32

Comments:

Q1. $OACB$ is a parallelogram and M is the mid-point of BC .

$\overrightarrow{OA} = \mathbf{a}$ and $\overrightarrow{OB} = \mathbf{b}$



Not drawn accurately

(a) Express the following vectors in terms of \mathbf{a} and \mathbf{b}

(i) \overrightarrow{BA}

Answer

(1)

(ii) \overrightarrow{AM}

Answer

(1)

(b) AM is extended to N , where $\overrightarrow{AN} = 2\overrightarrow{AM}$.

Show that $\overrightarrow{BN} = \mathbf{b}$

.....

(2)

(c) What does this tell you about the position of N ?

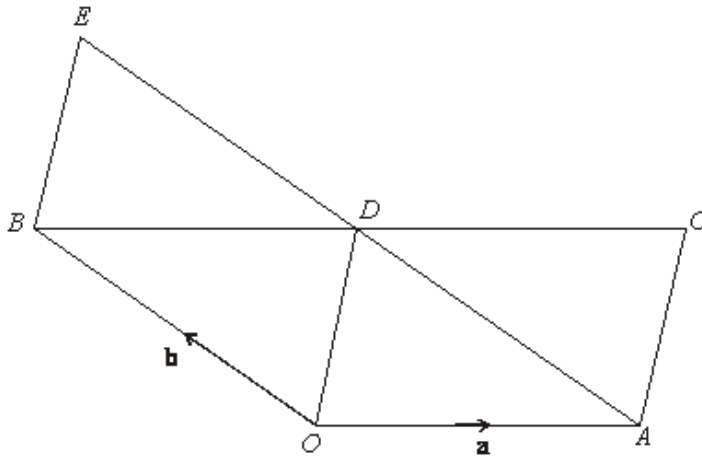
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(1)

(Total 5 marks)

Q2. In the diagram $OACD$, $OADB$ and $ODEB$ are parallelograms.

$\vec{OA} = \mathbf{a}$ and $\vec{OB} = \mathbf{b}$



(a) Express, in terms of \mathbf{a} and \mathbf{b} , the following vectors.
Give your answers in their simplest form.

(i) \vec{OD}

.....

Answer

(1)

(ii) \vec{OC}

.....

Answer

(1)

(iii) \vec{AB}

.....

.....

Answer

(1)

(b) The point F is such that $OCFE$ is a parallelogram.

Write the vector \vec{CF} in terms of \mathbf{a} and \mathbf{b} .

.....

.....

Answer

(2)

- (c) What geometrical relationship is there between the points O , D and F ? Justify your answer.

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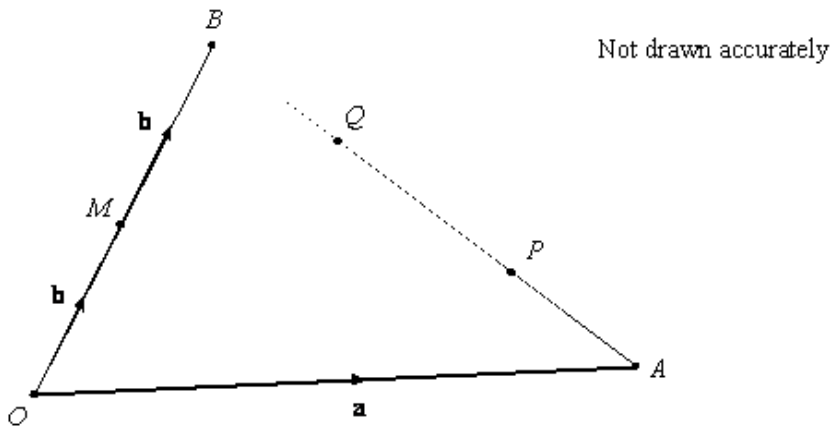
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(2)
(Total 7 marks)

Q3.



OAB is a triangle where M is the mid-point of OB .

P and Q are points on AB such that $AP = PQ = QB$.

$\overrightarrow{OA} = \mathbf{a}$ and $\overrightarrow{OB} = 2\mathbf{b}$

- (a) Find, in terms of \mathbf{a} and \mathbf{b} , expressions for

(i) \overrightarrow{EA}

.....

.....

Answer

(1)

(ii) \overrightarrow{MQ}

.....

.....

.....

Answer

(2)

(iii) \overline{OP}

.....
.....
.....
.....

Answer

(2)

(b) What can you deduce about quadrilateral $OMQP$?
Give a reason for your answer.

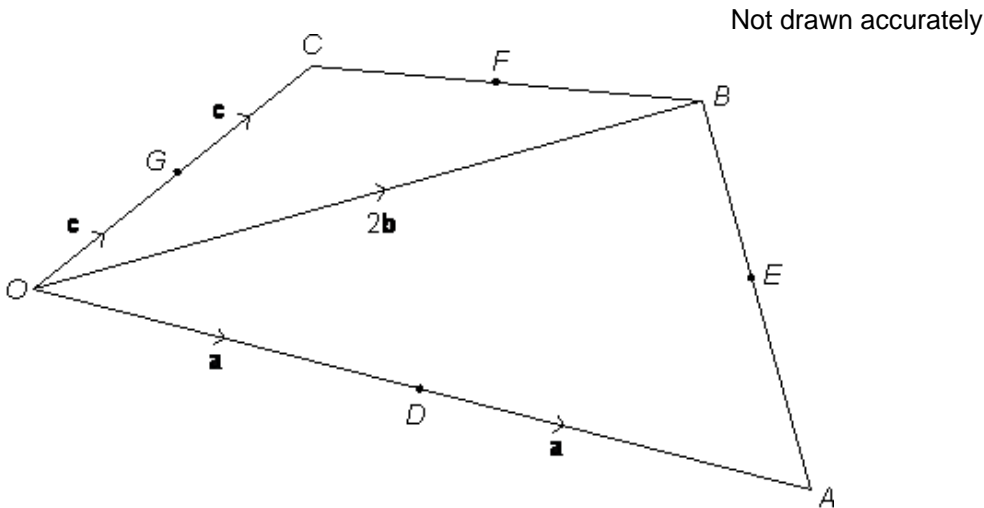
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(2)

(Total 7 marks)

Q4. $OABC$ is a quadrilateral.
 D, E, F and G are midpoints of OA, AB, BC and OC respectively.

$$\overline{OA} = 2\mathbf{a}, \overline{OB} = 2\mathbf{b} \text{ and } \overline{OC} = 2\mathbf{c}$$



Find the following vectors in terms of **a**, **b** and **c**.

For example $\overline{DG} = \mathbf{c} - \mathbf{a}$

(a) \overline{AB}

.....
.....

Answer

(1)

(b) \overline{BC}

.....
.....

Answer

(1)

(c) Use your answers to parts (a) and (b) to show that $\overline{EF} = \mathbf{c} - \mathbf{a}$

.....
.....
.....

(1)

(d) Explain how you can tell that $DEFG$ is a parallelogram.

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.....
.....

(1)

(Total 4 marks)

Q5. A , B and C are three points such that

$$\overline{AB} = 5\mathbf{a} - 3\mathbf{b} \text{ and } \overline{AC} = 7.5\mathbf{a} - 4.5\mathbf{b}$$

(a) Write down a fact about the points A , B and C .

.....
.....

(1)

(b) Write down the ratio of the lengths $AB : BC$ in its simplest form.

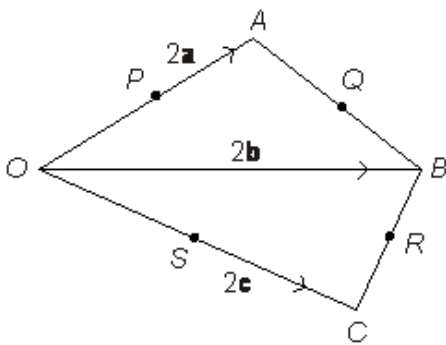
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(1)
(Total 2 marks)

Q6. $OABC$ is a quadrilateral.

P, Q, R and S are the mid-points of OA, AB, BC and CO respectively.

$\vec{OA} = 2\mathbf{a}, \vec{OB} = 2\mathbf{b}$ and $\vec{OC} = 2\mathbf{c}$



Not drawn accurately

(a) Write down, in terms of \mathbf{a} and \mathbf{b} , the vector \vec{AB} .

Answer

(1)

(b) Write down, in terms of \mathbf{c} and \mathbf{b} , the vector \vec{CB} .

Answer

(1)

(c) Show that $\vec{PQ} = \vec{SR} = \mathbf{b}$

.....
.....
.....

(2)

(d) Using your answer to part (c) write down a geometrical fact about the line joining the mid-points of two sides of a triangle.

.....
.....

(1)

- (e) What type of quadrilateral is formed by joining the mid-points of the four sides of a quadrilateral?
Give a reason for your answer.

Type of quadrilateral

Reason.....

.....

(2)
(Total 7 marks)

