**Question 9 continued**

**(Total for Question 9 is 8 marks)**

**10**

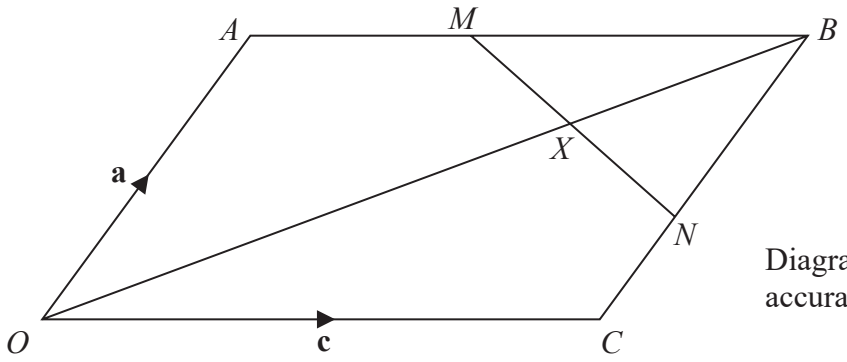


Diagram **NOT** accurately drawn

**Figure 3**

Figure 3 shows the parallelogram $OABC$

$$\overrightarrow{OA} = \mathbf{a} \qquad \overrightarrow{OC} = \mathbf{c}$$

The midpoint of $AB$ is $M$ and the midpoint of $BC$ is $N$.

The line $OB$ intersects $MN$ at the point $X$.

(a) Find in terms of **a** and **c**,

(i) $\overrightarrow{OB}$

(ii) $\overrightarrow{MN}$

**(2)**

Given $\overrightarrow{MX} = \lambda\overrightarrow{MN}$ and that $\overrightarrow{OX} = \mu\overrightarrow{OB}$,

(b) use a vector method to find the value of $\lambda$ and the value of $\mu$.

**(8)**

(c) Hence find, in its simplest form, the ratio

Area of quadrilateral $OXNC$ : Area of parallelogram $OABC$.

**(3)**

DO NOT WRITE IN THIS AREA

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