1 **a** and **b** are vectors such that

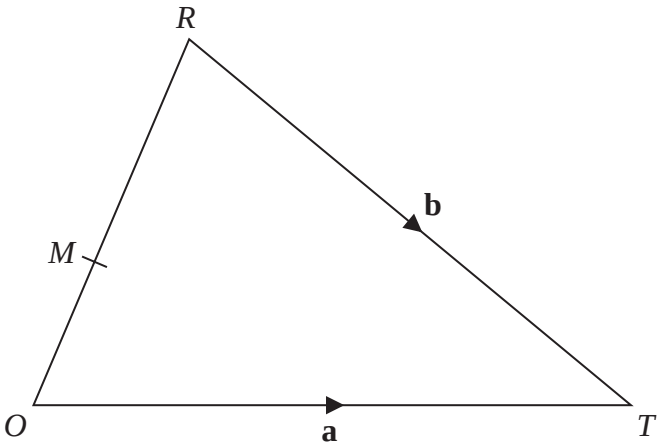
$$\mathbf{a} = \begin{pmatrix} 2 \\ -3 \end{pmatrix} \quad \text{and} \quad 3\mathbf{a} - 2\mathbf{b} = \begin{pmatrix} 8 \\ -17 \end{pmatrix}$$

Find **b** as a column vector.

$$\begin{pmatrix} \ldots\ldots \\ \ldots\ldots \end{pmatrix}$$

(Total for Question 1 is 3 marks)

2 *ORT* is a triangle.



$\overrightarrow{OT}$ = **a** $\overrightarrow{RT}$ = **b**

M is the point on *OR* such that $OM : MR = 2 : 3$

Express $\overrightarrow{MT}$ in terms of **a** and **b**.
Give your answer in its simplest form.

.....

(Total for Question 2 is 4 marks)

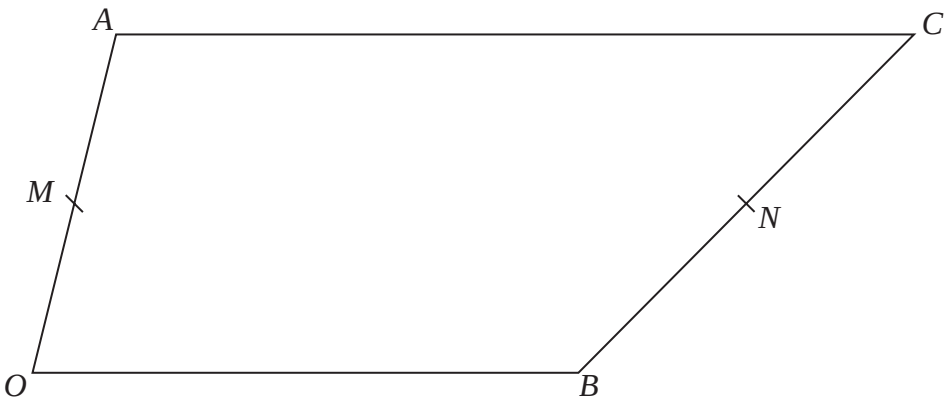
3 Given that the vector $a\begin{pmatrix}2\\6\end{pmatrix}+b\begin{pmatrix}8\\2\end{pmatrix}$ is parallel to the vector $\begin{pmatrix}13\\6\end{pmatrix}$

find an expression for b in terms of a.

.....

(Total for Question 3 is 3 marks)

4 The diagram shows quadrilateral *OACB*.



M is the midpoint of *OA*.
N is the point on *BC* such that $BN : NC = 4 : 5$

$\overrightarrow{OA} = \mathbf{a}$ $\overrightarrow{OB} = \mathbf{b}$ $\overrightarrow{AC} = k\mathbf{b}$ where *k* is a positive integer.

(a) Express $\overrightarrow{MN}$ in terms of *k*, **a** and **b**.
Give your answer in its simplest form.

.....

(4)

(b) Is *MN* parallel to *OB*?
Give a reason for your answer.

.....

.....

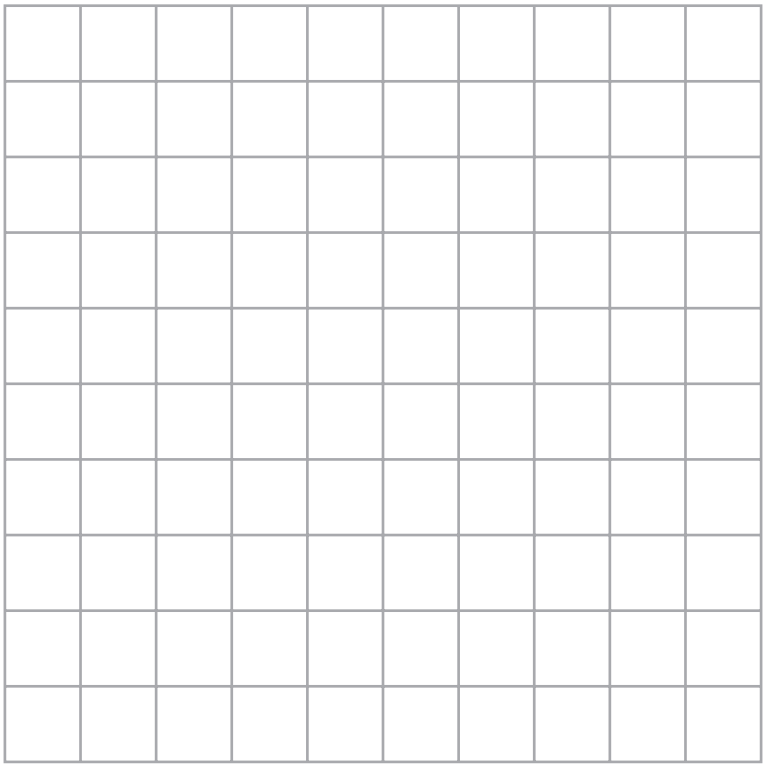
.....

(1)

(Total for Question 4 is 5 marks)

5 $\mathbf{a} = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} -1 \\ 4 \end{pmatrix}$

On the grid below, draw and label the vector $2\mathbf{a} + \mathbf{b}$



(Total for Question 5 is 3 marks)