1 *OACB* is a parallelogram.

$\overrightarrow{OA}$ = **a** $\overrightarrow{OB}$ = **b**

Work out the following vectors in terms of **a** and **b**.

(a) $\overrightarrow{AO}$

....
(1)

(b) $\overrightarrow{BC}$

....
(1)

(c) $\overrightarrow{AB}$

....
(1)

(d) $\overrightarrow{CO}$

....
(1)

(Total for Question 1 is 4 marks)

1st

2 *OXYZ* is a quadrilateral.
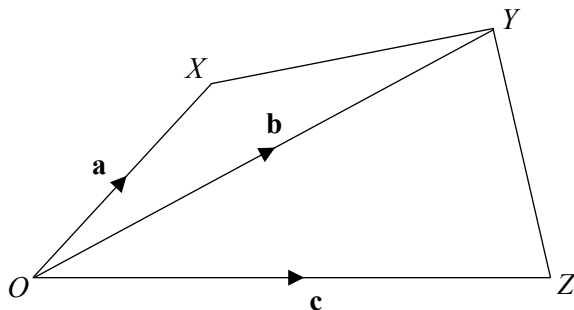
$$\overrightarrow{OX} = \mathbf{a} \qquad \overrightarrow{OY} = \mathbf{b} \qquad \overrightarrow{OZ} = \mathbf{c}$$

Work out the following vectors in terms of **a** and **b**.

(a) $\overrightarrow{ZO}$

....
(1)

(b) $\overrightarrow{XY}$

....
(1)

(c) $\overrightarrow{ZY}$

....
(1)

(d) $\overrightarrow{XZ}$

....
(1)

(Total for Question 2 is 4 marks)

3
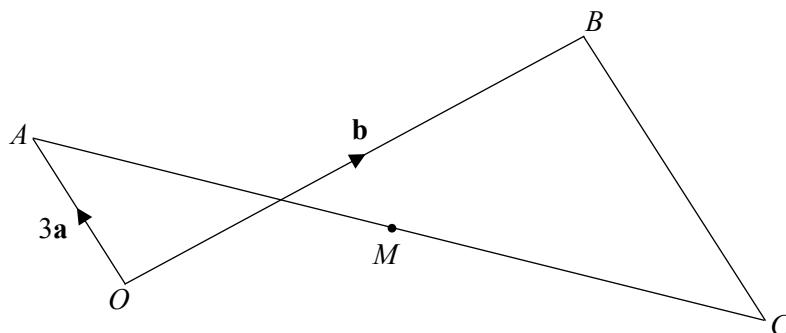
$$\overrightarrow{OA} = 3\mathbf{a} \qquad \overrightarrow{OB} = \mathbf{b} \qquad \overrightarrow{CB} = 2\overrightarrow{OA}$$

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

Work out the following vectors in terms of **a** and **b**.

(a) $\overrightarrow{AB}$

....

(1)

(b) $\overrightarrow{CA}$

....

(2)

M is the midpoint of *AC*.

(c) Write $\overrightarrow{CM}$ in terms of **a** and **b**.

....

(2)

(Total for Question 3 is 5 marks)

© 1stclassmaths   *Solutions*

1st

4 *OACB* is a trapezium
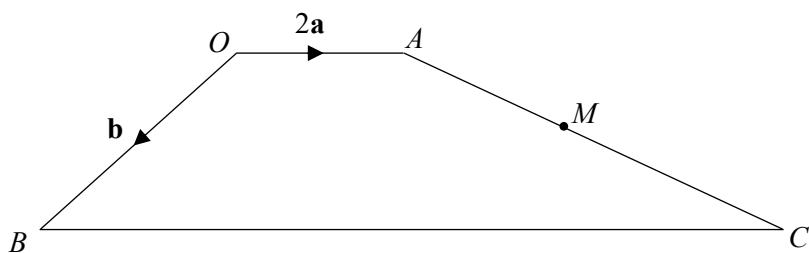
$$\overrightarrow{OA} = 2\mathbf{a} \qquad \overrightarrow{OB} = \mathbf{b} \qquad \overrightarrow{BC} = 4\overrightarrow{OA}$$

(a) Write $\overrightarrow{AC}$ in terms of **a** and **b**.

....

(2)

M is the midpoint of *AC*.

(b) Write $\overrightarrow{BM}$ in terms of **a** and **b**.

....

(3)

(Total for Question 4 is 5 marks)

4

5 *OACD* is a parallelogram.
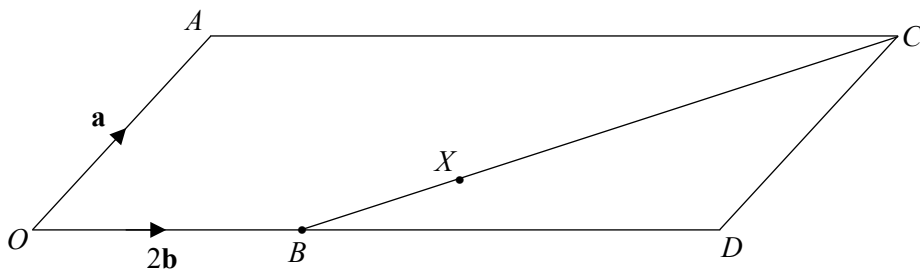
$$\overrightarrow{OA} = \mathbf{a} \qquad \overrightarrow{OB} = 2\mathbf{b} \qquad \overrightarrow{OD} = 2.5\,\overrightarrow{OB}$$

(a) Write $\overrightarrow{AD}$ in terms of **a** and **b**.

....

(2)

(b) Write $\overrightarrow{BC}$ in terms of **a** and **b**.

....

(2)

$BX : XC = 1 : 3$

(c) Write $\overrightarrow{OX}$ in terms of **a** and **b**.

....

(2)

(Total for Question 5 is 6 marks)

6 *PQRS* is a quadrilateral
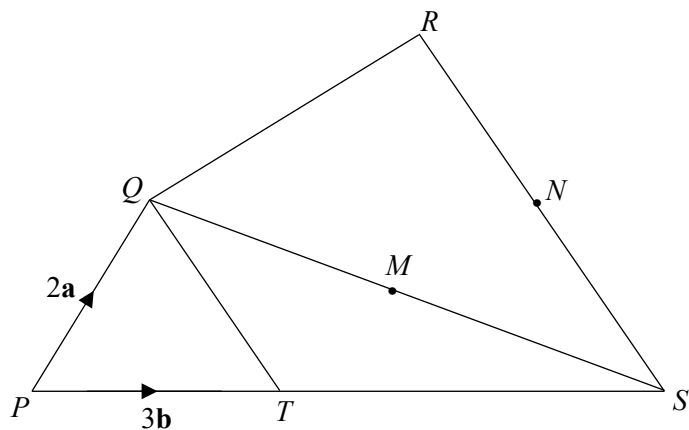
$$\overrightarrow{PQ} = 2\mathbf{a} \qquad \overrightarrow{PT} = 3\mathbf{b} \qquad \overrightarrow{RS} = 2\overrightarrow{QT}$$

PTS is a straight line with *PT* : *TS* = 3 : 5

M is the midpoint of *QS*.
N is the midpoint of *RS*.

Write $\overrightarrow{MN}$ in term of **a** and **b**.

(Total for Question 6 is 4 marks)

7

Not drawn
accurately
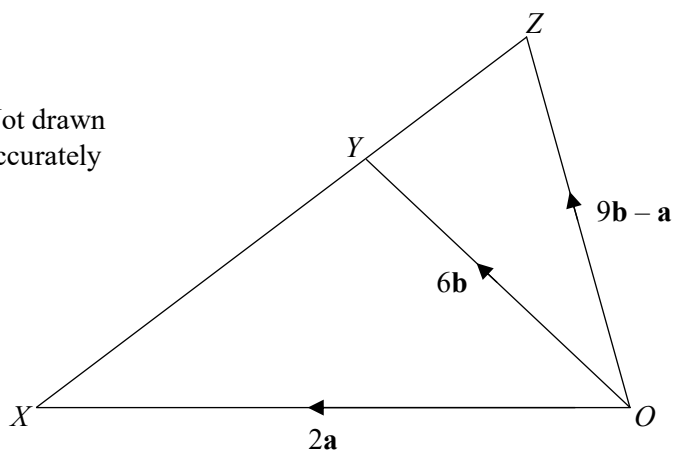
Prove, using vectors, that *XYZ* is a straight line.

(Total for Question 7 is 3 marks)

Solutions

8 *OXYZ* is a parallelogram
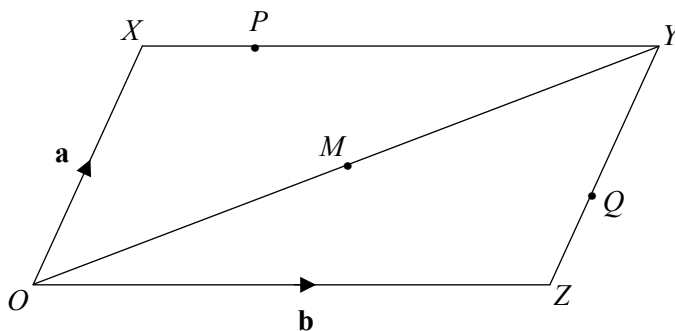
$$\overrightarrow{OX} = \mathbf{a} \qquad \overrightarrow{OZ} = \mathbf{b}$$

$XP : PY = 1 : 3$
$ZQ : QY = 2 : 3$

M is the midpoint of *OY*

(a) Write $\overrightarrow{PQ}$ in terms of **a** and **b**.

....

(2)

(b) Write $\overrightarrow{MQ}$ in terms of **a** and **b**.

....

(3)

(Total for Question 8 is 5 marks)

Solutions

9
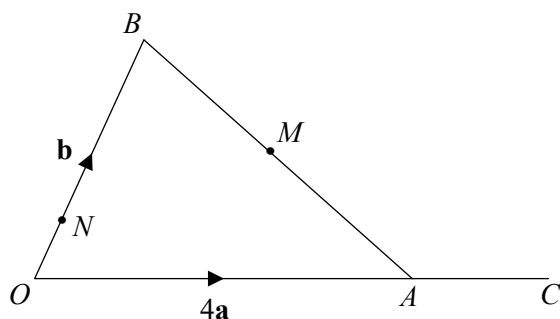
$\overrightarrow{OA} = 4\mathbf{a}$ $\overrightarrow{OB} = \mathbf{b}$

$OA : OC = 3 : 4$
$ON : OB = 2 : 9$

M is the midpoint of AB

(a) Write $\overrightarrow{MC}$ in terms of $\mathbf{a}$ and $\mathbf{b}$.

....

(3)

(b) Write $\overrightarrow{NM}$ in terms of $\mathbf{a}$ and $\mathbf{b}$.

....

(2)

(Total for Question 9 is 5 marks)

10 *OXYZ* is a parallelogram
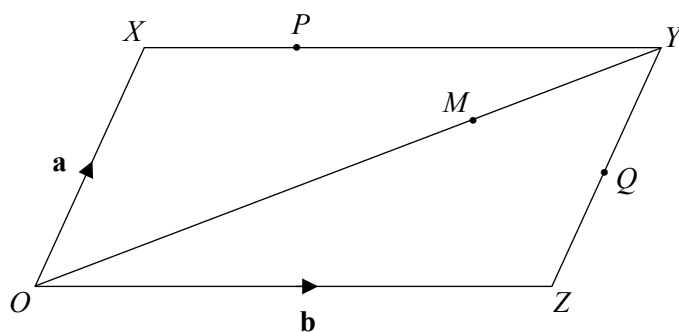
$$\overrightarrow{OX} = \mathbf{a} \qquad \overrightarrow{OZ} = \mathbf{b}$$

ZQ = *QY*
XP : *PY* = 1 : 2
OM : *MY* = 5 : 2

Prove, using vectors, that *PMQ* is a straight line.

(Total for Question 10 is 4 marks)

11 *OACB* is a trapezium
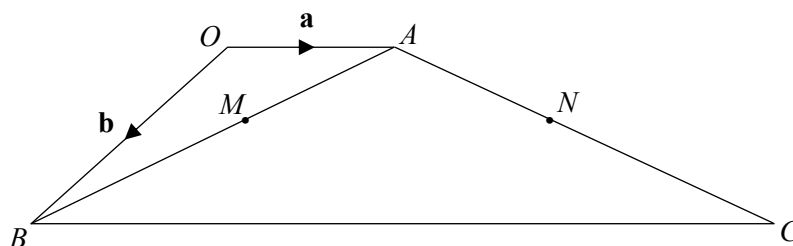
$$\overrightarrow{OA} = \mathbf{a} \qquad \overrightarrow{OB} = \mathbf{b}$$
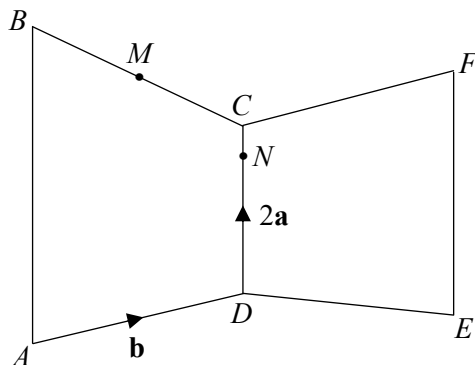
M and *N* are the midpoints of *AB* and *AC*.

Prove, using vectors, that *MN* is parallel to *OA*.

(Total for Question 11 is 4 marks)

12 *ABCD* and *CDEF* are trapeziums

$$\overrightarrow{DC} = 2\mathbf{a} \qquad \overrightarrow{AD} = \overrightarrow{CF} = \mathbf{b}$$

$AB : DC : EF = 4 : 2 : 3$
M is the midpoint of *BC*.
N is on the line *CD*.

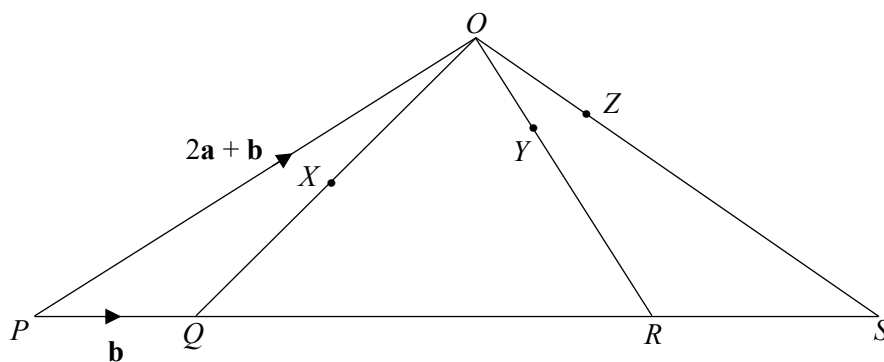*MNE* is a straight line.

$DN : NC = k : 1$, where k is an integer.

Work out the value of k.

$k =$ ....

(Total for Question 12 is 5 marks)

13 *POS* is a triangle.

$\overrightarrow{PQ} = \mathbf{b}$ $\qquad$ $\overrightarrow{PO} = 2\mathbf{a} + \mathbf{b}$

X is the midpoint of *QO*

OY: *YR* = 1 : 2

PQ : *QR* : *RS* = 2 : 6 : 3

XYZ is a straight line.

OZ : *OS* = 1 : *k*

Work out the value of *k*.

k = ...

(Total for Question 13 is 6 marks)

14 *PQRS* is a quadrilateral.
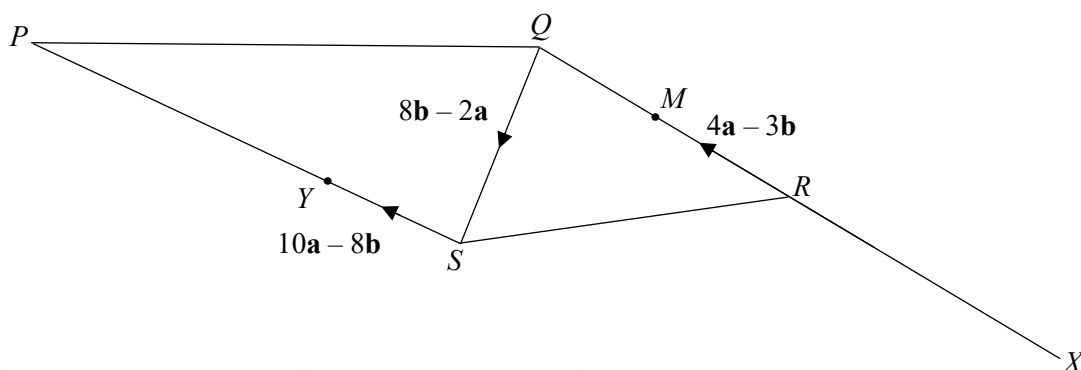
$\overrightarrow{SY} = 10\mathbf{a} - 8\mathbf{b}$ $\overrightarrow{QS} = 8\mathbf{b} - 2\mathbf{a}$ $\overrightarrow{RM} = 4\mathbf{a} - 3\mathbf{b}$
$RM = MQ$
$SY : YP = 1 : 2$
QRX is a straight line.
XS is parallel to *RP*.

Work out *XS* : *RP*
Give your answer in the form n : 1

(Total for Question 14 is 6 marks)