Vectors

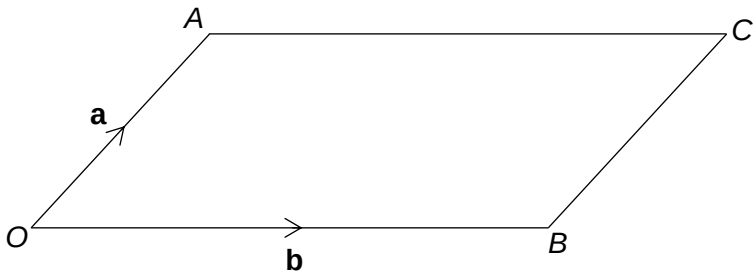
SCAN ME

REVISE THIS TOPIC

CHECK YOUR ANSWERS

SCAN ME

1 *OACB* is a parallelogram.



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

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

1 (a) $\overrightarrow{AO}$ **[1 mark]**

Answer _____

1 (b) $\overrightarrow{BC}$ **[1 mark]**

Answer _____

1 (c) $\overrightarrow{AB}$ **[1 mark]**

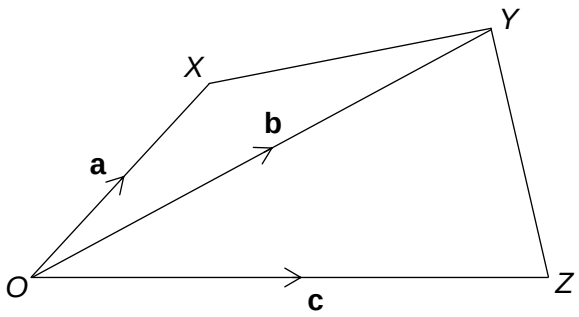
Answer _____

1 (d) $\overrightarrow{CO}$ **[1 mark]**

Answer _____

4

2 $OXYZ$ is a quadrilateral.



$\overrightarrow{OX}$ = **a** $\overrightarrow{OY}$ = **b** $\overrightarrow{OZ}$ = **c**

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

2 (a) $\overrightarrow{ZO}$ **[1 mark]**

Answer _____

2 (b) $\overrightarrow{XY}$ **[1 mark]**

Answer _____

2 (c) $\overrightarrow{ZY}$ **[1 mark]**

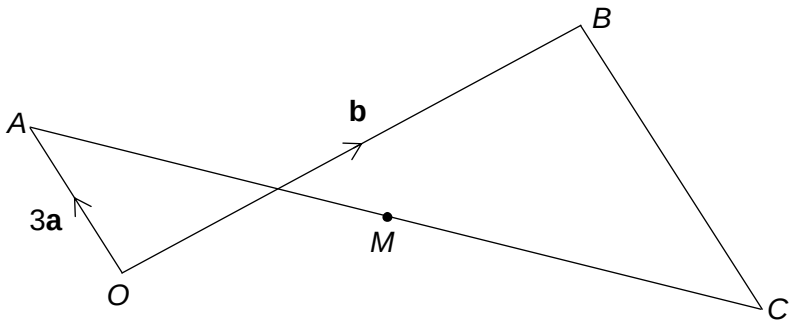
Answer _____

2 (d) $\overrightarrow{XZ}$ **[1 mark]**

Answer _____

Solutions

3



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

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

3 (a) $\overrightarrow{AB}$ **[1 mark]**

Answer _____

3 (b) $\overrightarrow{CA}$ **[2 marks]**

_____

_____

_____

Answer _____

3 (c) *M* is the midpoint of AC.

Write $\overrightarrow{CM}$ in terms of **a** and **b**. **[2 marks]**

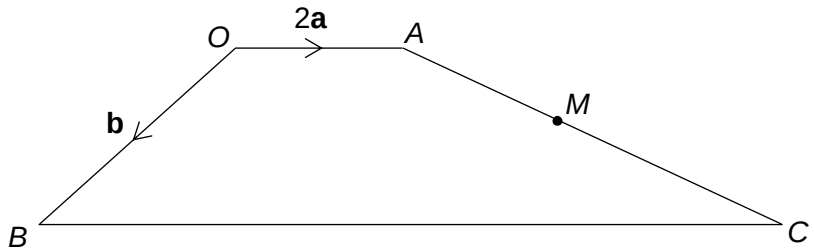
_____

_____

Answer _____

9

4 $OACB$ is a trapezium



$\overrightarrow{OA} = 2\mathbf{a}$ $\overrightarrow{OB} = \mathbf{b}$ $\overrightarrow{BC} = 4\overrightarrow{OA}$

4 (a) Write $\overrightarrow{AC}$ in term of **a** and **b**. **[2 marks]**

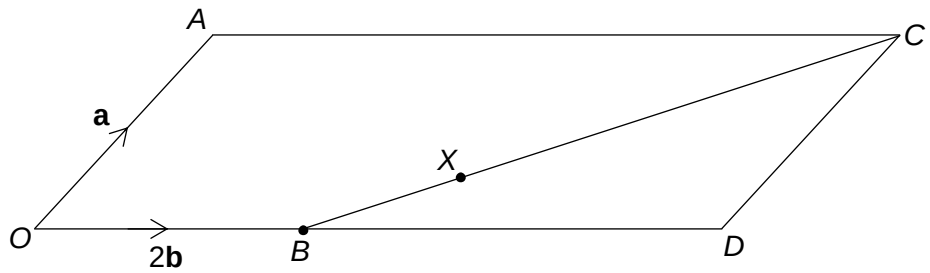
Answer _____

4 (b) M is the midpoint of AC.

Write $\overrightarrow{BM}$ in term of **a** and **b**. **[3 marks]**

Answer _____

5 *OACD* is a parallelogram.



$\overrightarrow{OA} = \mathbf{a}$ $\overrightarrow{OB} = 2\mathbf{b}$ $\overrightarrow{OD} = 2.5\overrightarrow{OB}$

5 (a) Write $\overrightarrow{AD}$ in term of **a** and **b**. **[2 marks]**

Answer _____

5 (b) Write $\overrightarrow{BC}$ in term of **a** and **b**. **[2 marks]**

Answer _____

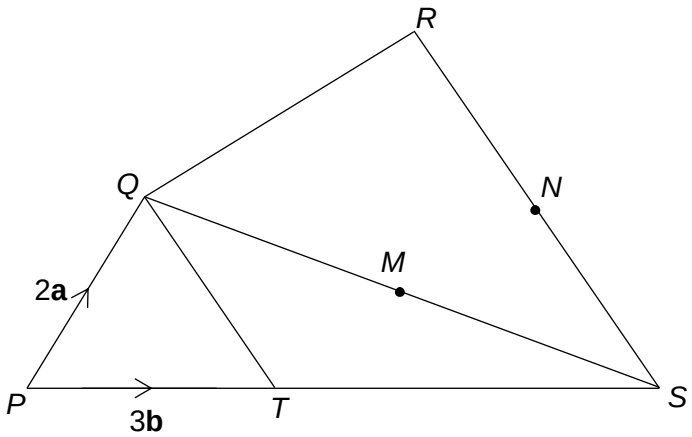
5 (c) $BX : XC = 1 : 3$

Write $\overrightarrow{OX}$ in term of **a** and **b**. **[2 marks]**

Answer _____

11

6 *PQRS* is a quadrilateral



$\overrightarrow{PQ} = 2\mathbf{a}$ $\overrightarrow{PT} = 3\mathbf{b}$ $\overrightarrow{RS} = 2\overrightarrow{QT}$

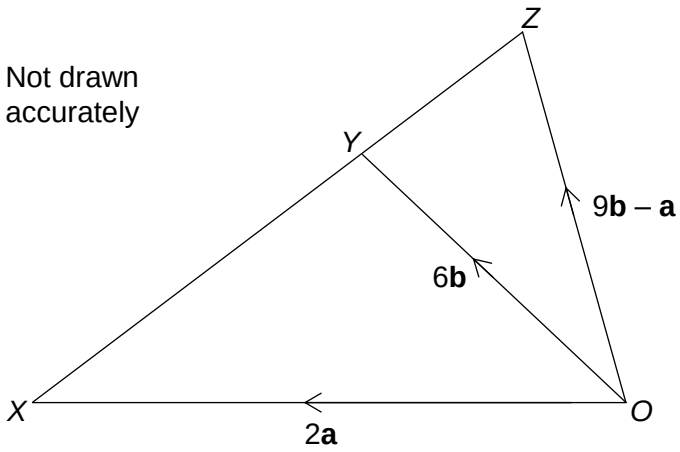
PTS is a straight line with $PT : TS = 3 : 5$

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

Write $\overrightarrow{MN}$ in term of **a** and **b**. **[4 marks]**

Answer _____

7

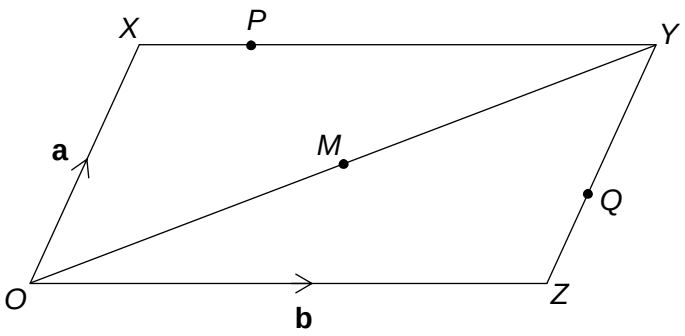


Prove, using vectors, that *XYZ* is a straight line.

[3 marks]

7

8 $OXYZ$ is a parallelogram



$\overrightarrow{OX} = \mathbf{a}$ $\overrightarrow{OZ} = \mathbf{b}$

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

M is the midpoint of OY

8 (a) Write $\overrightarrow{PQ}$ in term of **a** and **b**. **[2 marks]**

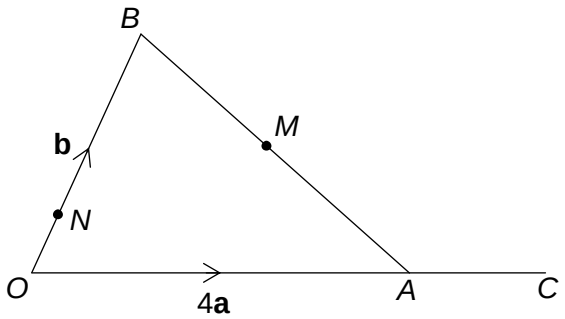
Answer _____

8 (b) Write $\overrightarrow{MQ}$ in term of **a** and **b**. **[3 marks]**

Answer _____

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

9 (a) Write $\overrightarrow{MC}$ in term of **a** and **b**. **[3 marks]**

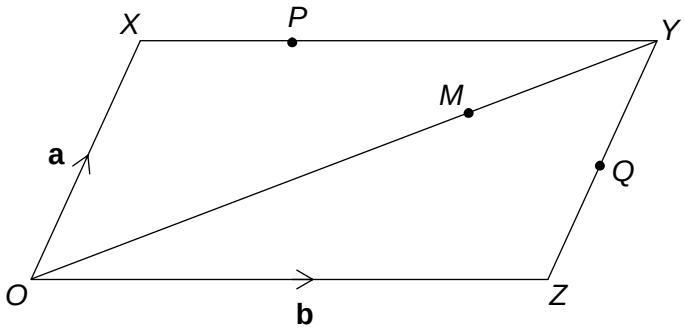
Answer _____

9 (b) Write $\overrightarrow{NM}$ in term of **a** and **b**. **[2 marks]**

Answer _____

10

10 *OXYZ* is a parallelogram



Not drawn accurately

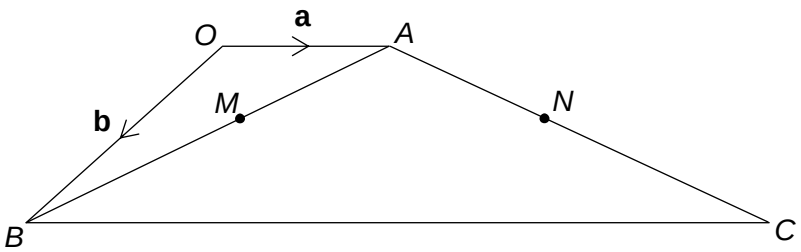
$\overrightarrow{OX} = \mathbf{a}$ $\overrightarrow{OZ} = \mathbf{b}$

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

Prove, using vectors, that PMQ is a straight line. **[4 marks]**

Solutions

11 *OACB* is a trapezium



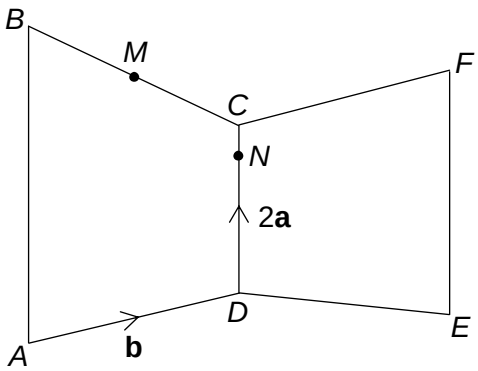
$\overrightarrow{OA} = \mathbf{a}$ $\overrightarrow{OB} = \mathbf{b}$

M and *N* are the midpoints of *AB* and *AC*.

Prove, using vectors, that *MN* is parallel to *OA*. **[4 marks]**

8

12 *ABCD* and *CDEF* are trapeziums



Not drawn accurately

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

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.

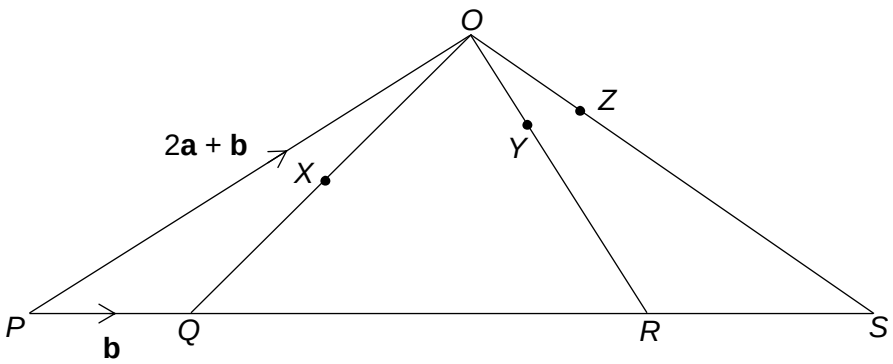
Work out the value of k.

[5 marks]

$k =$ _____

Solutions

13 *POS* is a triangle.



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

X is the midpoint of *QO*
OY: *YR* = 1 : 2
PQ : *QR* : *RS* = 2 : 6 : 3
XYZ is a straight line.

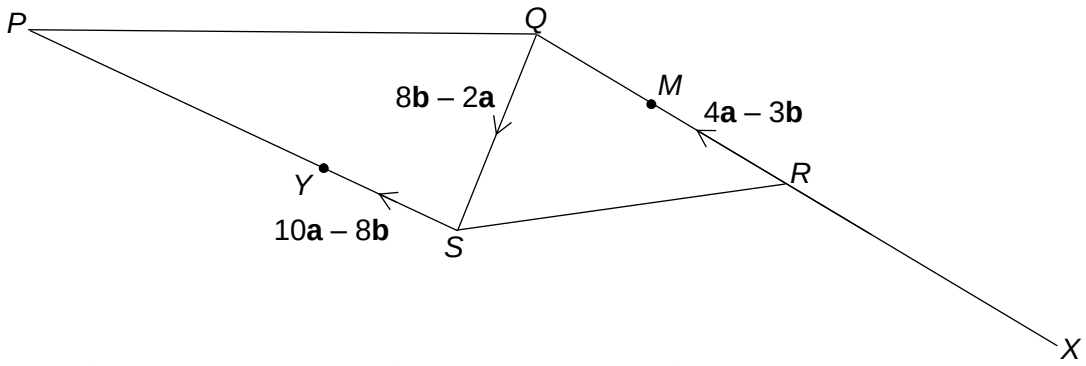
OZ : *OS* = 1 : k
Work out the value of k.

[6 marks]

k = _____

11

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 $n : 1$ **[6 marks]**

Answer _____

6

Solutions