



Vectors



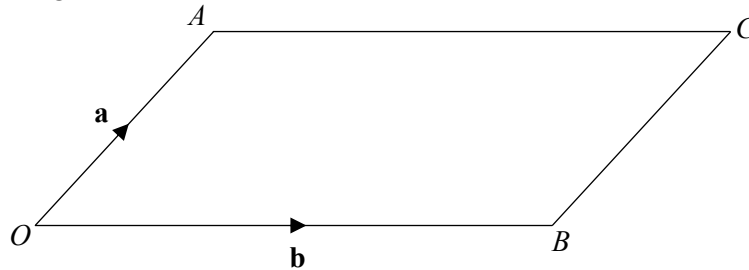
SCAN ME

REVISE THIS TOPIC

CHECK YOUR ANSWERS

SCAN ME

1 $OACB$ is a parallelogram.



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

Work out the following vectors in terms of \mathbf{a} and \mathbf{b} .

(a) \vec{AO}

..... (1)

(b) \vec{BC}

..... (1)

(c) \vec{AB}

..... (1)

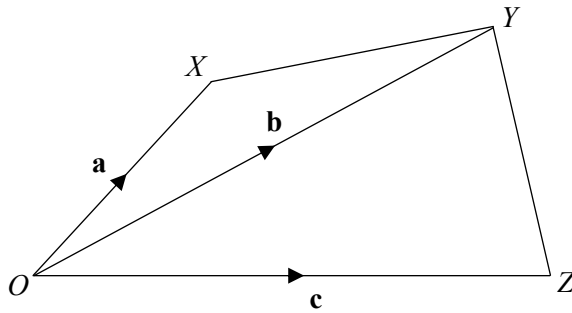
(d) \vec{CO}

..... (1)

(Total for Question 1 is 4 marks)



2 $OXYZ$ is a quadrilateral.



$\vec{OX} = \mathbf{a}$ $\vec{OY} = \mathbf{b}$ $\vec{OZ} = \mathbf{c}$

Work out the following vectors in terms of \mathbf{a} , \mathbf{b} and \mathbf{c} .

(a) \vec{ZO}

..... (1)

(b) \vec{XY}

..... (1)

(c) \vec{ZY}

..... (1)

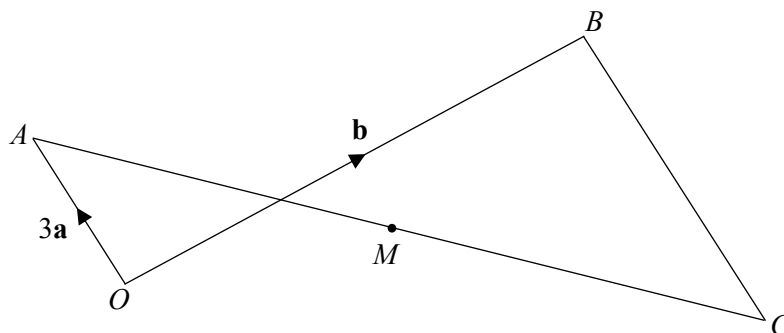
(d) \vec{XZ}

..... (1)

(Total for Question 2 is 4 marks)



3



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

Work out the following vectors in terms of \mathbf{a} and \mathbf{b} .

(a) \vec{AB}

.....
(1)

(b) \vec{CA}

.....
(2)

M is the midpoint of AC .

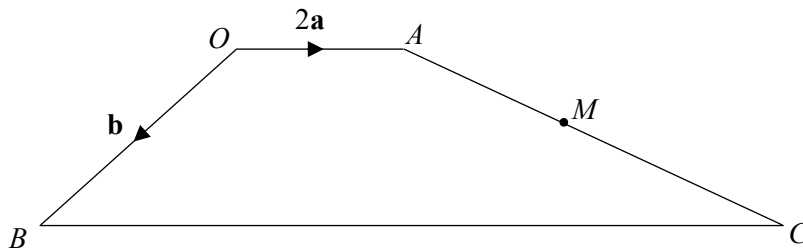
(c) Write \vec{CM} in terms of \mathbf{a} and \mathbf{b} .

.....
(2)

(Total for Question 3 is 5 marks)



4 $OACB$ is a trapezium



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

(a) Write \vec{AC} in terms of \mathbf{a} and \mathbf{b} .

.....
(2)

M is the midpoint of AC .

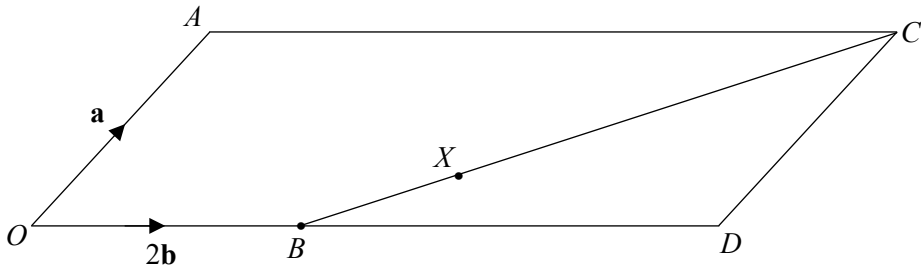
(b) Write \vec{BM} in terms of \mathbf{a} and \mathbf{b} .

.....
(3)

(Total for Question 4 is 5 marks)



5 $OACD$ is a parallelogram.



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

(a) Write \vec{AD} in terms of \mathbf{a} and \mathbf{b} .

(b) Write \vec{BC} in terms of \mathbf{a} and \mathbf{b} .

..... (2)

$$BX : XC = 1 : 3$$

(c) Write \vec{OX} in terms of \mathbf{a} and \mathbf{b} .

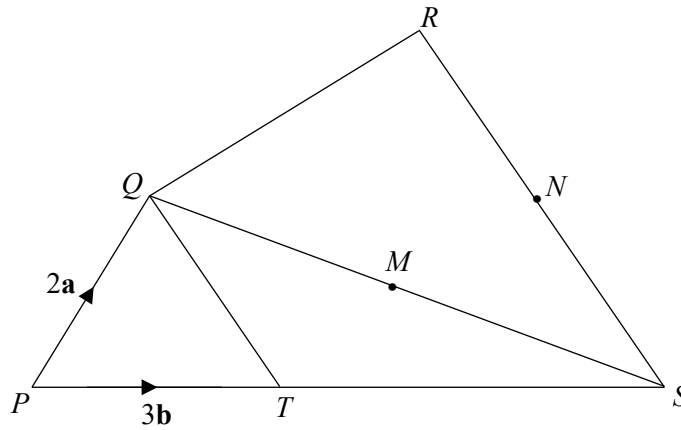
..... (2)

..... (2)

(Total for Question 5 is 6 marks)



6 $PQRS$ is a quadrilateral



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

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

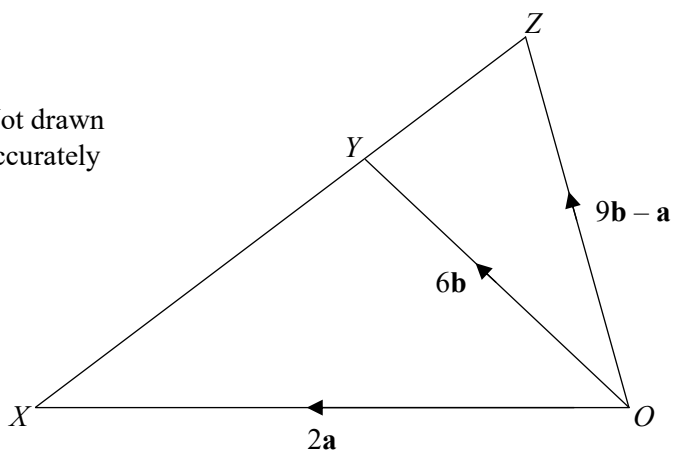
M is the midpoint of QS .
 N is the midpoint of RS .

Write \vec{MN} in term of \mathbf{a} and \mathbf{b} .



7

Not drawn accurately

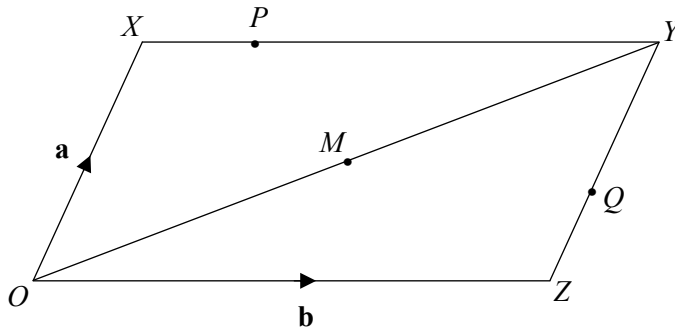


Prove, using vectors, that XYZ is a straight line.

(Total for Question 7 is 3 marks)



8 $OXYZ$ is a parallelogram



$$\vec{OX} = \mathbf{a} \quad \vec{OZ} = \mathbf{b}$$

$$XP : PY = 1 : 3$$

$$ZQ : QY = 2 : 3$$

M is the midpoint of OY

(a) Write \vec{PQ} in terms of \mathbf{a} and \mathbf{b} .

(b) Write \vec{MQ} in terms of \mathbf{a} and \mathbf{b} .

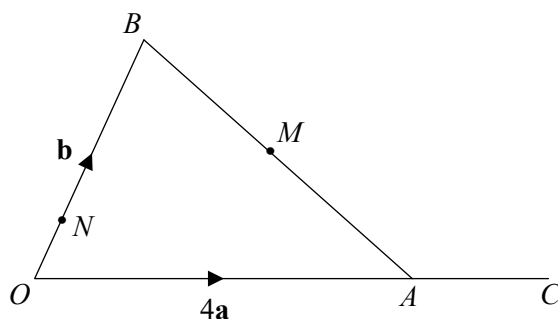
.....
(2)

.....
(3)

(Total for Question 8 is 5 marks)



9



$\vec{OA} = 4\mathbf{a}$ $\vec{OB} = \mathbf{b}$

$OA : OC = 3 : 4$

$ON : OB = 2 : 9$

M is the midpoint of AB

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

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

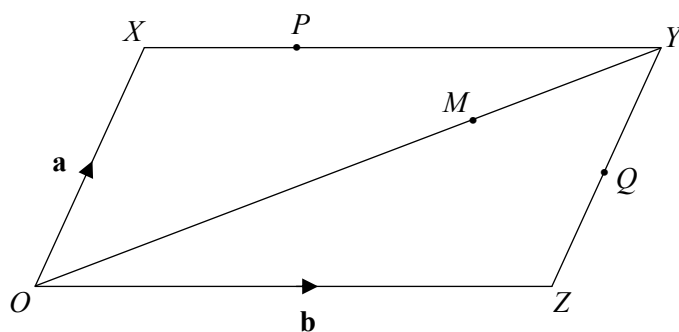
..... (3)

..... (2)

(Total for Question 9 is 5 marks)



10 $OXYZ$ is a parallelogram



$$\vec{OX} = \mathbf{a} \quad \vec{OZ} = \mathbf{b}$$

$$ZQ = QY$$

$$XP : PY = 1 : 2$$

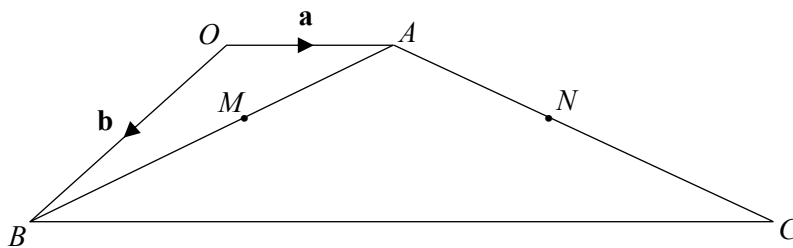
$$OM : MY = 5 : 2$$

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

(Total for Question 10 is 4 marks)



11 $OACB$ is a trapezium



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

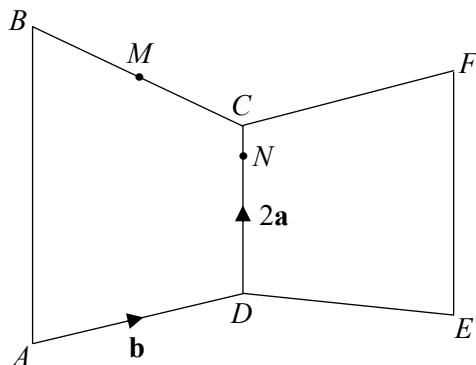
M and N are the midpoints of AB and AC .

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

(Total for Question 11 is 4 marks)



12 $ABCD$ and $CDEF$ are trapeziums



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

$AB : DC : EF = 4 : 2 : 3$
 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.

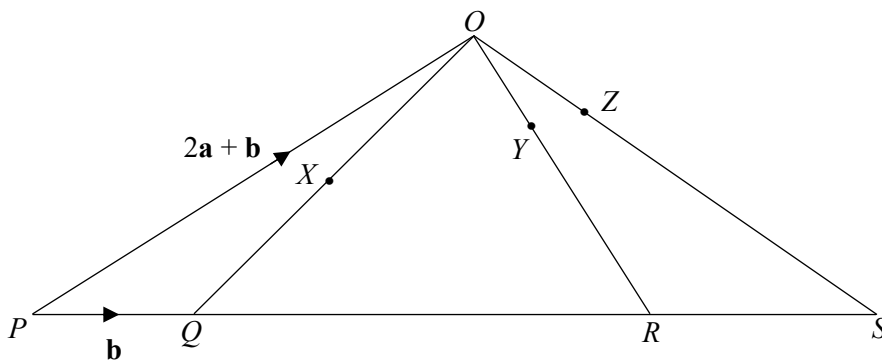
Work out the value of k .

$k = \dots\dots\dots$

(Total for Question 12 is 5 marks)



13 POS is a triangle.



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

X is the midpoint of OQ

$OY : YR = 1 : 2$

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

XYZ is a straight line.

$OZ : OS = 1 : k$

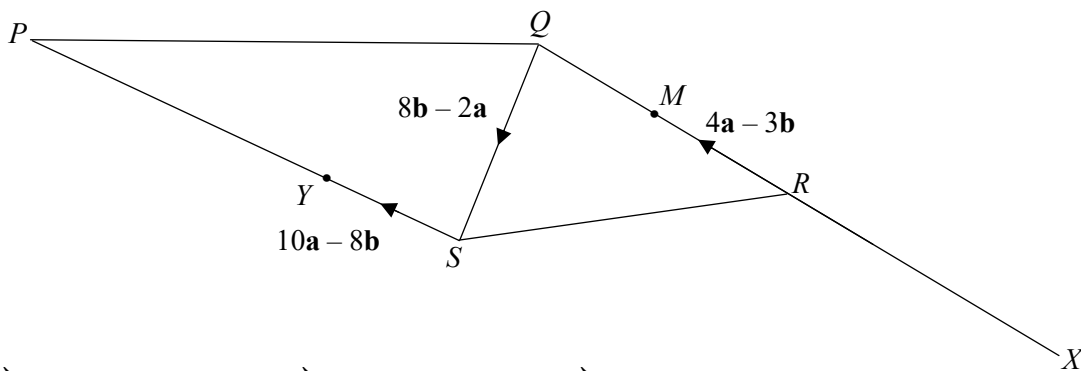
Work out the value of k .

$k = \dots\dots\dots$

(Total for Question 13 is 6 marks)



14 $PQRS$ is a quadrilateral.



$$\vec{SY} = 10\mathbf{a} - 8\mathbf{b}$$

$$\vec{QS} = 8\mathbf{b} - 2\mathbf{a}$$

$$\vec{RM} = 4\mathbf{a} - 3\mathbf{b}$$

$$RM = MQ$$

$$SY : YP = 1 : 2$$

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)

