Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Pages	Mark
3	
4 – 5	
6 – 7	
8 – 9	
10 – 11	
12 – 13	
TOTAL	

mathsrevision revisionworld

GCSE
Mathematics (Non-calculator Paper)

Practice Paper Style Questions – Topic: Vectors (Higher Tier)

For this paper you must have:

- black pen
- HB pencil
- ruler (with cm & mm)
- rubber
- protractor
- compass
- pencil sharpener

Time allowed
- 1 hour

Instructions
- Use **black ink** or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the space provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work that you do not want to be marked.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is **44**.
  The quality of your written communication is specifically assessed in questions indicated with an asterisk (*)
- You may ask for more answer paper and graph paper.
  These must be tagged securely to this answer booklet.
- A calculator must NOT be used.

Advice
- Read each question carefully before you answer it.
- In all calculations, show clearly how you work out your answer.
- Check your answers if you have time at the end.

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED

Do not write outside the box

1 ORW is a triangle.

M is the midpoint of OR.

$\overrightarrow{OW} = \boldsymbol{x}$

$\overrightarrow{WR} = \boldsymbol{y}$

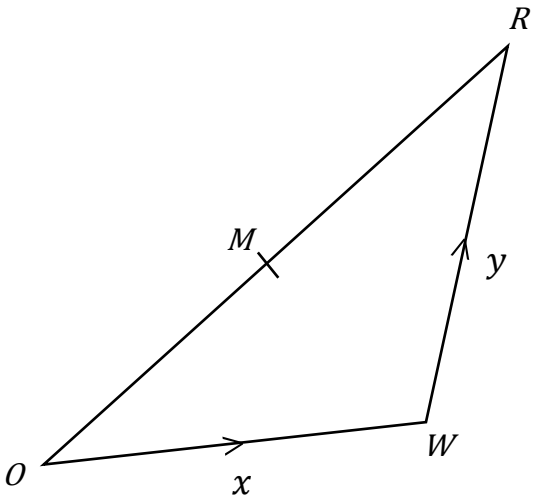


Diagram NOT accurately drawn

(a) Express $\overrightarrow{OM}$ in terms of $\boldsymbol{x}$ and $\boldsymbol{y}$.

Answer ..... $\overrightarrow{OM}$ =..... *(2 marks)*

(b) Express $\overrightarrow{WM}$ in terms of $\boldsymbol{x}$ and $\boldsymbol{y}$.

Give your answer in its simplest form.

Answer ..... $\overrightarrow{WM}$ =..... *(2 marks)*

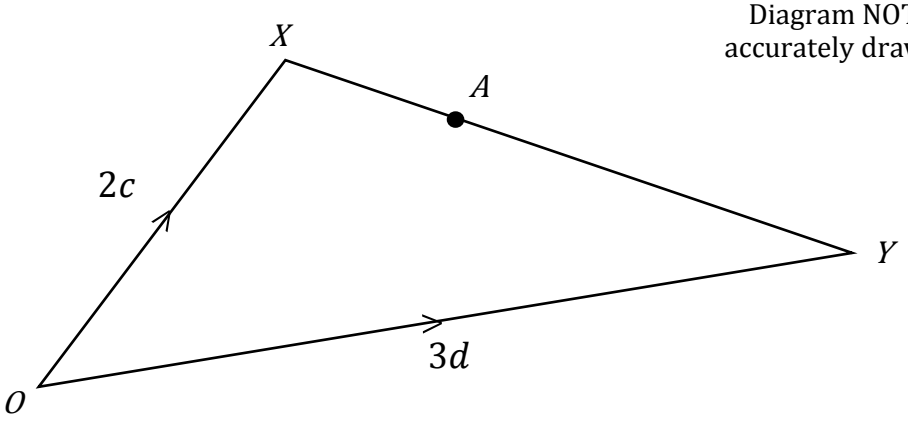
4

2 OXY is a triangle.

$\overrightarrow{OX} = 2c$

$\overrightarrow{OY} = 3d$

Diagram NOT accurately drawn



(a) Find $\overrightarrow{XY}$ in terms of c and d.

Answer ..... $\overrightarrow{XY}$ =..... *(1 mark)*

A is the point on XY such that $XA : AY = 2 : 3$

(b) Show that $\overrightarrow{OA}$ is parallel to the vector $c + d$.

(3 marks)

3 OMR is a triangle.

$\overrightarrow{OR} = \boldsymbol{x}$

$\overrightarrow{OM} = \boldsymbol{y}$

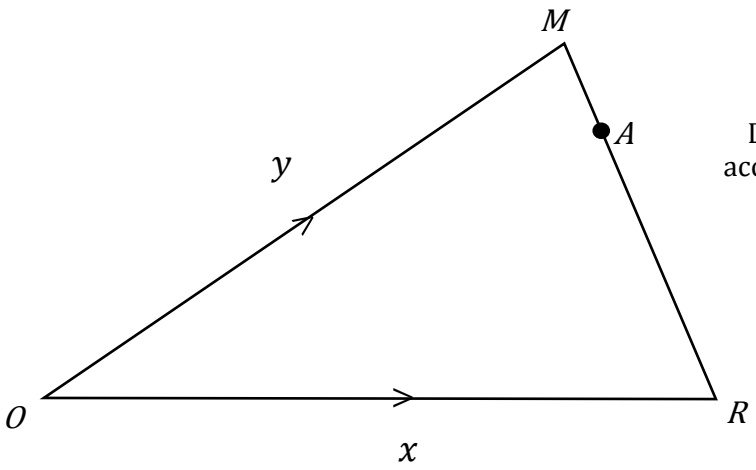


Diagram NOT accurately drawn

(a) Find $\overrightarrow{RM}$ in terms of $\boldsymbol{x}$ and $\boldsymbol{y}$.

Answer ..... $\overrightarrow{RM}$ =..... *(1 mark)*

A is the point on MR such that $MA : AR = 3 : 1$

(b) Find $\overrightarrow{OA}$ in terms of $\boldsymbol{x}$ and $\boldsymbol{y}$.

Give your answer in its simplest form.

Answer ..... $\overrightarrow{OA}$ =..... *(3 marks)*

8

4

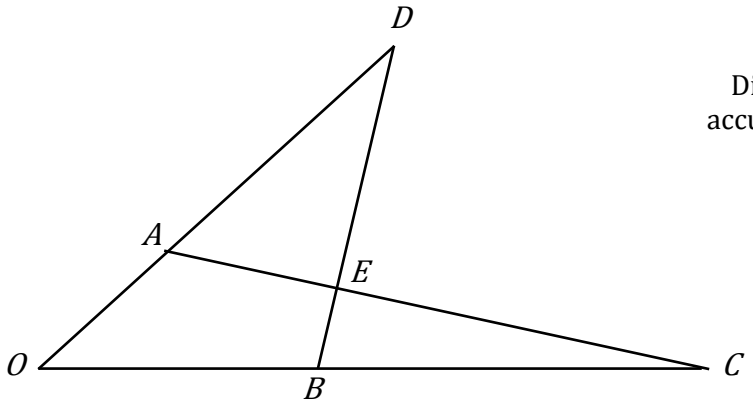


Diagram NOT accurately drawn

In the diagram,

$\overrightarrow{OA} = 4x$ and $\overrightarrow{OB} = 4y$

OAD, OBC and BED are all straight lines.

$AD = 2OA$ and $BE : ED = 1 : 3$

(a) Find, in terms of x and y, the vectors which represent:

(i) $\overrightarrow{BD}$

Answer ..... *(2 marks)*

(ii) $\overrightarrow{AE}$

Answer ..... *(2 marks)*

Given that $\overrightarrow{BC} = 8y$

(b) Show that AEC is a straight line.

(3 marks)

5 ABD is a triangle.

E is a point on AD

$\overrightarrow{AB} = \boldsymbol{x}$

$\overrightarrow{AE} = \boldsymbol{2y}$

$\overrightarrow{ED} = \boldsymbol{y}$

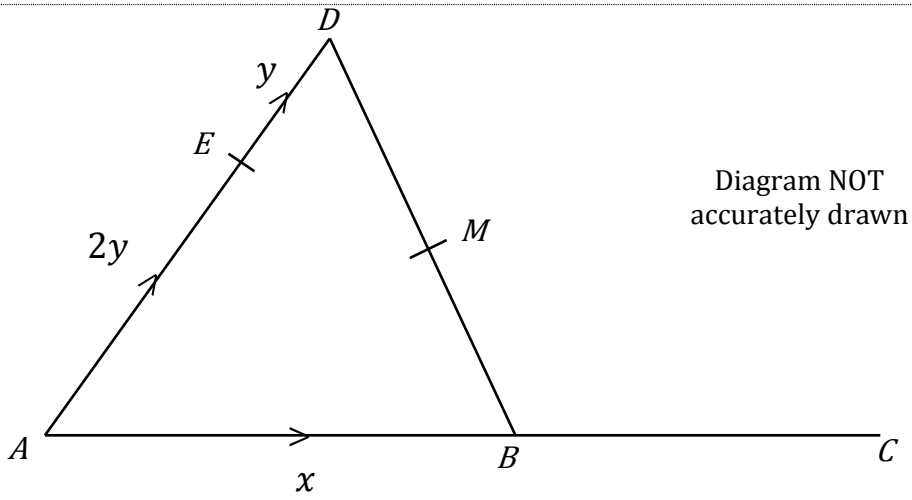


Diagram NOT accurately drawn

(a) Find the vector $\overrightarrow{DA}$ in terms of $\boldsymbol{x}$ and $\boldsymbol{y}$.

Answer ..... $\overrightarrow{DA}$ =..... *(1 mark)*

B is the midpoint of AC

M is the midpoint of DB

(b) Show that EMC is a straight line.

(4 marks)

12

6 OAB is a triangle.

$\overrightarrow{OA} = \boldsymbol{x}$

$\overrightarrow{OB} = \boldsymbol{y}$

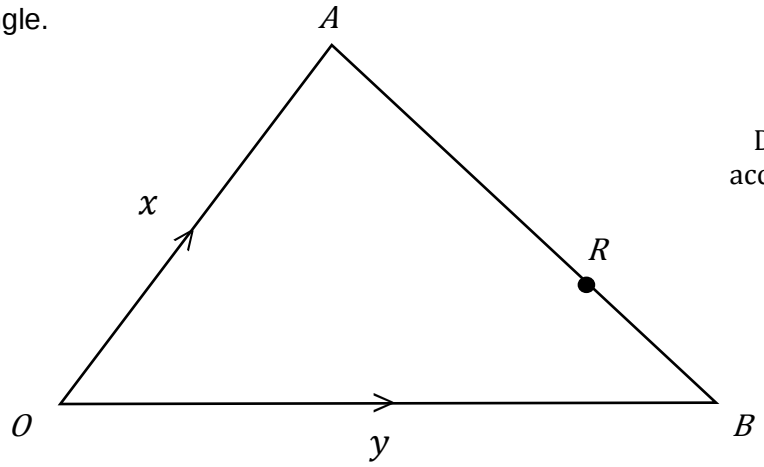


Diagram NOT accurately drawn

(a) Find $\overrightarrow{AB}$ in terms of $\boldsymbol{x}$ and $\boldsymbol{y}$.

Answer ..... $\overrightarrow{AB}$ =..... *(1 mark)*

R is the point on AB such that $AR : RB = 3 : 2$

(b) Show that $\overrightarrow{OR} = \frac{1}{5}(2\boldsymbol{x} + 3\boldsymbol{y})$

(3 marks)

7

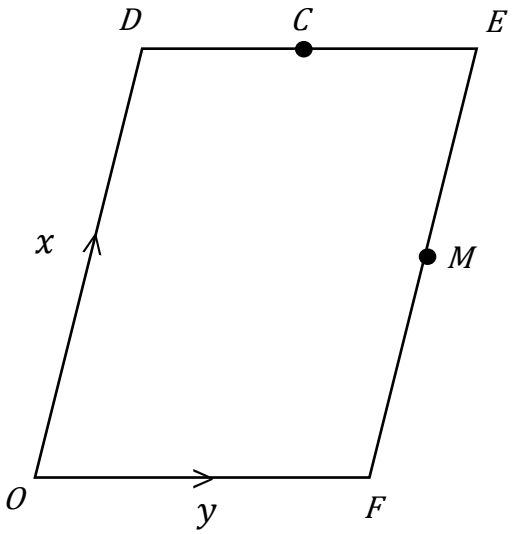


Diagram NOT accurately drawn

$ODEF$ is a parallelogram.

M is the midpoint of FE.

C is the midpoint of DE.

$\overrightarrow{OD} = \boldsymbol{x}$ and $\overrightarrow{OF} = \boldsymbol{y}$

(a) Find, in terms of $\boldsymbol{x}$ and/or $\boldsymbol{y}$, the vectors:

(i) $\overrightarrow{ME}$

Answer ..... *(1 mark)*

(ii) $\overrightarrow{MC}$

Answer ..... *(1 mark)*

(b) Show that FD is parallel to MC.

(2 marks)

8

8

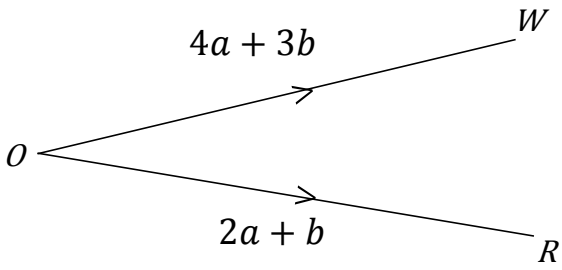


Diagram NOT accurately drawn

$\overrightarrow{OR} = 2a + b$

$\overrightarrow{OW} = 4a + 3b$

(a) Express the vector $\overrightarrow{RW}$ in terms of a and b.

Give your answer in its simplest form.

Answer ..... $\overrightarrow{RW}$ =..... *(2 marks)*

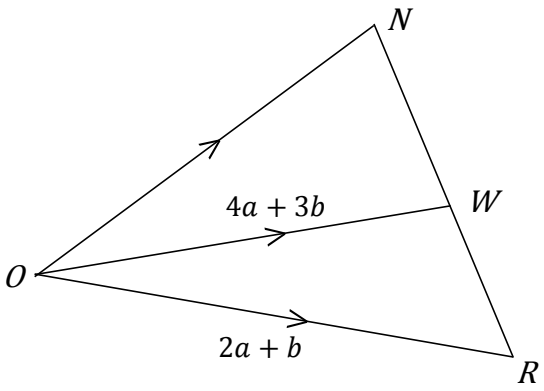


Diagram NOT accurately

RWN is a straight line and NW: WR = 3 : 2

(b) Express the vector $\overrightarrow{ON}$ in terms of a and b.

Give your answer in its simplest form.

Answer ..... $\overrightarrow{ON}$ =..... *(3 marks)*

9

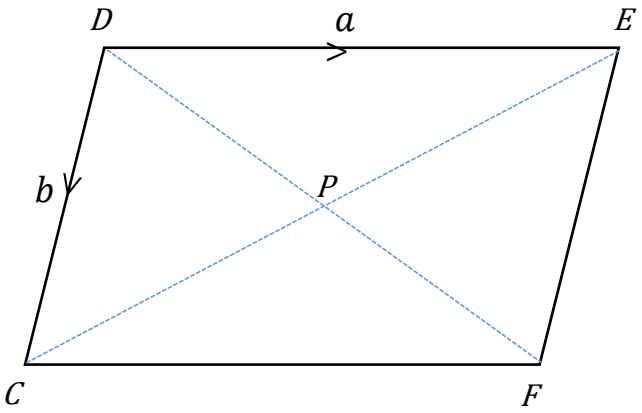


Diagram NOT accurately drawn

$CDEF$ is a parallelogram.

$\overrightarrow{DE} = \boldsymbol{a}$ and $\overrightarrow{DC} = \boldsymbol{b}$

(a) Express, in terms of $\boldsymbol{a}$ and $\boldsymbol{b}$, the vectors:

(i) $\overrightarrow{DF}$

Answer ..... *(1 mark)*

(ii) $\overrightarrow{EC}$

Answer ..... *(1 mark)*

DF and EC are diagonals of parallelogram $CDEF$ and they intersect at point P.

(b) Express $\overrightarrow{DP}$ in terms of $\boldsymbol{a}$ and $\boldsymbol{b}$.

Answer ..... *(1 mark)*

8

10 OAB is a triangle.

$\overrightarrow{OA} = 2x$

$\overrightarrow{OB} = 3y$

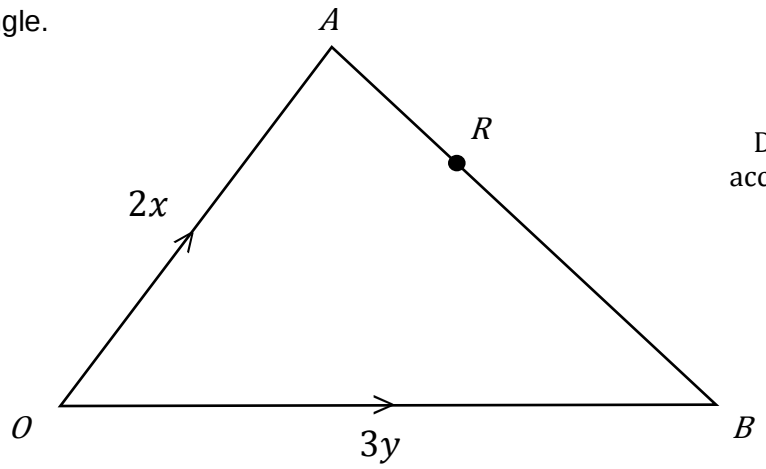


Diagram NOT accurately drawn

(a) Find $\overrightarrow{AB}$ in terms of x and y.

Answer ..... $\overrightarrow{AB}$ =..... *(1 mark)*

R is the point on AB such that $AR : RB = 2 : 3$

(b) Show that $\overrightarrow{OR}$ is parallel to the vector $x + y$

(3 marks)

END OF QUESTIONS

There are no questions printed on this page

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