Name: _____

GCSE (1 – 9)

Vectors Proof Questions

Instructions

• Use **black** ink or ball-point pen.
• Answer all questions.
• Answer the questions in the spaces provided
– *there may be more space than you need.*
• Diagrams are **NOT** accurately drawn, unless otherwise indicated.
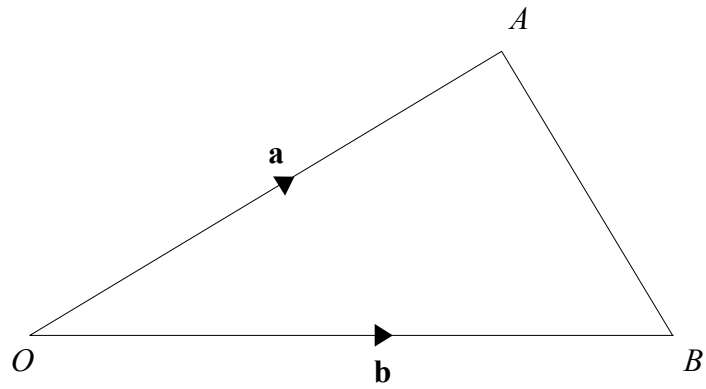• You must **show all your working out.**

Information

• The marks for each question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

• Read each question carefully before you start to answer it.
• Keep an eye on the time.
• Try to answer every question.
• Check your answers if you have time at the end

1

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

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

P is the point on AB such that AP:PB = 1:3

$\overrightarrow{OP} = k\left(3\,\boldsymbol{a} + \boldsymbol{b}\right)$

Find the value of k

…......................

(Total for question 1 is 4 marks)

2
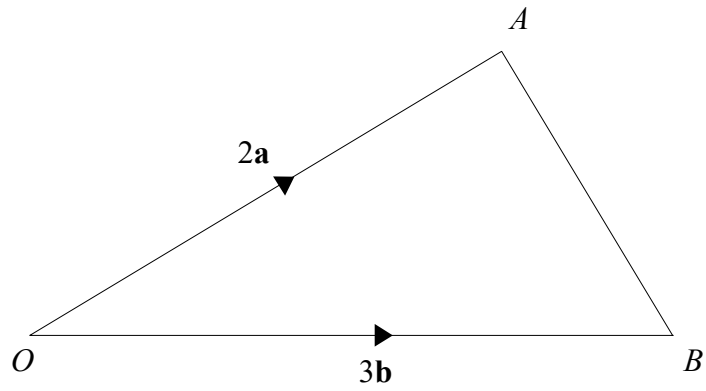
$\overrightarrow{OA}=2a$

$\overrightarrow{OB}=3b$

P is the point on AB such that AP:PB = 3:2

$\overrightarrow{OP}=k\left(4\boldsymbol{a}+9\boldsymbol{b}\right)$

Find the value of k

…........................

(Total for question 2 is 4 marks)

3
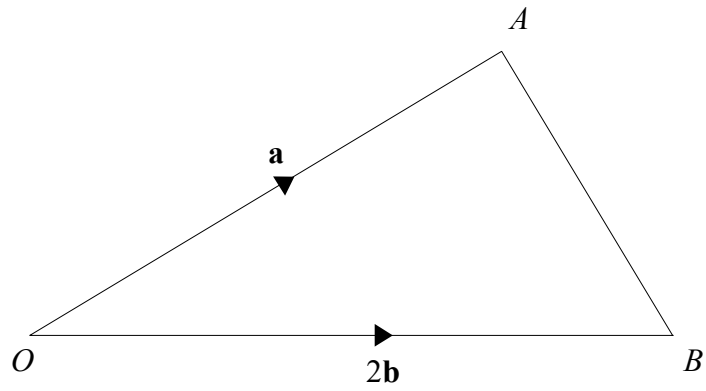
$\overrightarrow{OA} = \boldsymbol{a}$

$\overrightarrow{OB} = 2\,\boldsymbol{b}$

P is the point on AB such that AP:PB = 3:2

$\overrightarrow{OP} = k\left(\boldsymbol{a} + 3\,\boldsymbol{b}\right)$

Find the value of k

…..........................

(Total for question 3 is 4 marks)

4 *ABCDEF* is a regular hexagon with centre *O*.
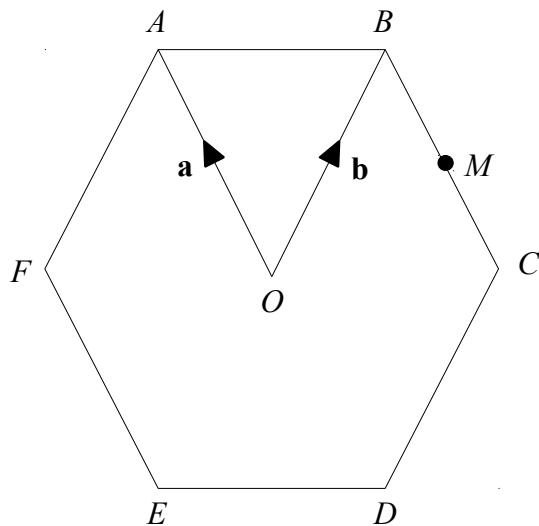
$\overrightarrow{OA} = a$

$\overrightarrow{OB} = b$

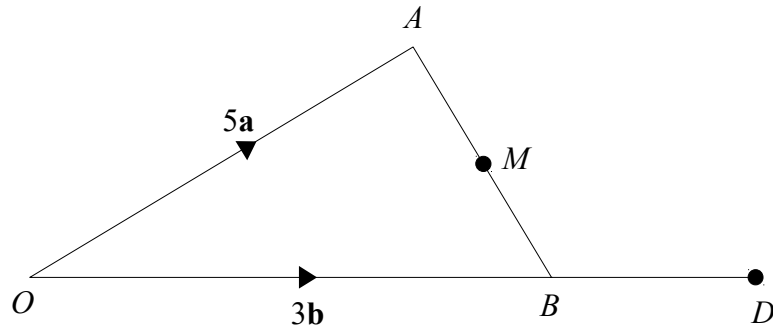*M* is the midpoint of *BC*.
X is the point on *AB* extended, such that *AB*:*BX* = 3:2

Prove that *E*, *M* and *X* are on the same straight line.

5

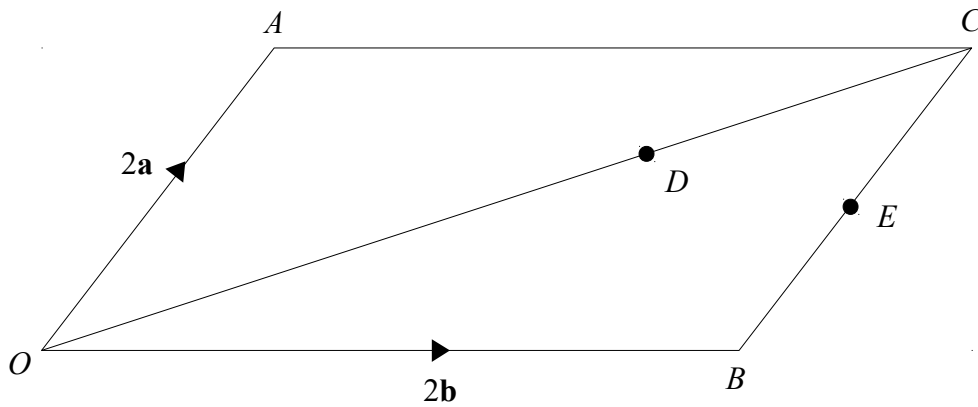

$\overrightarrow{OA}=5$a

$\overrightarrow{OB}=3$b

C is the point such that OC:CA = 4:1
M is the midpoint of AB
D is the point such that OB:OD = 3:4

Show that C, M and D are on the same straight line.

6 The diagram shows a parallelogram.

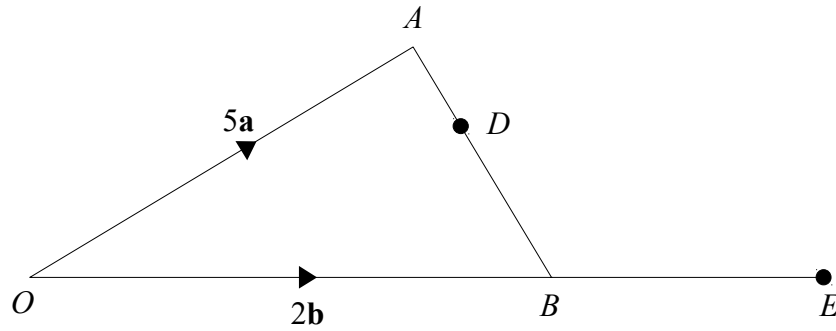$\overrightarrow{OA} = 2a$

$\overrightarrow{OB} = 2b$

D is the point on OC such that OD:DC = 2:1

E is the midpoint of BC

Show that A, D and E are on the same straight line.

(Total for question 6 is 4 marks)

7

$\overrightarrow{OA} = 5a$

$\overrightarrow{OB} = 2b$

C is the point on OA such that OC:CA = 4:1
D is the point such that AD:DB = 1:2
The line OB is extended to point E

Given that C, D and E are on the same straight line find $\overrightarrow{BE}$

…..........................

(Total for question 7 is 5 marks)