Bishops Online Tutoring

Education Consultancy

Edexcel GCSE Mathematics

VECTORS

Materials Required:

- Pen
- HB Pencil
- Ruler (in centimetres and millimetres)
- Protractor
- Compass

Instructions:

- Use a black ink pen to answer all questions
- Fill your name in the section below
- Answer the questions in the spaces provided
- Show your working out for all answers

Information:

- The marks allocated for each question are displayed within brackets – utilise this information to gauge the appropriate amount of time to dedicate to each question
- Questions marked with an asterisk (*) will assess your written communication; be careful of spelling, punctuation and grammar with these questions

Advice:

- Carefully read the question before attempting to answer it
- Be vary of time and try to answer every question
- If you have enough time in the end, go back and check your answers. A good way to check your answers is to retry the question with the hope of getting the same answer as before without looking at your working out from before

NO CALCULATOR ALLOWED

NAME:	

1.

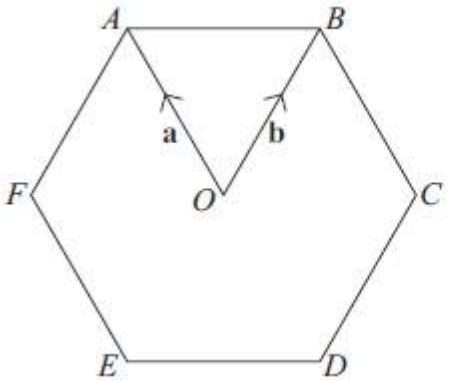

Diagram **NOT** accurately drawn

ABCDEF is a regular hexagon, with centre *O*.

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

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

.....

(1)

The line *AB* is extended to the point *K* so that $AB : BK = 1 : 2$

(b) Write the vector $\overrightarrow{CK}$ in terms of **a** and **b**.
Give your answer in its simplest form.

.....

(3)

(4 marks)

2.

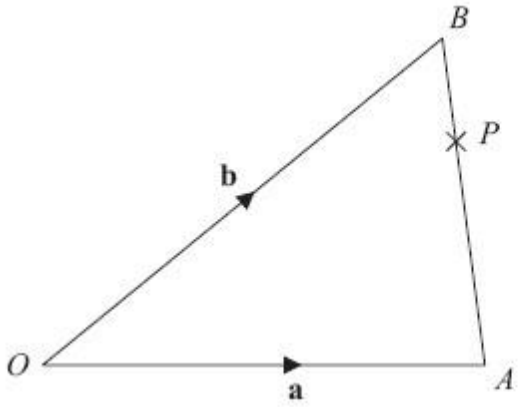

Diagram **NOT** accurately drawn

OAB is a triangle.

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

(a) Find $\overrightarrow{AB}$ in terms of **a** and **b**.

.....

(1)

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

(b) Find $\overrightarrow{OP}$ in terms of **a** and **b**.
Give your answer in its simplest form.

.....

(3)

(4 marks)

3.

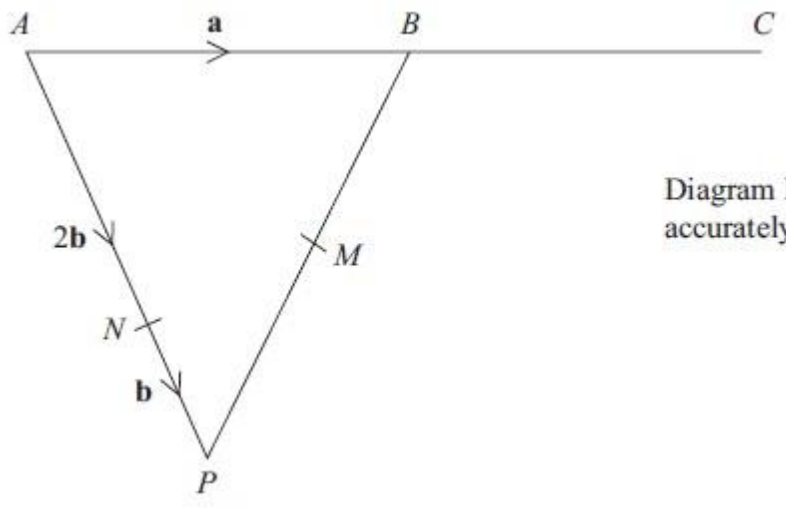

Diagram **NOT** accurately drawn

APB is a triangle.
N is a point on *AP*.

$\overrightarrow{AB} = \mathbf{a}$ $\overrightarrow{AN} = 2\mathbf{b}$ $\overrightarrow{NP} = \mathbf{b}$

(a) Find the vector $\overrightarrow{PB}$, in terms of **a** and **b**.

.....

(1)

B is the midpoint of *AC*.
M is the midpoint of *PB*.

*(b) Show that *NMC* is a straight line.

(4)

(5 marks)

4.

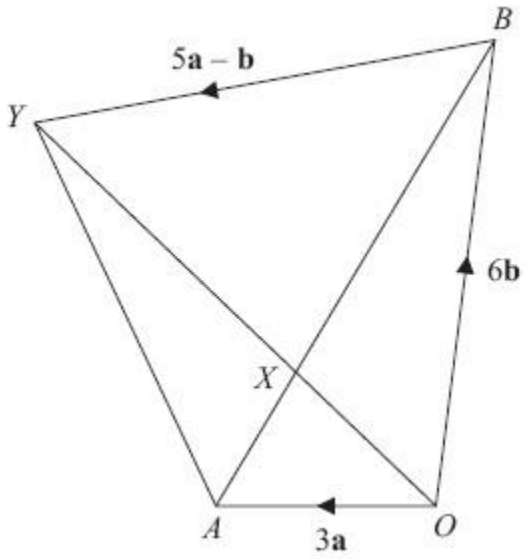

Diagram **NOT** accurately drawn

OAYB is a quadrilateral.

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

$\overrightarrow{OB} = 6\mathbf{b}$

(a) Express $\overrightarrow{AB}$ in terms of **a** and **b**.

.....

(1)

X is the point on *AB* such that *AX* : *XB* = 1 : 2

and $\overrightarrow{BY} = 5\mathbf{a} - \mathbf{b}$

* (b) Prove that $\overrightarrow{OX} = \frac{2}{5}\overrightarrow{OY}$

(4)

(5 marks)

5.

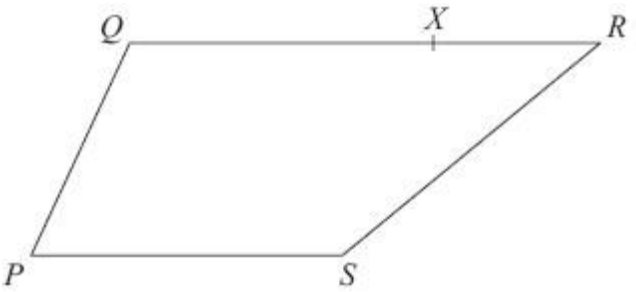

Diagram **NOT** accurately drawn

$PQRS$ is a trapezium.
PS is parallel to QR.
$QR = 2PS$

$\overrightarrow{PQ} = \mathbf{a}$ $\overrightarrow{PS} = \mathbf{b}$

X is the point on QR such that $QX : XR = 3 : 1$

Express in terms of **a** and **b**.

(i) $\overrightarrow{PR}$

(2)

.....

(ii) $\overrightarrow{SX}$

(3)

.....

(5 marks)

6.

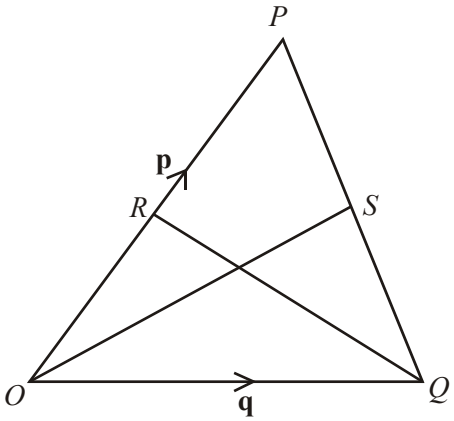

Diagram **NOT** accurately drawn

OPQ is a triangle.

R is the midpoint of OP.

S is the midpoint of PQ.

$\overrightarrow{OP} = p$ and $\overrightarrow{OQ} = q$

(i) Find $\overrightarrow{OS}$ in terms of p and q.

$\overrightarrow{OS}$ = ...

(ii) Show that RS is parallel to OQ.

(5 marks)

7.

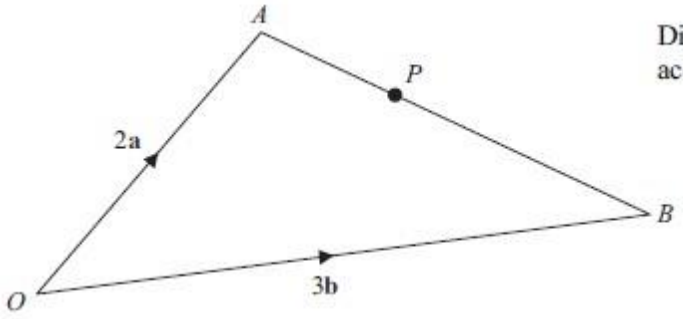

Diagram **NOT** accurately drawn

OAB is a triangle.

$\overrightarrow{OA} = 2\mathbf{a}$

$\overrightarrow{OB} = 3\mathbf{b}$

(*a*) Find AB in terms of **a** and **b**.

$\overrightarrow{AB}$ = ...

(1)

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

(*b*) Show that $\overrightarrow{OP}$ is parallel to the vector **a** + **b**.

(3)

(4 marks)