Name ANSWERS	Class

MATHS TEACHER HUB

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Vectors

(9 – 1) Topic booklet

Foundation

These questions have been collated from previous years GCSE Mathematics papers.

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser.	Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- 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.**
- If the question is a **1F** question you are not allowed to use a calculator.
- If the question is a **2F** or a **3F** question, you may use a calculator to help you answer.

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.

Answer ALL questions
Write your answers in the space provided.
You must write down all the stages in your working.

26 $\mathbf{a} = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} 5 \\ -2 \end{pmatrix}$

Find $2\mathbf{a} - 3\mathbf{b}$ as a column vector.

$\begin{pmatrix} 6 \\ 8 \end{pmatrix} - \begin{pmatrix} 15 \\ -6 \end{pmatrix} = \begin{pmatrix} -9 \\ 14 \end{pmatrix}$

$\begin{pmatrix} -9 \\ 14 \end{pmatrix}$

May 2020 – Paper 2F **(Total for Question 26 is 2 marks)**

26 $\mathbf{a} = \begin{pmatrix} 5 \\ 2 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} -1 \\ 7 \end{pmatrix}$

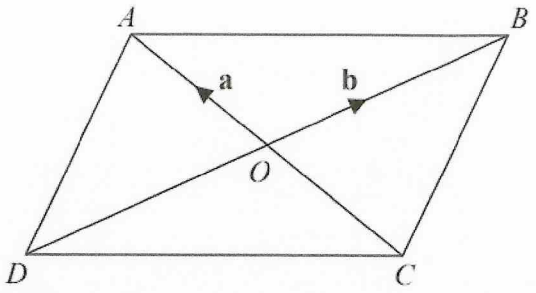
Work out $2\mathbf{a} + \mathbf{b}$ as a column vector.

$\begin{pmatrix} 10 \\ 4 \end{pmatrix} + \begin{pmatrix} -1 \\ 7 \end{pmatrix} = \begin{pmatrix} 9 \\ 11 \end{pmatrix}$

$\begin{pmatrix} 9 \\ 11 \end{pmatrix}$

May 2018 – Paper 1F **(Total for Question 26 is 2 marks)**

27



$ABCD$ is a parallelogram.
The diagonals of the parallelogram intersect at O.

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

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

+2b

(1)

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

-a+b

(1)

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

-a-b

(1)

(Total for Question 27 is 3 marks)

29 $\mathbf{a} = \begin{pmatrix} 4 \\ 5 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$

Work out $\mathbf{a} - 2\mathbf{b}$ as a column vector.

$\begin{pmatrix} 4 \\ 5 \end{pmatrix} - \begin{pmatrix} 6 \\ 4 \end{pmatrix} = \begin{pmatrix} -2 \\ 1 \end{pmatrix}$

$\begin{pmatrix} -2 \\ 1 \end{pmatrix}$

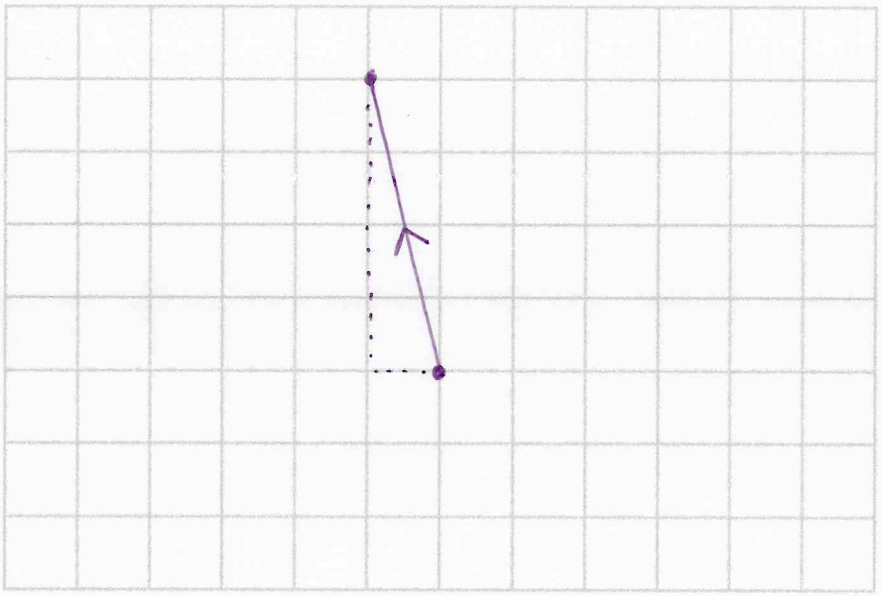
(Total for Question 29 is 2 marks)

30 Here are two column vectors.

$\mathbf{a} = \begin{pmatrix} 5 \\ 2 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} 3 \\ -1 \end{pmatrix}$

On the grid below, draw and label the vector $\mathbf{a} - 2\mathbf{b}$

$\begin{pmatrix} 5 \\ 2 \end{pmatrix} - \begin{pmatrix} 6 \\ -2 \end{pmatrix} = \begin{pmatrix} -1 \\ 4 \end{pmatrix}$



November 2019 – Paper 2F **(Total for Question 30 is 3 marks)**

30 $\mathbf{a} = \begin{pmatrix} 3 \\ -7 \end{pmatrix}$, $\mathbf{b} = \begin{pmatrix} 4 \\ 2 \end{pmatrix}$

Work out $\mathbf{b} - 2\mathbf{a}$ as a column vector.

$\begin{pmatrix} 4 \\ 2 \end{pmatrix} - \begin{pmatrix} 6 \\ -14 \end{pmatrix} = \begin{pmatrix} -2 \\ 16 \end{pmatrix}$

$\begin{pmatrix} -2 \\ 16 \end{pmatrix}$

Sample 1 – Paper 1F **(Total for Question 30 is 2 marks)**