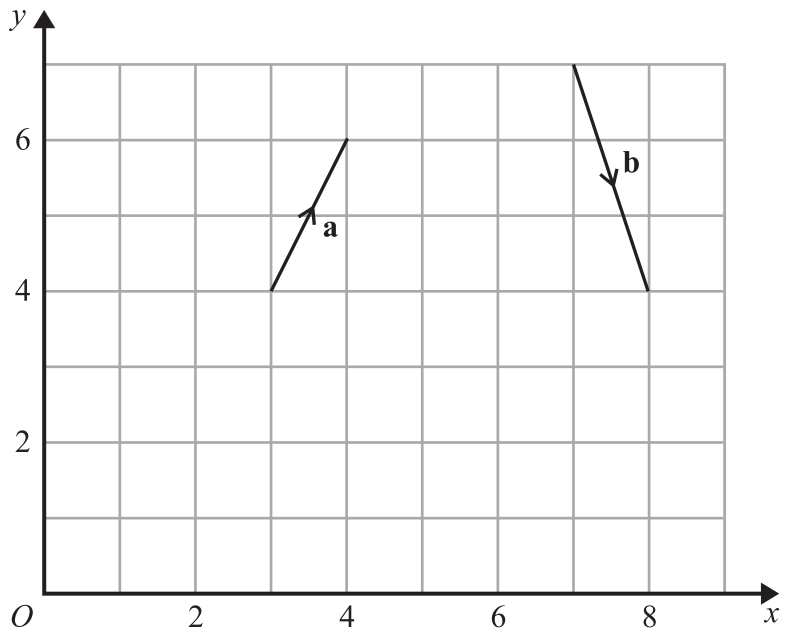
Summer 2018 Paper 2 Q10

1 The vector **a** and the vector **b** are shown on the grid.



(a) On the grid, draw and label vector –2**a**

(1)

(b) Work out **a** + 2**b** as a column vector.

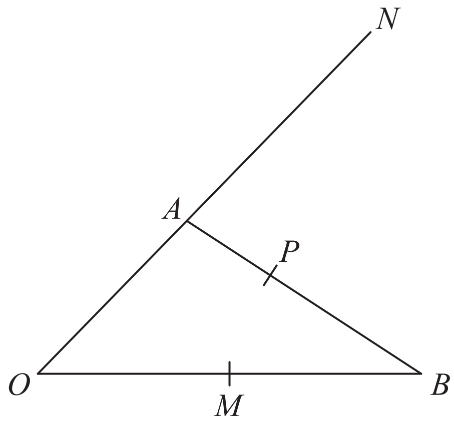
$\begin{pmatrix} \ldots\ldots \\ \ldots\ldots \end{pmatrix}$

(2)

(Total for Question 1 is 3 marks)

Autumn 2017 Paper 3 Q21

2



OAN, OMB and APB are straight lines.
$AN = 2OA$.
M is the midpoint of OB.

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

$\overrightarrow{AP} = k\overrightarrow{AB}$ where k is a scalar quantity.

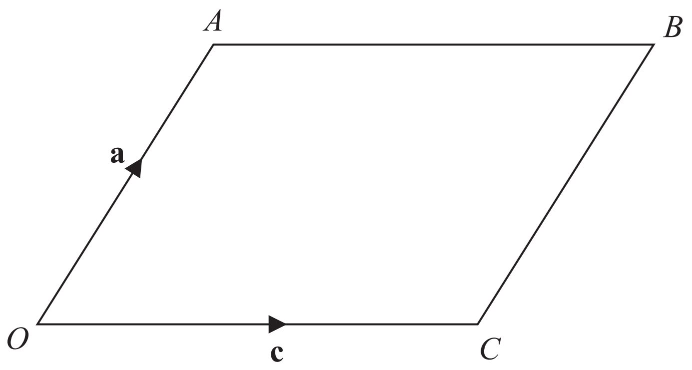
Given that MPN is a straight line, find the value of k.

....

(Total for Question 2 is 5 marks)

Summer 2017 Paper 1 Q19

3



$OABC$ is a parallelogram.

$\overrightarrow{OA} = \mathbf{a}$ and $\overrightarrow{OC} = \mathbf{c}$

X is the midpoint of the line AC.
OCD is a straight line so that $OC : CD = k : 1$

Given that $\overrightarrow{XD} = 3\mathbf{c} - \frac{1}{2}\mathbf{a}$

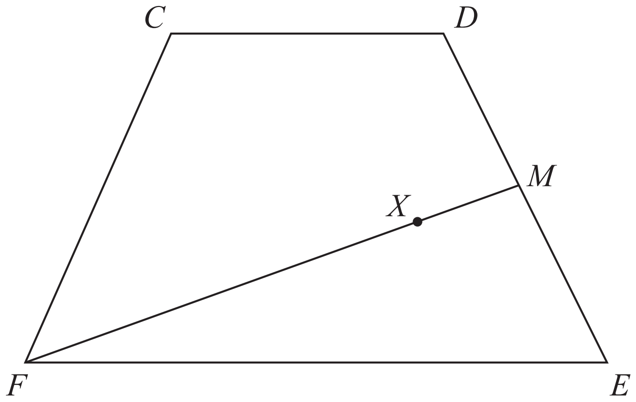
find the value of k.

$k =$ ....

(Total for Question 3 is 4 marks)

Summer 2019 Paper 2 Q20

4 *CDEF* is a quadrilateral.



$\overrightarrow{CD} = \mathbf{a}$, $\overrightarrow{DE} = \mathbf{b}$ and $\overrightarrow{FC} = \mathbf{a} - \mathbf{b}$.

(a) Express $\overrightarrow{FE}$ in terms of **a** and/or **b**.
Give your answer in its simplest form.

....

(2)

M is the midpoint of *DE*.
X is the point on *FM* such that $FX : XM = n : 1$
CXE is a straight line.

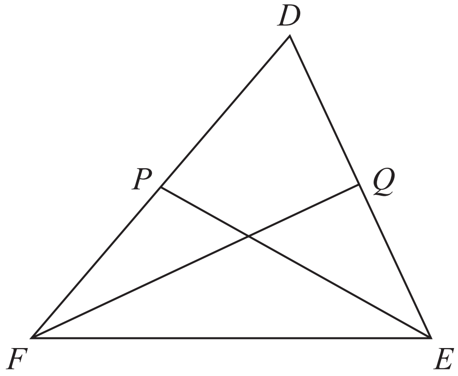
(b) Work out the value of *n*.

$n =$ ....

(4)

(Total for Question 4 is 6 marks)

5 *DEF* is a triangle.



P is the midpoint of *FD*.
Q is the midpoint of *DE*.

$\overrightarrow{FD} = \mathbf{a}$ and $\overrightarrow{FE} = \mathbf{b}$

Use a vector method to prove that *PQ* is parallel to *FE*.

(Total for Question 5 is 4 marks)

Summer 2020 Paper 2 Q6

6 $\mathbf{a} = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} 5 \\ -2 \end{pmatrix}$

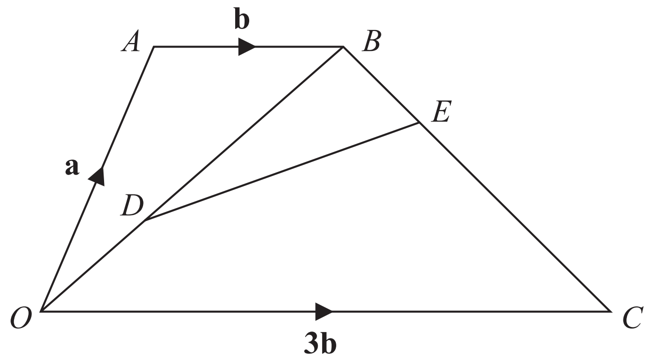
Find $2\mathbf{a} - 3\mathbf{b}$ as a column vector.

$\begin{pmatrix} \ldots\ldots\ldots\ldots \\ \ldots\ldots\ldots\ldots \end{pmatrix}$

(Total for Question 6 is 2 marks)

Summer 2021 Paper 3 Q18

7 *OABC* is a trapezium.



$\overrightarrow{OA} = \mathbf{a}$
$\overrightarrow{AB} = \mathbf{b}$
$\overrightarrow{OC} = \mathbf{3b}$

D is the point on OB such that $OD : DB = 2 : 3$
E is the point on BC such that $BE : EC = 1 : 4$

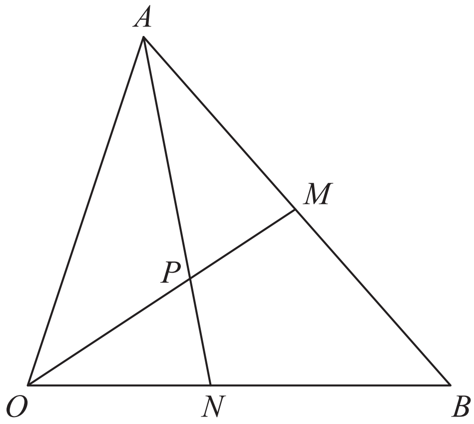
Work out the vector $\overrightarrow{DE}$ in terms of **a** and **b**.
Give your answer in its simplest form.

....

(Total for Question 7 is 4 marks)

Autumn 2018 Paper 1 Q21

8



OAB is a triangle.
OPM and *APN* are straight lines.
M is the midpoint of *AB*.

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

$OP : PM = 3 : 2$

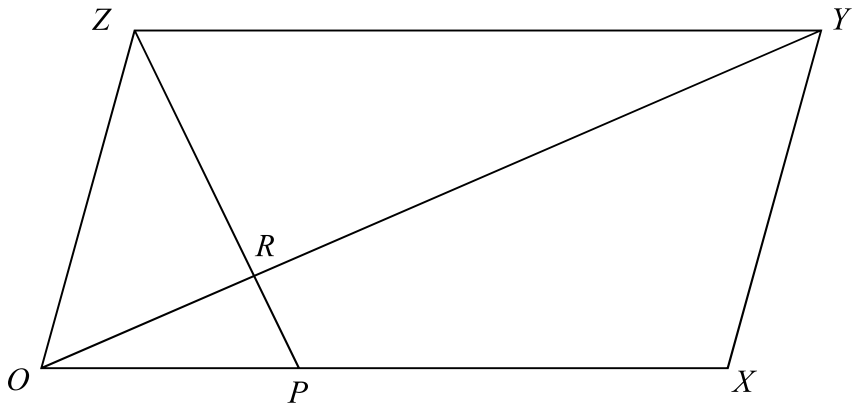
Work out the ratio $ON : NB$

....

(Total for Question 8 is 5 marks)

Autumn 2019 Paper 3 Q24

9 *OXYZ* is a parallelogram.



$\overrightarrow{OX} = \mathbf{a}$

$\overrightarrow{OY} = \mathbf{b}$

P is the point on OX such that $OP : PX = 1 : 2$
R is the point on OY such that $OR : RY = 1 : 3$

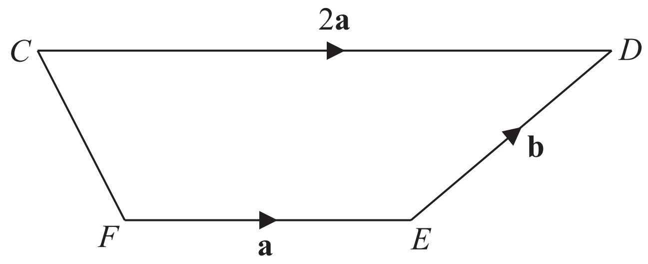
Work out, in its simplest form, the ratio $ZP : ZR$
You must show all your working.

....

(Total for Question 9 is 5 marks)

Autumn 2022 Paper 3 Q24

10 *CDEF* is a quadrilateral.



$\overrightarrow{FE} = \mathbf{a}$ $\overrightarrow{ED} = \mathbf{b}$ $\overrightarrow{CD} = 2\mathbf{a}$

The point *P* is such that *CEP* is a straight line and that *CE* = *EP*

Use a vector method to prove that *CF* is parallel to *DP*.

(Total for Question 10 is 4 marks)

Summer 2022 Paper 1 Q15

11 A, B and C are three points such that

$\overrightarrow{AB} = 3\mathbf{a} + 4\mathbf{b}$

$\overrightarrow{AC} = 15\mathbf{a} + 20\mathbf{b}$

(a) Prove that A, B and C lie on a straight line.

(2)

D, E and F are three points on a straight line such that

$\overrightarrow{DE} = 3\mathbf{e} + 6\mathbf{f}$

$\overrightarrow{EF} = -10.5\mathbf{e} - 21\mathbf{f}$

(b) Find the ratio

length of DF : length of DE

....

(3)

(Total for Question 11 is 5 marks)

Summer 2022 Paper 3 Q13

12 **a** and **b** are vectors such that

$$\mathbf{a} = \begin{pmatrix} 2 \\ -3 \end{pmatrix} \qquad \text{and} \qquad 3\mathbf{a} - 2\mathbf{b} = \begin{pmatrix} 8 \\ -17 \end{pmatrix}$$

Find **b** as a column vector.

$$\begin{pmatrix} \dots\dots\dots \\ \dots\dots\dots \end{pmatrix}$$

(Total for Question 12 is 3 marks)