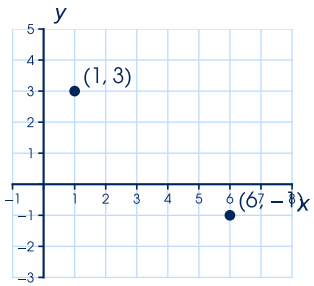
GCSE HIGHER · REVISION MAT 3

Vectors

1 $\mathbf{a} = \begin{pmatrix} -2 \\ 5 \end{pmatrix}$ and $\mathbf{b} = \begin{pmatrix} 4 \\ 1 \end{pmatrix}$

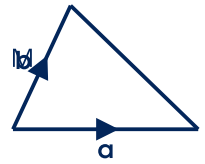
Find $\mathbf{a} + 2\mathbf{b}$.

2 Write down the vector that translates (1, 3) to (6, −1).



3 Explain the difference between $\begin{pmatrix} 3 \\ 4 \end{pmatrix}$ and $\begin{pmatrix} 4 \\ 3 \end{pmatrix}$.

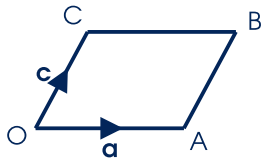
4 M is the midpoint of OB.



Find AM in terms of $\mathbf{a}$ and $\mathbf{b}$.

5 Show that $\begin{pmatrix} 3 \\ -6 \end{pmatrix}$ and $\begin{pmatrix} -1 \\ 2 \end{pmatrix}$ are parallel.

6 OABC is a parallelogram. X lies on OB with OX : XB = 1 : 3.



Find AX in terms of $\mathbf{a}$ and $\mathbf{c}$.

7 $\mathbf{a}$ and $\mathbf{b}$ are not parallel.

$m\mathbf{a} + 3\mathbf{b} = 4\mathbf{a} + n\mathbf{b}$.

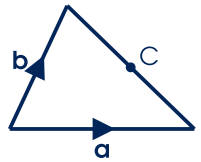
Explain why $m = 4$ and $n = 3$.

8 OA = $\mathbf{a}$ and OB = $\mathbf{b}$.

C is the midpoint of AB.

OD = $2\mathbf{a} + 2\mathbf{b}$.

Prove that O, C and D lie on a straight line.



Mr&Mrs MATHS

ANSWERS · REVISION MAT 3

Vectors

1 $\begin{pmatrix} 6 \\ 7 \end{pmatrix}$

2 $\begin{pmatrix} 5 \\ -4 \end{pmatrix}$

3 The top number is the *x*-step and the bottom the *y*-step, so they point in different directions.

4 $\overrightarrow{AM} = -\mathbf{a} + \frac{1}{2}\mathbf{b}$

$\overrightarrow{AM} = \frac{1}{2}\mathbf{b} - \mathbf{a}$

5 $\begin{pmatrix} 3 \\ -6 \end{pmatrix} = -3\begin{pmatrix} -1 \\ 2 \end{pmatrix}$

6 $\overrightarrow{OX} = \frac{1}{4}(\mathbf{a} + \mathbf{c})$

$\overrightarrow{AX} = \frac{1}{4}(\mathbf{a} + \mathbf{c}) - \mathbf{a}$

$\overrightarrow{AX} = \frac{1}{4}\mathbf{c} - \frac{3}{4}\mathbf{a}$

7 As a and b are not parallel, the amounts of each must match.

8 $\overrightarrow{OC} = \frac{1}{2}(\mathbf{a} + \mathbf{b})$

$\overrightarrow{OD} = 2(\mathbf{a} + \mathbf{b}) = 4\overrightarrow{OC}$

OD is a multiple of OC through O, so they are collinear.

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