

8. The n th term of a sequence is $n^2 + 6n - 8$



Work out the position of the first term in the sequence with a value greater than 100.

.....
(2)

9. A sequence has an n th term of $n^2 - 6n + 7$



Work out which term in the sequence has a value of 23

.....
(3)

10. A sequence has an n th term of $n^2 + n - 3$



Work out which term in the sequence has a value of 87

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(3)

15. Here are the first 5 terms of a quadratic sequence



-3 -2 1 6 13

Find an expression, in terms of n , for the n th term of this quadratic sequence.

.....
(3)

16. Here are the first 4 terms of a quadratic sequence



10 20 38 64

Find an expression, in terms of n , for the n th term of this quadratic sequence.

.....
(3)

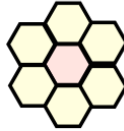
21. Here is a tile.



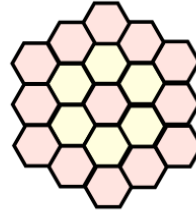
Here is a sequence of patterns made from these tiles.



Pattern 1



Pattern 2



Pattern 3

How many of these tiles are needed to make Pattern number 10?

22. The n th term of a quadratic sequence is $an^2 + c$ where a and c are integers.



The second term is 16 and the fifth term is 163.

Find the values of a and c .

.....
(4)

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23. The n th term of a quadratic sequence is $an^2 + bn$ where a and b are integers.



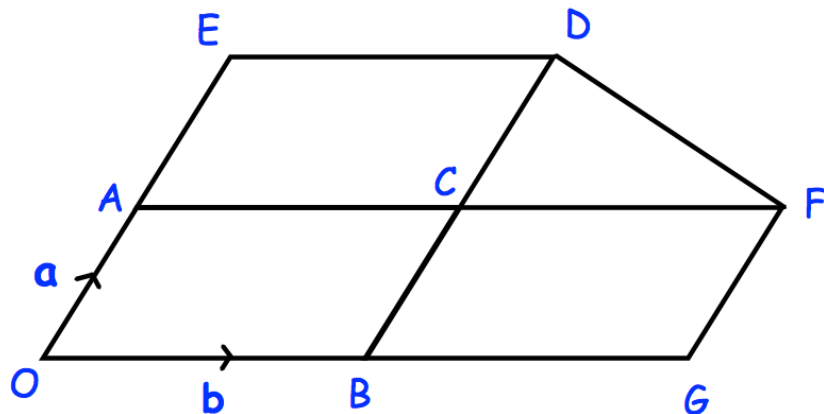
The second term is -4 and the sixth term is 60

Find the values of a and b .

.....
(4)

1. In the diagram OBDE and OAFG are parallelograms.
 B is the midpoint of OG.
 A is the midpoint of OE.

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



- (a) Express, in terms of $\mathbf{a}$ and $\mathbf{b}$, the following vectors.
 Give your answers in their simplest form.

(i) $\overrightarrow{OC}$

.....
 (1)

(ii) $\overrightarrow{BA}$

.....
 (1)

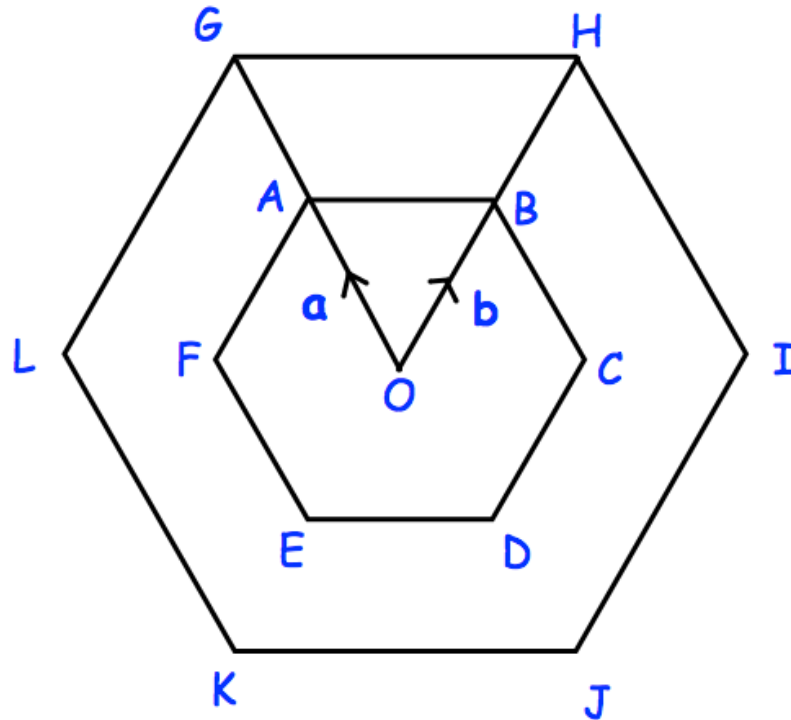
(iii) $\overrightarrow{DF}$

.....
 (1)

- (b) Show $\overrightarrow{EG}$ and $\overrightarrow{DF}$ are parallel.

(2)

2.



ABCDEF and GHIJKL are regular hexagons with centre O.
GHIJKL is an enlargement of ABCDEF, with scale factor 2.

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

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

.....
(1)

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

.....
(1)

(c) Write the vector $\overrightarrow{OE}$ in terms of $\mathbf{a}$ and $\mathbf{b}$.

.....
(1)

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

.....
(1)

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

.....
(1)

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

.....
(1)

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

.....
(1)

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

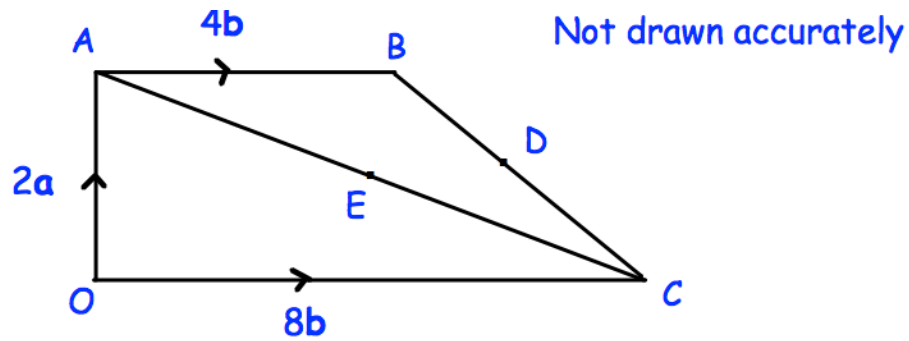
.....
(1)

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

.....
(1)

3. OABC is a trapezium.
 Point D is the midpoint of BC.
 Point E is the midpoint of AC.

$$\overrightarrow{OA} = 2\mathbf{a} \quad \overrightarrow{AB} = 4\mathbf{b} \quad \text{and} \quad \overrightarrow{OC} = 8\mathbf{b}$$



- (a) Write these vectors in terms of $\mathbf{a}$ and $\mathbf{b}$.

(i) $\overrightarrow{OB}$

.....
 (1)

(ii) $\overrightarrow{AC}$

.....
 (1)

(iii) $\overrightarrow{AE}$

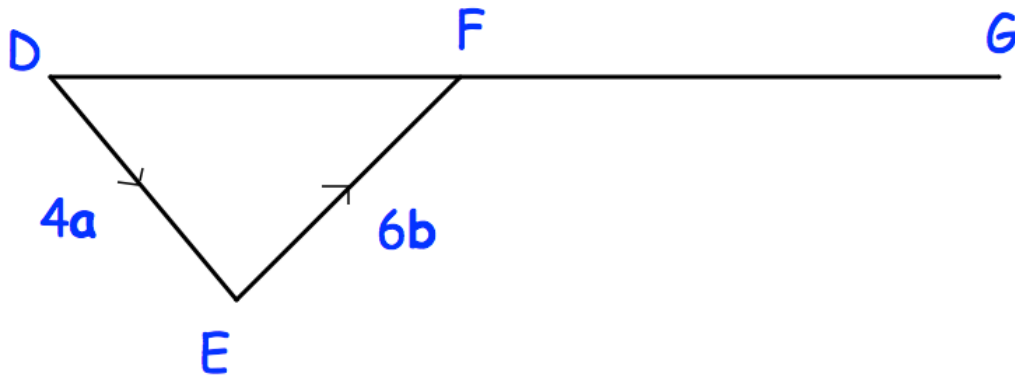
.....
 (1)

- (b) Show $\overrightarrow{ED}$ and $\overrightarrow{OC}$ are parallel.

(3)

4. DFG is a straight line.

$$\overrightarrow{DE} = 4\mathbf{a} \quad \text{and} \quad \overrightarrow{EF} = 6\mathbf{b}$$



- (a) Write down the vector $\overrightarrow{DF}$ in terms of $\mathbf{a}$ and $\mathbf{b}$

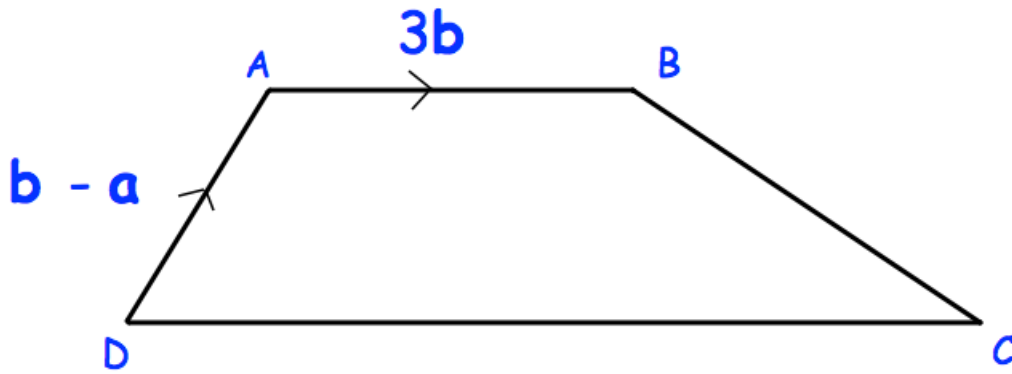
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(1)

- (b) $DF : FG = 2:3$

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

.....
(2)

5. ABCD is a trapezium



AB and DC are parallel.
 $DC = 2AB$

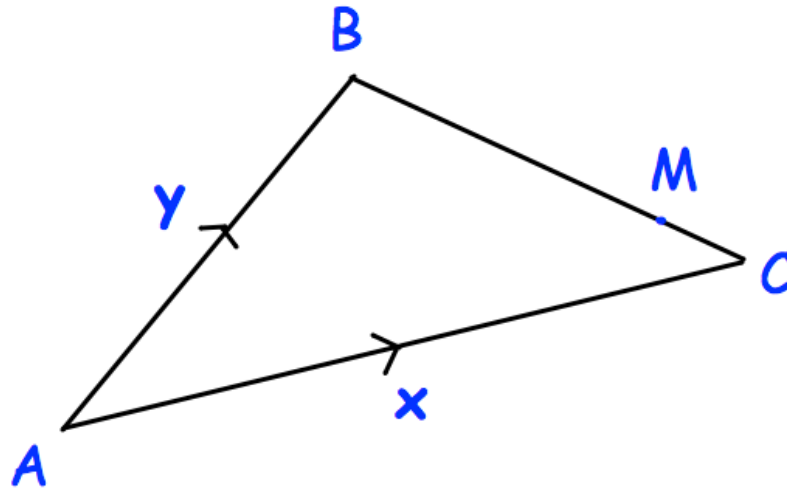
- (a) Write down the vector $\overrightarrow{DC}$ in terms of $\mathbf{a}$ and $\mathbf{b}$

.....
(1)

- (b) Work out the vector $\overrightarrow{BC}$ in terms of $\mathbf{a}$ and $\mathbf{b}$
Give your answer in its simplest form.

.....
(2)

6.



ABC is a triangle.

M lies on BC such that $BM = \frac{4}{5} BC$

Express these vectors in terms of $\mathbf{x}$ and $\mathbf{y}$

(a) $\overrightarrow{BC}$

.....
(1)

(b) $\overrightarrow{BM}$

.....
(1)

(c) $\overrightarrow{AM}$

.....
(1)