



Scan for the solutions

Name: _____

Date: _____

Score: _____ / 58

1 OAB is a triangle.

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

M is the midpoint of OA and N is the midpoint of OB.

Prove that MN is parallel to AB.

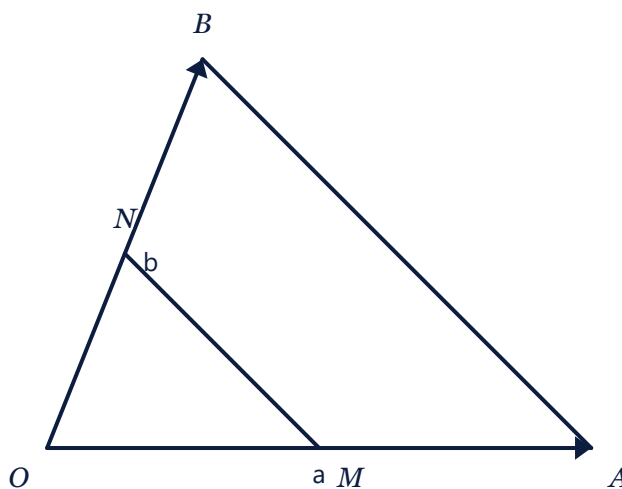


Diagram NOT accurately drawn

(4 marks)

Answer _____

2 ABCD is a quadrilateral.

Vector $AB = 4\mathbf{a} + 2\mathbf{b}$

Vector $BC = \mathbf{a} - 3\mathbf{b}$

Vector $CD = -4\mathbf{a} - 2\mathbf{b}$

Prove that ABCD is a parallelogram.

(4 marks)

Answer _____

3Vector $EF = 4\mathbf{a} - 2\mathbf{b}$ Vector $GH = 6\mathbf{a} - 3\mathbf{b}$

Prove that EF is parallel to GH.

(4 marks)

Answer _____

4

P, Q and R are three points.

Vector $PQ = 2\mathbf{a} - 3\mathbf{b}$ Vector $QR = 6\mathbf{a} - 9\mathbf{b}$

Prove that P, Q and R lie on the same straight line.

(4 marks)

Answer _____

5 OAB is a triangle.

Vector $\mathbf{OA} = 2\mathbf{a}$ and vector $\mathbf{OB} = 3\mathbf{b}$.

M is the midpoint of OA.

N is the point on OB such that $\mathbf{ON} : \mathbf{NB} = 2 : 1$.

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

b. Show that $\mathbf{MN}$ is not parallel to $\mathbf{AB}$.

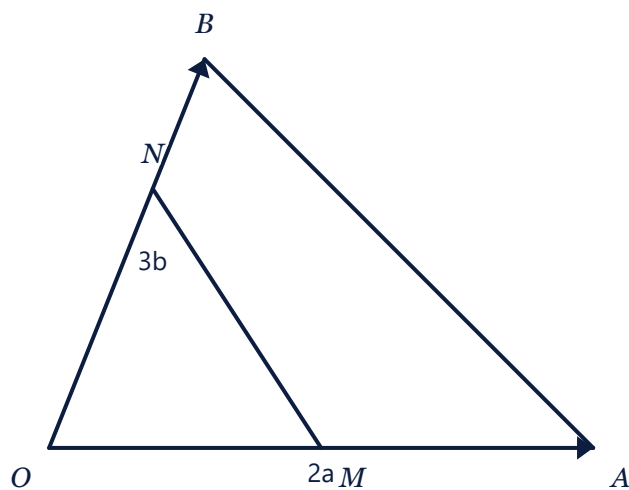


Diagram NOT accurately drawn

(5 marks)

Answer

6 OACB is a parallelogram.

Vector $\mathbf{OA} = \mathbf{a}$ and vector $\mathbf{OB} = \mathbf{b}$, so vector $\mathbf{OC} = \mathbf{a} + \mathbf{b}$.

M is the midpoint of OB.

X is the midpoint of OC.

D is the midpoint of AC.

Prove that M, X and D lie on the same straight line.

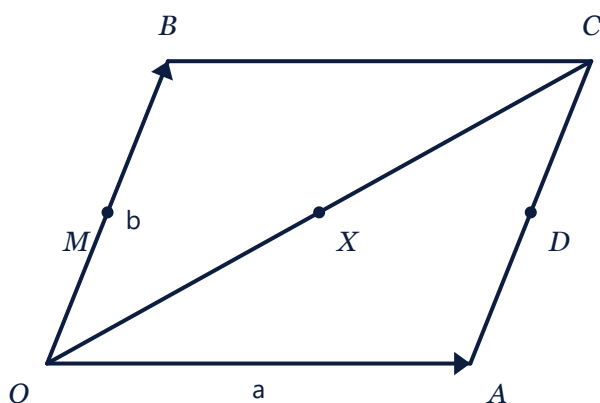


Diagram NOT accurately drawn

(5 marks)

Answer _____

7 The points A and B have position vectors

$\mathbf{OA} = 4\mathbf{a} + 3\mathbf{b}$ and $\mathbf{OB} = 8\mathbf{a} + 11\mathbf{b}$.

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

b. The point P lies on AB such that $\mathbf{AP} : \mathbf{PB} = 3 : 1$. Work out vector $\mathbf{OP}$ in terms of $\mathbf{a}$ and $\mathbf{b}$.

c. The point D has position vector $\mathbf{OD} = 14\mathbf{a} + 18\mathbf{b}$. Prove that O, P and D lie on the same straight line.

(5 marks)

Answer _____

8 The vectors **a** and **b** are non-parallel.

The points A, B and C have position vectors

$$OA = 2\mathbf{a} + 5\mathbf{b}$$

$$OB = 4\mathbf{a} + \lambda\mathbf{b}$$

$$OC = 8\mathbf{a} + 23\mathbf{b}$$

where λ is a number.

A, B and C lie on the same straight line.

Find the value of λ .

(5 marks)

Answer _____

9

OAB is a triangle.

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

M is the midpoint of AB.

N is the midpoint of OB.

P is the point on OM such that $OP : PM = 2 : 1$.

- Prove that A, P and N lie on the same straight line.
- Find $AP : PN$.

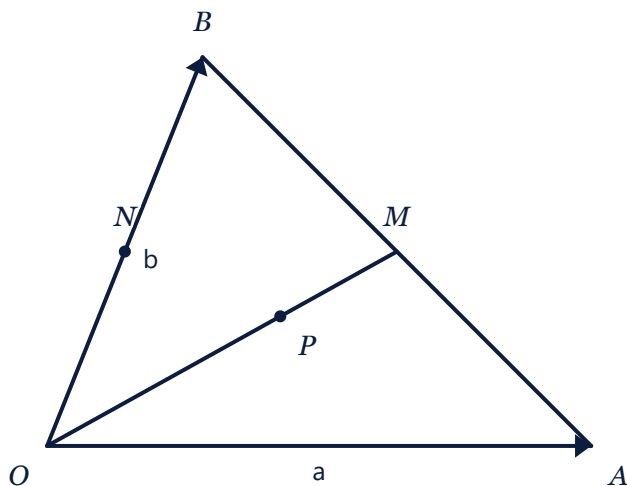


Diagram NOT accurately drawn

(5 marks)

Answer _____

10 OAB is a triangle.

Vector $OA = 3\mathbf{a}$ and vector $OB = 3\mathbf{b}$.

P is the point on AB such that $AP : PB = 1 : 2$.

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

b. Show that vector $OP = 2\mathbf{a} + \mathbf{b}$.

c. The point Q lies on OP produced, so that BQ is parallel to OA. Work out $OP : PQ$.

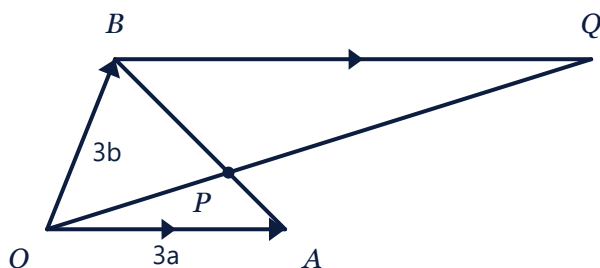


Diagram NOT accurately drawn

(6 marks)

Answer _____

11 OAB is a triangle. $OA = \mathbf{a}$ and $OB = \mathbf{b}$.

M is the midpoint of OA and N is the midpoint of OB.

Show that MN is parallel to AB.

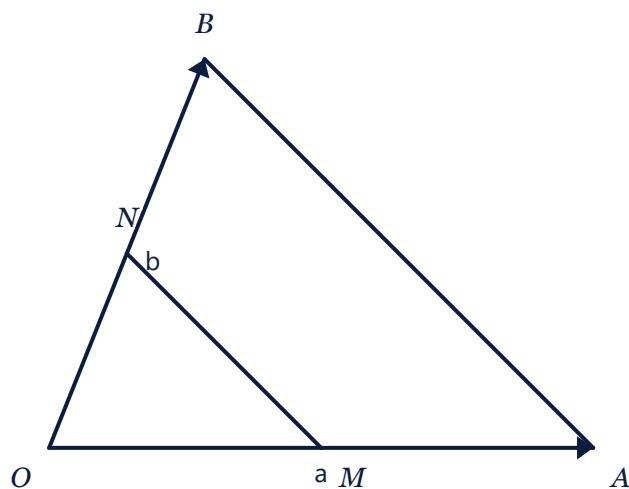


Diagram NOT accurately drawn

(3 marks)

Answer _____

12 OAB is a triangle. $OA = \mathbf{a}$ and $OB = \mathbf{b}$.

P is the point on AB such that $AP : PB = 2 : 1$.

Express OP in terms of $\mathbf{a}$ and $\mathbf{b}$. Give your answer in its simplest form.

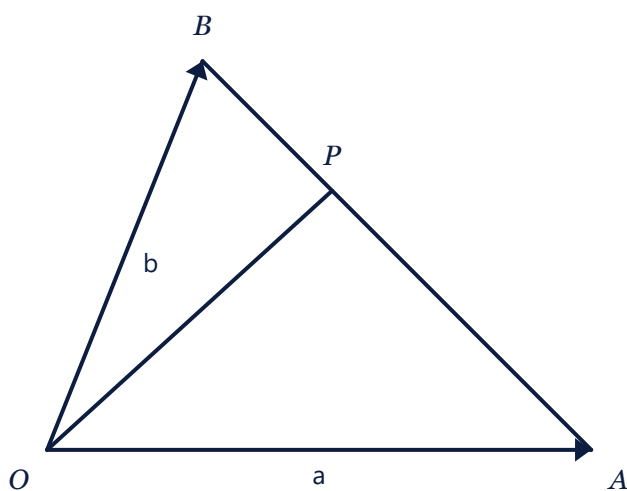


Diagram NOT accurately drawn

(4 marks)

Answer

13 OABC is a trapezium. $OA = \mathbf{a}$ and $OC = \mathbf{c}$.

CB is parallel to OA and $CB = 2\mathbf{a}$.

M is the midpoint of AB.

Find OM in terms of $\mathbf{a}$ and $\mathbf{c}$. Give your answer in its simplest form.

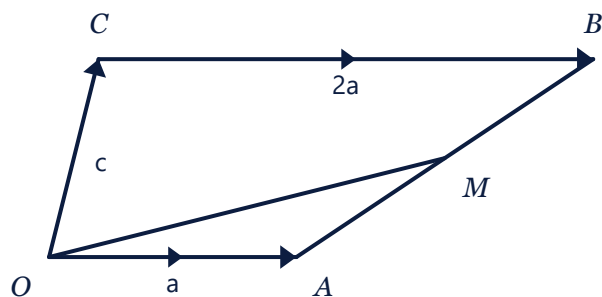


Diagram NOT accurately drawn

(4 marks)

Answer _____

End of questions | Total 58 marks