# Solving vector problems

128

Name:

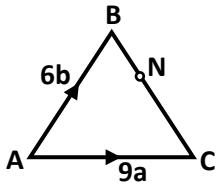
maths-school.co.uk

Find the following vectors in terms of **a** and **b**

a) ABC is a triangle.

$\overrightarrow{BN} = \frac{1}{2}\overrightarrow{NC}$

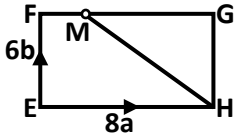
Express $\overrightarrow{AN}$ in terms of **a** and **b**




b) EFGH is a rectangle.

$\overrightarrow{FM} : \overrightarrow{MG} = 1:3.$

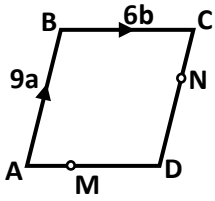
Express $\overrightarrow{MH}$ in terms of **a** and **b**




c) ABCD is a parallelogram.

$2\overrightarrow{AM} = \overrightarrow{MD}$ and $2\overrightarrow{CN} = \overrightarrow{ND}$

Express $\overrightarrow{MN}$ in terms of **a** and **b**

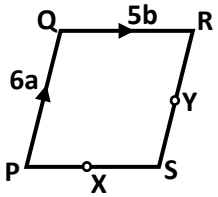



d) PQRS is a parallelogram.

$\overrightarrow{PX} : \overrightarrow{XS} = 2:3.$

Y is the midpoint of $\overrightarrow{RS}$

Express $\overrightarrow{YX}$ in terms of **a** and **b**



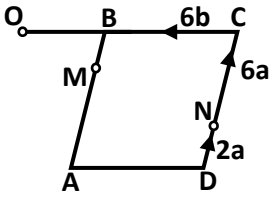

e) ABCD is a parallelogram. $\overrightarrow{DN} =$ **2a** and $\overrightarrow{NC} =$ **6a**

$M$ is the point on AB such that $\overrightarrow{AM} = 3\overrightarrow{MB}$

OC is a straight line and $\overrightarrow{OB} = \frac{1}{2}\overrightarrow{BC}$

i) Write an expression for $\overrightarrow{MO}$ in terms of $\boldsymbol{a}$ and $\boldsymbol{b}$

ii) Determine if OMN is a straight line.



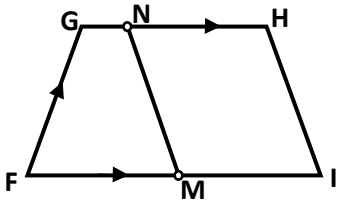

f) FGHI is an isosceles trapezium.

$\overrightarrow{FG} =$ **2b** , $\overrightarrow{FI} =$ **6a,** $\overrightarrow{GH} =$ **4a,** $\overrightarrow{GN} : \overrightarrow{NH} = 1:3$

M is the midpoint of $FI$

i) Write an expression for $\overrightarrow{HI}$ in terms of $\boldsymbol{a}$ and $\boldsymbol{b}$

ii) Prove that NM is parallel to HI.




**Exam question:**

ABCD is a parallelogram. $\overrightarrow{AB} = \boldsymbol{2a}$ and $\overrightarrow{BC} = \boldsymbol{4b}$

U is the midpoint of AD and T is the midpoint of DC.

a) Write an expression for $\overrightarrow{UT}$ in terms of $\boldsymbol{a}$ and $\boldsymbol{b}$

b) Prove that UT is Parallel to AC.