# AS#25 VECTOR PROBLEMS

AEM questions are taken from past exam papers - they have been carefully chosen to represent a typical exam question at each level of difficulty. If you can do these questions, you're ready to move onto past papers for this topic.

APPRENTICE

In a triangle QPR, $\overrightarrow{PQ} = 4\mathbf{i} + \mathbf{j}$, $\overrightarrow{PR} = 6\mathbf{i} - 8\mathbf{j}$.

a. Find $\overrightarrow{QR}$

b. Find the size of $\angle QPR$, in degrees, to one decimal place.

c. Find the area of triangle PQR.
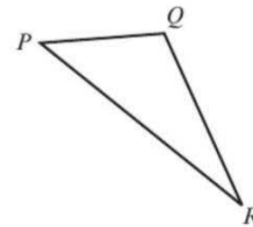
EXPERT

A is the point $(-30, \ 10)$ and B is the point $(45, \ 80)$

Find the position vector of the point C which splits AB in the ratio $3 : 7$

MASTER

O, A, B and C are four points such that $\overrightarrow{OA} = 10\mathbf{a}$, $\overrightarrow{OB} = 5\mathbf{b}$ and $\overrightarrow{OC} = 4\mathbf{a} + 3\mathbf{b}$.

Prove that A, B and C are collinear*

*Collinear means they all lie in a straight line. The standard way to prove this is to show that $\overrightarrow{AB}$ is parallel to $\overrightarrow{AC}$ or $\overrightarrow{AB}$ is parallel to $\overrightarrow{BC}$