Solving Geometric Problems





Test your understanding



Area of a triangle example

If $\vec{AB}=3i-2j$ and $\vec{AC}=i-5j$. Determine $∠BAC$.

Extension

*[STEP 2010 Q7]*

Relative to a fixed origin $O$, the points $A$ and $B$ have position vectors $a$ and $b$, respectively. (The points $O, A$ and $B$ are not collinear.) The point $C$ has position vector $c$ given by

$$c=αa+βb,$$

where $α$ and $β$ are positive constants with $α+β<1$. The lines $OA$ and $BC$ meet at the point $P$ with position vector $p$ and the lines $OB$ and $AC$ meet at the point $Q$ with position vector $q$. Show that

$$p=\frac{αa}{1-β}$$

and write down $q$ in terms of $α, β$ and $b$.

Show further that the point $R$ with position vector $r$ given by

$$r=\frac{αa+βb}{α+β},$$

lies on the lines $OC$ and $AB$.

The lines $OB$ and $PR$ intersect at the point $S$. Prove that $\frac{OQ}{BQ}=\frac{OS}{BS}$.

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