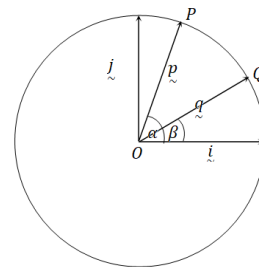




**TG 5** Use vectors and the diagram of the unit circle to derive the formula for the expansion of  $\cos(\alpha - \beta)$  where  $0 \leq \beta \leq \alpha \leq \frac{\pi}{2}$ .



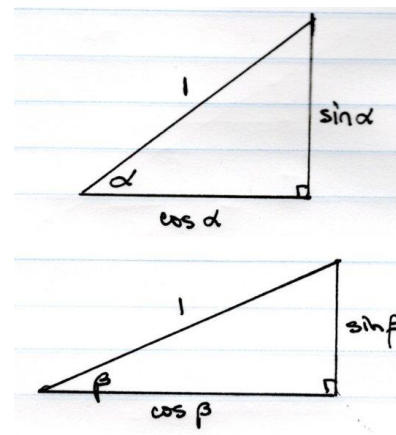
Let  $\vec{p} = \cos \alpha \vec{i} + \sin \alpha \vec{j}$  and

$\vec{q} = \cos \beta \vec{i} + \sin \beta \vec{j}$

$$\text{Now, } \cos(\alpha - \beta) = \frac{\vec{p} \cdot \vec{q}}{|\vec{p}| |\vec{q}|}$$

$$= \vec{p} \cdot \vec{q}, \text{ as } |\vec{p}| = 1 \text{ and } |\vec{q}| = 1.$$

$$= \cos \alpha \times \cos \beta + \sin \alpha \times \sin \beta$$



\* These solutions have been provided by [projectmaths](http://projectmaths.com.au) and are not supplied or endorsed by NESA.

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