HL

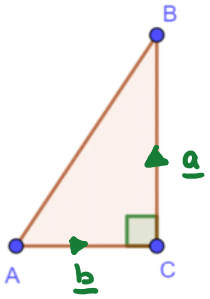
ACB is a right-angled triangle

$\overrightarrow{CB} = \mathbf{a}$ $\overrightarrow{AC} = \mathbf{b}$

a) Write $\overrightarrow{AB}$ in terms of ***a*** and ***b***

b) Find $\mathbf{a} \cdot \mathbf{b}$

c) Show that $|\mathbf{a}+\mathbf{b}|^2 = |\mathbf{a}|^2 + |\mathbf{b}|^2$ and hence prove Pythagoras' Theorem.



a) $\overrightarrow{AB} = \overrightarrow{AC} + \overrightarrow{CB}$

$= \underline{b} + \underline{a}$

b) $\overrightarrow{AC}$ and $\overrightarrow{CB}$ are perpendicular, hence $\underline{a} \cdot \underline{b} = 0$

c) $|\underline{a}+\underline{b}|^2 = (\underline{a}+\underline{b}) \cdot (\underline{a}+\underline{b})$

$= \underline{a} \cdot \underline{a} + \underline{a} \cdot \underline{b} + \underline{b} \cdot \underline{a} + \underline{b} \cdot \underline{b}$

$= \underline{a} \cdot \underline{a} + 0 + 0 + \underline{b} \cdot \underline{b}$

$= |\underline{a}|^2 + |\underline{b}|^2$