1) $\overline{B'B} = \overline{CB} - \overline{CB'}$ ✓

$\overline{CB'} = \overline{CB} \cdot \frac{\overline{CP}}{|\overline{CP}|}$ ← Scalar!

Vector

$\overline{B'B} = \overline{CB} - \frac{\overline{CB} \cdot \overline{CP}}{|\overline{CP}|}$?

2) $\overline{CP} \cdot \overline{B'B} = \overline{CP} \cdot \overline{CB} - \frac{\overline{CB} \cdot \overline{CP} \cdot \overline{CP}}{|\overline{CP}|}$?

$= 0.$

$\frac{\overline{CP}}{|\overline{CP}|}$ - normalised vector that just shows the direction