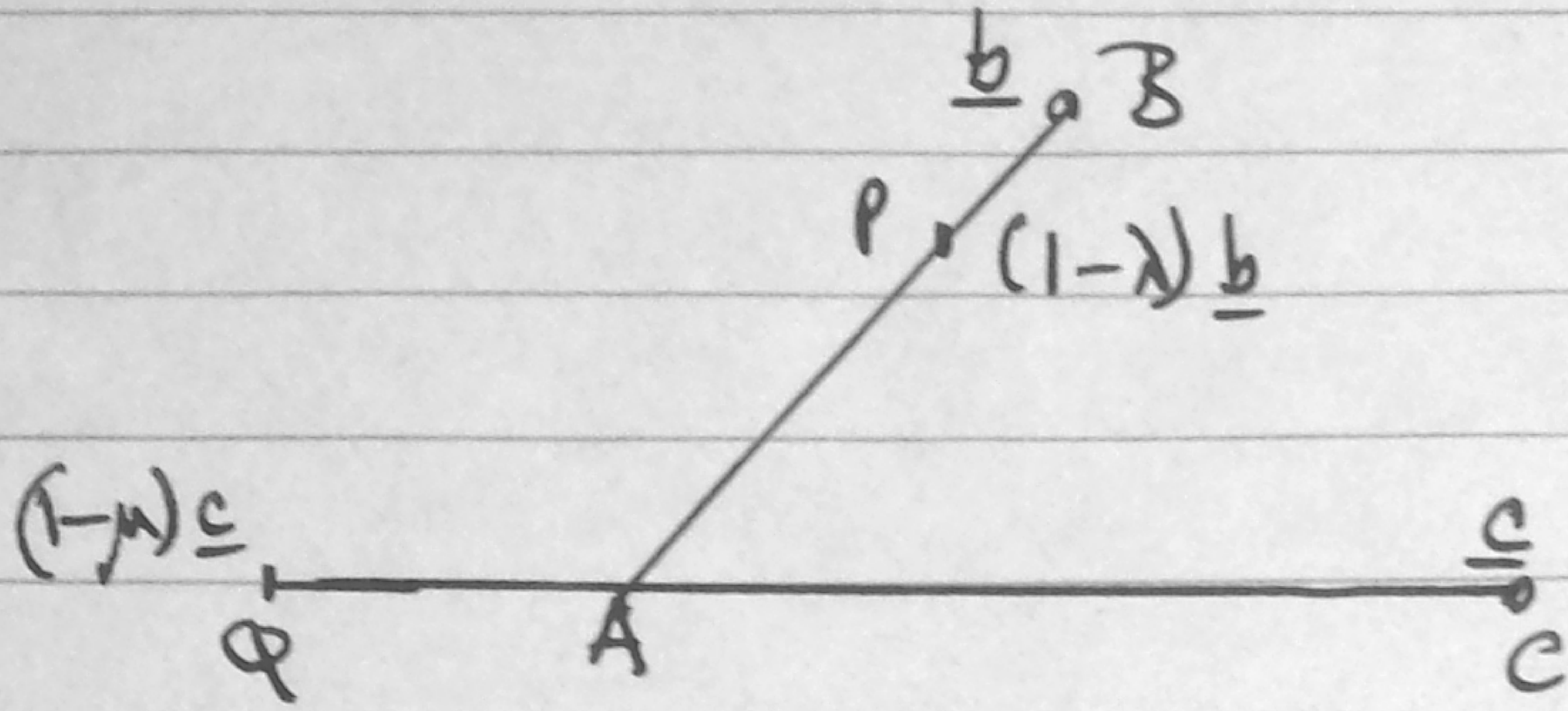
2/2009/8 Put $\underline{a} = 0$ without loss of generality



$\bullet\ D = \underline{b} + \underline{c}$

$CQ = \mu c$ and $BP = \lambda b$, so

$CQ . BP = AB . AC \Rightarrow \mu = \frac{1}{\lambda}$

The line PQ is points $\underline{x}$ given by

$$\underline{x} = \rho(1-\lambda)\underline{b} + (1-\rho)(1-\mu)\underline{c} \quad \text{as } \rho \text{ varies}$$

Put $\rho = 1/(1-\lambda)$ and

$$x = \underline{b} + \frac{-\lambda}{1-\lambda}\left(1 - \frac{1}{\lambda}\right)\underline{c} = \underline{b} + \underline{c}$$

so $\underline{b} + \underline{c}$ is on PQ

ABDC is a parallelogram since $\overrightarrow{BD} = \overrightarrow{AC}$ and $\overrightarrow{CD} = \overrightarrow{AB}$