Let $(X_n)_{n\in\mathbb{N}}$ and $(Y_n)_{n\in\mathbb{N}}$ be two sequence of random variables that converges in distribution to X and Y respectively. Moreover, let X and Y as well as X_n and Y_n for each $n \in \mathbb{N}$ independent. Show that $X_n + Y_n$ converges in distribution to $X + Y$.