1. Let $\mathbb{F}$ be an arbitrary field and let $S = \text{Mat}_{m \times m}(\mathbb{F})$, $R = \text{Mat}_{n \times n}(\mathbb{R})$ be algebras of $m \times m$ (respectively, $n \times n$) matrices. Let $A = \text{Mat}_{m \times n}(\mathbb{F})$ be the space of $m \times n$ matrices considered as an $(S, R)$–bimodule.
   (a) Prove that $A \otimes_R \mathbb{F}^n \cong \mathbb{F}^m$ (as an $S$-module).
   (b) Compute $A \otimes_R B$, where $B = \text{Mat}_{n \times k}(\mathbb{F})$.


