MAT 534: HOMEWORK 10

DUE TH, NOV 13

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

2. Dummit and Foote, pp. 375 - 377, exercise 5.

3. Dummit and Foote, pp. 375 - 377, exercise 9.

4. Dummit and Foote, pp. 375 - 377, exercise 16.

5. Dummit and Foote, pp. 375 - 377, exercise 24.

6. Dummit and Foote, pp. 375 - 377, exercise 27.