Last name: *First name:*

Recommended problems - *Please do NOT turn these in*:

- §8.4: 3, 5a, 11, 21.
- §8.5: 1, 3, 11, 13, 19, 21.

Submitted problems: *Please turn these problems in*:

(1) Let $\mathbf{A} = \begin{bmatrix} 0 & 2 & 1 & 0 \\ 1 & 1 & 4 & 3 \\ 1 & -1 & 0 & 2 \end{bmatrix}$ be the standard matrix representation for linear transformation $T : \mathbb{R}^4 \to \mathbb{R}^3$. Let $B = \{(0,1,1,1),\ (2,1,-1,-1),\ (1,0,-1,2),\ (-1,0,0,2)\}$ be a basis for $\mathbb{R}^4$ and $B' = \{(0,1,1),\ (-1,1,2),\ (1,0,1)\}$ be a basis for $\mathbb{R}^3$.
Given that $\mathbf{x} = (1,0,1,0)$.
  (a) Compute $T(\mathbf{x})$ and find the coordinate of $T(\mathbf{x})$ with respect to basis B'; i.e., find $[T(\mathbf{x})]_{B'}$
  (b) Find the matrix for T with respected to bases B and B'.
  (c) Use the matrix in part (b) to compute $[T(\mathbf{x})]_{B'}$. Compare your answer to (a).

(2) Problem 12 in §8.4 on page 423.

(3) Let $\mathbf{A} = \begin{bmatrix} -2 & 1 & -1 \\ 1 & -2 & -1 \\ -1 & -1 & -2 \end{bmatrix}$ be the standard matrix representation for linear transformation $T : \mathbb{R}^3 \to \mathbb{R}^3$.
  (a) Find a basis B for $\mathbb{R}^3$ relative to which the matrix for T is diagonal.
  (b) Given that $\mathbf{x} = (1,2,0)$. Use the matrix in part (a) to compute $[T(\mathbf{x})]_B$.