

**UH - Math 4377 - Dr. Heier - Spring 2010**  
**HW 6 – due 03/04 at the beginning of class**

1. Let  $T_1 : \mathbb{R}^2 \rightarrow \mathbb{R}^2$ ,  $T_1(a_1, a_2) = (a_1 + a_2, a_1 - a_2)$ . Let  $\beta = \{(1, 0), (0, 1)\}$  and  $\gamma = \{(1, 2), (1, 1)\}$ . Compute  $[T]_{\beta}^{\gamma}$ .

2. Let  $T_2 : \mathbb{R}^2 \rightarrow \mathbb{R}^2$ ,  $T_2(a_1, a_2) = (2a_1 + 4a_2, -a_1 - a_2)$ . Let  $\beta = \{(1, 2), (-1, 1)\}$  and  $\gamma = \{(2, 1), (2, 0)\}$ . Compute  $[T]_{\beta}^{\gamma}$ .

3. Section 2.2, Problem 10

4. Section 2.2, Problem 15

5. Section 2.3, Problem 1

6. Let  $T_1, T_2$  be as above. Let  $\alpha = \{(1, 1), (0, 1)\}$ ,  $\beta = \{(1, 2), (-1, 1)\}$ ,  $\gamma = \{(0, 1), (2, 1)\}$ . Verify explicitly that  $[T_2 \circ T_1]_{\alpha}^{\gamma} = [T_2]_{\beta}^{\gamma} [T_1]_{\alpha}^{\beta}$ . (This is of course assured by Theorem 2.11.)

7. Section 2.4, Problem 1

8. Section 2.4, Problem 7

9. Let  $A$  be the matrix

$$A = \begin{pmatrix} 1 & 3 & -1 \\ 2 & 5 & 1 \\ 3 & 4 & 13 \end{pmatrix}.$$

Find  $A^{-1}$ .

10. Section 2.5, Problem 2

11. (extra credit) Section 2.4, Problem 16