MMA210, Advanced Differential Analysis

Assignment 3 , turn in: Course-week 5

1. Let V and W be two vector spaces with bases $\mathcal{E} = \{e_1, \dots, e_d\}$ and $\mathcal{F} = \{f_1, \dots, f_l\}$. Let $\{e_1^*, \dots, e_d^*$, $\{f_1^*, \dots, f_l^*\}$ be the dual bases in the dual spaces V^*, W^*. Let $T : V \to W$ be a linear transformation, who's representation in the bases $\mathcal{E}$, $\mathcal{E}$ is given by the matrix A. Derive the formula for the action of the mapping T^* on the element $f_{i_1}^* \wedge \cdots \wedge f_{i_k}^*$ as a sum of elements $e_{j_1}^* \wedge \cdots \wedge e_{j_k}^*$.

2. Find a 2-form ω on $\mathbb{R}^{2d}$ so that $\omega^d = dx_1 \wedge \cdots \wedge dx_{2d}$.