1. Do problem 6–4 of Lee.

2. Do problem 12–3 of Lee.

3. A $k$–form $\eta$ on a vector space $V$ is called decomposable if it can be expressed as

$$\eta = \omega^1 \wedge \cdots \wedge \omega^k,$$

for 1–forms $\omega^1, \ldots, \omega^k$.

   a) Prove that every 2–form on $\mathbb{R}^2$ and every 2–form on $\mathbb{R}^3$ is decomposable.

   b) Prove that on $V = \mathbb{R}^4$, the 2–form $\eta = dx \wedge dy + dz \wedge dw$ is not decomposable.