1. Suppose $d\alpha = \beta$. Find $d(\alpha \wedge \beta)$.

2. Consider 2-dimensional Minkowski space, i.e. $\mathbb{R}^2$ with coordinates $(t, x)$, inner product

$$g(dt, dt) = -1 \quad g(dt, dx) = 0 \quad g(dx, dx) = 1$$

and orientation $\omega = dx \wedge dt$. Find the Laplacian $\Delta f = *d*df$ of a function $f$.

3. Calculate the curl $\nabla \times F = *dF$ of a vector field $F$ in (Euclidean) $\mathbb{R}^3$ using the orthonormal spherical basis $\{dr, r\sin \theta d\theta, r\sin \theta d\phi\}$. 