1. Let $M$ denote the torus of Callahan’s Problem 5(e) (p. 219):
   (a) Exhibit explicitly coordinate charts for $M$.
   (b) Choose two charts that intersect and write down explicitly the transition maps between these two charts as well as their inverses. (Do not need to do this for all charts, just two.)
   (c) Write down the differential of the transition maps and their inverses (just between the two charts of (b)).

2. Let $(M,g)$ be a Riemannian manifold. Denote by $dV_g$ the Riemannian volume form, defined as a section of $\Lambda^n T^*M$ with the property that $dV_g(E_1,\ldots,E_n) = \pm 1$ whenever $E_i \in T_pM$, $i = 1,\ldots,n$ is an orthonormal basis of $T_pM$ with respect to $g$ (i.e., $g(E_i,E_j)(p) = \delta_{ij}$). Show that with respect to local coordinates $x_1,\ldots,x_n$ valid near $p$,
   \[
dV_g(x) = \sqrt{\det[g_{ij}(x)]} dx^1 \wedge \cdots \wedge dx^n.
   \]