Homework 3 John Waczak MTH 434 Date: February 24, 2019

Dr. Tevian Dray

1. **SPHERICAL COORDINATES** Consider spherical coordinates in 3-dimensional Euclidean space with the usual orientation, namely $\omega = r^2 \sin \theta dr \wedge d\theta \wedge d\phi$.

(a) Determine the Hodge dual operator * on all forms (expressed in spherical coordinates) by computing its action on basis forms at each rank.