Math 443 **Differential Geometry** **Spring 2013**

Assignment #2

Due 4/19/13

Reading:

AT Sections 4.1, 4.2, 4.3.

Written Problems:

(1) [AT] Exercise 4.1.
(2) [AT] Exercise 4.6.
(3) [AT] Exercise 4.10.
(4) [AT] Exercise 4.14. (Assume the surface is connected.)
(5) [AT] Exercise 4.15.
(6) Suppose $S_1, S_2 \subseteq \mathbb{R}^3$ are regular surfaces and $F\colon \mathbb{R}^3 \to \mathbb{R}^3$ is a rigid motion such that $F(S_1) = S_2$. Prove that $F|_{S_1}$ is an isometry from S_1 to S_2.
(7) Let S be the torus of revolution defined in Example 3.1.19, and let $R \subseteq S$ be the subset where $y \geq 0$ and $z \geq z_0$. Prove that R is a regular region and compute its area.