Homework 2A

Qingyun Zeng
MATH 241-910 :Calculus IV

May 24, 2017

Problem 0. Reading: section 2.1-2.4 in Haberman.

Problem 1. Haberman 2.3.2 (a)(b)(c)(d)

Problem 2. Haberman 2.3.3 (a)(b)(c)

Problem 3. Haberman 2.3.8

Optional exercise: Below are exercise proposed in class and some additional problems. These are for your own benefit and may be helpful for your understanding of the material It is not required to turn them in. It is suggested that you at least read those problems.

Problem A. (Haberman 1.5.8) If the Laplace equation is satisfied in 3 dimensions, i.e. $\delta u = 0$, show that

$$\oiint_S \nabla u \cdot \hat{\mathbf{n}} \, dS = 0 \tag{1}$$

for any closed surfaces. Give a physical interpretation of this result (in the context of heat flow).

Problem B. [Superposition principle for nonhomogeneous problems] Haberman 2.2.4

Problem C. [Orthogonality of Sines] Haberman 2.3.5

Due: May 30 (Tuesday), 2017