HOMEWORK 8

(1) Let M be a surface in $\mathbb{R}^3$ and let n be a unit normal vector field defined on M. In other words, n has length 1 and it is everywhere perpendicular to the tangent spaces of M. Recall that dS is a 2-form defined on M by

$$dS(v, w) = \det(n, v, w).$$

This is denoted by $d\sigma$ is the book. Given a function $f : M \to \mathbb{R}$ defined on M. The surface integral of f over M is given by $\int_M f dS$. If a vector field $F : M \to \mathbb{R}^3$ is given instead, then the surface integral or flux of F over M is given by $\int_M \langle F, n \rangle \, dS$. Do the following problems from the textbook: Section 16.6: 14, 16, 18, 38, 40, 42; Section 16.8: 6, 14, 16.

(2) Do the following problems from the textbook: Section 16.8: 25, 26, 27.