MA 213 Worksheet #24

Sections 16.7
04/18/19

1 *16.7.4* Suppose that $f(x,y,z) = g\left(\sqrt{x^2+y^2+z^2}\right)$, where g is a function of one variable such that $g(2) = -5$. Evaluate $\iint_S f(x,y,z)\ dS$, where S is the sphere $x^2+y^2+z^2 = 4$.

2 *16.6.11* Evaluate the surface integral

$$\iint_S x\ dS,$$

where S is the triangular region with vertices $(1,0,0), (0,-2,0)$, and $(0,0,4)$.

3 *16.7.19* Evaluate the surface integral

$$\iint_S xz\ dS,$$

where S is the boundary of the region enclosed by the cylinder $y^2+z^2 = 9$ and the planes $x = 0$ and $x+y = 5$.

4 *16.7.31* Evaluate the surface integral $\iint_S \mathbf{F}\cdot\ d\mathbf{S}$ where $\mathbf{F}$ is the vector field

$$\mathbf{F}(x,y,z) = \langle x^2, y^2, z^2\rangle$$

and the oriented surface S is the boundary of the solid half-cylinder $0 \le z \le \sqrt{1-y^2},\ 0 \le x \le 2$. (In other words, find the flux of $\mathbf{F}$ across S.)

5 *16.7.45* Use Gauss's Law to find the charge contained in the solid hemisphere $x^2+y^2+z^2 \le a^2,\ z \ge 0$, if the electric field is

$$\mathbf{E}(x,y,z) = \langle x, y, 2z\rangle.$$