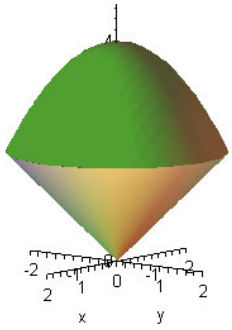
Mat 241 Homework Set 15 – Due _____

Professor David Schultz

Directions: **Show *all algebraic* steps neatly and concisely using *proper mathematical symbolism*. When graphs and technology are to be implemented, do so appropriately.**

Mechanics:

#1. Verify the divergence theorem for the field $\vec{F}(x,y,z)=\langle 0,0,z\rangle$ and the shown closed surface created by the intersection of $2z=8-x^2-y^2$ and $z=\sqrt{x^2+y^2}$. (Remember: $\iint_S \vec{F}\cdot d\vec{S}=\iiint_V div\vec{F}dV$)



#2. Let S be the closed surface obtained by the a portion of the sphere $x^2+y^2+z^2=4$ and a portion of the cone: $x^2+y^2=\frac{1}{3}z^2$. Verify the divergence theorem for the following two field vectors:

A. $\vec{F}(x,y,z)=\langle 0,0,z\rangle$

B. $\vec{F}(x,y,z)=\langle x,y,z\rangle$