Math 2551 Worksheet Section 16.5

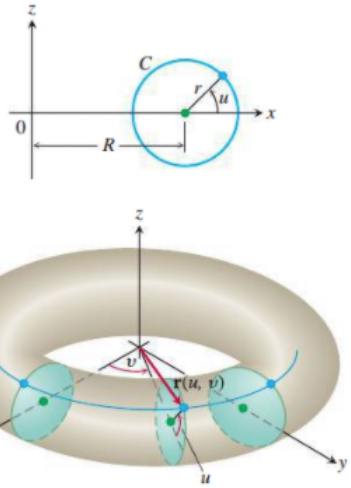
1. Consider the surface cut from the parabolic cylinder $z = 4 - y^2$ by the planes $x = 0$, $x = 2$, and $z = 0$. Sketch S, parametrize S, and set up the integral to find the surface area of S.

2. Consider the surface left in the $x^2 + y^2 + z^2 = 4,\ z \geq 0$ after cutting off the lower part between the planes $z = 0$ and $z = \sqrt{3}$ from the hemisphere. Sketch S, parametrize S, and find the surface area of S.

3. Let C be a circle of radius 1 with center $(2, 0, 0)$ in xz-plane. Let T be a surface obtained by rotating the circle C in xz-plane about the z-axis in space $\mathbb{R}^3$. Note that such T is called (hollow) torus.

   (a) Find a parametrizaiton of the torus T.

   Hint: Set parameters u and v as follows (Here, set $R = 2$ and $r = 1$)):



   (b) Find the surface area of the torus T.

4. Let S be a bounded surface obtained by cutting a paraboloid $x^2 + y^2 - z = 0$ by a plane $z = 4$. (i.e. S is a surface that the portion of the paraboloid $x^2 + y^2 - z = 0$ with $z \leq 4$.) Find (surface) area of S.