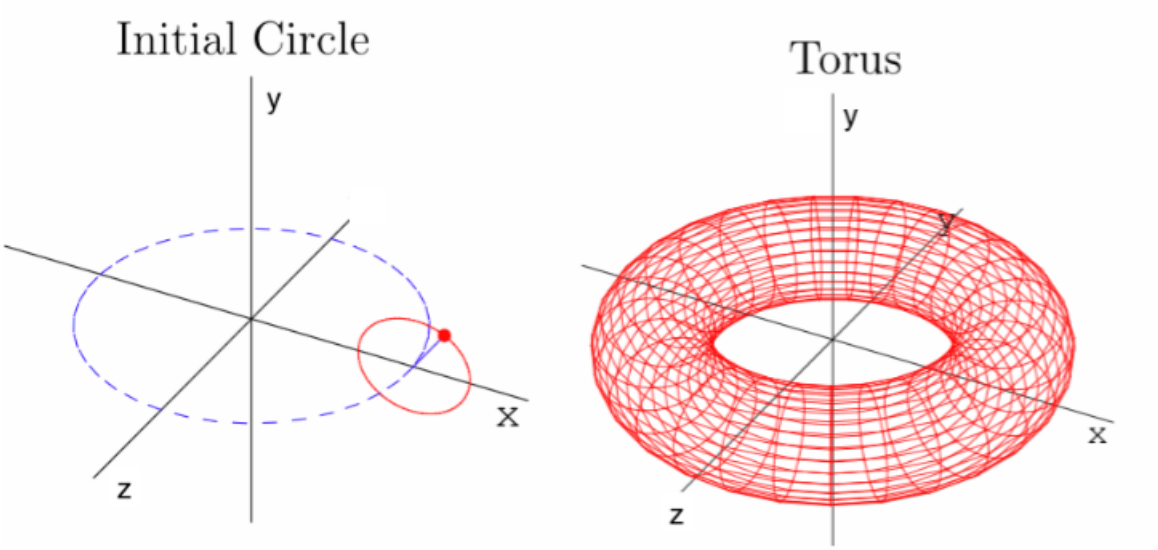
1. Evaluate $\int_0^a \sqrt{a^2 - x^2}\, dx$.

2. Assume $f(x)$ is an odd function, evaluate $\int_{-a}^{a} f(x)\, dx$. Be sure to explain your reasoning.

3. Two parameters, r and R, can describe a torus. The torus can be built by rotating a circle of radius r (on say the $x-y$-plane) around an axis (say y) where the center of the circle follows a path that is a second circle of radius R (on say the $x-z$-plane).



   (a) Using washers (parallel to the $x-z$-plane) compute the volume of the torus in terms of R and r. [Hint: use a new set of coordinates placing the origin at the center of the initial circle.]

   (b) Does your formula make sense from the geometry of a torus?

   (c) Revisit the volume using the "shell" method.