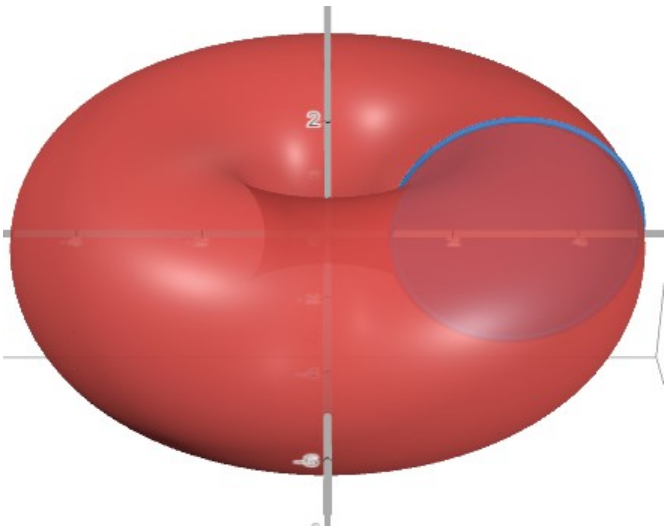
1. **Finish the Section 6.6 notes.** When the circle $(x-a)^2+y^2=r^2$ is revolved about the y-axis, the resulting surface is a torus or $0<r<a$. Show that the surface area of this torus is $S=4\pi^2 ar$.



2. **Scaling surface area.** Let f be a non-negative function with a continuous first derivative on $[a, b]$ and suppose $g(x) = cf(x)$ and $h(x) = f(cx)$ where $c > 0$. When the curve $y = f(x)$ on $[a, b]$ is revolved about the x-axis, the area of the resulting surface is A. Evaluate the following integrals in terms of A and c.

   (a) $\displaystyle\int_a^b 2\pi g(x)\sqrt{c^2 + g'(x)^2}dx$

   (b) $\displaystyle\int_{\frac{a}{c}}^{\frac{b}{c}} 2\pi h(x)\sqrt{c^2 + h'(x)^2}dx$

3. **Integration Practice.**

(a) $\displaystyle\int \frac{2x^2}{\sqrt{1-4x^3}}dx$

(b) $\displaystyle\int \sin x \sec^8 x dx$

(c) $\displaystyle\int \frac{3x+1}{4-x^2}dx$

(d) $\displaystyle\int \frac{dx}{1-x^{-1}}$

(e) $\displaystyle\int \frac{d\theta}{1+\cos\theta}$

(f) $\displaystyle\int \sin x \sin 2x \, dx$

(g) $\displaystyle\int_0^1 \frac{dp}{4-\sqrt{p}}$