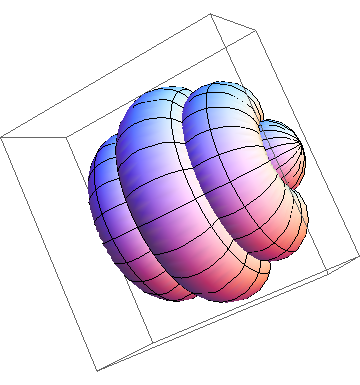
**Mathematica Lab I**



Solids of Revolution

*(Lab report due: 10 February 2016)*

Before beginning this lab, view the Mathematica tutorial [Hands-On Start](http://www.wolfram.com/broadcast/screencasts/handsonstart/) and carefully look at the *examples on our website*. Submit a printed version of your Mathematica notebook. You may work with other students and compare results, but ultimately you must submit *your own* lab results --- not a shared copy. On your front page (using Mathematica) state your name and “Mathematica Lab I” using an appropriate style, font, size and color. Make certain that your lab report is ***stapled***.

1. Plot the sphere of radius 7 centered at the origin and compute its volume.
2. Plot a right-circular cone with base radius 5 and height 13 and compute its volume.
3. Rotate one arch of the curve y = sin4 x about the x-axis and find its volume. Plot.
4. Suppose that the curve y = 1/x4 is rotated about the x-axis from 1 to *m*. What happens to the volume of such a solid as *m* grows without bound? Explain! Plot! (*Note:* In Mathematica, the *RevolutionPlot3D* command requires you to choose specific values for *m*.)
5. Consider the region R bounded above by one arch of the [cycloid](http://mathworld.wolfram.com/Cycloid.html): x(t) = 3(t – sin t), y(t) = 3(1 – cos t), 0 ≤ t ≤ 2, and below by the x-axis. Find the volume of the solid of revolution obtained by rotating R about the y-axis. (Express your answer to the nearest tenth.) Plot!
6. A lab glass container can be modeled by revolving the graph of



about the x-axis, where *x* and *y* are measured in centimeters. Plot the solid and compute its volume (to the nearest tenth). (*Note:* You will need to use the *Piecewise* command to define f(x).)

*"I could have done it in a much more complicated way," said the red Queen, immensely proud.*

                                       - Lewis Carroll



[Course Home Page](http://www.math.luc.edu/~ajs/courses/162spring2016/index.pdf)          [Department Home Page](http://www.math.luc.edu/)        [Loyola Home Page](http://www.luc.edu/)