

A web page which can help you with this assignment is linked to at the TA's webpage. You are encouraged to discuss this assignment with other students and with the instructors, but the work you hand in should be your own.

Also posted is individual data for each student. For this lab, the data is information about a region in the plane, and information about a region in space:

- The region in the plane is defined by its boundary curves. Both curves are of the form $y = f(x)$. One curve is a straight line, and one curve is the graph of a fourth degree polynomial. The area of the region is also given.
- The region in space is those points which are both inside a sphere centered at the origin, and above the graph of a circular paraboloid. The volume of this region is also given. A density function, a polynomial possibly involving x and y and z , is given.

Use **Maple** to help you answer the following questions.

Display the region in the plane graphically. Assume the region in the plane has constant density. Where is the center of gravity (centroid) of the region? Along the way, verify the value given for the area of the region.

Display the region in space graphically. Verify the value given for the volume of the region. Using the given mass density, find the total mass of the material filling the region.

This assignment is due **12/07/2008**.

Please hand in the following material:

0. All pages should be labeled with your name and section number. Also, please *staple* together all the pages you hand in.
1. A printout of all **Maple** instructions you have used. (Yes, you may and should “clean up” by removing the instructions that had errors.)
2. A clear picture of the region in the plane.
3. Computation of the area of the region (verifying the given information), and the total moments about each coordinate axis. Compute the center of gravity of the region. Label the total moments and the center of gravity.
4. A clear picture of the region in space.
5. Compute the volume of the region, including appropriate specification of the intersection points of the two surfaces defining the boundary.
6. Compute the total mass in the region using the given density distribution by computing a triple integral or integrals.