

Maple file name: Last name_ Last name _Volume.mw

F1: Quick Help List

Ctrl F1: Help

F5: Toggle between Math and Text

Open and save a new Maple document

Use the basic “Starting with Maple” directions on the Directions and Reference Page

Maple Commands (reference only, the lab starts on the next page)

1. Download Maple_code.mw from your class web page to find needed Maple commands.
2. Using Maple to display a solid of revolution

From the menu bar, select

Tools>Tutors>Calculus-Single Variable>Volume of Revolution

- A large dialog box appears in which one can enter the functions bounding the region, the values for a and b , and the axis and direction of rotation (lower left part of the box).
- Select whether to display the solid or slices ("disks") from the Riemann sum.
- Select whether to display the region to be rotated or not.
- After making adjustments, click *Display* to preview the picture.

Note the integral for the volume and its value (exact and decimal approximation) and the value of a Riemann sum (when in the "disks" display mode) are given. Also notice for integration with respect to y that you have set up, the Maple tutor may display a different integral, but the values of both integrals (your integral and Maple's integral) should be the same.

When you click Close, the current image is displayed in your document. You may reorient it by dragging.

Maple Volumes of Revolution Lab Activities

For each of the given regions, do the following

1. (By hand; type using Math in Maple) Determine the region to be rotated about the given line and enter the function(s) into Maple.

Regions are defined in the box below

2. (For region 1 and region 2 = region 3) Use Maple to plot and shade the region. Define functions as needed.
(For region 4 and region 5) Use Maple to plot the region. Define functions as needed. If you wish to figure out how to shade these two regions, you may—but it is not required.
3. Say whether the solid of revolution uses the disc or washer method.
4. Say whether the solid uses x or y as the variable of integration.
5. Type out the area function, $A(x)$ or $A(y)$ to be used to determine the volume of revolution.
6. Set up the correct integral to determine the volume of revolution. Use Maple to carry out the integration. (use `evalf()` around the integral command or `evalf(%)` after the integral for a decimal value)
7. Use the Volume of Revolution tutor to display the volume of revolution for the given region and specific line of rotation. Include both the solid and the “region” in your display.

Region 1 (you will need the area under the curve commands)

Region bounded by $y = x^3$, $y = 0$, $1 \leq x \leq 2$, rotated about the x -axis.

Region 2 (you will need the area between curves commands)

Region bounded by $y = \sqrt{x}$ and $y = x^2$ rotated about the x -axis.

Region 3 (you will need the area between curves commands)

Region bounded by $y = \sqrt{x}$ and $y = x^2$ rotated about the y -axis.

Region 4 (you will need the implicit plot commands)

Region bounded by $y = \sqrt{x}$ and $x = 4$ rotated about the line $x = 4$.

Region 5 (you will need the implicit plot commands)

Region bounded by $y = \sqrt{x}$ and $x = 4$ rotated about the line $x = 5$.

**One copy/partner pair: Email your correctly named Maple worksheet to fleschb@wou.edu
Email subject line: Maple Volume**