

Calculus II – Technology Exercises

Create the following documents and email them to the instructor at james@richland.edu before the exam over that material. These projects may be worked in pairs. Submit one document per team with both names on it. You may not work with the same partner for these technology projects more than twice. You may work alone only once.

There are example solutions on the website. You must use different problems than the examples. When asked to create a problem, you should not use one from the textbook.

Chapter 5 – Transcendental Functions

There will be two files for this project. One will be an annotated Maxima file. The other will be a Winplot file.

1. Use Maxima to work problems 5.2.62, 5.4.92, 5.6.82, and 5.8.36
2. Use Winplot to graph $y = \log_b x$ and $y = b^x$ on the same graph. Let b be 2, e , and 3 (so there are 6 graphs in all). Also add a dashed line at $y = x$ to show the axis of reflection.

Chapter 6 – Differential Equations

There will be two files for this project. One will be a Word document containing the Winplot graph and Excel table. The other will be a labeled Maxima file.

1. Create two differential equation problems similar to 6.1.67-72 and then use Winplot to find the solutions. Copy and paste the graphs into Word.
2. Use Excel to create a table for problem 6.1.78. Copy and paste the table into the Word document.
3. Use Maxima to solve problem 6.2.74.

Chapter 8 – Techniques of Integration

The only file needed for this technology exercise is the annotated Maxima file.

1. Use Maxima to work problems 8.2.88, 8.3.80, 8.4.56
2. Use Maxima to find the partial fraction decomposition for problem 8.5.34. First work the steps manually and then use the **partfrac** command to check.

Chapter 9 – Infinite Series

The only file needed for this technology exercise is the annotated Maxima file.

1. Use Maxima to answer problems 9.7.34, 9.7.56, and 9.7.60.
2. Use Maxima to answer problems 9.10.48, 9.10.52, and 9.10.82

Chapter 10 – Analytic Geometry

There will be one file for this project, a Microsoft Word file. Use Winplot to create the graphs and then copy/paste them into Word. Use the equation editor to enter the equations. If you print this document out, you may use it on the chapter 10 test.

1. Explain the conic sections of ellipse, hyperbola, and parabola.
 - a. Organize your document by the type of conic section. Create headings for Ellipse, Hyperbola, and Parabola.
 - b. Use Winplot to make two graphs for each type of conic section and copy/paste them into Word. In Word, include the equation for your example. The two examples should have different axes (major axis, transverse axis, or axis of symmetry) – meaning that if your rectangular graph has a horizontal axis, then your polar example should have a vertical axis.
 - i. One example should be in rectangular form. Add points and labels to illustrate any vertices, foci, and the *main* axis.
 - ii. One example should be in polar form. Add points and labels to illustrate any vertices and foci. Add and label a line for the directrix.
 - c. Include the definitions of a , b , c , and/or p for each conic section. Give the Pythagorean relationship for the ellipses and hyperbolas. Give the equations of the standard forms for each conic in terms of a and b or p . Do this for both horizontal and vertical axes.
 - d. Give the eccentricity for each conic.
2. Summarize (you only need one of each type) of the different special polar graphs from page 737. Give the name of the graph and equation used to create the graph.

When you make your graphs, use actual numbers like $\frac{(x-2)^2}{9} + \frac{(y+1)^2}{25} = 1$, not

$\frac{(x-h)^2}{b^2} + \frac{(y-k)^2}{a^2} = 1$. The vertices and foci should be in the proper place for your equation.

You may want to pick your values carefully so that you end up with integer values.

Winplot Tips

- Use Equa / Point to add points.
- Use Equa / Line to add a line.
- To add labels, choose Btns / Text. The right button adds/edits text while the left button allows you to drag text around.
- Use View / View to change your viewing window so that the graph fills the window.