Math 291
Lab 10
Due Monday April 9, 2018

Instructions: Turn in your lab by emailing it to fagerstrom@mnstate.edu. You should email both your raw TEX (.tex) file and your compiled document (in .dvi, .ps, or .pdf form).

You will be graded on both your raw TEX code and the accuracy of your compiled document.

Name your file in the format of JaneDoeLab10.tex

Use a textwidth of 7.5 inches and a textheight of 9.5 inches. Set your top margin and oddside margin appropriately so that it fits nicely on the page when built.

Include the normal name block and load the "pst-func", "pst-3dplot", and "graphicx" packages to the preamble or your document. Use enumerate and itemize environments in your submission to automatically number the problems.

1. Create a sequence of graphs using the psplot functionality of LATEX. In each graph, plot $1/5x^5 - 12/5x^3 + 4x + 1$. Start with using a psset command to set the xunit to be 1 cm and the yunit to be 0.25cm. Remember to answer the questions as well as create the plots.

   (a) Create a pspicture environment with x-values ranging from -5 to 5 and y-values ranging from -10 to 30. Then plot, in this order, a psgrid using the options of gridlabels=0, griddots=0, subgriddiv=1, and gridcolor=pink, with the extent of the grid the same as your pspicture. Then plot psaxes with the options of Dy=5 and linecolor=purple, again with the extent of the axes being the same as the pspicture. Then start a clip using a polygon (with linestyle=none as an option) with the points of the polygon being the four points of the rectangle formed by your pspicture. Within the clip, plot the given function from x-values of -4 to 4, with a linecolor of blue. Then close your clip (and the pspicture).

   (b) Using the same lines of code as you used in part (1a) above (I suggest you cut-and-paste), rearrange them so that the clip is clipping all three of the other objects (the grid, the axes, and the function). Keep the three objects in their original order.

   - What do you notice happens that you would not want to happen in a graph submitted within a formal paper?

   (c) Using the same lines of code as you used in part (1a) above, rearrange them so that only the function is clipped and comes first, then the grid, then the axes.

   - What do you notice that happens that is different from part (1a)?

   (d) Finally, using the same lines of code as you used in part (1a) above, rearrange them so that only the function is clipped and comes first, then the axes, then the grid.

   - What do you notice that happens that is different from parts (1a) and (1c)?

   Note that it is for these reasons that you have to pay attention to the order in which objects are graphed!

2. Use another psset command to make the xunit and yunit equal, then make **your own** drawing using at least one of each of the following commands, along with color and arrow options: pscircle, psellipse, psparabola, and psline. Note: You may also include other options similar to these (like pstriangle, psframe, etc., if you so desire.

3. Make at least one 2D parametric plot and at least one 3D parametric plot (if you don't have any ideas, feel free to use your calculus book to generate some ideas).

4. Make at least one drawing of your own design using postscript 3D graphics commands.

5. Pick your favorite function (**other than** $y = \sqrt{x}$ or any scalar multiple of this function) and make a diagram that represents finding the volume of the related solid of revolution using the washer method (feel free to refer to your calculus textbook or calculus labs). You may need to do a little reading on your own about how the psVolume command expects you to input functions.