Due Date
The due date for this lab will be set by your lecturer or recitation instructor. Late submissions will not be accepted.

You are encouraged to discuss this assignment with other students and with the instructors, but the work you hand in should be your own.

Getting Help
For helpful background material, see the web page

> https://sites.math.rutgers.edu/courses/251/ComputationalLabs/Computing251.html

The goal of this assignment is to visualize the tangent plane to a surface and see how the way we compute these in Calculus 3 is related to what you have done previously in Calculus 1.

INSTRUCTIONS
For this assignment, the individualized data from your instructor will be a function $f(x, y)$, a function $g(x, y, z)$, a value $x = A$ and a pair of values $(x, y) = (B, C)$.

- **Use Maple, Matlab, or Mathematica to**

    - Sketch the curve that satisfies $f(x, y) = 0$.
    - Find the tangent 'planes' (they are really tangent lines) to the curve $f(x, y) = 0$ where the x-coordinate is A.
    - Sketch the surface that satisfies $g(x, y, z) = 0$.
    - Find the tangent planes to the surface $g(x, y, z) = 0$ where the x and y coordinates are B and C respectively.

- **Your code should consist of the following:**

    - A sketch of the curve(s) satisfying $f(x, y) = 0$.
    - Compute the points of the form (A, y) that are on the curve.
    - Find an equation of the tangent line to the curve $f(x, y) = 0$ at each point of the form (A, y).
    - Draw a plot of this curve $f(x, y) = 0$ along with the tangent lines.
    - Using the computer software, find an equation of the form $y = h(x)$ that represents this curve near the point with larger y coordinate, and use Calculus 1 techniques to find an equation of the tangent line at that point. **In words**, compare and contrast your two results.
    - Draw a sketch of the surface $g(x, y, z) = 0$.
    - Compute the points of the form (B, C, z) that are on this surface.
    - Find an equation of the tangent plane to the surface $g(x, y, z) = 0$ at each point of the form (B, C, z).
    - Draw a plot of this surface $g(x, y, z) = 0$ along with the tangent planes. It will likely be helpful to show one plot for each tangent plane.

- **Hand in a printout of your work. In this printout:**

    - Label all pages with your name and section number. Also, please *staple together* all the pages you hand in.
    - *Clean up your submission by removing the instructions that had errors.*