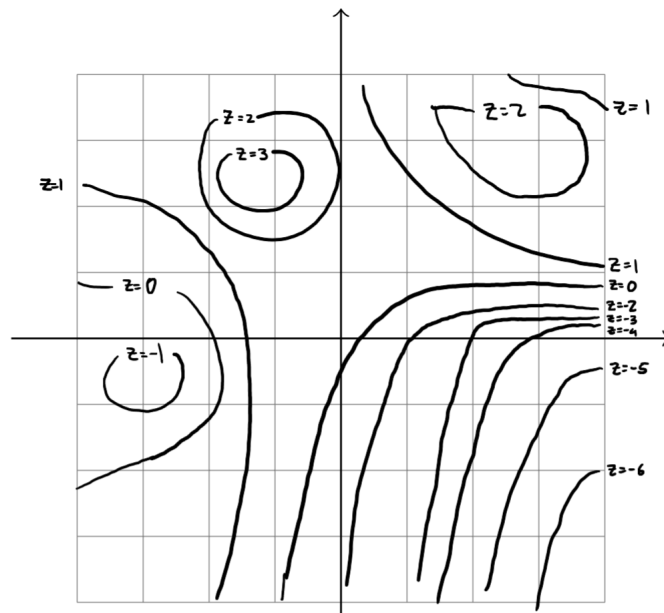


WORKSHEET, SEP 13

0.1. **Drawing Contour Plots.** Draw a contour plot with steps at $z = 0, z = -1$ and $z = -1$ of the function $f(x, y) = xy$. What is the general shape of the graph of $f(x, y)$?

0.2. **Interpreting Contour Plots.** Determine the following information from the drawn contour plot:

- Mark the locations of minimum, maximum and saddle points for the drawn contour plot.
- Where on this contour plot is the function going to be the “steepest”?
- Approximate the partial derivative $\frac{\partial f}{\partial x}$ at the point $(1, 0)$.



0.3. **Review: Planes.** Describe the graph of the function $f(x, y) = \sqrt{x^2 + y^2}$. Draw a picture of the graph. Using your geometric intuition, guess what the tangent plane to the graph looks like at the point $\langle 1, 0, 1 \rangle$. After you have used your drawing to guess what the tangent plane is, use partial derivatives to check your solution.

0.4. **Continuity.** Consider the function $f(x, y) = \frac{x+y}{\sqrt{x^2+y^2}}$. What does this function look like when restricted to the plane $x + y = 0$ and the plane $x - y = 0$? Why does this show that f fails to be continuous at the origin?