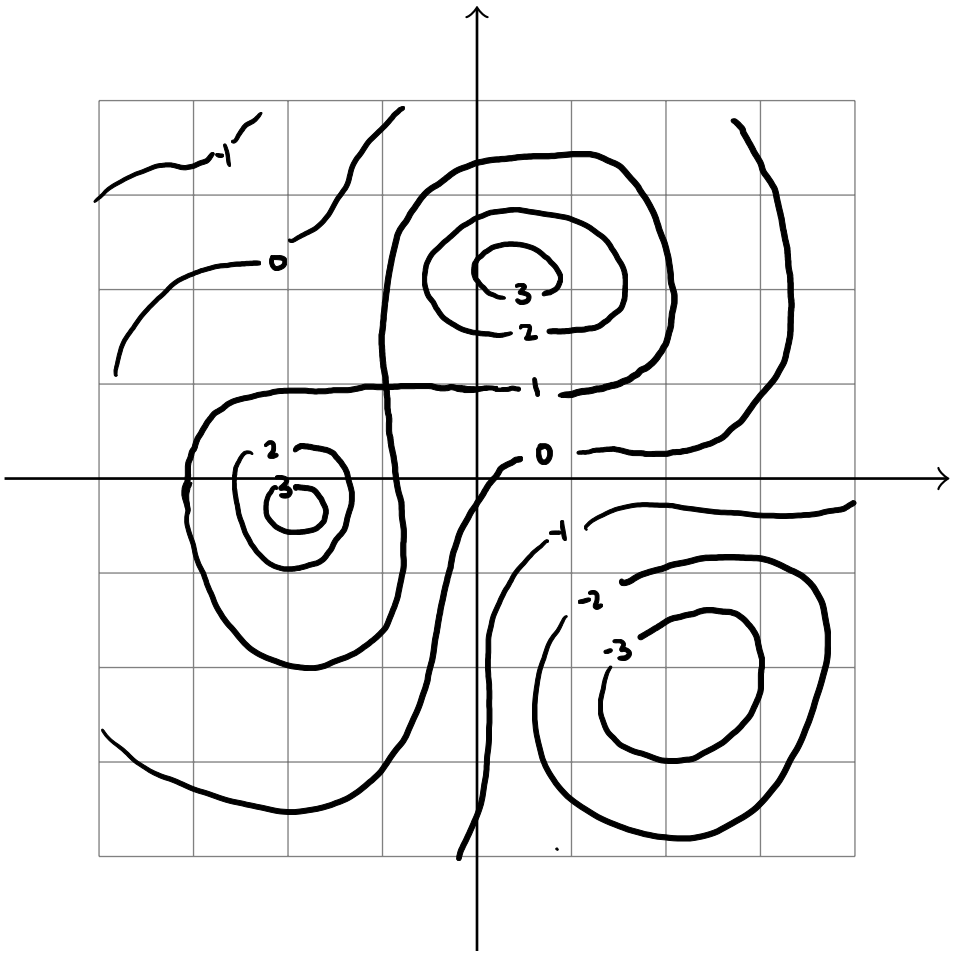
Quiz, Sep 18

Name:

Continuity (5pts). Show that the function $\frac{x+y}{\sqrt{x^2+y^2}}$ is not continuous at the origin. (One way to do this is to take limits along $x = y$ and $x = -y$.)

Tangent Plane (8 pts). Find the equation for the tangent plane to $f(x, y) = xy$ at the point $(1, 1, 1)$.

Contour Plots. Consider the function of 2 variables whose contour graph is drawn below.



- **4 Points:** Mark all local maximum, minima, or saddle points of f on the contour plot.
- **3 Points:** Write the equation of the tangent plane at the point $(-1, 1, 1)$.

Bonus Problem. *Worth no points!* Consider the piecewise defined function

$$f(x,y) = \begin{cases} 0 & \text{Whenever } x \neq y^2 \text{ or } x = y = 0 \\ 1 & \text{Whenever } x = y^2 \text{ and } x \neq y \neq 0. \end{cases}$$

Show that this function is continuous along every line approaching the origin. Also show that this funciton is not continuous.