

Name:

Score:

Math 1321 Week 7 Lab Worksheet Due Thursday 3/7

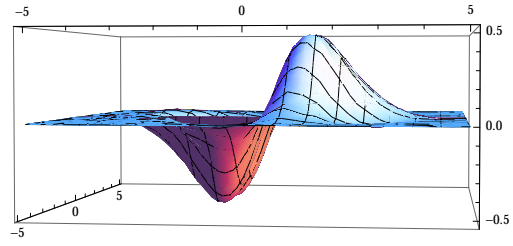
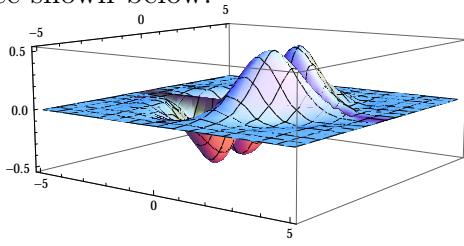
1. Suppose that $f(x, y) = \frac{x^2y}{x^4+y^2}$

(a) **(1 point)** Show that $f(x, y) \rightarrow 0$ as $(x, y) \rightarrow (0, 0)$ along any line $y = mx$.

(b) **(1 point)** Show that $f(x, y) \rightarrow \frac{1}{2}$ as $(x, y) \rightarrow (0, 0)$ along the parabola $y = x^2$.

(c) **(1 point)** What conclusions can you draw? Explain.

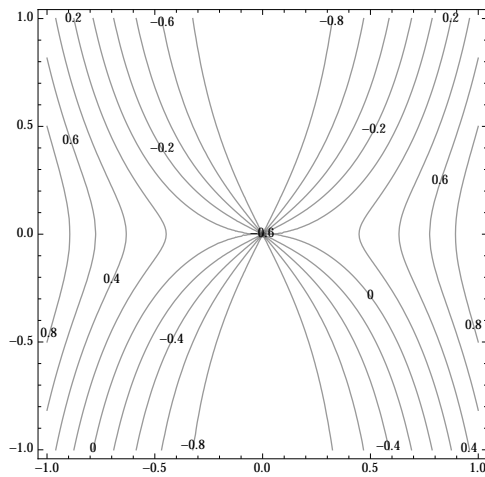
2. **Contour Plots(2 points)** Make a simple contour plot with labels to represent the surface shown below.



3. Polar Coordinates and Continuity

(a) (2 points) Suppose that $f(x, y) = \frac{x^2 - y^2}{x^2 + y^2}$, use polar coordinates to verify that f is not continuous at the origin.

(b) (2 points) Use the following plot of several contours of f to argue that f is not continuous at the origin.



4. **Wind-Chill** The wind-chill index W is the perceived temperature when the actual temperature is T and the wind speed is v so, we can write $W = f(T, v)$.

- (a) (**2 points**) The following table of values is an excerpt from Table 1 in Section 11.1. Use the table to find a linear approximation to the wind-chill index function when T is near $-15^\circ C$ and v is near $50 km/h$.

		Wind speed (km/h)						
		v	20	30	40	50	60	70
Actual temperature ($^\circ C$)	T							
	-10	-18	-20	-21	-22	-23	-23	
	-15	-24	-26	-27	-29	-30	-30	
	-20	-30	-33	-34	-35	-36	-37	
-25	-37	-39	-41	-42	-43	-44		

- (b) (**1 point**) Estimate the wind-chill index when the temperature is $-17^\circ C$ and the wind speed is $55 km/h$.