

MATH 261 EXAM 2, Spring 2004

Simplify all answers. Show your work!		Name:	Score	
1.	Let $g(x, y) = \sqrt{9 - x^2 - 9y^2}$. a) Find $g(1, 0)$. Ans: _____	b) Sketch the domain of g .	1	
			2	
			3	
			4	
			5	
			6	
			7	
2.	Let $f(x, y) = \sqrt{x^2 + y^2}$. a) Sketch the level curves for $k = 1, 2$. Ans: _____	b) Sketch the surface.	8	
			9	
			10	
			Tot	
3.	Show that $\lim_{(x,y) \rightarrow (0,0)} \frac{x^4 + x^2y}{3x^4 + y^2}$ does not exist.			
4.	Let $f(x, y) = e^{3y} \sin(x^2y)$. a) f_x . Ans: _____	b) f_y . Ans: _____		
5.	Let $u = \sin(x - at) + (1/9) \sin(3x - 3at)$ a) Find u_{xx} . Ans: _____	b) Show that u satisfies the wave equation. Ans: _____		
Extra space				

Part II.	Name:	
6.	Let $x \sin(3z) + yz^3 = 6$. Compute: a) dz . Ans:_____	b) z_x and z_y . Ans:_____
7.	Let $z = e^r \cos \theta$, $r = 2st$, and $\theta = s^2 - t^2$. <u>Use the chain rule</u> to compute: a) z_s at $(1, 1)$. Ans:_____ b) z_t at $(1, 1)$. Ans:_____	
8.	Given the be the surface $\mathcal{S} : x^2 + 4y^3z^2 = 4$ and the point $P(1, 1, 4)$, find: a) A normal to \mathcal{S} at P . Ans:_____	b) The equation of the tangent plane at P . Ans:_____
9.	Let $f(x, y, z) = x^3y^4 - 3xy^2$ and $P(1, -1)$. Find: a) The rate of change of f at P in the direction $\theta = \pi/3$ Ans:_____	b) The maximum rate of increase at P Ans:_____
10	Let $f(x, y) = x^3 + y^3 - 3xy + 12$ a) Find the critical points. Ans:_____	b) Classify the critical points. Ans:_____