

MATH 261 EXAM 2, Spring 2003

Simplify all answers. Show your work!		Name:	Score	
1.	Let $f(x, y) = \sqrt{x^2 + 9y^2 - 9}$. a) Find $f(4, 1)$. Ans: _____	b) Sketch the domain of f .	1	
			2	
			3	
			4	
			5	
			6	
			7	
2.	Let $f(x, y) = e^{\sin(x/y)}$. Find: a) f_x Ans: _____	b) f_y Ans: _____	8	
			9	
			10	
			Tot	
3.	Show that $\lim_{(x,y) \rightarrow (0,0)} \frac{3x^2y}{x^4 + 2y^2}$ does not exist.			
4.	Let $u = \ln(x + at)$ a) Find u_{tt} . Ans: _____	b) Show that u is a solution of the wave equation.		
5.	Let $xz^4 + \cos(y + z) = 1$. Use implicit differentiation to find: a) z_x Ans: _____	b) z_y Ans: _____		
Extra space				

6.	<p>Let $z = \tan^{-1}(3x - 5y)$, where $x = u^2v$, and $y = u \ln v$. Use the chain rule to compute:</p> <p>a) z_u</p> <p style="text-align: right;">Ans: _____.</p> <p>b) z_v</p> <p style="text-align: right;">Ans: _____.</p>	
7.	<p>Given the be the surface $\mathcal{S} : x^2 + 4y^2 + 9z^2 = 14$ and the point $P(1, 1, 1)$, find:</p> <p>a) A normal to \mathcal{S} at P</p> <p style="text-align: right;">Ans: _____.</p>	<p>b) The equation of the tangent plane at P</p> <p style="text-align: right;">Ans: _____.</p>
8.	<p>Let $f(x, y) = x^2/y^3$, $P(2, 1)$ and $\vec{v} = \langle 4, -2 \rangle$. Find:</p> <p>a) The rate of change of f at P in the direction \vec{v}</p> <p style="text-align: right;">Ans: _____.</p>	<p>b) The maximum rate of increase at P</p> <p style="text-align: right;">Ans: _____.</p>
9.	<p>Let $f(x, y) = x^3 - 6xy + 8y^3$</p> <p>a) Find the critical points.</p> <p style="text-align: right;">Ans: _____.</p>	<p>b) Classify the critical points.</p> <p style="text-align: right;">Ans: _____.</p>
10.	<p>Use Lagrange multipliers to find the minimum of $f(x, y, z) = x^2 + y^2 + z^2$ with constraint $3x + 2y + z = 6$.</p> <p style="text-align: right;">Ans: _____.</p>	
	<p>Extra space</p>	