

MATH 261 EXAM 2, Fall 2005

Simplify all answers. Show your work!		Name:	Score	
1.	Let $f(x, y, z) = \sqrt{4x^2 - y^2 - 16z^2}$ . a) Find $f(2, 2, -1)$ .     Ans: _____	b) Describe the level surfaces for $k = 0, 1$ .     $k = 0$ : _____ $k = 1$ : _____	1	
			2	
			3	
			4	
			5	
			6	
2.	Let $f(x, y) = \ln \sqrt{4x^2 + 9y^2}$ . Compute: a) $f_x$ .     Ans: _____	b) $f_y$ .     Ans: _____	7	
			8	
			9	
			10	
			Tot	
3.	Show that $\lim_{(x,y) \rightarrow (0,0)} \frac{2xy^2}{x^2 + 2y^4}$ does not exist. (Use proper syntax.)			
4.	Find the indicated partial derivatives a) $f(x, y) = \sin(2x - y)$ ; $f_x(1, 2)$     Ans: _____	b) $f(x, y) = e^{xy^2}$ ; $f_{yy}$ .     Ans: _____		
5.	Let $u = \sinh(x - at) + \cosh(x + at)$ a) Find $u_{xx}$ .     Ans: _____	b) Show that $u$ satisfies the wave equation.     Ans: _____		
Extra space				

Part II.	Name:	
6.	Let $y^3 + x^2z + \sin z^2 = 2$ . Compute: a) $dz$          Ans: _____	b) $z_x$ .          Ans: _____
7.	Let $z = x^2 \sec 5y$ , $x = re^{-2s}$ , and $y = s^2 \tan^{-1} r$ . Use the chain rule to compute: a) $z_r$ .          Ans: _____          b) $z_s$ .          Ans: _____	
8.	Given the be the surface $\mathcal{S} : f(x, y) = 4x^2 - y^2 + 3x - 2$ and the point $P(1, 1, 4)$ , find: a) A normal to $\mathcal{S}$ at $P$ .          Ans: _____	b) The equation of the line normal to $\mathcal{S}$ at $P$ .          Ans: _____
9.	Let $f(x, y, z) = x + 4y/z$ and $P(3, 2, -2)$ . Find: a) The slope of $f$ at $P$ in the direction $\mathbf{v} = 6\mathbf{i} - 2\mathbf{j} - 3\mathbf{k}$          Ans: _____	b) The maximum rate of increase at $P$          Ans: _____
10	Let $f(x, y) = 2x^2 - 3xy + y^2 - x + 8$ . a) Find the critical points.          Ans: _____	b) Classify the critical points.          Ans: _____