

MATH 261 EXAM 2, Fall 2007

Simplify all answers. Show your work!		Name:	Score	
1.	Let $f(x, y, z) = \ln(16 - 4x^2 + y^2 - z^2)$ . a) Find $f(1, 3, -1)$ .       Ans: _____	b) Find and sketch the domain of $f$ .	1	
			2	
			3	
			4	
			5	
			6	
			7	
2.	Let $f(x, y) = x^2 e^{y/x}$ . Compute: a) $f_x$ .       Ans: _____	b) $f_y$ .       Ans: _____	8	
			9	
			10	
			Tot	
3.	Show that $\lim_{(x,y) \rightarrow (0,0)} \frac{3xy^3}{x^2 + 2y^6}$ does not exist. (Use proper syntax.)			
4.	Let $f(x, y, z) = \cos(4x - 3y + 5z^2)$ . Find the indicated derivatives a) $f_{xxy}$       Ans: _____	b) $f_{yyz}$       Ans: _____		
5.	Let $u = e^{-\alpha^2 k^2 t} \cos kx$ a) Find $u_{xx}$ .       Ans: _____			
Extra space				

Part II.	Name:	
6.	Let $yz^2 = 2 \ln(4x - z)$ . Compute: a) $dz$          Ans: _____	b) $z_x$ .          Ans: _____
7.	Let $z = e^{xy} \tan y$ , $x = 3s + t$ , and $y = s\sqrt{t}$ . <u>Use the chain rule</u> to compute: a) $z_s$ .          Ans: _____          b) $z_t$ .          Ans: _____	
8.	Given the be the surface $\mathcal{S} : f(x, y) = \sqrt{20 - x^2 - 7y^2}$ and the point $P(2, 1)$ , find: a) A normal to $\mathcal{S}$ at $P$ .          Ans: _____	b) The equation of the tangent plane to $\mathcal{S}$ at $P$ .          Ans: _____
9.	Let $f(x, y) = \ln(x^2 + y^2)$ and $P(1, 2)$ . Find: a) The slope of $f$ at $P$ in the direction $\mathbf{v} = -5\mathbf{i} + 12\mathbf{j}$          Ans: _____	b) The maximum rate of increase at $P$          Ans: _____
10	Let $f(x, y) = x^3y + 12x^2 - 8y$ . a) Find the critical points.          Ans: _____	b) Classify the critical points.          Ans: _____