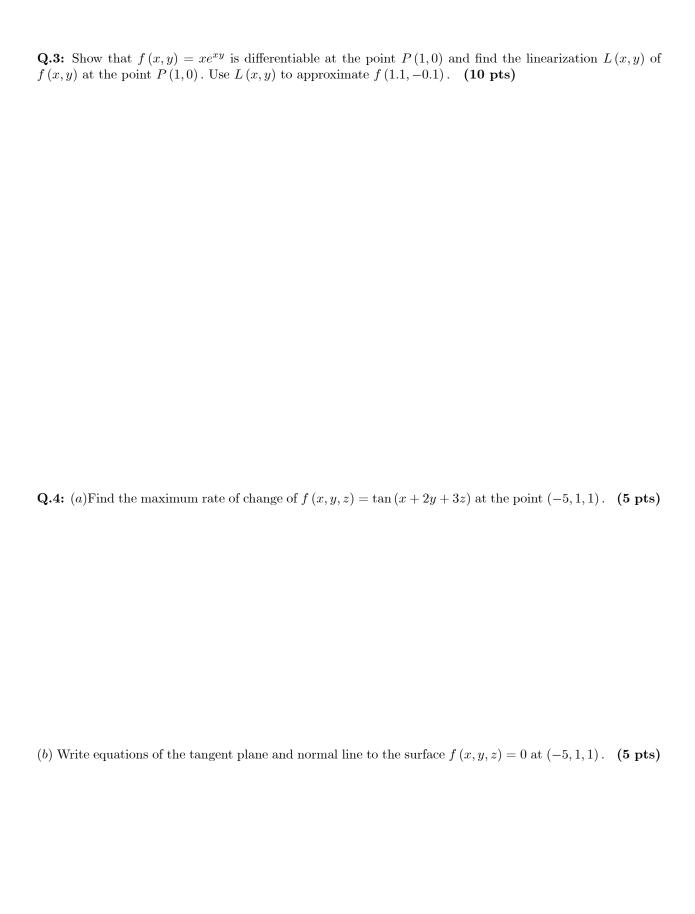
King Fahd University of Petroleum and Minerals Department of Mathematical Sciences

Final Exam for Math 201 (071)

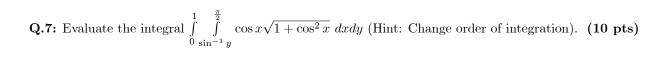
Date: January 22, 2008	Instructor: I	Instructor: Dr. Muhammad Yousuf		
Name:	ID #:	Sec #	04 06	
Time Allowed: 150 Minutes				
NOTE: Show complete and clear	work to get full credit.	Calculator is not a	allowed.	
Q.1: Write the equation $\rho^2 \left(\sin^2 \phi - 3\phi\right)$	$\cos^2 \phi$) = 1 in cartesian coord	linates. (10 pts)		

Q.2: Find symmetric equation of the line of intersection of the planes x + y - z = 2 and 3x - 4y + 5z = 6. Also find angle between these planes. (5+5 pts)



Q.5: Use Lagrange Multipliers to find the maximum and minimum values of the function f(x, y, z) = 8x + 6y + 2z subject to the constraint $x^2 + y^2 + z^2 = 26$. (10 pts)

Q.6: Find volume of the solid enclosed by the surface $z=e^y\sin x+e^x\cos y$ and the planes $x=0,\ x=\pi,\ y=0,\ y=\frac{\pi}{2},$ and z=0. (10 pts)



Q.8: Use double integrals in polar coordinates to find the area bounded by the circles $r = \sin \theta$ and $r = \cos \theta$. (12 pts)

Q.9: Find, if any, the local maximum, local maximum and saddle point(s) of the function $f(x,y) = 2x^4 + 2y^4 - 8xy + 12$. (12 pts)

Q:10: Use chain rule to find $\frac{\partial z}{\partial r}$, $\frac{\partial z}{\partial s}$ and $\frac{\partial z}{\partial t}$ if $z = w \sin^{-1}(uv)$, and u = r + s, v = s + t, w = t + r. (12 pts)

Q.11: Find volume of the region bounded by the surfaces $z = x^2 + y^2$ and $z = 2 - x^2 - y^2$. (12 pts)

Q.12: Evaluate $\iiint_E x^2 dV$, where E is the solid region bounded by the hemispheres $z = \sqrt{4 - x^2 - y^2}$ and $z = \sqrt{9 - x^2 - y^2}$ and the xy - plane. (12 pts)