Name _____ Oct 21,2005

Math. 2673 Exam 2

Answer the following:

1.) Compute the limit along any line and state any conclusion:

$\lim_{(x,y)->(0,0)} \frac{2xy}{x^2+y^2}$

Take home portion: make a 3D plot of this function $z = \frac{2xy}{x^2+y^2}$

2.) Find all CP's and classify them according to being local maximum/ minimum values and saddle points of the given function. $f(x,y) = -x^3 + 2xy - y^2 + 1$

make a 3D plot of this function to illustrate your answer

3.) If $z = \ln(x^2+y^2)$,find

$\frac{\partial z}{\partial u}$ and $\frac{\partial z}{\partial v}$ where $x = e^u \cos(v)$ and $y = e^u \sin(v)$.

Eliminate all u' and v's

4.) If $w = x^2 + y^2 + z^2$where $x = \cos(t)$, $y = \sin(t)$ and $z = t^2$, use the Chain Rule to find $\frac{dw}{dt}$.

Eliminate all x's y's and z's.

5.) For $z^2 = 4(x^2+y^2)$ and $P = (1,0,2)$.

a.) Find the equation of the tangent plane at P.

For the take home portion; plot together, the surface and the tangent plane .

6.)

a.) Find the directional derivative for $f(x,y) = 2x^2 + 3y^2 + z^2$ at the point $(2,1,3)$ in the direction $v = [1,0,-2]$

b.) In which direction does the max change occur?

c.) What is that Change?

7. Take home portion do p. 998 ex. 29 by hand or in maple.