Math 042  

Review for Midterm 1.

1. Find the $u_x(1,1)$, $u_y(1,1)$ if $x \sin(x,y) + y(u(x,y))^2 = x^2 - 1$ and $u(1,1) = 0$.

2. Plot level curves for the function $z = f(x,y) = 4x^2 - y^2$. Plot the level surfaces of the function $f(x,y,z) = x^2 + y^2 + 4z^2$.

3. If a kid blows a balloon at 2 in$^3$ per second. Find the rate of change of the volume if you assume the balloon always assume the shape of a ball.

4. Find the directional derivative of $f(x,y,z) = x^2 + 2xy + 4yz$ in the direction of $i + j + k$.

5. What is physical meaning of this derivative?

6. Compute: $(x^2 + xz)_x$ and $(x^2 + xx)_y$.

7. Find tangent, normal vector and curvature of the curve: $ti + tj + t^2k$.

8. A particle’s acceleration is according to $a(t) = ti - tj + t^2k$. Find all its possible vector-valued position function.

9. Find parameterizations of the curves $x^2 + 5y^2 = 8$.

10. Give a function so that it is continuous at $(0,0)$ by not differentiable. Give a function so that it isn’t continuous at $(0,0)$.

11. Find tangent line of the curve defined as $x + \sin(x + y - 2) = x - y + 2$, at the point $(0,2)$. 