1. Compute the partial derivatives f_x and f_y in the case that $f(x,y) = \arctan(x/y)$.

2. Compute the partial derivatives f_x and f_y in the case that $f(x,y) = x^2 \sin(xy)$.

3. Letting $f(x,y) = \log(x^2 + y^2)$, find the rate at which f is changing at the point $(1,2)$ in the direction of the vector $\mathbf{v} = \langle 2, 1 \rangle$.

4. Suppose that $z = e^x \cos y$, where $x = st$ and $y = \log(s^2 + t^2)$. Compute z_s and z_t.

5. Suppose that $f = f(u,v,w)$, where $u = x - y$, $v = y - z$ and $w = z - x$. Assuming that all partial derivatives exist, show that $f_x + f_y + f_z = 0$.

- You are going to work on these problems during your Friday tutorials.

- When writing up solutions, write legibly and coherently. Use words, not just symbols.

- Write both your name and your tutor's name on the first page of your homework.

- Your tutor's name is Thomas, if you are a TP student; otherwise, it is Christian.

- Your solutions may use any of the results stated in class (but nothing else).

- NO LATE HOMEWORK WILL BE ACCEPTED.