MATH 201 QUIZ 4

1. Compute $f_{yxy}(1,1)$ for function

$$f(x,y) = x^2y^3 + y\tan^{-1}\left(\frac{1}{\sqrt{x^2+1}}\right).$$

2. Approximate $f(0.01,-0.02)$ by the linear approximation of f at $(0,0)$, where

$$f(x,y) = (x-2y)e^{2x^2-y^2}.$$

3. Find $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$ at $(x,y,z) = (0,0,1)$ by the implicit differentiation method, where

$$\tan^{-1}\frac{x}{z} = \ln(y+z).$$

4. Let

$$f(x,y) = 2x^2y, \quad g(x,y) = x-y.$$

Find the real number k such that the 1-level curve of f intersects the k-level curve of g perpendicularly.