Problem statement a) Suppose $f(x, y) = x^y$. Rewrite f as a composition of standard functions, and then find the domain of f and the first partial derivatives of f in its domain. Surely $2^3 = 8$. If x is increased by .01 (so (x, y) changes from $(2, 3)$ to $(2.01, 3)$), approximate the change in f using linear approximation. If y is increased by .01 (so (x, y) changes from $(2, 3)$ to $(2, 3.01)$), approximate the change in f using linear approximation. Compare the "exact answers" to the linearization answers.

b) Suppose $g(x, y, z) = x^{(y^z)}$. Rewrite g as a composition of standard functions, and then find the domain of g and the first partial derivatives of g in its domain. Surely $2^{(3^4)} \approx 2.417 \cdot 10^{24}$ (it is *exactly* 24178 51639 22925 83494 12352.). If one of the variables in g is increased by .01, which variable will likely make the biggest change in the value of g? Support your assertion by an argument using linear approximation based on the derivatives which have been calculated. The exact values of g are not requested, but only a decision based on the linearized approximations to the perturbed function values.