Read directions carefully and show all your work. Partial credit will be assigned based upon the correctness, completeness, and clarity of your answers.

1. (5 pts) Use implicit differentiation to find $\frac{dy}{dx}$ when $xe^y + y^2 = x^4 - \arctan y$.

2. (5 pts) Use logarithmic differentiation to find $\frac{dy}{dx}$ when $y = x^{\ln x}$.