Problem 1. [10 points] Find and classify critical points of
\[ f(x, y) = x^4 - 4x - y^2 + 2y. \]

Problem 2. [10 points] Using the linear approximation for \( f(x, y) = xy \) at \((x_0, y_0) = (1, 1)\), find the approximate value of \(1.01 \cdot 1.02\).