Name: ____

Directions: Please show all your work leading to your answers. Having some correct work with an incorrect answer will earn you partial credit.

Consider the function $f(x, y) = 4x^2 + 10y^2$.

- 1. Classify the critical points of f and determine local maximum or local minimum values at the points, if applicable. (8 points)
- 2. Find the maximum and minimum values of f subject to the constraint $x^2 + y^2 = 4$. (10 points)
- 3. Use parts (1) and (2) to find the absolute maximum and minimum values of f on the set $D = \{(x, y) \mid x^2 + y^2 \leq 4\}$. (2 points)