Math 203 Spring 2019 Professor MG
Classwork 22 Name: _____

Show all work and circle/box your final answer. All answers must be simplified unless stated otherwise.

(1) Consider the function $f(x,y) = x^2 + 2y^2 + 2xy + 2x + 4y + 7$.

(a) Find the critical points of $f(x,y)$.

(b) Compute the number $D(x,y)$, and evaluate D at each critical point from part (a).

(c) Classify each critical point, using your answers to (a) and (b), as a maximum, minimum, saddle point, or that the test is inconclusive.

(2) Consider the function $g(x,y) = -x^2 - y^2 + 3x - 2y$.

(a) Find the critical points of $g(x,y)$.

(b) Compute the number $D(x,y)$, and evaluate D at each critical point from part (a).

(c) Classify each critical point, using your answers to (a) and (b), as a maximum, minimum, saddle point, or that the test is inconclusive.

(3) Let $f(x,y) = x^2 + 4x - y^2 - 2y + 2$

(a) Find the critical points for $f(x,y)$.

(b) Use the second derivative test to determine whether the critical points from part (a) are maxima, minima, or saddles.

(4) Suppose you have the function of two variables $f(x,y) = x^4 - 12x^2 - 4xy - y^2 + 16$.

(a) Find the first partial derivatives $\frac{\partial f}{\partial x}$ and $\frac{\partial f}{\partial y}$

(b) Find all three second partial derivatives $\frac{\partial^2 f}{\partial x^2}$, $\frac{\partial^2 f}{\partial y^2}$, and $\frac{\partial^2 f}{\partial x \partial y}$

(c) Find and classify all critical points of the function using the second derivative test for functions of two variables.