MATH 0120 Business Calculus. Worksheet 3.

University of Pittsburgh, 6W2-Summer 2019

Name:_____

Partial derivatives

1. Find the first partial derivatives of the function.

   (a) $f(x,y) = y^5x^4 - \dfrac{x}{y}$

   (b) $f(x,y) = \dfrac{x}{(4x+7y)^2} + \ln\left(1 + x^4y^3 + e^{x^2-y^2}\right)$

   (c) $f(x,y) = \dfrac{y}{1+x^2+y^2} + \sqrt{1+x^2+y^2}$

Maximum and minimum values

2. Find the local maximum and minimum values and saddle points of the function.

   (a) $f(x, y) = xy - 2x - 2y - x^2 - y^2$

   (b) $f(x, y) = y^3 + 3x^2y - 6x^2 - 6y^2 + 2$

(c) $f(x, y) = xe^{-2x^2-2y^2}$

Lagrange Multipliers

3. Use Lagrange multipliers to find the maximum and minimum values of the function subject to the given constraint.

   (a) $f(x, y) = 3x + y$ subject to $x^2 + y^2 = 10$.

(b) $f(x, y) = e^{xy}$ subject to $x^3 + y^3 = 16$.

(c) $f(x, y, z) = 2x + 2y + z$ subject to $x^2 + y^2 + z^2 = 9$.