

Problems for Lecture 6

1. Find all stationary points and classify them

a) $f(x,y) = e^{xy}$

b) $f(x,y) = e^{x-2y}$

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

d) $f(x,y) = x \ln x + y \ln y$

e) $\otimes f(x,y) = x \ln(y) - y \ln(x)$ ($\otimes$ Difficult.)

2. Solve the Lagrange problems

a) $\max_{\min} f(x,y) = 3x + 4y$ when $x^2 + y^2 = 25$

b) $\max f(x,y) = y$ when $x^2 + y^3 = 0$

c) $\min f(x,y) = 3x^2 + 4y^2$ when $xy = 1$