Department of Economics

Mathematics II. Final Exam June 2002.

Modelo 1

1 point



(a) Find the gradient of f at the point (a, a), with a > 0.

respectively and f(x, y) are the units produced.

- (b) Let $\alpha = 1/4$. Compute the first order Taylor polynomial, P(x, y), of f at the point (a, a), assuming a > 0. Compute P(a + 0'1, a + 0'2).
- (6) Consider the function $f(x, y) = 2ax^2 + by^2 + xy 2y 7x + 12$. **1 point**
 - (a) Assuming a and b are both different from 0, discuss when f is strictly concave, depending on the values of a and b.
 - (b) Discuss when f is strictly concave, depending on the values of a and b, assuming one of them is 0.
- (7) Consider the function f(x, y) = x³ + y² + 2axy. [1'5 points]
 (a) Compute the critical points of f assuming a ≠ 0.
 (b) Classify the critical points of f assuming a ≠ 0.
 (c) Find and classify the critical points of f when a = 0.
 (8) Consider the function f(x, y) = (x + 1)³ + y². [1 point]
 (a) Write the Lagrange equations that determine the extreme points of f on the set A = {(x, y) ∈ ℝ² : x² + y² = 1}.
 (b) Compute and classify the extreme points of f on the set A.

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