

**MATH 16C:
FAKE TEST 2A**

SPRING 2007

- (1) Consider the function

$$f(x, y) := \sqrt{36 - 9x^2 - 4y^2}.$$

- a) Sketch the domain of f .
- b) Sketch the level curves corresponding to $f(x, y) = 0$, $f(x, y) = \sqrt{11}$, and $f(x, y) = \sqrt{20}$ on the same graph.

- (2) Find all first order partial derivatives of

$$f(x, y, z) := \frac{\ln(x^3 - y^2 + z)}{xyz}.$$

- (3) Find and classify all critical points of

$$f(x, y) = x^2 + y^2 + x^2y + 4.$$

- (4) Find three positive numbers that satisfy the following: their sum is a fixed number S , and the sum of their squares is minimum.

- (5) Calculate the following integral

$$\int_0^1 \int_{\frac{x}{2}}^{1-\frac{x}{2}} (2 - x - 2y) \, dy \, dx.$$