

# MATHEMATICAL ANALYSIS 2

## Test 1, version B.

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1. Write the general and the directional forms of equation of the tangent plane to the graph  $z = f(x, y)$  of the function

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

at the point  $(x_0, y_0, z_0) = (0, 1, z_0)$ .

2. Find and classify the critical points of the function  $f(x, y) = x^3 + 3xy^2 - 6xy$ .

3. Find the maximal and minimal values of the function  $f(x, y) = xy^2$  under the constraint  $g(x, y) = x^2 + 2y^2 - 1 = 0$ . Indicate all the points where the maximal/minimal values are obtained.

4. \* In the previous problem, find the the maximal and minimal values of the function  $f(x, y)$  in the domain  $D = \{(x, y) : g(x, y) \leq 0\}$ .