Math 32A. Quiz 5a February 28, 2006

Name:

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Write your solution on the exam sheet. Show some work and justify your answer. Do not just give the correct answer. You have 15 minutes. Good luck!

1. Let

$$f(x, y) = \tan^{-1}(2x + 3y)$$

and let $(a, b) = (1, 0)$. Find the partial derivatives $f_x(1, 0)$ and $f_y(1, 0)$ and find the linearization $L(x, y)$ of f at $(1, 0)$.

Solution: In general $f_x = \frac{2}{1+(2x+3y)^2}$ and $f_y = \frac{3}{1+(2x+3y)^2}$. At $(1, 0)$ we have $f_x(1, 0) = \frac{2}{5}$ and $f_y(1, 0) = \frac{3}{5}$. The linearization is

$$L(x, y) = \tan^{-1}(1/2) + \frac{2}{5}(x - 1) + \frac{3}{5}(y).$$