

King Fahd University of Petroleum and Minerals  
Department of Mathematical Sciences  
**Math 201, Section: 8 (062)**  
**Quiz 3(a)**

**Time: 15 Minutes**

**Marks: \_\_\_\_\_/9**

Name: \_\_\_\_\_

ID #: \_\_\_\_\_

Serial #: \_\_\_\_\_

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1. Determine the set of points at which the function  $F(x, y) = \tan^{-1}(x + \sqrt{y})$  is continuous.

2. Let  $f(x, y) = \begin{cases} \frac{x^2y - xy^2}{x^2 + y^2} & (x, y) \neq (0, 0) \\ 0 & (x, y) = (0, 0). \end{cases}$  Find  $f_x(1, 1)$  and  $f_y(0, 0)$ .

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Quiz 3(b)

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1. Use polar coordinates to evaluate  $\lim_{(x,y) \rightarrow (0,0)} \left[ \frac{x^2 - y^2}{\sqrt{x^2 + y^2}} + \frac{\sinh(4x^2 + 4y^2)}{x^2 + y^2} \right]$ .

2. For  $f(r, s) = r \ln(r^2 + s^2)$ , find  $f_{rs}(r, s)$ .