

**King Fahd University of Petroleum and Minerals**  
**Department of Math & Stat**  
**Math 201 Section # 1, 9 (082)**  
**Quiz 3(a)**

Time: 20 minutes

Marks: \_\_\_\_\_/10

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Name: \_\_\_\_\_ Section #: \_\_\_\_\_

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

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1. Find the domain and range of  $f(x, y, z) = \sqrt{100 - x^2 - y^2 - z^2}$ .

2. Let  $f(x, y) = \frac{\sin^{-1}(xy - 2)}{\tan^{-1}(3xy - 6)}$ . Find  $\lim_{(x,y) \rightarrow (2,1)} f(x, y)$ . Is  $f(x, y)$  continuous at  $(2, 1)$ ?

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1. Find  $\lim_{(x,y) \rightarrow (0,0)} (x^2 + y^2) \ln(x^2 + y^2)$ .

2. Find all points at which the direction of fastest change in function  $f(x, y) = x^2 + y^2 - 2x - 4y$  is  $\vec{i} + \vec{j}$ .

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1. Find and sketch domain of  $f(x, y) = \frac{\sqrt{y - x^2}}{4 - x^2}$ .

2. Find  $\lim_{(x,y,z) \rightarrow (0,0,0)} \frac{xy + yz + zx}{x^2 + y^2 + z^2}$ , if it exists.

3. Find gradient of  $f(x, y) = 5xy^2 - 4x^3y$  at  $(1, 2)$ .

