

King Fahd University of Petroleum and Minerals
Department of Math & Stat
Math 201, Sections: 2, 5, 14 (071)
Quiz 2(a)

Time: 15 Minutes

Marks: _____/9

Name: _____

ID #: _____ Serial #: _____ Sec. #: _____

1. Define $f : \mathbb{R}^2 \rightarrow \mathbb{R}$ by $f(x, y) = \begin{cases} \frac{\sin(2x^2 + y^2)}{x^2 + y^2} & (x, y) \neq (0, 0), \\ 0 & (x, y) = (0, 0). \end{cases}$

(a) Find $\lim_{(x,y) \rightarrow (0,0)} f(x, y)$.

(b) Is $f(x, y)$ continuous at $(0, 0)$. Give reasons.

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Quiz 2(b)

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1. Find and sketch domain of the function $f(x, y) = \sqrt{y-x} \ln(y+x)$.

2. Calculate:
$$\lim_{(x,y) \rightarrow (0,0)} \frac{e^{-\frac{1}{\sqrt{x^2+y^2}}}}{\sqrt{x^2+y^2}}.$$

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Quiz 2(c)

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1. For $z = \tan^{-1} \left(\frac{2xy}{x^2 - y^2} \right)$, check whether or not $z_x(x, y) = \frac{-2y}{(x^2 + y^2)^2}$.

2. Determine the set of points at which $f(x, y, z) = \sqrt{x + y + z}$ is continuous.

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Quiz 2(d)

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1. Describe level surfaces of the function $w = f(x, y, z) = x^2 - y^2 + z^2$.

2. Calculate: $\lim_{(x,y) \rightarrow (2,1)} \frac{\sin^{-1}(xy - 2)}{\tan^{-1}(4xy - 8)}$.