

King Fahd University of Petroleum and Minerals
Department of Math & Stat
Math 201, Sections 1, 5, 8, 20 (081)
Quiz 2(a)

Time: 20 minutes

Marks: _____/9

Name: _____ Section #: _____

ID #: _____ Serial #: _____

1. Define $f(x, y) = \begin{cases} \frac{xy}{x^2 + y^2} & (x, y) \neq (0, 0) \\ 0 & (x, y) = (0, 0) \end{cases}$

Check whether or not f is continuous at $(0, 0)$.

2. Describe level surface of $f(x, y, z) = x^2 + y^2 - z^2$ for $k = -1, 0, 1$.

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Quiz 2(b)

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

2. Check whether or not $f(x, y) = \frac{4x^3y}{2x^4 + 3y^4}$ is continuous at $(0, 0)$.

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Quiz 2(c)

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

2. Use implicit differentiation to find $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$ for the equation
 $yx^2 + 3z^2 - \cos xy z = 310$.

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Quiz 2(d)

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1. Verify the conclusion of Clairaut's theorem ($z_{xy} = z_{yx}$) for $z = \frac{x}{x+y}$.

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