

King Fahd University of Petroleum and Minerals
Department of Mathematical Sciences
Math 201, Sections: 3, 6, 13 (061)
Quiz 4(a)

Time: 15 Minutes

Marks: _____/9

Name: _____ Section #: _____

ID #: _____ Serial #: _____

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

2. What is the degree of the homogeneous function $f(x, y) = \tan^{-1}(y/x)$.

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Quiz 4(b)

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1. Find a unit vector in whose direction $f(x, y, z) = 4e^{xy} \cos z$ decreases most rapidly at $P(1, 0, \pi/4)$. Also find the rate of change of f at P in that direction.

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Quiz 4(c)

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1. Find all points on the ellipsoid $2x^2 + 3^2y + 4z^2 = 9$ at which the tangent plane is parallel to the plane $x - 2y + 3z = 5$.

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Quiz 4(d)

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1. For $f(x, y, z) = x^3 + \sin yz$, find $\nabla f(1, 1, 1)$.

2. For $z = f(x - y, y - x)$, use chain rule to find $\frac{\partial z}{\partial x} + \frac{\partial z}{\partial y}$.

3. Find equation of the tangent plane of the surface $z = x^2y$ at $(2, 1, 4)$.