

King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics

Math 201 Section#: Serial #: Quiz IV(a) (Term 191)

Name : ID #..... Marks/6

1. Let $z = f(x, y) = \tan^{-1}(x + 2y)$:

(i) Find linearization $L(x, y)$ of $f(x, y)$ at $(1, 0)$

(ii) Find equation of tangent plane to the surface $z = f(x, y)$ at $(1, 0, 1)$.

(iii) Check whether or not $f_{xx} + f_{yy} = 0$ holds.

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Math 201 Section#: Serial #: Quiz IV(b) (Term 191)

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

(a) Check whether or not the function $f(x, y)$ is continuous at $(0, 0)$.

(b) Is $f(x, y)$ differential at $(0, 0)$? Give reason in support of your answer.

2. For $F(x, y) = x \cos y + \sin xy$, find $F_{xyx} \left(1, \frac{\pi}{2} \right)$.

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

2. Find equation of the tangent plane to the surface $\ln(xy - yz) = xz$ at the point $P(2, e^2, 1)$.

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1. For $f(x, y, z) = xy \sin^{-1}(yz)$, find $\frac{\partial f}{\partial z}|_{(1,0,1)}$

2. If (x, y) changes from $(2, -1)$ to $(1.96, -0.95)$ in the function $z = x^2 - xy + 3y^2$, then find $dz|_{(2,-1)}$