King Fahd University of Petroleum and Minerals

MATH 201 QUIZ #2 Term 131 *Dr. A. Khalfallah*

Name: ID:

Q1. Find (a) $\lim_{(x,y)\to(0,0)} \frac{\sin(x^2+y^2)}{x^2+y^2}$ (b) $\lim_{(x,y)\to(0,0)} \frac{x^4-y^2}{x^4+y^2}$

Q2 Find $\frac{\partial z}{\partial s}$ and $\frac{\partial z}{\partial t}$ if $z = e^r \cos\theta\,, \quad r = st, \quad \theta = \sqrt{s^2+t^2}$

Q3 Find $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$ if $x - z = \tan^{-1}(yz)$.

Q4 The derivative of $f(x, y, z)$ at a point P is greatest in the direction of $\mathbf{v} = \mathbf{i} + \mathbf{j} - \mathbf{k}$. In this direction, the value of the derivative is $2\sqrt{3}$.

(a) What is ∇f at P ?

(b) What is the derivative of f at P in the direction of $\mathbf{i} + \mathbf{j}$?

Q5 At what point on the parabloid $y = x^2 + z^2$ is the tangent plane parallel to the plane $x + 2y + 3z = 1$?