

Name \_\_\_\_\_

Section A, C, D 10

MA 104, Quiz #6

18 April, 2008

---

**Instructions:** The quiz is worth 15 points. You are allowed to use basic issued calculator for this quiz. Show all work for full credit. Good luck!

---

1. For the equation  $f(x, y, z) = ye^{3xz}$ ,

(a) Find the gradient of  $f$ .

(b) Evaluate the gradient at the point  $P(0, 5, 1)$ .

2. Find the rate of change of  $g$  and the point  $P(x_0, y_0, z_0)$  in the direction of the vector  $\vec{v} = \langle 2, 1, -1 \rangle$  given that  $\nabla g(x_0, y_0, z_0) = \langle 3, 1, 4 \rangle$ .

3. Find the maximum rate of change of the function  $f(x, y) = 5x^3 + 4y^2 - 3x^2y$  and the point  $P(1, -2)$  and the direction in which it occurs.