

MATH 251: Quiz 4

October 22, 2015

Name: _____ Sec: _____

1. Use linear (tangent plane) approximations to approximate the value of

$$((5.01)^2 + (9.98)^2)^{1/3}.$$

You need to pick a function f and do the linear approximation. Hint: $5^3 = 125$.

$$\text{Tangent Plane: } z = f(a, b) + f_x(a, b)(x - a) + f_y(a, b)(y - b)$$

2. Find and characterize all critical points of

$$f(x, y) = x^3 + 6xy + 3y^2$$

3. If $f(x, y) = 3x^2 + 4xy + 5y^2$ where x and y are written in terms of s and t as

$$x(s, t) = 3s + t \quad y(s, t) = 2s + 5t^2$$

compute $\frac{\partial f}{\partial s}$.