

Name: _____

MA 3330: Quiz 6

1. Let $f(x, y) = x^2 - xy^3$. Compute the tangent plane at $(2, -1)$. Use the plane to estimate $f(2.1, -0.9)$.
2. Let $f(x, y, z) = \cos(x^2 - y^2) + 3x + 5z$. Compute the tangent plane at $(1, -1, 1)$. Use the plane to estimate $f(1.1, -1.1, 1.2)$.
3. Let $f(x, y) = x^2 - y^2$.
 - (a) Graph the contour plot. Use $z = -1, 0, 1, 2, 3$.
 - (b) On the contour plot graph the points $A(2, 1)$ and $B(1, 1)$. Draw the gradients at each of these two points without computing.
 - (c) Compute the gradients at the points A and B .
 - (d) Compute the directional derivative at A in the direction of $\langle 1, 1 \rangle$. Interpret.
4. Use the Second derivative Test (page 441) to find the extrema for
 - (a) $f(x, y) = -x^3 + 4xy - 2y^2 + 1$
 - (b) $f(x, y) = x^3 + y^3 - 300x - 75y - 3$
5. Use LaGrange Multipliers to find the maximum or minimum for
 - (a) $f(x, y) = xy; 4x^2 + 8y^2 = 16$
 - (b) $f(x, y, z) = x^2 + y^2 + z^2, 3x - 4y + z = 1$