Name: _____

Take–home Quiz 2

1. Consider the function $f(x,y) = 3x^2y - 4xy^2 + (2x + 3y)^2$

   a) Find f_x

   b) Find $\frac{\partial^2 f}{\partial y^2}$

   c) Find ∇f

2. If $f(x,y) = 3x^2y^3 - 2xy$ and $x = \cos(t)$ and $y = \sin(t)$, then find $\frac{\partial f}{\partial t}$ for $t = 0$

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

   a) Find the directional derivative $D_v(f)$ at $P(1,1)$ in the direction $v =< 3,4 >$

   b) If you are standing a $P(1,1)$, in which direction would the function increase the most?

   c) What is the steepest increase of $f(x,y)$ at $P(1,1)$?

4. Find all local max, min, and saddle points, if any, for $f(x,y) = x^2 + 4y^2 + 8xy + 18x$