**Math 408D Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Quiz #3 2012 Discussion time\_\_\_\_\_\_\_\_\_\_**

**True/False (3 pts each)**

\_\_\_\_\_\_\_ 1, If g(x,y) = , then = 0.

\_\_\_\_\_\_\_ 2. If f(x,y) has a critical point at (a,b) and all its partial derivatives exist, then

(a,b) = 0.

\_\_\_\_\_\_\_ 3. If g(x,y) = xcos(y), then .

\_\_\_\_\_\_\_ 4. For a function f(x,y), if (a,b) is a critical point for which

 then f has a local maximum at (a,b).

\_\_\_\_\_\_\_ 5. If a level set for f(x, y) and a level set for g(x, y) are tangent at a point (a, b), then

 and  are parallel at (a, b).

\_\_\_\_\_\_\_ 6. The maximum value of the directional derivative of f at (a, b) is the length of the

vector .

\_\_\_\_\_\_\_ 7. A saddle point (a,b) for f(x,y) cannot be a local minimum.

\_\_\_\_\_\_\_ 8. 

\_\_\_\_\_\_\_ 9. If the vector **u** is perpendicular to , then .



\_\_\_\_\_\_\_ 10. If , then .



\_\_\_\_\_\_\_ 11. The level set f(x, y) = 4 and the level set f(x, y) = 6 cannot intersect.

\_\_\_\_\_\_\_ 12. The vector <4, 12, -16> is perpendicular to the surface at the



point (1, 1, 1).

\_\_\_\_\_\_\_ 13. If (a, b) is a critical point of f(x, y) such that and (a, b) = 0, then f



has a saddle point at (a.b).

\_\_\_\_\_\_\_ 14. If f(x, y, z) = then = 0.



\_\_\_\_\_\_\_ 15. If the gradient of f at a point P is , then f is decreasing in the direction



given by the vector **v** = .



16. (8 pts each) For the function  find the following. **Show your work**.





 where **u** = 

17. (20 pts) Locate and classify the critical points of f(x, y) = . **Show your work.**

17. (11 pts) Find  where R = { 0  x  2, and 1  y  6 - x}