

## QUIZ 4

(Math 200-Section A)

1. Find the directional derivative of  $f(x, y) = 2xy - 3y^2$  at  $P = (5, 5)$  in the direction of  $v = 4i + 3j$ . (4 pts)

2. Find the directions in which  $f(x, y) = x^2 - xy + y^2$ : (4 pts)

(a) increases most rapidly at  $P = (1, -1)$

(b) decreases most rapidly at  $P = (1, -1)$

(c) has zero change at  $P = (1, -1)$

3. Find the equations for the tangent plane and normal line for  $x^2 - xy - y^2 - z = 0$  at  $P = (1,1,-1)$ . (4 pts)
4. Find the equation for the tangent line for  $x^2 - y = 1$  at  $P = (\sqrt{2}, 1)$ . (4 pts)
5. Find the parametric equations of the line tangent to the curve of intersection of the surfaces  $xyz = 1$  and  $x^2 + 2y^2 + 3z^2 = 6$  at  $P = (1,1,1)$ . (4 pts)