

QUIZ 4

(Math 200-Section B)

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