

KFUPM.....Math & Stats DeptMath 301-03 (123) ... Quiz #1

ID:..... Name:.....

Exercise #1:

- (a) Find the unit tangent vector u to the graph of $y^2 + \sin x = 1$ at $(0, 1)$
- (b) Find the directional derivative of $f(x, y) = x^2y + 3y^2 \sin x$ at $(\frac{\pi}{2}, 1)$ in the direction of the vector $u = \langle 1, 2 \rangle$.
- (c) Find the direction of the minimum rate of change of $f(x, y)$ at $(\frac{\pi}{2}, 1)$.

Exercise #2: Find the length of the curve traced by $r(t) = (-\cos t)\mathbf{i} + t\mathbf{j} + (\sin t)\mathbf{k}$ when $0 \leq t \leq \pi$.