MAC 2313 Cal3 **Quiz 3** 11 Feb 2003 **Name:** _____

Show **ALL** work for credit; be neat. Calculators can be used for graphing and calculating only. Give exact answers when possible.

1. Find the directional derivative of $f(x, y) = xe^y$ as you leave the point $P(2, 3)$ heading in the direction of $Q(3, 2)$.

2. A. Convert the function $z = f(x, y)$ below into cylinderical coordinates (simplify).

$$z = f(x, y) = \frac{xy^3 - x^3y}{(x^2 + y^2)^2}$$

B. Show the limit below does not exit. [Hint: Look along the lines with $y = mx$.]

$$\lim_{(x,y)\to(0,0)} \frac{xy^3 - x^3y}{(x^2 + y^2)^2}$$