Quiz 4
Math 336, Winter '00

1. Let $f : \mathbf{R}^3 \to \mathbf{R}^2$ be given by
$$f(x, y, z) = (xy, yz).$$
Compute the Jacobian matrix for f and show using the definition of differentiability that this matrix is $Df_{\mathbf{a}}$ at the point $(x, y, z) = (1, 1, 1)$.

2. Following are two subsets of $\mathbf{R}^2$. Describe the interior and closure of each set.

   (1) $\{(x, y) \in \mathbf{R}^2 : 0 < |x| < 1, |y| \le 1\}$.
   (2) $\bigcup_{j=1}^{\infty} \{(x, 1/j) \in \mathbf{R}^2 : 0 \le x \le 1\}$.