1. Show that the limit \( \lim_{(x,y) \to (0,0)} \frac{x+y}{\sqrt{x^2+y^2}} \) does not exist.

2. Determine the equation of the tangent plane to the surface \( z = xe^{xy} \) at the point \((2,0, 2)\).

3. Find and classify all the critical points of \( f(x, y) = 2x^2 - y^3 - 2xy \).

   \text{Recall:} \\
   D(a,b) = f_{xx}(a,b)f_{yy}(a,b) - [f_{xy}(a,b)]^2 \\
   D > 0 \text{ and } f_{xx}(a,b) > 0 \Rightarrow f(a,b) \text{ is a local min} \\
   D > 0 \text{ and } f_{xx}(a,b) < 0 \Rightarrow f(a,b) \text{ is a local max} \\
   D < 0 \Rightarrow f(a,b) \text{ is not a local max or min}

4. Determine the maximum and minimum of \( f(x, y) = 5x - 3y \) subject to the constraint \( x^2 + y^2 = 136 \).

5. A contour map is shown for a function \( f \) on the square \( R = [0,3] \times [0,3] \). Use the Midpoint Rule with nine terms to estimate the value of \( \iint_R f(x, y)dA \).

6. Evaluate the iterated integral, \( \int_0^8 \int_{\sqrt[3]{y}}^2 \sqrt{x^4+1} \, dx \, dy \).