1. Compute the following limits if they exist:
   (a) \( \lim_{(x,y) \to (0,0)} \frac{\cos xy - 1}{x} \).
   (b) \( \lim_{(x,y) \to (0,0)} \frac{\sin 2x - 2x + y}{x^3 + y} \).

2. Find an equation for the tangent plane of the graph of
   \( f(x, y) = e^{xy} \ln(x^2 + y^2) \)
   at the point \((1, 0)\).

3. Sketch and describe the surface in \( \mathbb{R}^3 \) defined by the equation
   \( \frac{x}{4} = \frac{y^2}{4} + \frac{z^2}{9} \).

4. Suppose that a particle following the given path
   \( c(t) = (\sin c', t, 4 - t^3) \)
   flies off on a tangent at \( t = 1 \). Compute the position of the particle at time \( t = 2 \).