1) Let \( z = z(x, y) \) be defined implicitly by the equation
\[ \sin(xyz) = \ln(yz^3). \]
Compute \( \frac{\partial z}{\partial x} \). (Assume \( x \) and \( y \) are independent.)

2) Consider the surface given by \( z = y \cos x \). Find all points \((x, y, z)\) where the plane tangent to the surface is horizontal (i.e., is parallel to the \( x-y \) plane).

3) Let \( x = e^t \) and let \( y = e^{2t} \).
   a) Sketch the graph of this curve in the \( x-y \) plane. Draw an arrow on your curve in the direction of increasing \( t \).
   b) Let \( f(x, y) = \cos(3x - 2y) \). Given the definitions of \( x \) and \( y \) above, compute \( \frac{df}{dt} \) in two different ways:
      i) using the chain rule.
      ii) writing \( f \) as a function of \( t \) and then differentiating. Demonstrate that the answers to parts i) and ii) are equal.
   c) Let \( f \) represent temperature of a particle (measured in degrees) and let \( t \) represent time (measured in seconds). Suppose the particle travels along the curve in part a). When the particle reaches the point \((1, 1)\), is its temperature increasing or decreasing? At what rate? Explain.