1. A parametric curve is defined by the equation
   \[ x(t) = t \ln t, \quad y(t) = 4(t + \cos t) \]

   (a) Find \( \frac{dx}{dt} \) and \( \frac{dy}{dt} \)

   (b) Find the equation of the tangent line to the point corresponding to \( t = 1 \)

   (c) Find the points in the \((x, y)\) plane at which this curve has a horizontal tangent line

2. Find the solution of the differential equation
   \[ \frac{dy}{dx} = \frac{\ln x}{xy} \]

   satisfying the initial condition \( y(1) = 2 \).