1. (a) Find the symmetric equations of the line of intersection of the planes 
\[ x - 2y + z = 4 \quad \text{and} \quad 3x + y - 4z = 5 \]

(b) Find the distance between the first plane and the point (1,1,2).

2. Identify and sketch the following surface:
\[ x^2 - 2x - 4y^2 + 16y - 4z^2 - 8z = 35 \]

3. Consider the functions,
\[ f(x, y) = \arctan \left( \frac{x}{y} \right) \quad \text{and} \quad g(x, y) = \frac{xy - 1}{x^2 + y^2 - 4} \]

i. Determine the set of points at which \( fg \) is continuous, and draw a sketch.
ii. Determine the set of points at which \( f/g \) is continuous, and draw a sketch.

4. Consider the function,
\[ f(x, y, z) = 3 \exp(-y^2) \ln(x) - \frac{\sin(2z)}{xy} \]

i. Find all three first partial derivatives of \( f \).
ii. Evaluate \( f_y, f_{xy}, f_{yz} \) and \( f_{yy} \) at the point \((2,1,\frac{z}{4})\).