1) Sketch the region of integration, reverse the order of integration and evaluate
\[ \int_0^2 \int_0^{4-x^2} \frac{xe^{2y}}{4-y} \, dy \, dx \]

2) Evaluate by converting to polar coordinates and integrating
\[ \int_0^{\pi/2} \int_0^{\sqrt{1-y^2}} \frac{1}{1+x^2+y^2} \, dy \, dx \]

3) Find the coordinates of the center of mass of a thin triangular plate formed by the points (0,0), (0,1), (1,0) where the density within this area is given by \( \rho = x + y \)

4) Evaluate, using triple integration, the volume of the region in the first octant bounded by the coordinate planes \( (x=0, y=0, z=0) \) the plane \( y + z = 2 \) and the parabolic cylinder \( x = 4 - y^2 \)

5) Find the mass of the solid that has a density \( \rho = yz \) and is enclosed by the surfaces \( z = 1 - y^2 \) \( (y \geq 0) \), \( z = 0 \), \( y = 0 \), \( x = -1 \), \( x = 1 \)