1. Let

\[ I = \int_0^2 \int_{x/2}^1 xe^{y^3} \, dy \, dx \]

Sketch the region of integration, reverse the order of integration and evaluate \( I \).

2. Find the surface area \( S \) of the portion of the surface \( z = xy \) which lies inside the cylinder \( x^2 + y^2 = 9 \).

3. Compute by triple integration the volume \( V \) of the region \( D \) that is bounded by the parabolic cylinder \( x = y^2 \) and the planes \( z = 0 \), \( y = 0 \) and \( x + z = 1 \).

4. Find the mass of the solid lying between the spheres \( x^2 + y^2 + z^2 = 1 \) and \( x^2 + y^2 + z^2 = 4 \) if the density at each point is proportional to the reciprocal of the distance from the center of the spheres. (Call the constant of proportionality \( k \).)

5. Compute \( \int \int_R x \, dA \) where \( R \) is the region bounded by \( xy = 1 \), \( xy = 2 \), \( x(1 - y) = 1 \) and \( x(1 - y) = 3 \) by making the change of variables \( x = u + v \), \( y = v/(u + v) \).