1. Evaluate the double integral \( \int \int_R x^2 y(x - y) \, dx \, dy \), where \( R = [0, 2] \times [0, 1] \).

2. Evaluate the double integral of \( x^2 y(x - y) \) over each of the two triangles obtained by bisecting \( R \) from Problem (1) by the diagonal from \((0, 0)\) to \((2, 1)\).

3. Evaluate \( \int \int_D x^2 y^2 \, dx \, dy \), where \( D \) is the bounded region in the first quadrant lying between the hyperbolas \( xy = 1 \) and \( xy = 2 \) and the lines \( y = 2x \) and \( y = 4x \).

4. A pyramid is bounded by the three coordinate planes and the plane \( x + 2y + 4z = 7 \). Find its volume.

5. Using Green’s theorem, calculate the work done by the force \( F(x, y) = (x^2 - y^2)i + 2xyj \) in moving a particle in the counterclockwise direction around the square with corners \((0, 0)\), \((a, 0)\), \((a, a)\), \((0, a)\). (The work is the line integral of the force).

6. Use Green’s theorem to calculate the integrals \( \int_C y^2 \, dx + 2x \, dy \), where \( C \) is:
   (a) The square with vertices \((\pm1, \pm1)\).
   (b) The circle of radius 1 centered at the origin.
   (c) The positively oriented boundary of the annulus \( \{(x, y) : 1 < x^2 + y^2 < 4\} \).