1. Let \( C \) be the perimeter of the rectangle with sides \( x = 1, y = 2, x = 3, \) and \( y = 3 \) and \( D \) is the region bounded by the curve \( C \). Verify the Green’s theorem for the region \( D \), the boundary \( C = \partial D \) and the functions

\[
P(x, y) = 3x^2 + 5, \quad Q(x, y) = 3y^2 + 2y - 1
\]

2. Let \( C \) be the boundary of the rectangle with sides \( x = 1, y = 2, x = 3, \) and \( y = 3 \), i.e., the same curve as in the previous exercise. Evaluate

\[
\int_C \left( \frac{2y + \sin(x)}{1 + x^2} \right) \, dx + \left( \frac{x + e^y}{1 + y^2} \right) \, dy.
\]

3. Let \( F = (2y + e^x) \mathbf{i} + (x + \sin(y^2)) \mathbf{j} \) and \( C \) be the circle \( x^2 + y^2 = 1 \). Evaluate

\[
\int_C F \cdot \, ds.
\]

4. Use Green’s Theorem to find the area of a disk of radius 7.