HW 9

1. Prove Green's theorem for Type III domains.
2. Calculate the area of a right-circular cone by parametrising it.
3. Calculate the volume of a right-circular cone by triple integrals.
4. Let $y = f(x)$ be the graph of a C^1 function $f : [1, 2] \to \mathbb{R}$. Rotate the graph about the y-axis in space, and prove that the resulting object is a C^1 parametrised surface. Calculate its area. Such surfaces are called surfaces of revolution.
5. Calculate $\int\int_{[0,t]\times[1,t]} y^{-3} e^{tx/y} dxdy$.
6. Calculate $\int\int_S (x - y)^2 \sin^2(x + y) dxdy$ where S is a parallelogram with vertices $(\pi, 0), (2\pi, \pi), (\pi, 2\pi), (0, \pi)$.