

# **SRM Institute of Science and Technology, Tiruchirappalli Campus**

## **21MAB102T-Advanced Calculus and Complex Analysis**

### **Assignment-1**

**Write all the questions.**

1. Verify Gauss divergence theorem for  $\vec{F} = x^2\vec{i} + y^2\vec{j} + z^2\vec{k}$  taken over the rectangular parallopiped formed by  $0 \leq x \leq a, 0 \leq y \leq b, 0 \leq z \leq c$
2. Verify Green's theorem for  $\int_C (3x^2 - 8y^2)dx + (4y - 6xy)dy$  where C is the boundary of the region defined by the lines  $x = 0, y = 0$  and  $x + y = 1$ .
3. By changing the order of integration, evaluate  $\int_0^1 \int_y^{2-y} xy \, dx \, dy$ .
4. Find the Volume of the tetrahedron bounded by the plane  $\frac{x}{a} + \frac{y}{b} + \frac{z}{c} = 1$  and the coordinate planes.
5. Find the Laplace transform of  $f(t) = \begin{cases} t, & 0 < t < a \\ 2a - t, & a < t < 2a \end{cases}$  and  $f(t + 2a) = f(t)$ .