

- b) Using Green's theorem, evaluate for the scalar line integral of $\overrightarrow{F} = (x^2 y^2) \, \widehat{i} + 2xy \, \widehat{j}$ over the rectangular region bounded by the line x = 0, y = 0; x = a, y = b.
- 13. a) Evaluate using Gauss' divergence theorem $\iint_S \vec{F} \cdot \hat{n} ds$, where $\vec{F} = (x \hat{i} + y \hat{j} + z^2 \hat{k})$ and s is the closed surface bounded by the cone $x^2 + y^2 = z^2$ and the plane z = 1.
 - b) Evaluate by Stoke's theorem $\oint_C (\sin z dx \cos x dy + \sin y dz)$, where 'C' is the boundary of the rectangle, $0 \le x \le \pi$, $0 \le y \le 1$, z = 3.



Evaluate $\int_{0}^{\infty} e^{-x} \sin y dx + e^{-x} \cos y dy$, using Green's theoreth, where $\int_{0}^{\infty} e^{-x} dx$ the rectangle with vertices (0, 0), $(\pi, 0)$, (π, π) and $(0, \pi)$

a) Using Stoke's theorem evaluate $\int_{C} \vec{F} d\vec{r}$, where $\vec{F} = y^2 \hat{i} + x^2 \hat{j} - (x+z) \hat{k}$