

Exam for Graduation

[May 2017–Calculus]

1. Show that the vector field $\mathbf{F} = \frac{-y}{x^2+y^2}\mathbf{i} + \frac{x}{x^2+y^2}\mathbf{j}$ is *not conservative* in its natural domain.
2. Show that $\mathbf{curl} \circ \mathbf{grad} = 0$.
3. For what values of x do the following power series converges?

$$\sum_{n=1}^{\infty} (-1)^{n-1} \frac{x^n}{n}$$