

Exercise 10

If $\mathbf{f}(\mathbf{x})$ is continuous and $|\mathbf{f}(\mathbf{x})| \leq 1/(|\mathbf{x}|^3 + 1)$ for all \mathbf{x} , show that

$$\iiint_{\text{all space}} \nabla \cdot \mathbf{f} \, d\mathbf{x} = 0.$$

(*Hint:* Take D to be a large ball, apply the divergence theorem, and let its radius tend to infinity.)