

April 20, 2004

Show all work for credit.

1. Determine whether or not \mathbf{F} is a conservative vector field. If it is, find a function f such that $\mathbf{F} = \nabla f$.

$$\mathbf{F}(x, y) = (2x \cos y - y \cos x)\mathbf{i} + (-x^2 \sin y - \sin x)\mathbf{j}$$

2. (Bonus) Determine whether or not the domain of the given function is (a) open, (b) connected, and (c) simply-connected; then sketch the domain.

$$f(x, y) = \frac{1}{\sqrt{xy}}$$