

Worksheet Feb 17

1. Let $\mathbf{F} = \left\langle \frac{x-y}{x^2+y^2}, \frac{x+y}{x^2+y^2} \right\rangle$.

(a) Check that \mathbf{F} satisfies the condition $\frac{\partial Q}{\partial x} = \frac{\partial P}{\partial y}$.

(b) Is the domain of \mathbf{F} simply connected?

(c) Find the line integral of \mathbf{F} over the circle $x^2 + y^2 = 1$ with the positive orientation. (Does it make sense to use Green's theorem to compute this or do you have to compute it directly?)

(d) Is \mathbf{F} conservative?

2. Use Green's Theorem to compute the area inside a circle of radius r . (Of course you know the answer already; this is just a practice exercise.)