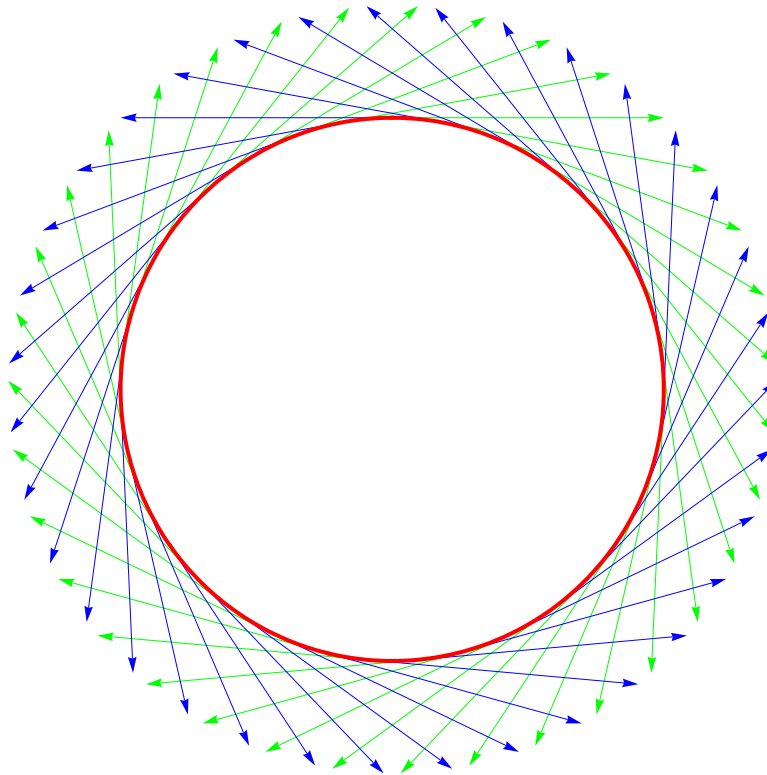


16.3 Fundamental Theorem of Line Integrals and Test for Conservative Vector Fields

Curve: $\{\sin[t], \cos[t]\}$

Vector Field $\mathbf{F}=\{\mathbf{f}, \mathbf{g}\}$: $f = -\frac{y}{x^2 + y^2}$, $g = \frac{x}{x^2 + y^2}$

$$\text{Work} = \oint_C \mathbf{F} \cdot \mathbf{T} ds = -2\pi$$



Test: $\frac{\partial g}{\partial x} = \frac{y^2 - x^2}{(x^2 + y^2)^2} = \frac{\partial f}{\partial y}$ Passed

$$\varphi(x, y) = -\text{ArcTan} \frac{x}{y}, \quad Q = P, \quad \varphi(Q) - \varphi(P) = 0$$