

Section 16.2 #19, 20, 21, 23, 41, 44, 45, 51.

Section 16.3 #12, 15, 16, 25, 28.

For this final problem, let  $D$  be the set of points in the plane other than the origin:

$$D = \{(x, y) : x \neq 0 \text{ or } y \neq 0\}.$$

Let

$$\vec{F} = \langle P(x, y), Q(x, y) \rangle = \left\langle \frac{-y}{x^2 + y^2}, \frac{x}{x^2 + y^2} \right\rangle.$$

Recall from earlier homework that  $\vec{F}$  is defined on all of  $D$ , and  $\frac{\partial}{\partial y} F_1 = \frac{\partial}{\partial x} F_2$  everywhere on  $D$ , but  $\vec{F}$  is not conservative on  $D$ . Let  $C$  be the circle of radius 1 centered at the origin, parametrized counterclockwise.

Problem: Compute the line integral of  $\vec{F}$  along  $C$ . Can you conclude, from this calculation, that  $\vec{F}$  is not conservative?