

## Homework Problem for Wednesday 4/25

### Problem 1.

Consider the vector field  $\vec{V}$  defined by:

$$\vec{V}(x, y) = \left( \frac{-y}{x^2 + y^2}, \frac{x}{x^2 + y^2} \right) .$$

- (1) What is the domain of definition  $D$  of the vector field  $\vec{V}$ ?
- (2) Compute the curl of the vector field  $\vec{V}$ .
- (3) Consider the unit circle  $C$  in the  $xy$ -plane. Check that  $C$  is inside  $D$ . Compute the circulation of the vector field  $\vec{V}$  along  $C$ .
- (4) Is the converse of the “curl test theorem” true?