

Name: \_\_\_\_\_

- No electronic devices are allowed. You must show your work to obtain credit.
- You may use the back if necessary. Please indicate clearly if you do so.

1. (5 points) Use Green's Theorem to evaluate

$$\oint_C \mathbf{F} \cdot d\mathbf{r},$$

where  $\mathbf{F} = \langle -\frac{1}{2}y^2x^2, y^3x \rangle$  and  $C$  is the boundary of the region  $D$  lying inside the circle  $x^2+y^2 = 1$ , above the  $x$ -axis, and to the left of the line  $x = -\frac{1}{2}$ , with positive(counter-clockwise) orientation.(Spring 2016, question 6)

2. (5 points) Find the curl and the divergence of the vector field:

$$\mathbf{F}(x, y, z) = \frac{1}{\sqrt{x^2 + y^2 + z^2}} \langle x, y, z \rangle$$