ME 572 Aerodynamic Design
HW #3 (Due at 11:59 pm on Friday, Feb 23)

Problem 1 [10 pt]
Consider a velocity field where the x and y components of velocity are given by $u = cx/(x^2 + y^2)$ and $v = cy/(x^2 + y^2)$, respectively, where c is a constant. Find the equations of the streamlines and describe the streamlines pattern.

Problem 2 [10 pt]
Consider a velocity field where the x and y components of velocity are given by $u = cy/(x^2 + y^2)$ and $v = -cx/(x^2 + y^2)$, respectively, where c is a constant. Find the equations of the streamlines and describe the streamlines pattern.

Problem 3 [10 pt]
Consider a velocity field where the radial and tangential components of velocity are $V_r = 0$ and $V_\theta = cr$, respectively, where c is a non-zero constant. Please mathematically prove if this flow field is irrotational or rotational?