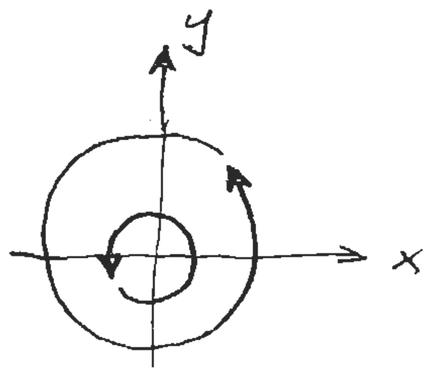
$$\frac{dy}{dx} = \frac{v}{u} = -\frac{x}{y}$$

$$y\,dy = -x\,dx$$

$$\frac{1}{2}y^2 = -\frac{1}{2}x^2 + C$$

$$x^2 + y^2 = 2C$$



circles of radius $\sqrt{2C}$

For steady flow, with ρ = const, must have $\nabla \cdot \vec{V} = \frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} = 0$

$$u = \frac{-y}{x^2+y^2} \qquad \frac{\partial u}{\partial x} = \frac{y \cdot 2x}{(x^2+y^2)^2}$$

$$v = \frac{x}{x^2+y^2} \qquad \frac{\partial v}{\partial y} = \frac{-x \cdot 2y}{(x^2+y^2)^2}$$

$$\Rightarrow \frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} \overset{\checkmark}{=} 0$$