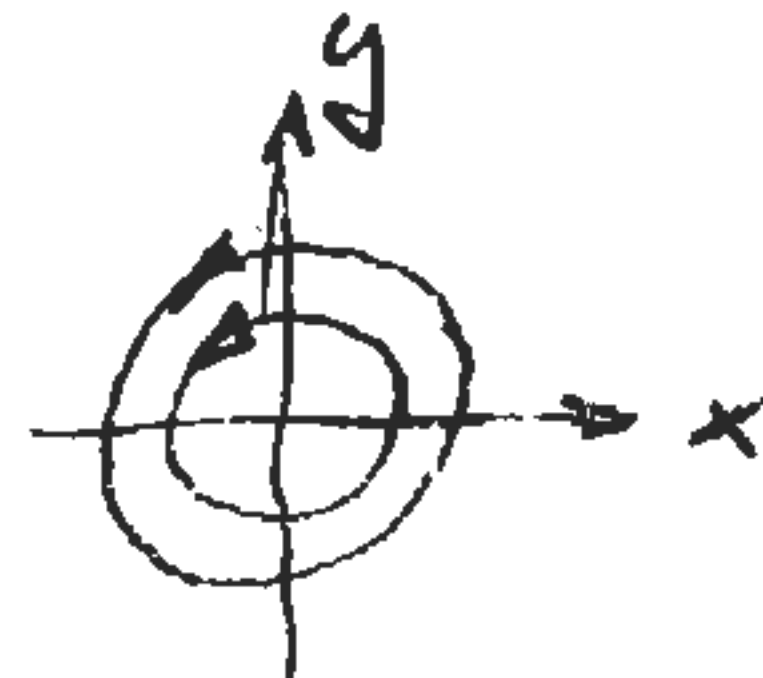


a) $u = -y \quad v = x$

$\frac{dy}{dx} = \frac{v}{u} = \frac{-x}{-y} \rightarrow y dy = -x dx \rightarrow \frac{1}{2}y^2 = -\frac{1}{2}x^2 + C$

$x^2 + y^2 = 2C$ circles of radius $\sqrt{2C}$



b) $\frac{Du}{Dt} = u \frac{\partial u}{\partial x} + v \frac{\partial u}{\partial y} = -y \cdot 0 + x \cdot (-1) = -x$

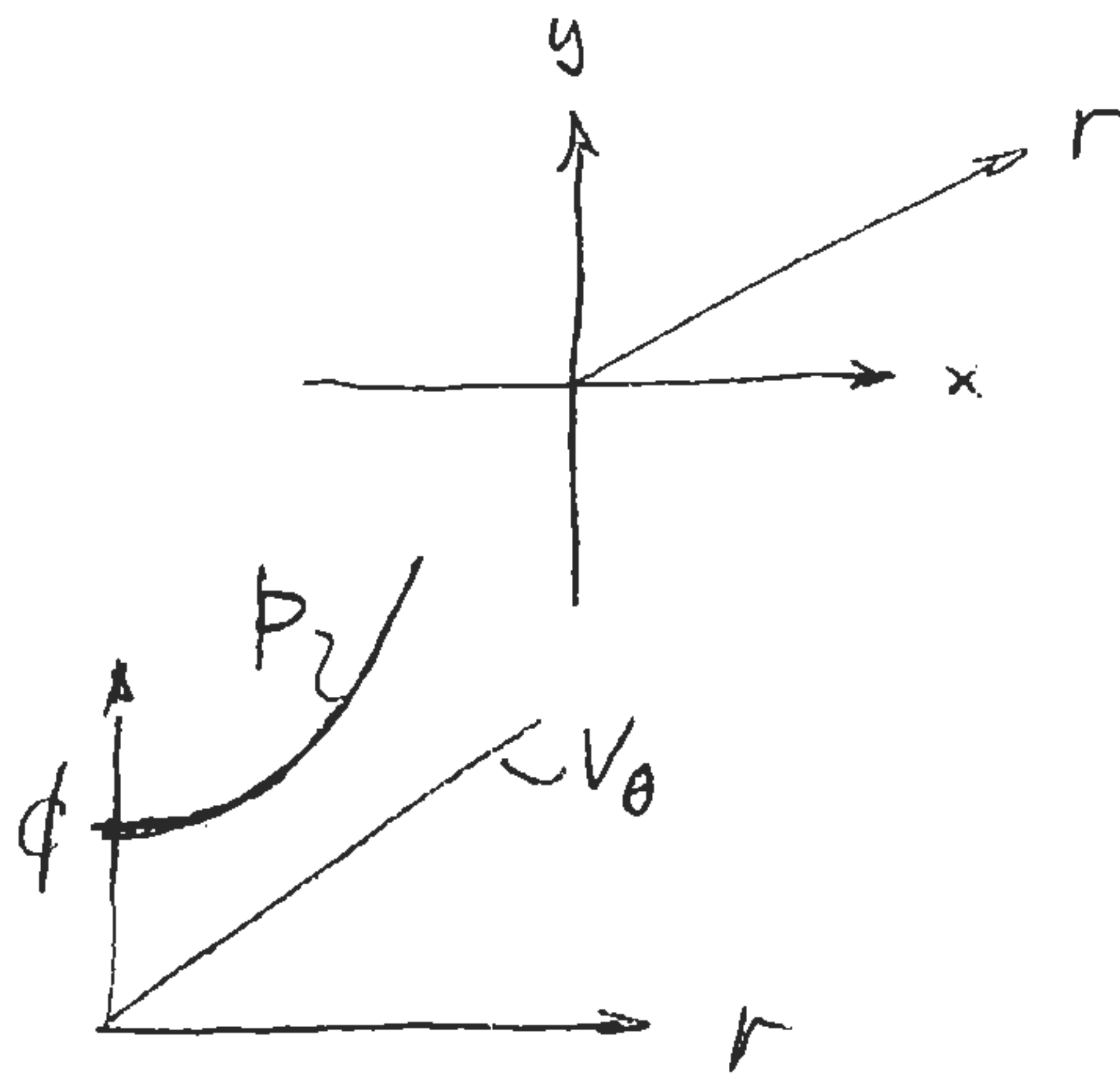
$\frac{Dv}{Dt} = u \frac{\partial v}{\partial x} + v \frac{\partial v}{\partial y} = -y \cdot 1 + x \cdot 0 = -y$

using momentum eq'n: $\frac{\partial p}{\partial x} = -\rho \frac{Du}{Dt} = \rho x$

$\frac{\partial p}{\partial y} = -\rho \frac{Dv}{Dt} = \rho y$

$\nabla p = \frac{\partial p}{\partial x} \hat{i} + \frac{\partial p}{\partial y} \hat{j} = \rho x \hat{i} + \rho y \hat{j}$

c) $\left. \begin{aligned} \frac{\partial p}{\partial x} &= \rho x \\ \frac{\partial p}{\partial y} &= \rho y \end{aligned} \right\} p = \frac{1}{2} \rho (x^2 + y^2) + C$



19-782
42-301
42-302
42-889
42-892
42-890



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