Homework 2b

Consider particle in homogeneous magnetic field described in symmetric gauge:

$$\vec{A} = \frac{B}{2} r \vec{e}_\varphi = \frac{B}{2}(-y, x, 0)$$

Write the stationary schrödinger equation and show that it is solved by

$$\psi_m = N \cdot (x - iy)^m \, e^{-(x^2+y^2)/4x_B^2}$$

where $x_B = \sqrt{\hbar/qB}$.

Discuss the energy and the angular momentum of these states.