Consider a quantum particle confined to the surface of a cylinder (not including the endcaps).

1. Define the system, i.e. write down the Hamiltonian for this system and any relevant boundary conditions.
2. Guess the energy eigenfunctions. (You may find it valuable to base your answer on systems you have previously studied!)
3. Find the energy eigenvalues of this system and discuss any degeneracies.
4. Consider the special case that the height of the cylinder be equal to half its circumference. Again discuss the degeneracies.