3. **Dryer.** A small load of mass m is sliding with friction coefficient μ along the interior wall of a cylindrical front-loading clothes dryer with radius r. The cylinder rotates with constant angular speed $\dot{\theta} = \Omega$ about its horizontal symmetry axis. The mass is initially in equilibrium at angle θ_0 as measured from the lowest point on the cylinder. If perturbed from equilibrium by a small angle ϵ, the mass executes simple harmonic motion around θ_0 with frequency ω.

   Find expressions for θ_0 and ω in terms of the given quantities.