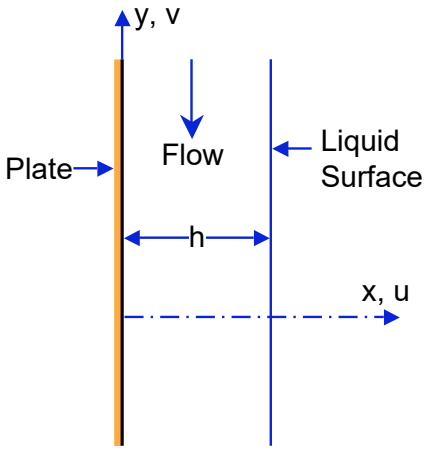
Problem 150H

A constant and uniform layer of Newtonian, viscous, incompressible liquid (dynamic viscosity, μ, and density, ρ) flows down a vertical flat plate:



The thickness of the layer is h and the flow is planar with velocity components as follows:

$$u = 0 \quad ; \quad v(x) = -Cx(2h - x)$$

where C is a constant. Find an expression for C in terms of ρ, μ, and the acceleration due to gravity, g.