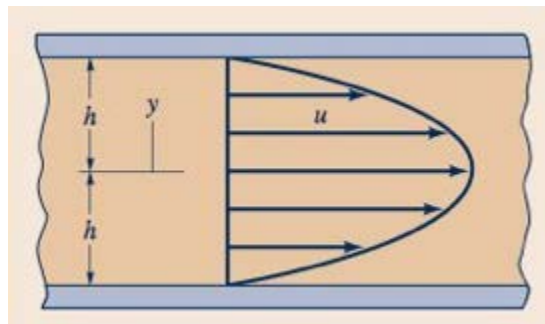NAME

Fluids-ID

Quiz 1. The velocity distribution for the flow of a Newtonian fluid between two fixed wide, parallel plates is given by equation shown below where V is the mean velocity. The fluid has a viscosity of 0.04 lb*s/ft^2. Also V=2ft/s and h=1/60 ft. Determine the shear stress acting on the bottom wall (y=-h).

$$u(y) = \frac{3V}{2}\left[1 - \left(\frac{y}{h}\right)^2\right]$$

Note: Attendance (+2 points), Format (+1 points)

Solution:

$$\tau = \mu \frac{du}{dy}$$

(+4 points)

$$\frac{du}{dy} = \frac{-3Vy}{h^2}$$

(+2 points)

$$\tau_w = \mu \frac{du}{dy}\bigg)_{y=-h} = \mu \frac{3V}{h} = \left(0.04 \ \frac{lb.s}{ft^2}\right) \times \frac{(3)(2\frac{ft}{s})}{\left(\frac{1}{60}ft\right)} = 14.4 \ lb/ft^2$$

(+1 points)