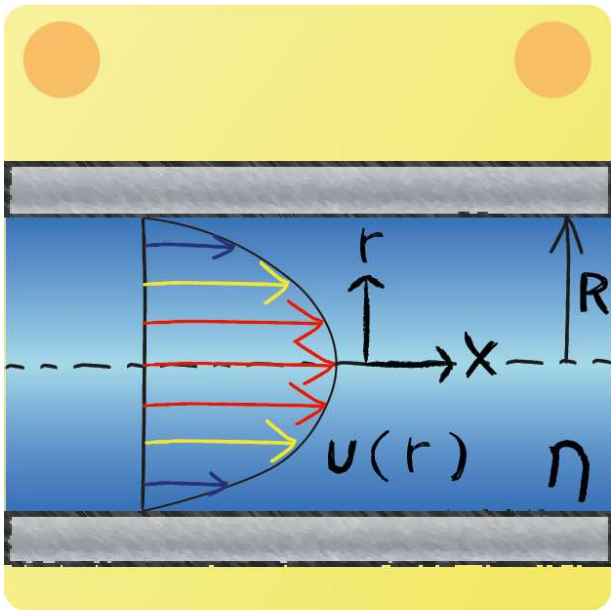
Lecture 7 - Question 1



Consider a hydrodynamically fully developed pipe flow of an ideal gas. Determine the wall shear stress.

$$\frac{\partial u}{\partial r} = -4 \cdot V_{\text{avg}} \cdot \frac{r}{R^2}$$

$$\tau_{\text{w}} = \eta \left.\frac{\partial u}{\partial r}\right|_{\text{r=R}} = -4 \cdot \eta \cdot V_{\text{avg}} \cdot \frac{1}{R} = -320 \text{ Pa}$$