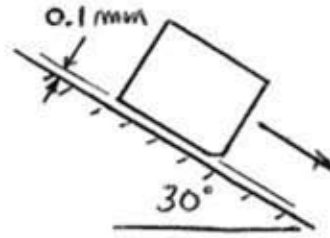


Flows with Friction

1. A block slides down an inclined plane on an oil film 0.1 mm thick. The block is 20 cm long, 15 cm wide, and has a mass of 0.35 kg. What is its terminal velocity?



2. Water flows in a parallel plate channel at the rate of $\dot{q} = 0.15 \text{ m}^3 / \text{s}$. The channel is 12 cm high and 50 cm wide.
- What is the average velocity?
 - What is the centerline velocity?
 - What is the pressure gradient?
 - What is the wall shear stress?
3. A fluid flows in a 1 cm diameter pipe at the rate of 4 m/s. Calculate the Reynolds number and determine if the flow is laminar or turbulent for
- Air
 - Water
 - Oil