1. (25 points) Calculate the flow rate of 40°C water in the pipe shown below (kinematic viscosity at 40°C = 0.661x10^{-6} m²/s)
2. **(20 points)** The pipe below transports 200 kg/s of water. The pipe tees into a 5-cm-diameter pipe and a 7-cm-diameter pipe. If the average velocity in the smaller-diameter pipe (5-cm-diameter pipe) is 25 m/s, calculate the flow rate in the larger pipe (7-cm-diameter pipe).
3. (30 points) Assuming uniform velocity profiles, find $F$ needed to hold the circular plug in the pipe shown below. The pipe discharges to the atmosphere right downstream of the plug. Neglect viscous effects.
1. **(25 points)** Find the velocity $V_1$ of the water in the vertical pipe shown below. Assume no head losses.