

HW 16

A thin, 1.5-m wide (into the page), right-angle gate with negligible mass is free to pivot about a frictionless hinge at Point O . The horizontal portion of the gate is 2-m long and covers a 30-cm diameter drain pipe which contains air at atmospheric pressure. A 10-kg concrete block ($\rho = 2300 \text{ kg/m}^3$) is tied as a hanging weight to the end of the horizontal section. Denote the minimum water depth at which the gate will pivot to allow water to flow into the pipe to be h_{min} . Develop an equation with h_{min} as the only unknown and solve for its value. (Answer: 0.599 m)

Remark: The lightly shaded area in the figure is filled with water.

