Work and turn in problems 5.49, 5.50, 5.54, 5.59, and 5.61 in Munson et al (2013). Also, work and turn in the following three problems, which are candidates for grading:

(1) This piping system lies in a horizontal plane. Calculate the total force required to hold this 180° return in place if the flowing liquid is ethanol at 68 °F (20 °C). Neglect friction and head losses in your calculations. Note that the flow does not exit to the atmosphere.

(2) Water flows from a large tank through a pipe of 3 in diameter and against a block as shown. The block weighs 50 lb and the coefficient of static friction between the block and the floor is 0.60. The velocity through the pipe may be estimated as $V = (2gh)^{1/2}$. To what minimum height $h$ above the pipe must the water rise in the tank to start the lock moving to the right?

(3) A coasting high-speed cart is decelerated by a scoop into a body of water, as shown. The total weight of the car and scoop is 2000 lb and $h = 3$ in. If the deceleration at this instant has a magnitude of 632 ft/s², what is the velocity $V$? Assume that the scoop has a width $b = 1$ ft into the paper.