

This print-out should have 6 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

Serway CP 09 40

001 10.0 points

A cowboy at a dude ranch fills a horse trough that is 1.6 m long, 69 cm wide, and 42 cm deep. He uses a 2.7 cm diameter hose from which water emerges at 2.3 m/s.

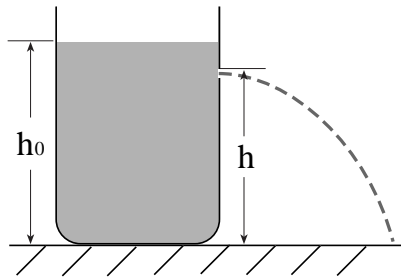
How long does it take him to fill the trough?

Correct answer: 5.86843 min.

Punctured Tank v1

002 10.0 points

A large storage tank is filled to a height 55 cm. The tank is punctured with a small hole at a height 34 cm from the bottom of the tank.



How far from the tank will the stream land? Assume that the tank is very large so that the velocity of the liquid at the top of the tank is zero.

Correct answer: 53.4416 cm.

Blowing Wind

003 (part 1 of 2) 10.0 points

If wind blows at 47.5 m/s over the roof of your house, what is the pressure difference at the roof between the inside and outside air? Use an air density of 1.29 kg/m³.

Correct answer: 1455.28 Pa.

004 (part 2 of 2) 10.0 points

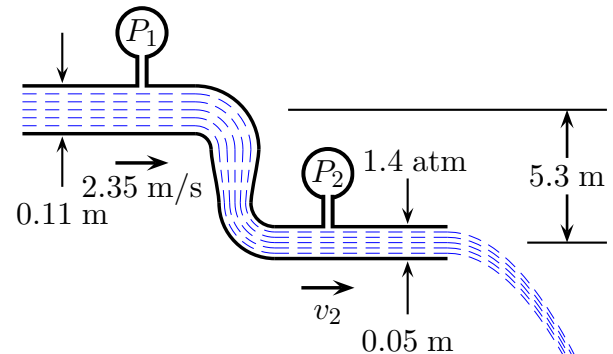
What net force does this pressure difference produce on a roof having an area of 241 m²?

Correct answer: 3.50723 × 10⁵ N.

Constricted Pipe 03

005 (part 1 of 2) 10.0 points

A liquid of density 1186 kg/m³ flows with speed 2.35 m/s into a pipe of diameter 0.11 m. The diameter of the pipe decreases to 0.05 m at its exit end. The exit end of the pipe is 5.3 m lower than the entrance of the pipe, and the pressure at the exit of the pipe is 1.4 atm.



What is the velocity v_2 of the liquid flowing out of the exit end of the pipe? Assume the viscosity of the fluid is negligible and the fluid is incompressible. The acceleration of gravity is 9.8 m/s² and $P_{atm} = 1.013 \times 10^5$ Pa.

Correct answer: 11.374 m/s.

006 (part 2 of 2) 10.0 points

Applying Bernoulli's principle, what is the pressure P_1 at the entrance end of the pipe?

Correct answer: 1.53659 × 10⁵ Pa.