1) A certain hydraulic system is designed to exert a force 100 times as large as the one put into it. Assume no losses due to friction.

   a) What is the ratio of the diameter of the output cylinder to the diameter of the master cylinder (input cylinder)?   Fasit: $D_2/D_1 = 10.0$

   b) What is the ratio of the distance the output cylinder moves relative to the distance the input cylinder moves?
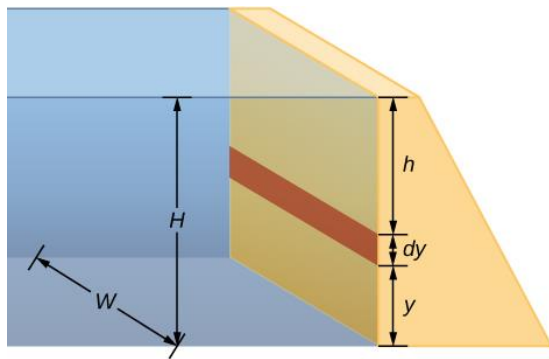
2) A dam is used to hold back a pond. The dam has a height H = 12.0 m and a width W = 10.0 m. Assume that the density of the water is ρ = 1000 kg / m³. Assume the water is not moving.

   a) Determine the net total force on the dam from the water.
      Fasit: F = 7.06 x 10⁶ N
   b) Why does the thickness of the dam increase with depth?

3) A man has a mass of 80.0 kg and a density of 955 kg/m3 (excluding the air in his lungs). At P = 100.0 kPa and T = 20°C = 293.15 K, the density of air is 1.204 kg/m³, g = 9.8 m/s²

   a) Calculate the volume of the man.

   b) Find the buoyant force air exerts on the man.

   c) What is the ratio of the buoyant force to the weight of the man?
      Fasit: F_B/F_W =.00126