If you are going to be able to look back on something and laugh about it, you might as well laugh about it now. – Marie Osmond

The gas tank of an automobile is sketched in a profile view in Figure 2.16. The lower edge of a semicircular plug is located 1 cm from the tank floor. The tank is filled to a height of 20 cm with gasoline and pressurized to 130 kPa. Calculate the force exerted on the semicircular plug. Assume that gasoline properties are the same as those for octane.
Problem

Figure P2.52 shows triangular retaining door holding acetone. Sketch the pressure prism and determine the resultant force on the door and its location.

Problem

Figure P2.55 shows a 4-ft-wide (into the page) gate that has an L-shaped cross section and is hinged at its comer. The gate is used to ensure that the water level does not get too high. Once the level rises over a certain point, the fluid forces acting on the gate tend to open it and release some liquid. Determine the height z above which the gate tends to open.
Reading

- Sections 2.3 and 2.5 (you can skip 2.4 for now)

Problem 5-1

A tank having one inclined wall contains chloroform as shown in Figure P2.58. The inclined wall has a rectangular plug 20 cm wide by 40 cm high. Determine the force exerted on the plug if a pressure gauge at the tank bottom reads 17 kPa (gauge).
Problem 5-2

2.48 A rectangular gate 3 ft wide is used as a partition to separate glycerine and water as shown in Figure P2.48. A stop is located on the floor of the water side of the gate. Calculate the force required to hold the door closed.

Problem 5-3

2.59 A small, narrow, flat-bottomed fishing boat is loaded down with two crew members and a catch of fish. The rear of the boat is a plane inclined at an angle $\theta$ of 75° with the horizontal. Thirty centimeters below the water surface is a hole in the boat plugged with a cork that is 8 cm in diameter. Determine the force and its location on the cork due to the saltwater if the liquid density is 1025 kg/m$^3$. (See Figure P2.59.)