(a) Using mercury-water interface as reference:
- Height of mercury = 2x
- Height of water = h
- Pressure at water = pressure at mercury

\[ \text{Pressure} = \rho g h = \rho g \times 2x \]

\[ x = \frac{\text{Pressure}}{2\rho g} = \frac{(1.53 \text{g/m}^3)(11.2 \text{cm})}{2(13.6 \text{g/m}^3)} = 0.412 \text{ cm} \]

(2) (a) Weight of water is

\[ W = mg = \rho V g \]

\[ = \left(1.0 \times 10^3 \text{kg/m}^3 \right) \left(80 \text{ ft} \right) \left(8.08 \text{ ft} \right) \left(0.3048 \text{ m/ft} \right) \left(4.98 \text{ m/s}^2 \right) \]

\[ = 5.3 \times 10^6 \text{ N} \quad (= \text{force on bottom}) \]

(5) Pressure at bottom = \( \rho g h = \rho g \times \left(9.8 \text{ m/s}^2 \right) \left(80 \text{ ft} \right) \left(0.3048 \text{ m/ft} \right) \)

\[ = 2.39 \times 10^4 \text{ N/m}^2 \]

Average pressure on sides = \( \frac{1}{2} \left(2.39 \times 10^4 \text{ N/m}^2 \right) \)

Area of side = \( (8 \text{ ft})(8.08 \text{ ft}) \left(0.3048 \text{ m/ft} \right)^2 = 59.46 \text{ m}^2 \)

Force on side = \( \frac{1}{2} \left(2.39 \times 10^4 \text{ N/m}^2 \right) \times 59.46 \text{ m}^2 = 7.1 \times 10^5 \text{ N} \)

(6) Force on end = \( \frac{1}{2} \left(2.39 \times 10^4 \text{ N/m}^2 \right) \left(30 \text{ ft} \right) \left(8.08 \text{ ft} \right) \left(0.3048 \text{ m/ft} \right)^2 \)

\[ = 2.7 \times 10^5 \text{ N} \]
(2) Assume entire volume of can is submerged

Buoyant force = \( F = \rho V g = (1.00 \times 10^3 \text{ kg/m}^3)(120 \times 10^{-6} \text{ m}^3)/(9.8 \text{ N/kg}) \)

\[ = 11.76 \text{ N} \]

Floating weight = \( \text{(Mean + Meal)} g = 11.76 \text{ N} \)

Mean + Meal = 1.200 kg

Meal = 1.200 kg - 0.130 kg = 1.070 kg