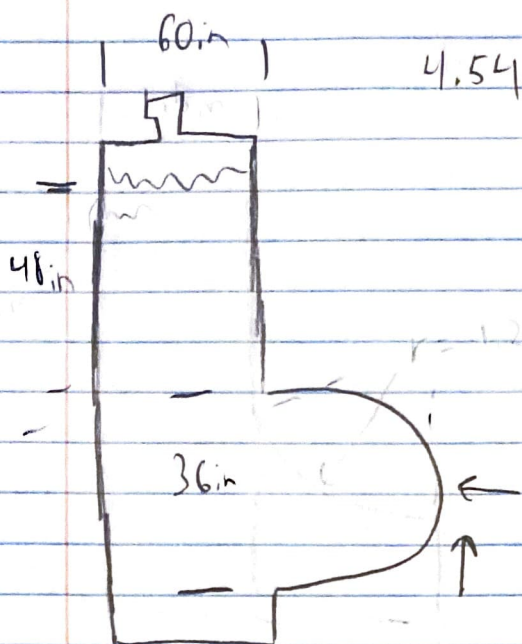


ch 4 54,

ch 5 8, 24



$$0.79 \cdot 62.43 \cdot 1000$$

$$\text{Alcohol} = \rho = 0.79$$

Find magnitude of

- Horiz component
- Vert component
- Magnitude, resultant force, direction

$$b = 60$$

$$d = 36$$

$$I = \frac{1}{12} b d^3$$

$$\frac{1}{12} (60) \cdot (36)^3 = 233280 \text{ in}^4$$

$$h_c = 48 + 18 = 66 \text{ in} \rightarrow \text{centroid}$$

$$h_p = \frac{I \cdot \sin^2 \alpha}{36 \cdot 60 \cdot 66} = \frac{233280 \cdot \sin^2(90^\circ)}{142560} + 66$$

$$1.6 + 66 = 67.64 \text{ in}$$

Centroid of curved surface:

$$\frac{4.18}{3.51} = 7.64 \text{ in}$$

$$\text{Horizontal force: } (790 \cdot 9.81) \cdot (66 \cdot 0.0254) \cdot (54.86) = 1845.55 \text{ N}$$

$$\text{or } 18.46 \text{ kN}$$

Vert force:

$$V \cdot \text{density} \cdot d.81$$

$$\left(\left(\frac{\pi \cdot 10^2}{2} \right) \cdot 60 \cdot 790 \right) \cdot 9.81$$
$$= 236.1 \text{ kN}$$

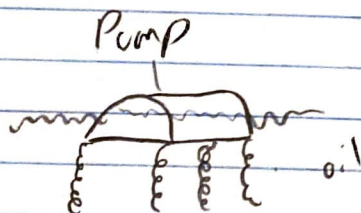
Resultant Force:

$$\sqrt{236.1^2 + 18.46^2}$$
$$= 236.82 \text{ kN}$$

$$\theta = \tan^{-1} \left(\frac{18.46}{236.1} \right) = 4.46^\circ$$

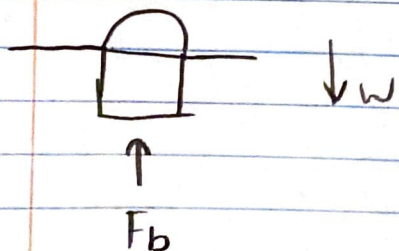
Ch 5, 8 + 24

8:



$$W = 14.6 \text{ lbs}$$

$$\text{Submerged volume} = 40 \text{ in}^3 \rightarrow 0.0232 \text{ ft}^3$$



Spring supporting force?

$$F_b = \gamma V_d$$

$$\gamma = 56.16 \text{ lb/ft}^3$$

$$F_b = 56.16 \cdot 0.0232$$
$$= 1.30 \text{ lb}$$

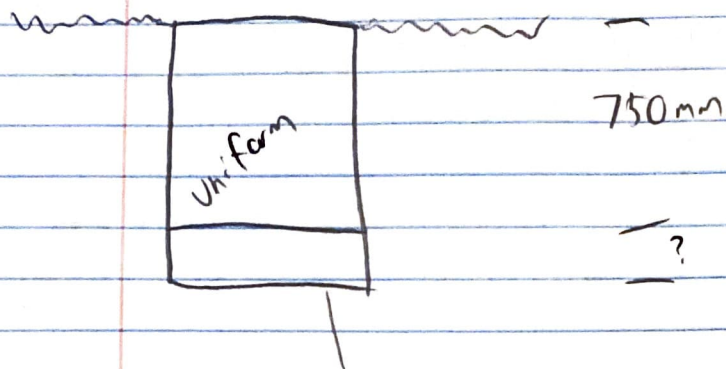
$$14.6 - 1.30 = 13.3$$

$$\boxed{13.3 \text{ lbs}}$$

(24)

$$d = 450 \text{ mm}$$

$$w_{\text{water}} = 95^\circ\text{C}$$



$$\gamma = 84.0 \text{ kN/m}^3$$

brass

Thickness of Brass?

$$F_B = \gamma g (L+H) \cdot \left(\frac{\pi}{4} \cdot d^2\right)$$

$$\gamma_w \cdot (H+L) \cdot A = \gamma_B \cdot t \cdot A$$

$$0.16 \text{ m}$$

$$\gamma_w \cdot (H+t) = \gamma_B \cdot t$$

$$(10 \cdot 750) + (10 \cdot t) = 84t$$

$$7.5 + 10t = 84t$$

$$-10t \quad -10t$$

$$\frac{7.5}{75} = \frac{75t}{75} = 0.1 \text{ m}$$

$$t = 0.1 \text{ m}$$

or

$$100 \text{ mm}$$