2.32

2.32 For the inclined-tube manometer of Fig. P2.32 the pressure in pipe A is 0.6 psi. The fluid in both pipes A and B is water, and the gage fluid in the manometer has a specific gravity of 2.6. What is the pressure in pipe B corresponding to the differential reading shown?

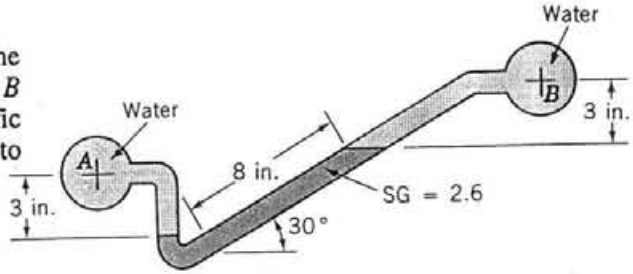

FIGURE P2.32

$$p_A + \gamma_{H_2O}\left(\tfrac{3}{12}\text{ ft}\right) - \gamma_{gf}\left(\tfrac{8}{12}\text{ ft}\right)\sin 30^\circ - \gamma_{H_2O}\left(\tfrac{3}{12}\text{ ft}\right) = p_B$$

(where γ_{gf} is the specific weight of the gage fluid)

Thus,

$$p_B = p_A - \gamma_{gf}\left(\tfrac{8}{12}\text{ ft}\right)\sin 30^\circ$$

$$= \left(0.6\ \tfrac{\text{lb}}{\text{in.}^2}\right)\left(144\ \tfrac{\text{in.}^2}{\text{ft}^2}\right) - (2.6)\left(62.4\ \tfrac{\text{lb}}{\text{ft}^3}\right)\left(\tfrac{8}{12}\text{ ft}\right)(0.5) = 32.3\ \tfrac{\text{lb}}{\text{ft}^2}$$

$$= 32.3\ \text{lb/ft}^2 / 144\ \text{in.}^2/\text{ft}^2 = \underline{\underline{0.224\ \text{psi}}}$$