

45. Note that the normal to the refracting surface is vertical in the diagram. The angle of refraction is $\theta_2 = 90^\circ$ and the angle of incidence is given by $\tan \theta_1 = w/h$, where h is the height of the tank and w is its width. Thus

$$\theta_1 = \tan^{-1} \left(\frac{w}{h} \right) = \tan^{-1} \left(\frac{1.10 \text{ m}}{0.850 \text{ m}} \right) = 52.31^\circ .$$

The law of refraction yields

$$n_1 = n_2 \frac{\sin \theta_2}{\sin \theta_1} = (1.00) \left(\frac{\sin 90^\circ}{\sin 52.31^\circ} \right) = 1.26 ,$$

where the index of refraction of air was taken to be unity.