

$$n_1 \sin \theta_1 = n_2 \sin \theta_2$$

$$1 \cdot \sin 30 = 1.5 \sin \theta_2$$

$$0.5 = 1.5 \sin \theta_2$$

$$0.33 = \sin \theta_2$$

$$\sin^{-1}(0.33) = \theta_2 = \boxed{19.5^\circ}$$

$$2. \quad n = \frac{c}{v} = \frac{1.86 \times 10^5 \frac{\text{miles}}{\text{sec}}}{140,000 \frac{\text{miles}}{\text{sec}}} = \boxed{1.329}$$

$$n = \frac{c}{v} = \frac{1.86 \times 10^5 \frac{\text{miles}}{\text{sec}}}{100,000 \frac{\text{miles}}{\text{sec}}} = \boxed{1.86}$$

$$n_1 = \text{air} = 1 \quad \theta_1 = 30$$

$$n_2 = ? \quad \theta_2 = 15$$

$$1 \sin(30) = n_2 \sin(15)$$

$$0.5 = n_2 (0.259)$$

$$\boxed{n_2 = 1.93}$$

$$n_1 = \text{air} = 1 \quad \theta_1 = 40$$

$$n_2 = ? \quad \theta_2 = 29$$

$$1 \sin(40) = n_2 \sin(29)$$

$$0.64 = n_2 \cdot 0.485$$

$$\boxed{n_2 = 1.32}$$

$$n_1 = \text{air} = 1 \quad \theta_1 = 35$$

$$n_2 = ? \quad \theta_2 = 14$$

$$1 \sin 35 = n_2 \sin(14)$$

$$0.574 = n_2 \cdot 0.242$$

$$\boxed{n_2 = 2.37}$$

$$n_1 = \text{air} = 1 \quad \theta_1 = 30$$

$$n_2 = \text{H}_2\text{O} = 1.33 \quad \theta_2 = ?$$

$$1 \cdot \sin 30 = 1.33 \sin \theta_2$$

$$0.5 = 1.33 \sin \theta_2$$

$$0.376 = \sin \theta_2$$

$$\sin^{-1}(0.376) = \theta_2 = \boxed{22^\circ}$$

$$n_1 = \text{air} = 1 \quad \theta_1 = ?$$

$$n_2 = 1.5 \quad \theta_2 = 15$$

$$1 \cdot \sin \theta_1 = 1.5 \sin(15)$$

$$\sin \theta_1 = 0.388$$

$$\sin^{-1}(0.388) = \theta_1 = \boxed{22.8^\circ}$$

$$n = \frac{c}{v} = \frac{1.86 \times 10^8}{v} = \frac{2v}{2} = \frac{1.86 \times 10^8 \frac{\text{m}}{\text{sec}}}{2} \quad v = \boxed{9.3 \times 10^5 \frac{\text{m}}{\text{sec}}}$$

$$n_1 = 1.498 \quad \theta_1 = 49 \quad 1.498 \sin(49) = n_2 \sin(41)$$

$$n_2 = ? \quad \theta_2 = 41 \quad \frac{1.13}{0.656} = n_2 \sin(41) \rightarrow 0.656$$

⑩

$$\boxed{n_2 = 1.72}$$

$$1. \quad n_1 = 1.33 \quad \theta_1 = ? \quad 1.33 \sin \theta_1 = 1.7 \sin 30$$

$$n_2 = 1.7 \quad \theta_2 = 30 \quad \frac{1.33 \sin \theta_1}{1.33} = \frac{0.85}{1.33} \quad \sin^{-1}(0.639) = \theta_1$$

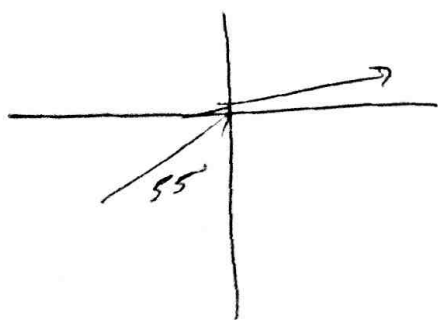
$$\sin \theta_1 = 0.639 \quad \boxed{\neq 39.7^\circ}$$

$$2. \quad n_1 = 1 \quad \theta_1 = 50 \quad 1 \sin(50) = n_2 \sin(35)$$

$$n_2 = ? \quad \theta_2 = 35 \quad 0.766 = n_2 \cdot \sin 35$$

$$\boxed{n_2 = 1.33 \text{ water}}$$

$$3 \quad n = \frac{c}{v} = \frac{1.86 \times 10^8}{109,000} = 1.7 \quad - \text{flint glass}$$



$$n_1 = 1.33 \quad \theta_1 = 55 \quad 1.33 \sin 55 = 1 \sin \theta_2$$

$$n_2 = 1 \quad \theta_2 = ? \quad 1.08 = \sin \theta_2$$

→ total internal reflection

— next week's lesson!