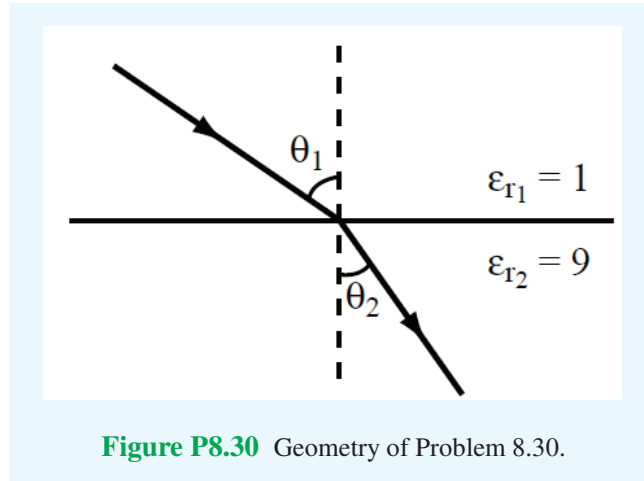


**8.30** A parallel-polarized plane wave is incident from air onto a dielectric medium with  $\epsilon_r = 9$  at the Brewster angle. What is the refraction angle?

**Solution:**



**Figure P8.30** Geometry of Problem 8.30.

For nonmagnetic materials, Eq. (8.72) gives

$$\theta_1 = \theta_B = \tan^{-1} \sqrt{\frac{\epsilon_2}{\epsilon_1}} = \tan^{-1} 3 = 71.57^\circ.$$

But

$$\sin \theta_2 = \frac{\sin \theta_1}{\sqrt{\epsilon_{r2}}} = \frac{\sin \theta_1}{3} = \frac{\sin 71.57^\circ}{3} = 0.32,$$

or  $\theta_2 = 18.44^\circ$ .