Snell's Law (SwiftStudy Printable)

Key Formula

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

n_1	index of refraction (incident medium)	[no units]
θ_1	angle of incidence	radians
n_2	index of refraction (refracted medium)	[no units]
θ_2	angle of refraction	radians

Tips to Remember

▶ Though the SI unit of angle measure is the radian, most problems are written using degrees, and Snell's Law works equally well with either unit. The real issue with angle units is to make sure your calculator is in the right mode, whether degrees or radians.

▶ It's traditional to associate n_1 and θ_1 with the incident light, i.e., the light moving toward the boundary, and n_2 and θ_2 with the refracted light, or the light rays that have passed through the boundary and are moving away from it. But since both sides of the equation have exactly the same form, you really don't need to worry if you mix them up.

▶ The angles of incidence and refraction are measured from a line drawn **perpendicular** to the boundary. When a problem refers directly to an angle of incidence or an angle of refraction, everything is as expected. But if you have to get the angles from a diagram, make sure you're measuring them from the perpendicular (also called the *normal*). Be especially on the lookout for words such as "the light strikes the water at a 10° angle with the surface of the water." The surface of the water is the boundary, and it's horizontal. So the angle of incidence must be meaured from the vertical, and it would be 80°, not 10°.

θ_1 is really 80°, since it must be measured from the dotted line perpendicular to the air-water boundary.

10°   air
water
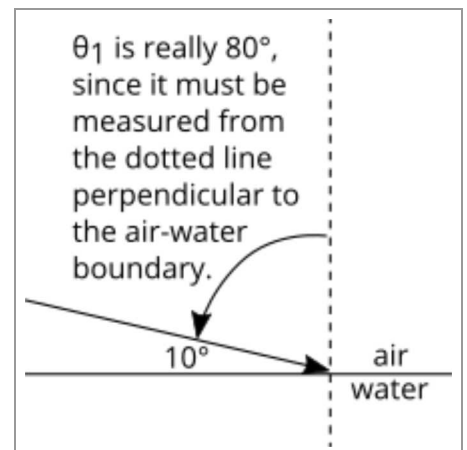
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