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Lab #1 - Theory Questions

1. Refraction is when light speeds up / slows down as it enters a new medium. Part of the light that hits an incident surface is absorbed, and bending occurs based on the index of refraction difference between the two materials. IOR values come from the way light interacts with atoms inside the medium

2. Index of refraction has no unit, it is related to the ratio of speed of light relative to vacuum n=1. Materials do not typically have n<1, although it does occur in some plasmas, etc.

3. Beyond the critical angle θ, all light is reflected. Below that angle (0-θ), some light is reflected and some is refracted, so light can get through. Looking straight up should allow light through, both into and out of the water, since the angle is zero.

4. Green IOR is larger since the B factor is represented better by green light's shorter wavelength.

5. f and h will change direction because their incident angle isn't zero. Only g is perpendicular to the surface

6. $\phi = 322 - 226 = 96°,\ \delta\phi = \sqrt{0.5^2 + 0.5^2} = 0.71$

Error is typically one sig fig, so $\phi = 96.0° \pm 0.7°$

7.
   a. $sin(\theta_1) = n\, sin(\theta_2)$
   b. $arcsin\left(\frac{sin(\theta_1)}{n}\right)$
   c. The equation is $Y = nX$, so the slope is n