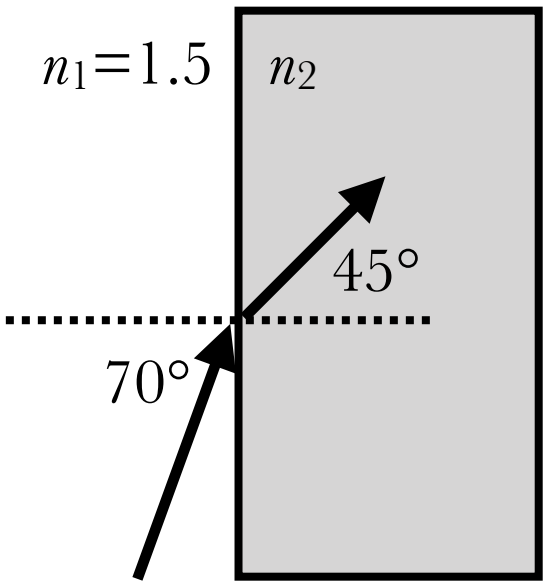
Physics 102 Homework #5

first draft due Wednesday, February 18th
final draft due Sunday, March 5th

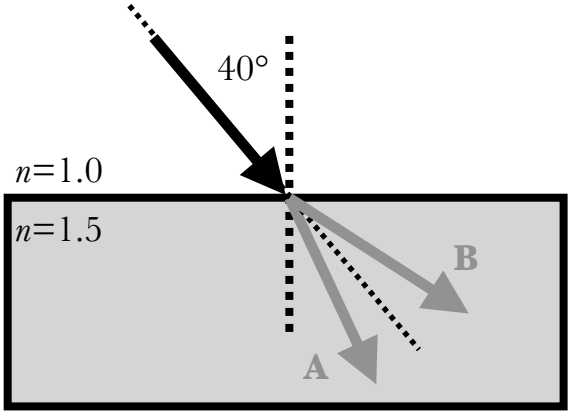
1a. A light ray with wavelength λ = 500 nm moves through air at speed 3×10^8 m/s. It then enters glass which has an index of refraction of n=1.53. What is the speed of light in this glass?

1b. If light in a certain material moves at 9×10^7m/s, what would the material's index of refraction be?

2. A ray of light in glass (n_1=1.5) enters another material (n_2) at a 70° angle; and emerges into the new material at a 45° angle. Find the index n_2.



3. A ray of light in air hits the surface of glass (n=1.5) at a 40° angle with respect to the normal. Find the angle between the normal and the ray that travels into the glass. Which of the rays shown, A or B, best represents the correct transmitted ray?



4. A ray of light travels in glass (n=1.5), and hits its interface with water (n=1.3). What is the maximum angle θ that the ray can make with the normal, and still pass through into the water?