Refraction Practice

Name: _____

On a separate piece of paper, solve the following questions showing all your work (formula, substitution, solution).

1. Calculate the index of refraction of a diamond if the speed of light in a diamond is 1.24×10^8 m/s.

2. Calculate the speed of light in the following mediums:
   a) water (n = 1.33)

   b) plexiglass (n = 1.51)

   c) quartz (n = 1.46)

3. Calculate the index of refraction for a substance if the speed of light in that medium is
   a) 2.1×10^8 m/s

   b) 1.5×10^8 m/s

   c) 0.76×10^8 m/s

4. Light passes from substance one into substance two at an angle of 50^o. The light passes through the 2^{nd} substance at an angle of 30^o.
   a) How do the densities of the two substances compare? How do you know?

   b) Calculate the index of refraction for the second substance.

5. An angle of incidence of 20^o in water results in an angle of refraction of 15^o.
   a) Is the second medium more or less optically dense than the first medium?

   b) Find the index of refraction of the second medium.

6. If an angle of incidence of 40^o resulted in an angle of refraction of 65^o, what would you conclude about the densities of the two media?

Challenge!

7. It takes 4.0×10^{-11} s for light to travel through a substance. If the distance the light travelled is 0.50 cm, find
   a) the speed of light in the substance, in m/s

   b) the index of refraction of the substance

   c) the identity of the substance