Do all problems on a separate sheet of lined paper. Indicate your answer by drawing a box around it. Common Indices of refraction:		
CR39 (plastic for eyeglass lenses): 1.498	Diamond: 2.42	Barium glass: 1.60
Polycarbonate: 1.586		Flint glass: 1.70

•Warm-ups:

Snell's Law Problem Set 1

•A] If the sine of an angle is 0.723, what is the angle?

Name

Answer: $\theta = \sin^{-1}(0.723) = 46.3^{\circ}$ (You have the sine, so use the inverse to find theta)

_ Hour ___ Date ___

•B] What is the ratio of sin(50°)to sin(25°)?

Answer: $sin(50^{\circ})/sin(25^{\circ}) = 0.766/0.423 = 1.81$ (not 2!)

- 1. A ray of light traveling from air into crown glass strikes the surface at an angle of 30°. What will the angle of refraction be? [Answer: 19°]
- Light travels through a liquid at 2.25×10⁸ m/s. What is the index of refraction of the liquid? [Answer: 1.33]
- 3. Light traveling through air encounters a second medium which slows the light to 1.88×10⁸ m/s. What is the index of the second medium? [Answer: 1.60]
- 4. What is the index of refraction of a refractive medium if the angle of incidence in air is 30.0° and the angle of refraction is 15.0°? [Answer: 1.93]
- 5. What is the index of refraction of a liquid if the angle of incidence in air is 35.0° and the angle of refraction is 14.0°? [Answer: 2.37]
- If the angle of incidence of light traveling through air, striking water, is 30°, what is the angle of refraction? [Answer: 22°]
- If the index of refraction for a certain glass is 1.50, and the angle of refraction is 15° for a ray of light traveling from air, what is the angle of incidence? [Answer: 23°]
- What is the velocity of light in meters per second in a material with an index of refraction of 2.00? [Answer: 1.50 x 10⁸ m/s]
- 9. A light ray moving through CR39 at an angle of 49° exits into another medium at an angle of 41°. What is the index of the second medium? [Answer: 1.723]
- 10. What is the angle of incidence for a light ray traveling from water into flint glass, if the angle of refraction is 30.0°? [Answer: 40°]
- 11. What is the refractive medium if a ray coming from air at an angle of incidence of 50.0° is refracted to an angle of 35.0°? [Answer: Index of refraction equals, 1.34, so the medium could be Water]
- 12. Light travels at 1.76×10⁸ m/s through an optical medium. What could the medium be? [Answer: Index of refraction equals, 1.70, so the medium could be Flint Glass]
- 13. A beam of white light arrives at a piece of glass. The glass is dispersive, which means it has different indices (n's) for different wavelengths, and therefore bends different wavelengths by different amounts. If the angle of incidence from air is 67.00 degrees, and the n for red light is 1.560, and the n for violet light is 1.590, then what will be the difference in the angles of refraction between the two colors as they travel through the glass? Give the answer rounded to the hundredth of a degree.

[Answer: 36.162 - 35.376 = 0.786, rounds to 0.79 degrees]