**Snell’s Law Problem Set 1 Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Block \_\_\_ Date \_\_\_\_\_\_\_\_\_**

**Do all problems on a separate sheet of lined paper. Indicate your answer by drawing a box around it.**

Common Indices of refraction:

Air or vacuum: 1.000 Water: 1.33 Crown Glass: 1.523

CR39 (plastic for eyeglass lenses): 1.498 Diamond: 2.42 Barium glass: 1.60

Polycarbonate: 1.586 Flint glass: 1.70

•Warm-ups:

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

Answer: θ = sin-1(0.723) = 46.3° (You have the sine, so use the inverse to find theta)

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

Answer: sin(50°)/sin(25°) = 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°]

2. Light travels through a liquid at 2.25×108 m/s. What is the index 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 refractive medium if the angle of incidence in air is 40.0° and the angle of refraction is 29.0°? [Answer: 1.33]

6. 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]

7. If the angle of incidence of light traveling through air, striking water, is 30°, what is the angle of refraction? [Answer: 22°]

8. 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°]

9. 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]

10. 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]

11. 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°]

12. 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]

13. Light travels at 1.76×108 m/s through an optical medium. What is the medium? [Answer: Index of refraction equals, 1.70, so the medium could be Flint Glass]