NAME: _____

Snell's Law & Critical Angles

1. Light entering a block of glass from air at an angle of incidence of 18.5° leaves the boundary between the air and the glass at an angle of 12.0°. What is the index of refraction of this type of glass?

2. Light from air is incident on diamond at an angle of 10.0°. At what angle will it refract?

3. A beam of light is incident on a sheet of glass in a window at an angle of 30°. Describe exactly what path the light beam will take (a) as it enters the glass and (b) as it leaves the other side of the glass. Assume n=1.500.

4. Light traveling in air has an angle of refraction of 20° as in passes into diamond. What is the incident angle of the light?

5. A transparent material has a refractive index of 1.27. What is the angle of incidence in air when the angle of refraction in the substance is 43°?

6. A ray of light passes from water into carbon disulphide (n=1.63) with an angle of incidence of 30°. What is the angle of refraction in the carbon disulphide?

7. Using Snell's Law with n = 1.33 for water and n = 2.42 for diamond determine the angle of refraction in the diamond for the following situation.

8. Calculate the critical angle for diamond into air.

9. What is the critical angle for a glass into air that has an index of refraction of 1.500?

10. A certain material has a critical angle of 52.0° when light travels from the material into air. What is its index of refraction?

11. What is the velocity of light in quartz?

Answers: 1. $n_r = 1.53$ 2. r = 4.1° 3. r = 19.5° 4. i = 56° 5. i = 60.0° 6. r = 24° 7. r = 19.3° 8. i = 33° 9.. i_c = 41.8° 10. n = 1.30 11. 1.95×10^8 m/s