Snell's Law Worksheet

Common Indices:

Air or vacuum: 1.00;
Water: 1.33;
CR39: 1.498;
Crown Glass: 1.523;
Barium glass: 1.60;
Flint glass: 1.70;
Polycarbonate: 1.586;
Diamond: 2.45

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? $\frac{1 \times \sin 30^\circ}{1.523} = \sin\theta_r = .328 = 19.2^\circ$
2. Light travels through a liquid at 2.25×10^8 m/s. What is the index of the liquid? $n = \frac{c}{v} = \frac{3\times10^8}{2.5\times10^8}$ ~~1.2~~ 1.33
3. Light traveling through air encounters a second medium which slows the light to 1.88×10^8 m/s. What is the index of the second medium? $n = \frac{3\times10^8 m/s}{1.88\times10^8 m/s} = 1.6$
4. What is the index of refraction of a refractive medium if the angle of incidence in air is 30° and the angle of refraction is 15°? $\frac{1 \times \sin 30^\circ}{\sin 15^\circ}$ = ~~1.1~~ 1.92
5. What is the index of refraction of a refractive medium if the angle of incidence in air is 40° and the angle of refraction is 29°? $\frac{1 \times \sin 40^\circ}{\sin 29^\circ}$ = ~~2.06~~ 1.33
6. What is the index of refraction of a liquid if the angle of incidence in air is 35° and the angle of refraction is 14°? $\frac{1 \times \sin 35^\circ}{\sin 14^\circ} = n = 2.37$
7. If the angle of incidence of light traveling through air, striking water, is 30°, what is the angle of refraction? $\frac{1 \times \sin 30^\circ}{1.33} = \sin a = .376 = 22^\circ$
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? $\sin\theta_i = \frac{1.5 \times \sin 15^\circ}{1} = .388 = 22.8^\circ$
9. What is the velocity of light in meters per second in a material with an index of 2.0? $V = c/n \quad V = \frac{3.0\times10^8}{2} = 1.5\times10^8 m/s$
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? $\frac{1.498 \times \sin 49^\circ}{\sin 41^\circ} = n = 1.72$
11. What is the angle of incidence for a light ray traveling from water into flint glass, if the angle of refraction is 30°? $\sin\theta = \frac{1.7 \times \sin 30^\circ}{1.33} = .639 = 39.7^\circ$
12. What is the refractive medium if a ray coming from air at an angle of incidence of 50° is refracted through an angle of 35°? $\frac{1 \times \sin 50^\circ}{\sin 35^\circ} = n = 1.33$ Water
13. Light travels at 1.76×10^8 m/s through an optical medium. What is the medium? $n = \frac{3\times10^8 m/s}{1.76\times10^8 m/s} = 1.70$ flint glass

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3. Light traveling through air encounters a second medium which slows the light to 1.88×10^8 m/s. What is the index of the second medium?

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6. What is the index of refraction of a liquid if the angle of incidence in air is 35° and the angle of refraction is 14°?

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

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?

9. What is the velocity of light in meters per second in a material with an index of 2.0?

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?

11. What is the angle of incidence for a light ray traveling from water into flint glass, if the angle of refraction is 30°?

12. What is the refractive medium if a ray coming from air at an angle of incidence of 50° is refracted through an angle of 35°?

13. Light travels at 1.76×10^8 m/s through an optical medium. What is the medium?