Snell's Law Problems

Medium	Index of Refraction (n)
Vacuum	1.000000
Air	1.000293
Carbon dioxide	1.00045
Hydrogen	1.000139
Water	1.33
Ethyl alcohol	1.36
Glycerin	1.47
Benzene	1.50
Ice	1.31
Glass (crown)	1.52
Glass (flint)	1.65
Sodium chloride	1.53
Zircon	1.92
Diamond	2.42

1. A ray of light leaves a piece of crown glass at an angle, entering water. Does the ray bend toward or away from the normal?

2. A ray of light passes from air into water at an angle of incidence of 50.0^{o}. What is the angle of refraction?

3. Light travels from air into water. If the angle of refraction is 30.0^{o}, what is the angle of incidence?

4. A diver shines her flashlight upward from beneath the water at an angle of 30.0^{o} from the normal. At what angle relative to the surface of the water does the beam of light emerge?

5. The critical angle for benzene is 41.8^{o}. Which of the following angles of incidence of light rays in benzene would result in total internal reflection?

   a) 35^{o} b) 50^{o} c) 42^{o} d) 3.0^{o}

6. What is the critical angle of zircon?

7. The critical angle for glass is 41^{o}. What is the index of refraction of the glass? What type of glass is it?

8. An incident ray of light in water strikes a layer of ice that has formed on top of the water. What is the critical angle in the water?