



**Work each of the following problems. SHOW ALL WORK.**

3. A light ray strikes the surface of crown glass ( $n = 1.520$ ), at a  $25^\circ$  angle with respect to the normal from air ( $n = 1.000293$ ), and leaves the glass, returning to the air.

a. Draw and label a diagram of the path of the light.

b. Determine the angle at which the light refracts when it enters the glass.

c. Determine the angle at which the light refracts when it leaves the glass.

d. How does the angle at which the light strikes the glass compare to the angle that it re-enters the glass?

---

---

questions continued on next page

Unit 6M\_Practice Problems

**Work each of the following problems. SHOW ALL WORK.**

4. At a saltwater aquarium, a ray of light strikes the glass, from air, at an angle of  $32^\circ$  with respect to the normal. The glass has an index of refraction of 1.53. The saltwater has an index of refraction of 1.33. The air has an index of refraction of 1.000293.

a. Draw and label a diagram of the path of the light.

b. What is the angle of refraction of the light as it enters the glass?

c. What is the angle of refraction of the light as it enters the water from the glass?

d. If the light entered the water directly from the air at  $32^\circ$  without the glass, what would be the angle of refraction of the light? Compare the results to the light in part c.

---

---

**Work each of the following problems. SHOW ALL WORK.**

5. Determine the critical angle between air ( $n = 1.000293$ ) and flint glass ( $n = 1.660$ ). Draw a diagram to help in your solution.

6. A beam of light traveling in air ( $n=1.000293$ ) strikes the surface of mineral oil at an angle of  $23.1^\circ$  with the normal to the surface. If the light travels at  $2.17 \times 10^8$  m/s in the oil, what are the (a) index of refraction of the mineral oil and (b) angle of refraction?

a.

b.