Pre-lab worksheet for Refraction, Critical Angle, Total Internal Reflection, and Chromatic Aberration

Objectives:
* Practice identifying the angle of incidence, refraction, and reflection.
* Practice with Snell’s Law
* Introduction to critical angle/total internal reflection

Problems:
In the diagram below, a scuba diver is sitting on the bottom of a pool at location A, and a friend of his is standing on the pool deck at location B.

1. As light travels from location B to location A, (a) which angle is the angle of incidence, and (b) which angle is the angle of refraction?

2. As light travels from location A to location B, (a) which angle is the angle of incidence, and (b) which angle is the angle of refraction?

3. When the scuba diver at A looks at his friend (at B), which angle is the angle of incidence.

4. Light travels from A to B. \( \theta_5 \) is 60 degrees. Use Snell’s Law to calculate the angle of refraction.

5. Light travels from A to B. \( \theta_4 \) is 40 degrees. Use Snell’s Law to calculate the angle of refraction.

6. Light travels from A to B. \( \theta_4 \) is 45 degrees. Use Snell’s Law to calculate the angle of refraction.

7. Light travels from A to B. \( \theta_4 \) is 50 degrees. Use Snell’s Law to calculate the angle of refraction.

8. Were you able to find an answer for each question above? If not, then explain why not. (Hint: Think about the critical angle)

9. Use Snell’s Law to calculate the critical angle. Explain what happens to the light at this angle.