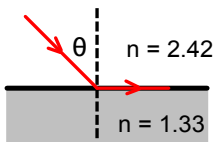
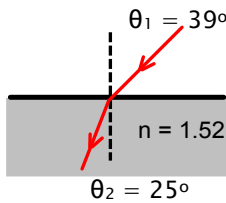


**Physics**  
**Refraction, Critical Angle, Total Internal Reflection Worksheet**

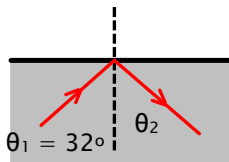
1. In the picture below, determine the angle of the incoming ray. (Answer:  $33.3^\circ$ )



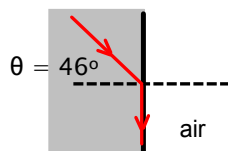
2. In the picture below, determine the index of refraction of the 1st material. (Answer: 1.02)



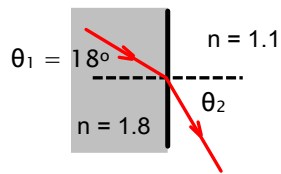
3. In the picture below, determine the value of the reflected angle,  $\theta_2$ . What do you know about the index of refraction of the top material compared to that of the bottom material? (Answer:  $32^\circ$ )



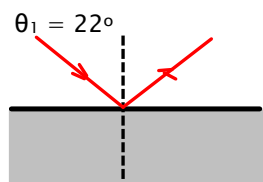
4. In the picture below, determine the value of the index of refraction of the material on the left. (Answer: 1.39)



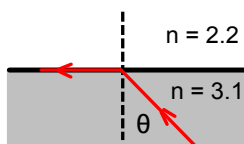
5. In the picture below, determine the angle of refraction. (Answer:  $30.4^\circ$ )



6. In the picture below, determine the angle of reflection. (Answer:  $22^\circ$ )



7. In the picture below, determine the angle  $\theta$ . (Answer:  $45.2^\circ$ )



8. In the picture below, determine the angle  $\theta_1$ . (Answer:  $27.6^\circ$ )

