Problem 1. In a two-slit interference experiment, the $m=2$ bright spot is found to be 3.0 mm away from the $m = 0$ bright spot when 750 nm light is used in air. The distance between the slits and the observing screen is 1.0 m. If the experiment is performed in oil with $n=1.85$, what should the slit spacing be to maintain the distance between the $m=2$ and $m=0$ bright spots at 3.0 mm?

Problem 2. Light ($\lambda=800$ nm) enters a 300 nm thick glass plate at an angle of 45°. The index of refraction of the glass is 1.4. What is the phase difference between the waves entering and leaving the glass plate?

(Hint: You need to take refraction into account.)