Physics 206b

1. An object is placed 14 cm away from a lens with a focal length of 9 cm. Use ray tracing to determine, qualitatively, the location of the image. (I.e., you needn't be ultra-precise in this, but do keep the distances as close to proportional as you can.)

2. Using ray tracing, indicate how a single, thin lens can act as a "magnifying glass." What condition must be met by the object distance for this to work?

3. An object is placed 7 cm to the left of a lens with a focal length of 12 cm. A lens with a focal length of 19 cm is placed 17 cm to the *right* of the first lens. What is the location of the final image? Sketch this system with appropriate raytracing from the initial object through any intermediate steps to the final image.

4. Explain why the following statement is *both* correct and incorrect: "Red light added to green light makes yellow light."

5. Assume a human eye is 25 mm in diameter. A myopic (nearsighted) person can see an infinitely distant object clearly when wearing corrective lenses (eyeglasses). Lenses are often characterized by their "power" rather than their focal length. The power of a lens is simply defined as $P = \dfrac{1}{f}$ and the unit for this is the "diopter" where $1\,diopter = 1\dfrac{1}{meter}$. A lens of this person's eyeglasses has a power of –5 diopters (this is a strong but not extreme prescription). What is the focal length of the biological lens in the person's eye?

6. Unpolarized light is passed through three polarizers. The second and third polarizers are oriented at 30 and 60 degrees, respectively, with respect to the orientation of the first. What fraction of the original light is passed at the end?