1. When trying to measure the power of her eyeglasses, a student discovers that the focal length she measures depends on how she uses the light source. The light source is a long straight filament. When it is held horizontally she measures a different focal length than when it is held vertically. What can she conclude about her eyes, and why do eyeglasses with these properties help?

2. You have one each of the following lenses, all of large diameter: 1) \( f = 50 \text{ mm} \), 2) \( f = 100 \text{ mm} \), 3) \( f = 200 \text{ mm} \), 4) \( f = 25 \text{ mm} \), and 5) \( f = -50 \text{ mm} \). Ignoring aberrations, which of them would you use, and why if you were making:

   (a) A magnifying glass?
   (b) A compound microscope?
   (c) An astronomical telescope?
   (d) A Galilean telescope?

3. If you are viewing an object that is very far away, the image distance in the eye is about 22 mm. If the diameter of the pupil is typically 4 mm, what is the speed of the lens?

4. Discuss how the eye and brain deal with the problems of aberrations? Pay particular attention to spherical aberration, field curvature, and distortions.