

**Phy114: Electromagnetism, Waves and Radiation
for the Sports Science
Homework Problems
Set #8: Due Monday, April 7, 2008**

Note: Students are encouraged to work together and discuss the problems. However, each student must arrive at her/his own final answers. Show all your work. Simply copied homework will result in zero.

1. (10 points) (a) When focusing a camera, you adjust the distance between the lens and the film so that it equals the image distance. Suppose your camera has a lens of focal length 50.0 mm, and the distance between the film and the lens is 52.0 mm. (a) How far away is the object being photographed? (b) If the image has a height of 1.5 cm, what is the height of the object?
2. (10 points) Suppose a person with normal eyes looks through one lens of Prof. Jung's eyeglasses at an object 30 cm on the other side of the lens. If the strength of the lens is -7.0 D, what is the magnification of the object? (*Hint: Note that the distance to the image must be found before the magnification can be found.*)
3. (10 points) A dentist would like to use a mirror that gives an upright image of a tooth with a magnification of 5.0 when held 3.0 cm from the tooth. Calculate the focal length of such a mirror.
4. (5 points) A farsighted person has eyeglasses with a strength of 1.65 D, and is having difficulty reading close up. When a lens of strength 0.30 D is held just in front of her eyeglasses, she finds that reading at a normal distance is possible. What strength should her new eyeglasses have?
5. (15 points) A six feet tall person got caught from shoplifting when a 7-11 clerk saw him through a surveillance mirror which was located 18 feet from the person. The height of the image of the person the clerk saw was 3 inches. (a) Calculate the magnification. (b) Calculate the location of the image. (c) What is the focal length of the mirror?