HW #11 Due Friday 4/15

We continue with Chapter 23. Since we have an exam on the 13th this assignment is shorter than usual.

Part 1

Ch. 23 P72. This is a little tricky, so here are some things to think about. You are looking toward the mirror on the left in the diagram, so all the images referred to are images you see behind that mirror. The image closest to you is easy. It is just what you would see if there were only one mirror.

   The next closest image is an image of an image: The mirror behind you reflects light from your backside toward the mirror in front of you, which then reflects the light to your eye. First figure out where the image is of your backside in the mirror behind you. Then think of this image as an object for the mirror in front of you and figure out where the image of the image is.

   The third closest image is an image of an image of an image. It is the image of the image of the closest image. Hope that helps.

Ch. 23 P7

AP1)   An automobile headlight consists of a bright light bulb and a concave mirror. It produces a beam of nearly parallel rays. If the radius of curvature of the mirror is 5.0 cm, approximately how far from the mirror (measured along the axis) is the filament of the light bulb? FYI: Spotlights and flashlights work in essentially the same way.

AP2)   (You need a ruler for this problem.) In class you saw a demonstration in which a concave mirror produced a real image of an upside down light bulb. The image was the same size as the original light bulb. Make an accurate one-fifth scale diagram for this demonstration showing 3 *construction* rays, one parallel to the axis, one through the focus, and one toward the center of the mirror. Assume that the focal length of the mirror is 25 cm, the height of the light bulb is 10 cm, and the light bulb is 50 cm from the mirror. Don't forget to start with an upside down light bulb. Does your answer make sense in terms of the demo?

Part II

Ch. 23 P9

Ch. 23 P11

Ch. 23 P12

Ch. 23 P13 Part b) of this question is a little confusing. Just read it as: Use Eq. 23-2 to determine the image distance.