
Name (Last, first)

Astronomy 110 Homework 11

Write the answers to the questions on this sheet.
Homework due by 11.20 am April 29th 2005

In this homework we will compare the light-gathering power of the Keck Telescope with that of your eye.

- a). The light-gathering power of your eye is proportional to the area of the pupil, which is the black disk in its center. Estimate the radius of your pupil and calculate its area using the formula

$$\text{Area} = \pi \times \text{radius}^2$$

- b). The light gathering power of the Keck Telescope is proportional to the area of its main mirror which is equivalent to a circle of radius 5 meters. Estimate the collecting area of the Keck Telescope.

- c). Calculate the ratio of the areas of the Keck telescope to your eye pupil. Make sure you have used the same units for both areas before you calculate the ratio. Write your answer in scientific notation.

- d) For how many days would you have to look at a star in order to collect the same amount of light into your eye that the Keck telescope collects in one second. (Assume you can observe the star for 12 hours of darkness per day).