

Astronomy 80B: Light Problem Set 7: due 22 May 2003

- **Read Ch 6** in *Seeing the Light* and do the following problems:
 - page 179: P1, P2, P4, P6, P10
PH2, PH5

- **Read Appendix J** in *Seeing the Light* and do the following problem
 - page 180: PM1, PM3, PM4

A. The Keck telescope is made of 36 hexagonal segments. Each segment has an area of 2.2m^2 . At night the human eye opens up so the pupil diameter is about 5mm. How many people would it take to have the same light gathering area as the Keck telescope? Use people with 2 eyes. Unfortunately this is not as effective as a telescope, since people cannot combine the light.

B. If you can see a car's headlights from 5 miles away, how far away could you see a car's headlights if you were looking through the Keck telescope? Assume that the light intensity falls off as the inverse square of the distance. For example this means that if the light source is 3 times as far away, its apparent brightness will be reduced by 9.