Homework # 2
PHYS 355 (Mendes, fall 2009)
(due in class on Sept 16)

(10 points)
1) Problem 1.2-8, p. 36 in Fundamentals of Photonics, 2nd Ed.

(10 points)
2) Problem 1.2-10, p. 36 in Fundamentals of Photonics, 2nd Ed.
Please note that the variable “f” shown in Figure P1.2-10 is NOT the effective focal length defined in the classnotes. It is actually the bfl defined in the classnotes.

(40 points)
3) A photographic camera is equipped with a lens having a 50 mm (0.05 m) focal length. A woman 1.7 m tall stands 10 m in front of the first principal plane of the camera lens.

(a) Determine the distance from the second principal plane of the lens to the photographic film in order to obtain a sharp image of the woman on the film.

(b) How tall is her image on the film?

(c) What is the lens transverse magnification?

(d) If the lens has a zoom mechanism that allows the focal length to be changed from 50 mm to 125 mm, what will be the new transverse magnification? Assume that the distance from the woman to the first principal plane is also about 10 m.

(e) The ratio between the two focal lengths is 125/50 = 2.5; determine the ratio between the two transverse magnifications.

(10 points)
4) Problem 1.4-8, p. 37 in Fundamentals of Photonics, 2nd Ed.