

Problem Set 3

Optics

PHYSICS 375

Due: 12 February 2019 at beginning of class

Problem 1. Hecht, Problem 3.15

Problem 2. Hecht, Problem 3.20

Problem 3. Hecht, Problem 3.23

Problem 4. Hecht, Problem 3.29

Problem 5. Hecht, Problem 3.40

Problem 6. Suppose that you have a spacecraft with total mass M and reflecting solar sail area A . Assume that the spacecraft starts at some distance r_0 from the sun and is at rest.

- a) What is the condition necessary for the spacecraft to remain stationary at the initial radial distance r_0 ?
- b) Suppose that you have twice the sail area to mass ratio that you calculated in part (a); what will be the spacecraft's speed when it reaches $r = 2r_0$? What about the limit as $r \rightarrow \infty$?