

# Astron 300 Problem Set 2

Due: Wednesday, Sep 22 at the beginning of class

**Homework Policy:** You can consult class notes and books. Always try to solve the problems yourself; if you cannot make progress after some effort, you can discuss with your classmates or ask the instructor. However, you cannot copy other's work: what you turn in must be your own. Make sure you are clear about the process you use to solve the problems: partial credit will be awarded.

**Reading:** Carroll & Ostlie, Chapter 2.1, 2.2, 2.3

**Problem 1** Carroll & Ostlie Problem 2.6

**Problem 2** Carroll & Ostlie Problem 2.7

**Problem 3** Carroll & Ostlie Problem 2.8

**Problem 4** Stellar Canibalism

We have a close binary system, with masses  $m_1$  and  $m_2$ . They are separated by  $a$  in a circular orbit and have period  $P$ . Because of its evolution, part of star 1 puffs up and ends up being dominated by the gravity of star 2, eventually being transferred. If  $dm$  is transferred, what happens to the orbit? Does it get closer or further apart? Assume that energy is *not* conserved (some escapes as light), but that angular momentum is.