

# Physics 20 Problem Set 1

Harry Nelson

**due Monday, October 4, by 5pm  
to the Physics 20 Boxes in Broida Hall's Lobby**

**Course Info:** The instructor is Harry Nelson, the TAs are Hyejin Ju and Yoni BenTov. A web page for the course is set up at <http://hep.ucsb.edu/courses/ph20>.

We meet MWF 10:00-10:50am in 1640 Broida. There are **three discussion sections**, and attendance at the one you've registered for is mandatory.

The text for the course is 'An Introduction to Mechanics' by Kleppner and Kolenkow. (KK). This is a hard textbook, but rewarding. Our plan is to cover much of the first five chapters of this text. The 4th edition of Resnick, Halliday, and Krane 'Physics' (RHK4) has more detailed explanations of many topics, so is a good reference. Both texts are available in the library under Physics 20 reserve.

Working problems is crucial to the understanding of physics. Expect to spend at least 12 hours a week outside of class studying and working problems. It is good to work with other students to understand how to solve problems, but **write up your solutions independently and originally; don't copy other work and use it as your own, from another student or off the web... that is, well, cheating, with potentially dramatic penalties.**

Please make your work neat, clear, and easy to follow. It is hard to grade sloppy work accurately. Generally, make a clear diagram, and label quantities. Derive symbolic answers, and then plug in numbers after a symbolic answer is available.

These problems pertain to the first three lectures, and the corresponding reading is pp. 1-19 of KK; similar material is covered in Chapter 3 of RHK4.

---

1. Can two vectors having different magnitudes be combined to give a zero vector sum (resultant)? How about three vectors? (RHK4 Q3.3).
2. A person walks in the following pattern: 3.1 km north, then 2.4 km west, and finally 5.2 km south.
  - (a) Construct the vector diagram that represents this motion.
  - (b) How far and in what direction would a bird fly in a straight line to arrive at the same final point? (RHK4 3.4).
3. KK 1.1
4. KK 1.2
5. The minute hand of a wall clock measures 10 cm from axis to tip. What is the displacement vector of its tip
  - (a) from a quarter after the hour to half past,
  - (b) in the next half hour,
  - (c) in the next hour? (RHK4 3.12)
6. KK 1.4

7. KK 1.5 (use vectors)

8. KK 1.8

---