The goal of the problem sets is to develop problem-solving skills, not just to test your ability to obtain the right answer. You will receive the problem sets a week before they are due. Each problem set involves both individual and team work.

**Individual phase (at home):** From the time you receive a problem set to the time it is due in class at 10 am, you are to work on the problem set alone. The work you complete during this phase will be evaluated on effort, not correctness. You may only use blue or black ink and you must attempt to solve each problem using the following 4-step procedure (see Section 1.8 in the textbook for additional details)

- **Getting Started**
  - State the important information and summarize the problem. If possible, include a diagram. Note any assumptions you’re making.

- **Devise Plan**
  - Devise a plan of attack before diving into the solution. Break down the problem into smaller, manageable segments. Identify which physical relationships you can apply.

- **Execute Plan**
  - Carry out your plan, explaining each step. The argument should be easy to follow. Articulate your thought process at each step (including roadblocks). Any variables should be clearly defined, and your diagrams should be labeled.

- **Evaluate Solution**
  - Check each solution for reasonableness. There are many ways to justify your reasoning: check the symmetry of the solution, evaluate limiting or special cases, relate the solution to situations with known solutions, check units, use dimensional analysis, and/or check the order of magnitude of an answer.

  **Note:** If you got stuck in the Execute Plan stage and there is no solution to evaluate, you should still attempt to use estimation skills to get a feeling for what would constitute a reasonable answer to the problem. So don’t just leave this section blank!

You can consult the textbook and online resources, and you may consult the teaching staff by posting questions to the Problem Set Discussion on the course Web site. However, you may not consult other people, nor collaborate with your peers. It’s ok to try hard and not succeed at first (only your effort is evaluated), but you must attempt every problem. If you reach the Evaluate stage and find that your answer does not seem reasonable, try to describe your thought process so you are prepared for a discussion with your team in class.

**Team/Reflect phase (in class):** On the due date of the problem set, you will work with your team in class to improve and/or correct your solutions, reflect on your work, and determine what you need to review. During this stage, you may only use red ink to write on your problem sets (pens will be provided in class). After the first 45 minutes, your team will be provided with a solution set which you may use to confirm your solutions. After an additional 45 minutes, your team must submit the marked-up problem sets together with completed reflection sheets for the entire team and a team scoring sheet.

It is the team’s responsibility to ensure that all team members hand-in complete and completely marked up solutions together with a completed reflection sheet, because your team’s submitted work will result in a shared team score. This means that if you do not put in adequate effort before the Team/Reflect phase, you will lower not only your own score, but also that of your team members. Likewise, it is important to ensure that everyone on your team marks his/her work up correctly during the Team/Reflect phase.

**Important:** Writing on the problem set in class in any other color but red will be considered academic dishonesty.
Scoring

Your problem set will be evaluated in two domains, using the standard 0–3 scale.

Effort All steps of the 4-step problem-solving procedure written in blue or black ink show convincing effort on

3 = all problems
2 = more than 75% of the problems
1 = more than 50% of the problems
0 = 50% or fewer of the problems

Reflection You clearly identify and explain (in red ink) any conceptual errors you made (or encountered) when you worked on the problem alone, as well as any mechanical errors you made on

3 = all problems and you submit a complete reflection sheet
2 = more than 75% and you submit a complete reflection sheet
1 = more than 50% and you submit a complete reflection sheet
0 = 50% or fewer of the problems OR you do not submit a complete reflection sheet

These two scores are combined into an individual score as follows:

3 3 in Effort and Reflection
2 2 in both domains or one 2 and one 3
1 1 in either domain
0 0 in either domain

Your individual score will be combined with a team score that is obtained by averaging the individual scores of all team members and rounding the result to the nearest integer. For example, if your team scored 3, 2, 1, 2, and 1, the team score is \((3 + 2 + 1 + 2 + 1)/5 = 9/5\), which rounds to 2. The team member with an individual score of 1, obtains a problem set score of 1.5; the team member with an individual score of 3, obtains a problem set score of 2.5.

If you miss the team phase, but hand in your individual work before the due date, we will evaluate that work on Effort only. Your individual score will not be taken into account in the team score and the team score will not factor into your problem set score. Instead, your individual score will be divided by two. Any work submitted after the deadline will not be accepted. If extenuating circumstances exist, we will ask you to provide documentation directly issued by the University, and we will try to work out an agreeable solution with you.

See the attached sample forms, which you will receive at the beginning of each Problem Set Reflection.