



Some thoughts and advice:

- You should expect to spend at least 1 – 2 hours on problem sets. A lot of practice problem-solving is essential to understand the material and skills covered in class. Be organised and do not leave problem sets until the last-minute. Instead, get a good start on the problems as soon as possible.
- When approaching a problem think about the following: *do you understand the words used to state the problem? what is the problem asking you to do? can you restate the problem in your own words? have you seen a similar problem worked out in class? is there a similar problem worked out in the textbook? what results/skills did you see in class that might be related to the problem?*

If you are stuck for inspiration, use the course **piazza** forum (accessible via the course Canvas site). However, don't just ask for the solution - provide your thought process, the difficulties you are having, and ask a coherent question in complete English sentences. Remember the 3RA approach to asking questions outlined in the course syllabus.

- Form study groups - get together and work through problem sets together. **This will make your life easier!** However, you must write your solutions *on your own* and *in your own words*.
- * * * You **are not allowed** to use any additional resources (e.g. solution manuals, **stackoverflow** etc). If you are concerned then please ask.
- The problems in parentheses are for extra practice and optional (in particular, they do not need to be submitted). **Problems for submission are underlined**.
To gain mastery of a topic you should expect to attempt a significant proportion of the problems in the textbook (> 60%(!)).
- Answers to odd-numbered exercises are at the back of the textbook. However, you need to submit a worked solution and provide justification for how you determined the answer.

- **Read/recap:** §1.7

- **Problems:** § $X.y$ refers to Chapter X , Section y of *Vector Calculus*, by Colley (4th Edition). All problems are taken from the 4th Edition.

§1.7: (10), 11, (13), (17), 18, 20b, (21), 22, (23), 24, 40, (41), 42

Problem A: Describe the unit circle centred at the origin and lying in the yz -plane in spherical and cylindrical coordinates.

Problem B: Consider the solid ball of radius 2 centred at the origin. Let S be the southern hemisphere of the ball i.e. the part of the solid ball lying below the xy -plane. Describe S using spherical and cylindrical coordinates.