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.

- 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:** §1.1, 1.2, 1.3

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

- §1.1: (6), (14), 16, 21
- §1.2: (7), (9), (10), 11, (12), (13), 14, (15), 16, (17), 29, 31,
- §1.3: (2), (3), 5, (7), 9, (13), 14, (17), 20

In addition to the problems from the textbook, submit solutions to the following:

**Problem A:** Let \( \mathbf{u}, \mathbf{v} \in \mathbb{R}^2 \) be unit vectors. By computing the dot product \( \mathbf{u} \cdot \mathbf{v} \) in two different ways deduce the following double angle formula

\[
\cos(\theta_1 - \theta_2) = \cos \theta_1 \cos \theta_2 + \sin \theta_1 \sin \theta_2
\]

**Problem B:** Use the dot product to deduce the *law of cosines*: for any triangle

\[
a^2 = b^2 + c^2 - 2bc \cos A
\]