



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.

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- **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,

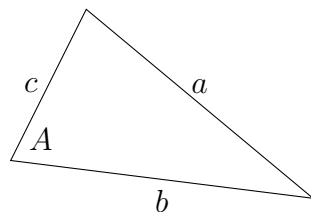
§1.3: (2), (3), 5, (7), 9, (13), 14, (17), 20

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

Problem A: Let $\underline{u}, \underline{v} \in \mathbb{R}^2$ be unit vectors. By computing the dot product $\underline{u} \cdot \underline{v}$ 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



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