



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), come to office hours, or send me an email. 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. **This will make your life easier!** You can use **piazza** to arrange meet-ups. However, you must write your solutions *on your own* and *in your own words*.
- If you would like more practice then there are (hundreds of) problems in the supplementary course textbooks mentioned in the syllabus, or you can check out **khanacademy.org**.
- You **are not allowed** to use any additional resources. If you are concerned then please ask.

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1. Each of the following functions is one-to-one. Determine the rule $x \mapsto f^{-1}(x)$ defining the inverse function. Determine the domain and codomain of f^{-1} .
 - (a) $f(x) = 3x + 7, -10 \leq x \leq 5$.
 - (b) $f(x) = 5x^3 - 1, -\infty < x < \infty$.
 - (c) $f(x) = -3x^2 + \pi, -2 < x < -1$.
 - (d) $f(x) = \frac{10}{2-9x}, 1 < x < 5$.
 - (e) $f(x) = \frac{x}{x^2-3x+2}, x > 2$.
 2. Determine a, b so that the function $f(x) = \frac{x+1}{x^2+ax+b}, -2 < x < 2$, is one-to-one. (*Note: there are infinitely many choices for a, b*)
 3. True/False. No justification required.
 - (a) If $f(x), g(x), a \leq x \leq b$, are both one-to-one then $(f + g)(x), a \leq x \leq b$, is one-to-one.
 - (b) If $f(x)$ is one-to-one then $f(x)$ is strictly increasing.
 - (c) If $f(x)$ is a function with inverse $f^{-1}(x) = 2x + 1, 2 \leq x \leq 3$, then $f(x)$ is one-to-one.
 - (d) Every function of the form $f(x) = x^3 + cx + d$, where c, d are constants, is one-to-one.