



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.

1. Solve the separable differential equations.

(a) $\frac{dy}{dx} = 4xy^2$, $y(0) = 1$

(b) $\frac{dy}{dx} = xe^{x^2 - \ln(y^2)}$

(c) $y' = -\sin(x)y^2$, $y(0) = 2$

(d) $\frac{dS}{dt} = \frac{t}{S - t^2S}$, $S(0) = 4$.

2. (a) Write down a separable differential equation that describes a curve whose slope at (x, y) is xy .
(b) Find an equation of the curve passing through the point $(1, 0)$ and whose slope at (x, y) is xy .