

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 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.

- Form study groups - get together and work through problem sets. **This will make your life easier!** You must write your solutions *on your own* and *in your own words*.
- If you would like more practice then let me know.
- You **are not allowed** to use any additional resources. If you are concerned then please ask.

Submit solutions to the following problems on **Friday, September 14th**.

1. Problems 13, 17, 38, 39, 59a), 63, 65, 69 in Section 1.1

2. Problems 9, 11, 13, 25-27 in Section 1.3.

For Problems 25-27 use the graphing calculator available at www.desmos.com

3. Rewrite and simplify:

a) $b^8(2b)^4$

b) $\frac{(6y^3)^4}{2y^5}$

c) $\frac{x^{2n} \cdot x^{3n-1}}{x^{n+2}}$

d) $\frac{(4x^6)^{\frac{1}{2}}}{2x^4}$

4. A bacterial culture starts with 200 bacteria and triples in size every hour.

a) How many bacteria are there after 3 hours?

b) After t hours?

c) Give a formula for the amount of bacteria as an exponential function of time.

5. At Calculus College, freshman students are assigned shared dorm rooms. Due to the popularity of Calculus College, the College has started assigning freshpeople to either a double or triple shared room according to birth months. In the incoming Class of 2022, the assignment of dorm rooms is given by the table on the next page. Moreover, for each month of the year, there is a student in the Class of 2022 born in that month.

Note: in order for a mapping to be a function, it must assign a single output to each input.

(a) Let x denote a student in the Class of 2022 at Calculus College. Explain why the rule

$$x \mapsto \text{roommates of } x \text{ (distinct from } x) \quad (*)$$

does not define a function with domain and range being the collection of all freshpeople in the Class of 2022.

- (b) Determine the largest domain so that the rule (*) defines a function $f(x)$. What is the range for $f(x)$?
- (c) The function $f(x)$ has an inverse function $f^{-1}(x)$. Describe $f^{-1}(x)$ i.e. determine the domain, range and rule defining $f^{-1}(x)$.
- (d) For any x in the domain of $f(x)$, determine $f(f(x))$.

Birth Month	Assigned Room
January	Double
February	Triple
March	Double
April	Double
May	Double
June	Triple
July	Triple
August	Double
September	Triple
October	Double
November	Double
December	Triple