4.1: Must know how to do

- Finding vertical, horizontal, slant asymptotes.
- Understand basic limit rules. Need to be able to identify whether function is going to $\infty$ or 0 from left hand limit or right hand limit and so on.
- Find $x$, $y$ intercept
- Using first derivative to identify where a function is increasing/decreasing. Finding critical point could help but not always.
- You probably don’t need to identify concavity unless it was asked for it. Sometimes calculating the second derivative can be really annoying so don’t waste your time.
- You need to be able to draw graph using the above information.
- Extra exercise: know how to take derivative when there are constants "$c, k, r_0...$"

4.2: Must know how to do

- Read definition of critical point and memorize it.
- Know how to do first derivative test and memorize the highlighted section on first derivative test.
- Know how to do second derivative test and memorize the highlighted section on second derivative test.
- Memorize and know how to do open, closed interval method.
- Know how to do $[a, b)$ looking interval (maybe)

4.3 4.4: Must know how to do

- Usually the problem will ask you to find maximum and minimum. This is same as applying the idea of open, closed interval test.
- Make sure to check what function you are dealing with. Sometimes function $f(x)$ will be given but it might not be that you are optimizing over this function. It could be $f(x) \cdot h(x)$ or other things. Pay attention on those detail.
- Practice writing a formula when a condition for a function is given. E.g. try cylinder tissue problem, statue of the liberty problem.
- Make sure to take derivative with respect to the right variable!. I can’t emphasize this enough. When a problem was given to ”maximize/minimize” with respect to variable "$r$", it means you to take derivative with respect to $r$!. Don’t get confused
- When there are interval given in some problems of optimization, make sure to find your answer within the interval.
Study Tips

- Reading carefully during the exam is the most important thing when it comes to math exam. Varying the condition for a problem a little bit may change the problem dramatically!

- Study problems from the back to forward since usually the later part is harder.

- Make sure to know how to solve homework problems. If there is time left, do optional problem

- If you still have some time left do the hard problem! like word problems!

- Make sure you know how to do the basics. It’s more important to do the basic problems from each section very well than know how to do 1 or 2 hard problems.

- Take a deep breath and keep studying! You got this!