Study guide for Midterm Exam 01

1. Review guide_mse22s_quiz01.pdf, guide_mse22s_quiz02.pdf and guide_mse22s_quiz03.pdf.

2. Section 10.7: Study the statement of Term by Term Differentiation Theorem and Term by Term Integration Theorem. Use them to derive the power series representation of $\ln x$ and $\tan^{-1}(x)$.

3. Section 10.8: Memorize the definition of Taylor polynomial of order n generated by f at $x = a$ and Taylor series generated by f at $x = a$ $(T_{f,a}(x))$. Study how to generate $T_{f,a}(x)$ and why it is possible that $T_{f,a}(x) \neq f(x)$, $x \neq a$.

4. Section 10.9: Study the statement of Taylor's Theorem (formula) and its proof. Study the Remainder Estimation Theorem and application on elementary functions.

5. Section 10.10: Memorize the binomial series and the Taylor series of basic functions in Table 10.1 (page 658). Practice on variant of these series: perform differentiation/integration on them and see if you can recognize the resulting new series. Then practice on examples such as section 10.10, problems 41-52 and Chap 10, Practice Exercises, problems 51-56.

6. Section 10.10: Review the application of Taylor series in

   (a) Indeterminate forms (section 10.10, problems 29-40 and Chap 10, Practice Exercises, problems 73-79).

   (b) Approximating integrals and the error estimate.