Homework Assignment for Chapter 10

1. Section 10.1:

   Problems 53, 59, 63, 67, 69, 73, 81, 87, 89.

   Hint for problem 73: Read Appendix A.5.

2. Section 10.2: Problems 61, 65, 71, 75.

3. Section 10.3: Problems 27, 31, 33, 37, 53, 55.

4. Section 10.4: Problems 17, 27, 29, 31, 43, 45, 51, 61, 62.

5. Section 10.5: Odd numbered problems in problem 17-43, 61, 65.

6. Section 10.6: Problems 4, 11, 25, 26, 28, 29, 30, 35, 39, 43, 49, 53.

7. Section 10.7: 7, 11, 15, 19, 23, 29, 33, 37, 47, 55, 60.

8. Section 10.7: Find a power series that converges on $(1,3)$ and diverges otherwise. Do the same for $(1,3]$, $[1,3)$ and $[1,3]$, respectively.

9. Section 10.7: Use the power series expression of $\frac{1}{1-x}$ to find that of $\ln(1-x)$ on $|x|<1$.

10. Section 10.7: Find the first few terms of the power series representation of

$$\frac{1-x^2+x^4-\cdots}{1-\frac{x^2}{2!}+\frac{x^4}{4!}-\cdots}$$

11. Section 10.8: Problems 15, 23, 29, 35.

    Remark for problem 23: We know that $f(x)=\sum_{n=0}^{3} b_n(x-2)^n$ for some b_n's (for example, one can conclude this by repeated division by $(x-2)$). Nevertheless, it is enough to assume $f(x)$ can be written this form. The explicit values of b_n is not needed. Show that, the final answer is the same as $f(x)$.

12. Section 10.8: Let

$$f(x)=\begin{cases} 0, & x=0 \\ e^{-1/x^2}, & x\neq 0 \end{cases}$$

    It is known that $f^{(n)}(0)=0$ for all n. Verify this for $f'(0)$ and $f''(0)$.

13. Section 10.9: Problems 7, 9, 17, 19, 33, 41, 42, 50(a), 51.

14. Section 10.10: Problems 10, 19, 27, 31, 35, 37, 43, 46, 51, 58, 65, 66.