Homework Assignment for Week 04

1. Section 10.7: 29, 33, 37, 47, 51, 56.

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

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

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

4. 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 $f(x)$.

5. 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. We have shown this in class for $f'(0)$ and $f''(0)$. Continue to verify it for $f'''(0)$.