

Homework Assignment for Chapter 10

1. Section 10.1: Problems 53, 59, 63, 67, 69, 81, 87.
2. Section 10.1: Study Definition of the limit of a sequence on page 552. Make sure that you can write down the definition correctly.
3. Section 10.2: Problems 61, 65, 71, 75.
4. Section 10.2: Study the definition of the sum of a series on page 563.
5. Section 10.3: Problems 27, 31, 33, 37, 53, 55.
6. Section 10.4: Problems 17, 27, 29, 31, 43, 45, 51, 61, 62.
Note in problem 62: the case $p = 1, q < -1$ should be convergent, instead.
7. Section 10.5: Odd numbered problems in problem 17-43, 61, 65.
8. Section 10.6: Problems 4, 11, 25, 26, 28, 29, 30, 35, 39, 43, 49, 53.
9. Section 10.7: 7, 11, 15, 19, 23, 29, 33, 37, 47, 51, 56.
10. 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.
11. Section 10.7: Use the power series expression of $\frac{1}{1-x}$ to find that of $\ln(1-x)$ on $|x| < 1$.
12. Section 10.7: Find the first few terms of the power series representation of

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

13. 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 $f(x)$.

14. 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 $f''(0)$.

15. Section 10.9: Problems 7, 9, 17, 19, 33, 41, 42, 50(a).
16. Section 10.10: Problems 10, 27, 35, 37, 43, 46, 51, 64, 66.