## MATH2060B Exercise 11

### No need to submit
### (but you're strongly encouraged to work through these problems).

The questions are from Bartle and Sherbert, *Introduction to Real Analysis*, Wiley, 4th edition, unless otherwise stated.

**Section 9.3** Q.10, 15(b)(d)
**Section 9.4** Q.1(a)(c)(e), 2, 5, 6(a)(b)(c)(d)(f), 11, 12, 16, 17, 19

## Supplementary Exercises

1. Discuss the uniform convergence of the series

$$\sum_{n=1}^{\infty} \frac{x^n}{n}$$

for $x \in (0, b)$ where $b > 0$. The answer depends on the range of $b$.

2. Find the power series expansion of the function

$$f(x) = \frac{1}{1 + x^2}$$

centered at $x = 0$. You should indicate where the power series expansion is valid.

3. Show that if the radius of convergence of the power series

$$\sum_{n=0}^{\infty} a_n x^n$$

is $r$, then the radius of convergence of the power series

$$\sum_{n=0}^{\infty} a_n x^{2n}$$

is $r^{1/2}$.

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For those who want more practice:

**Section 9.3** Q.3, 5, 7, 11, 14