MATH112Z CALCULUS II, FALL 2019
MIDTERM 3 REVIEW

Midterm 3 covers topics in Section 11.4 – 11.11. More specific topics are listed below.

(1) Sec 11.4: be able to apply two comparison tests for positive term series: the basic comparison test and the limit comparison test.

(2) Sec 11.5: definition of alternating series; know how to apply the convergence test for alternating series; know the remainder estimate.

(3) Sec 11.6: understand definitions of absolutely convergence and conditionally convergence; know absolute convergence implies convergence; be able to apply ratio test and root test. (Here, you need to be able to find limit of a sequence. You should review if needed.)

(4) Sec 11.7: be able to tell which method in 11.4–11.6 to apply for a given series. There are some guidelines and nice practices in Section 11.7.

(5) Sec 11.8: know the definition of power series; understand the convergence theorem for power series (Theorem 4); know how to find convergence radius and interval of convergence.

(6) Sec 11.9: understand the theorem (Theorem 2) about differentiating and integrating power series; be able to find the power series expansion using geometric series, combined with other methods (substitution, multiplication, differentiation and integration.)

(7) Sec 11.10: be able to find Taylor and Maclaurin series for a given function using the definition; memorize the Maclaurin expansions of the following functions

$$e^x, \quad \sin x, \quad \cos x, \quad \ln(1+x), \quad \frac{1}{1-x}$$

in Table 1 of Section 11.10; memorize the convergence radius for these; be able to use them to find other Taylor series; know Taylor polynomials, Taylor's inequality and their implications to the convergence of Taylor series.

(8) Sec 11.11: understand approximating functions by Taylor polynomials and how to obtain error.

Some suggestions:

- Make sure you understand all the topics listed above.

- Make sure you can do all the homework problems without external helps. There are many exercises similar to the hw problems in the textbook. Please practice and find help if there is any trouble.

- Notice that some problems may take time to solve. You should be familiar with the methods to save time in the exam.