# Spring 2019 Math 152

**Week in Review 7**

*courtesy: Amy Austin*

(covering section 11.4-11.5)

## Section 11.4

1. Determine whether the following series converge or diverge.

   a.) $\sum_{n=1}^{\infty} \frac{n^4}{10n^4+n^2+1}$

   b.) $\sum_{n=1}^{\infty} \frac{n^2}{n^5+10n+1}$

   c.) $\sum_{n=3}^{\infty} \frac{n^2+n+9}{\sqrt{n^5-n^2-1}}$

   d.) $\sum_{n=2}^{\infty} \frac{\cos^2 n+5}{n^3+\sqrt{n}}$

   e.) $\sum_{n=1}^{\infty} \frac{5+\sin(7n)}{\sqrt{n}}$

   f.) $\sum_{n=1}^{\infty} \frac{5+\arctan(n)}{n^3}$

   g.) $\sum_{n=1}^{\infty} \frac{3}{4^n+n}$

   h.) $\sum_{n=5}^{\infty} \frac{n}{8n^2+6n+1}$

   i.) $\sum_{n=1}^{\infty} \frac{n^4-n^3+1}{\sqrt{n^{10}-n^6+3}}$

   j.) $\sum_{n=1}^{\infty} \frac{n^2+5n-2}{(3n+1)^3+2n}$

## Section 11.5

4. Use the alternating series test to determine whether the following series converge.

   a.) $\sum_{n=1}^{\infty} \frac{(-1)^n}{\sqrt{n+1}}$

   b.) $\sum_{n=1}^{\infty} \frac{(-1)^n n^2}{1+n^2}$

   c.) $\sum_{n=1}^{\infty} (-1)^{n-1} 2^{-n}$

   d.) $\sum_{n=1}^{\infty} (-1)^n 2^{3/n}$

5. Consider $\sum_{n=1}^{\infty} \frac{(-1)^n}{n^2}$

   a.) Prove the series is convergent.

   b.) Use $s_6$ to approximate the sum of the series and use the Alternating Series Estimation Theorem to estimate the error in using the 6th partial sum to approximate the sum of the series.

   c.) Determine the minimum number of terms we need to add in order to find the sum with error less than $\frac{1}{120}$.