# Spring 2020 Math 152

**Week in Review X**

courtesy: David J. Manuel

(covering 11.4, 11.5, and 11.6)

## 1  Section 11.4

1. Determine whether the following series are convergent or divergent. Explain why.

   (a) $\displaystyle\sum_{n=1}^{\infty} \frac{\sin\left(\frac{1}{n}\right)}{n^2}$

   (b) $\displaystyle\sum_{n=1}^{\infty} \frac{n}{(n+2)(n-3)}$

   (c) $\displaystyle\sum_{n=1}^{\infty} \frac{n}{(n+2)(n+3)}$

   (d) $\displaystyle\sum_{n=1}^{\infty} \frac{\sqrt{n+n^2}}{n+n^3}$

## 2  Section 11.5

1. Determine whether the following series are convergent or divergent. Explain why.

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

   (b) $\displaystyle\sum_{n=1}^{\infty} (-1)^{n+1} 3n^2 e^{-n^3}$

   (c) $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n(n+1)}{n}$

   (d) $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n(2+\cos n)}{n^2}$

2. How many terms of the series $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{n^3}$ do you need to add to estimate the sum to within an error of $10^{-6}$?

## 3  Section 11.6

1. For the convergent series in #1 of the previous section, determine which are absolutely convergent.

2. Determine if the following series are absolutely convergent, convergent (but not absolutely), or divergent:

   (a) $\displaystyle\sum_{n=0}^{\infty} \frac{(-1)^n 4^n}{n! 3^n}$

   (b) $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^{n+1} 4^n}{n 3^n}$

3. Find the values of $x$ for which the series $\displaystyle\sum_{n=2}^{\infty} \frac{(-3)^n(x-1)^n}{\sqrt{n}}$ converges.