Math 252 Calculus II (Bueler) Name: ____________________

Written Homework #12

Due at start of class Monday, 16 April 2018.

This Written Homework has problems from sections 11.5 and 11.6. Please work on it with other students! The submitted version must be written by you. You must show your work for full credit.

1. (a) On the number line below, and with some precision, mark and label the first six partial sums $s_1, s_2, \dots, s_6$ of the harmonic series

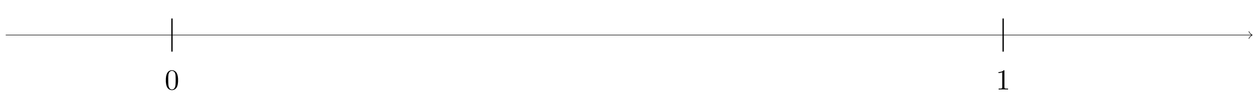
$$\sum_{j=1}^{\infty} \frac{1}{j}$$

Where is the limit of the partial sums?

(b) On the number line below, and with some precision, mark and label the first six partial sums $s_1, s_2, \dots, s_6$ of the alternating harmonic series

$$\sum_{j=1}^{\infty} \frac{(-1)^{j-1}}{j}$$

Also indicate the approximate location of the limit of the partial sums.



2. Test the series for convergence or divergence. If the Alternating Series Test is used, check that the hypotheses are satisfied.

$$\sum_{n=1}^{\infty} \frac{n\cos(n\pi)}{2^n}$$

3. Test the series for convergence or divergence. If the Alternating Series Test is used, check that the hypotheses are satisfied.

$$\sum_{n=1}^{\infty} (-1)^n \cos\left(\frac{\pi}{n}\right)$$

4. (a) Use the Alternating Series Test to show that the series converges.

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

(b) How many terms should be used so that the partial sum is within 10^{-3} of the (exact) sum of the series in part **(a)**?

5. Use the Ratio Test to determine whether the series converges or diverges.

$$\sum_{n=1}^{\infty} \frac{n}{2^n}$$

6. Use the Ratio Test to determine whether the series converges or diverges.

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

7. Use the Ratio Test to determine whether the series converges or diverges.

$$\sum_{n=1}^{\infty} \frac{n^{100} 100^n}{n!}$$

8. Use any test to determine whether the series is absolutely convergent, conditionally convergent, or divergent.

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

9. Use any test to determine whether the series is absolutely convergent, conditionally convergent, or divergent.

$$\sum_{n=1}^{\infty} \frac{(-1)^n}{n \ln n}$$