Math 1B

Test 3 Review

1. Determine whether $\displaystyle\sum_{n=0}^{\infty}\left(\frac{3}{\pi}\right)^n$ converges or diverges. If it converges, find the sum.

2. Consider the telescoping series $\displaystyle\sum_{n=1}^{\infty}\frac{4}{n^2+2n}$.

   a) Find a formula a_i for the decomposition of the general term of the given infinite series.

   b) Express the series as a partial sum s_n in sigma notation, $s_n = \displaystyle\sum_{i=1}^{n} a_i$.

   c) Expand the partial sum s_n and simplify.

   d) Find the sum of the infinite series, if it exists. Show all your work. NO CAS!

For problems 3-6, determine whether the series converges or diverges. State any tests that you use and show all steps.

3. $\displaystyle\sum_{n=1}^{\infty}\frac{1+3^n}{2^n}$

4. $\displaystyle\sum_{k=1}^{\infty}\left(\frac{4k^2-3}{7k^2+6}\right)^k$

5. $\displaystyle\sum_{n=0}^{\infty}\frac{1+\sin^2 n}{5^n}$

6. $\displaystyle\sum_{n=1}^{\infty} \frac{(2n)!}{n^{2n}}$

7. Classify the series below as absolutely convergent, conditionally convergent, or divergent. State any tests you use and show all steps.

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

b) $\displaystyle\sum_{k=1}^{\infty} (-1)^k \frac{k^2}{\sqrt{k^6+1}}$

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

A calculator may be used to help solve problem 8.

8. Solve the problems below. CAS may be used to help solve these problem.

a) Consider the infinite series $\displaystyle\sum_{n=1}^{\infty} \frac{1}{n^6}$. Using the **Remainder Estimate for the Integral Test**, find the smallest n such that the approximation is accurate to five decimal places ($R_n \leq 0.000001 = 1 \times 10^{-6}$). Using the n you found, determine with your calculator an approximation for the given infinite series to four decimal places of accuracy.

b) Consider the infinite series $\displaystyle\sum_{n=1}^{\infty} (-1)^n \frac{1}{n^6}$. Using the **Alternating Series Estimation Theorem**, find the smallest n such that the approximation is accurate to five decimal places ($R_n \leq 0.0000001 = 1 \times 10^{-6}$). Using the n you found, determine with your calculator an approximation for the given infinite series to four decimal places of accuracy.