Math 114: Practice Exam 3

This is a "Practice Exam", meaning it is like an exam appropriate for a Calc 2 class like ours. This is a **1 hour and 15 minute** exam. ∗Indicates this an extra problem like the one before it that would not be on said 1 hour and 15 minute exam.

1. Determine whether $\sum_{k=0}^{\infty} \frac{2^{k+1}}{5^k}$ converges or diverges. If it converges, find its sum.

2*. Determine whether $\sum_{k=0}^{\infty} e^{-k}$ converges or diverges. If it converges, find its sum.

3. Determine whether $\sum_{k=1}^{\infty} \frac{(-5)^{2k+1}}{k^k 9^k}$ converges or diverges. If it converges, does it converge absolutely or conditionally?

4. Determine whether $\sum_{k=1}^{\infty} \frac{1+\sin(k)}{k^2+1}$ converges or diverges.

5. Determine whether $\sum_{k=1}^{\infty} \frac{1+k+k^2}{\sqrt{1+k^2+k^6}}$ converges or diverges.

6*. Determine whether $\sum_{k=1}^{\infty} \frac{k+5}{\sqrt[3]{k^7+k^2}}$ converges or diverges.

7. Determine whether $\sum_{k=1}^{\infty} \left(\frac{2}{7k-3} - \frac{2}{7k+4}\right)$ converges or diverges. If it converges, find its sum.

8. Show $\sum_{k=1}^{\infty} \frac{(-1)^k}{(3k-1)^4}$ converges. How large must n be so that the approximation S_n is accurate within 10^{-4}?

9. Determine whether $\sum_{k=1}^{\infty} \frac{k^2-1}{k^2+k}$ converges or diverges.

10*. Determine whether $\sum_{k=1}^{\infty} \frac{\sqrt{k^6-1}}{k^2+k}$ converges or diverges.

11. Determine whether $\sum_{k=1}^{\infty} \frac{(-1)^{k+1}k^2}{(2k+1)!}$ converges or diverges. If it converges, does it converge absolutely or conditionally?

12. Show $\sum_{k=1}^{\infty} \frac{1}{(k+1)ln^3(k+1)}$ converges. How large could the error be if we approximate its sum with S_6? Do NOT simplify your answer.

13. Determine whether $a_n = (1 + 1/n)^n$ converges or diverges.