Calculus II, Exam 3 Review

Please keep in mind that this is a general review of topics to study. It is not meant to be all-inclusive.

- Chapter 10 -

1. Write the first four terms of the sequence $\left\{\frac{1}{6^n}\right\}$

2. Find the limit of the sequence $\left\{\frac{2n^3-1}{3n^3+1}\right\}$

3. Find the limit of the following sequence or determine that the sequence diverges. $\left\{\frac{n}{e^n+20n}\right\}$

4. Evaluate the geometric series or state that it diverges

$$\sum_{n=0}^{\infty} e^{-4n}$$

5. For the following telescoping series, find a formula for the nth partial sum and then use that to evaluate the sum of the series or state that the series diverges.

$$\sum_{k=1}^{\infty}\left(\frac{2}{\sqrt{k+2}} - \frac{2}{\sqrt{k+4}}\right)$$

6. Evaluate the following series or state that it diverges

$$\sum_{k=1}^{\infty}\left(3\left(\frac{1}{4}\right)^k - 2\left(\frac{3}{5}\right)^k\right)$$

7. Determine whether the following series converges. Justify your answer.

$$\sum_{k=1}^{\infty} \frac{10k^6 + k}{8k^6 - 12}$$

8. Determine whether the following series converges. Justify your answer.

$$\sum_{k=1}^{\infty} \frac{(-17)^k}{k!}$$

9. Determine whether the following series converges. Justify your answer.

$$\sum_{k=1}^{\infty} \frac{(-1)^k k}{3k^5 + 1}$$

10. Determine whether the following series converges. Justify your answer.

$$\sum_{k=1}^{\infty} \frac{k^{10}}{10^k}$$

11. Determine whether the following series converges. Justify your answer.

$$\sum_{k=1}^{\infty} \frac{6}{(k+2)^5}$$

12. Determine whether the following series converges. Justify your answer.

$$\sum_{k=1}^{\infty} \frac{8 + \cos 10k}{k^8}$$

13. Determine whether the following series converges. Justify your answer.

$$\sum_{k=1}^{\infty} (-1)^k \left(\frac{6k}{5k+8} \right)^k$$

14. Determine whether the following series converges. Justify your answer.

$$\sum_{k=1}^{\infty} k^7 e^{-3k}$$

15.   Determine whether the following series converges. Justify your answer.

$$\sum_{k=1}^{\infty} \frac{2(3k)!}{(k!)^3}$$

16.   Determine whether the following series converges. Justify your answer.

$$\sum_{k=1}^{\infty} \cos \frac{13}{k^7}$$

17.   Determine if the series converges absolutely, converges conditionally, or diverges

a. $$\sum_{k=1}^{\infty} \frac{(-1)^k}{2k+3}$$

b. $$\sum_{k=1}^{\infty} \frac{(-1)^k \tan^{-1} k}{k^3}$$