Number of people in the group: _____

Work on the following problems in groups. This worksheet will be collected at the end (but it will not be graded).

Write down the answer for each problem that you finish. For problems involving convergence or divergence of infinite series also write down the tests that you were using to get the answer.

1. For each of the following series, **evaluate it** or show that it diverges.

$$\frac{6}{2^0} + \frac{6}{2^1} + \frac{6}{2^2} + \frac{6}{2^3} + \cdots$$

$$\sum_{n=1}^{\infty} \frac{5 + (-2)^n}{3^n}$$

2. Compute Taylor polynomial $T_n(x)$ for e^x centered at -1.

3. Consider Taylor polynomial $T_3(x)$ for $\sin(3x)$ centered at 0. Compute error bound for

$$|T_3(.1) - \sin(.3)|$$

4. Compute interval of convergence for each of the following power series:

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

5. Starting from Maclaurin series written on the whiteboard, derive Maclaurin series for the following functions. Also specify for which x the expansion is valid.

$$\sin(x^2) \qquad\qquad \frac{1}{(1-3x)^2}$$

6. For each of the following series, determine whether it converges or diverges.

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

$$\sum_{n=1}^{\infty}\cos\left(\frac{1}{n}\right) \qquad\qquad \sum_{n=2}^{\infty}\frac{n!}{2^n}$$

7. For each of the following series, determine whether it diverges, converges conditionally, or converges absolutely.

$$\sum_{n=2}^{\infty}\frac{(-1)^n}{n^2+n} \qquad\qquad \sum_{n=1}^{\infty}\frac{(-1)^n}{\ln(n)+2}$$