1. Consider the sequence:

$$\left\{\frac{(n-1)^n}{n!}\right\}_{n=1}^{\infty}.$$

a. Find the first 10 terms in this sequence using the **seq** command, then evaluate the fractions using the **evalf** command.

b. Does this sequence converge or diverge? You may want to use Maple's **limit** command.

2. Consider the series:

$$4+\frac{-4}{3}+\frac{4}{5}+\frac{-4}{7}+...=\sum_{n=0}^{\infty}\frac{4(-1)^n}{2n+1}.$$

a. Create the sequence of partial sums, adding from 1 to 20 terms in this series. Give both fraction and decimal values. What is the decimal value of the 500^{th} partial sum?

b. Does this series converge, and if so, to what value?

3. a. Find the Maclaurin series expansion to 8 nonzero terms of the function

$$f(x)=\sinh(2x).$$

b. Find the Taylor's series expansion to 8 nonzero terms of the function

$$f(x)=\tan(x),$$

about $x=\pi/4$.

4. Work Problems 10.1 and 10.8 (p. 116) from the text. For the graphs, show at least two periods of the function.

a. **10.1**. Find the Fourier series of the following function of period 2π and make plots that show the Gibbs phenomenon. (Use $n=1,3,5,10,$ and 50 for the number of terms in your Fourier approximations for graphing.)

$$f(x)=\begin{cases}-3 & \text{if} \quad -\pi<x<0\\ 3 & \text{if} \quad 0<x<\pi\end{cases}$$

b. **10.8**. Find the Fourier series of the following function of period 1 and make plots showing $n=1,3,5,10,$ and 50 terms in your Fourier approximations.)

$$f(x)=\begin{cases}\frac{1}{2}+x & \text{if} \quad -1/2<x<0\\ \frac{1}{2}-x & \text{if} \quad 0<x<1/2\end{cases}$$