MATH 227-04 (Calculus II) **Computer Lab** **Power Series**
12/9/04

1. Find the power series of the following functions, centered at the given a. Then check your result with the computer.

   (a) $\dfrac{1}{1-3x}$, $a = 0$

   (b) $\dfrac{1}{3-x}$, $a = 0$

   (c) $\dfrac{1}{3-x}$, $a = 2$

   (d) $\dfrac{1}{3-2x}$, $a = 1$

2. Use `Mathematica` to compute the first few terms of the power series of the following functions, centered at the given a. From this data, guess the general form of the terms.

   (a) $\sin x$, $a = 0$

   (b) e^x, $a = 1$.

   (c) $\dfrac{1}{e^x}$, $a = 0$.

   (d) $\dfrac{1}{(1-x)^2}$, $a = 0$

3. For each of the functions in 2., plot the graphs of the first few partial sums of the power series.

4. Use some partial sums of the power series of e^x centered at $a = 0$ to compute e with different degrees of accuracy. Compare your results with the decimal expansion your calculator gives for e.