## MA 281, Honors Mathematical Analysis III, Spring '06. Extra Homework Sheet \# 3 .

1. Find the interval of convergence of the following power series. Also, comparing them with known power series (via differentiation, integration, or substitution) determine their limiting functions. [It is best to solve these problems in the given order.]
(a) $\sum_{n=0}^{\infty} x^{3 n}$.
(b) $\sum_{n=0}^{\infty} \frac{x^{3 n}}{27^{n}}$.
(c) $\sum_{n=0}^{\infty}(n+1) x^{n}$.
(d) $\sum_{n=0}^{\infty}(n+1) x^{3 n}$.
(e) $\sum_{n=0}^{\infty} n(n-1) x^{n-2}$.
(f) $\sum_{n=0}^{\infty} n^{2} x^{n} . \quad\left[\right.$ Hint: $\left.n^{2} x^{n}=x^{2}\left[\left(n^{2}-n\right) x^{n-2}\right]+x\left[n x^{n-1}\right].\right]$
(g) $\sum_{n=1}^{\infty} \frac{x^{n}}{n}$. [Hint: Change variable so that the series starts at 0.]
(h) $\sum_{n=1}^{\infty} \frac{(4 x)^{n}}{n}$.
(i) $\sum_{n=0}^{\infty} \frac{x^{2 n+1}}{n!}$.
