1. Find the interval and radius of convergence for the following two power series

a. $\sum_{n=1}^{\infty} \frac{2^n x^n}{n!}$

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

2. Find the third Taylor polynomial for $f(x) = \tan x$ centered at $a = \frac{\pi}{4}$

3. a. Find the third Taylor polynomial for $f(x) = \sin x$ centered at π

b. What is the bound on the error if we use the Taylor polynomial from part a. to approximate $\sin x$ for $\pi - \frac{1}{4} \le x \le \pi + \frac{1}{4}$.

4. Use the Maclaurin series for $\tan^{-1} x$ to approximate $\int_0^{.5} \tan^{-1}(x^2)dx$ with an error less than .001.

5. Give series representations (and their radius' of convergence) for the following functions, using known series:

a. $\frac{x}{3-x}$

b. $\frac{1}{(3-x)^2}$

c. $\ln(1+x^2)$ (start with $\frac{1}{1+x}$)

6. Use the series you obtained in problem 5 c. to approximate $\int_0^{\frac{1}{2}} \ln(1+x^2)dx$ with an error less than .001.

7. Let $f(x) = \sqrt{x+1}$

a. Find T_2 , the second Taylor polynomial for $f(x)$ centered at $a = 0$

b. Get a bound for the error if we assume $0 < x < \frac{1}{2}$