1) Find the third degree Taylor polynomial centered at 1 for the function $f(x) = \frac{x+3}{x}$.

2) Find the second term of the Maclaurin polynomial for the function $f(x) = sinx$.

3) Use the third degree Maclaurin polynomial to approximate the value of $e^{0.2}$. Then use Taylor's Theorem to obtain an upper bound for the error of the approximation.

4) Determine the interval of convergence of the series:

$$\sum_{n=1}^{\infty} \frac{(x-2)^n}{n3^n}$$

5) Given $f(x) = \sum_{n=0}^{\infty} \frac{(-1)^n x^{2n+1}}{(2n+1)!}$, find a power series for $f'(x)$.

6) Let f be the function $f(x) = \sum_{n=0}^{\infty} (-1)^n \left(\frac{x}{3}\right)^n$. Find the interval of convergence for

$\int f(x)dx$.

7) Find a power series, centered at 1, for the function $f(x) = \frac{2}{4x+3}$ and determine the

interval of convergence.