1: (a) Find the radius and interval of convergence of the power series $\displaystyle\sum_{n=1}^{\infty}\frac{(2-3x)^n}{n}$.

(b) Find the Taylor series centred at 0 for $f(x) = \dfrac{x}{x^2 - 6x + 8}$, and find its radius of convergence.

(c) Find the Taylor series centred at 3 for $f(x) = \dfrac{x}{x^2 - 6x + 8}$, and find its radius of convergence.

2: (a) Find the Taylor polynomial of degree 4 centred at 0 for $f(x) = \dfrac{\ln(1+x)}{e^{2x}}$.

(b) Find the Taylor polynomial of degree 5 centred at 0 for $f(x) = \dfrac{(1+3x)^{4/3}}{1+x}$.

3: (a) Approximate the value of $\ln(5/4)$ so the absolute error is at most $\frac{1}{1000}$.

(b) Approximate the value of $\sqrt[5]{e}$ so that the absolute error is at most $\frac{1}{1000}$

(c) Approximate the value of the definite integral $\displaystyle\int_0^1 \sqrt{4+x^3}\,dx$ so the absolute error is at most $\frac{1}{1000}$.

4: (a) Find the tenth derivative $f^{(10)}(0)$, where $f(x) = \sin(x^2/2)$.

(b) Evaluate $\displaystyle\lim_{x\to 0}\frac{\cos x - \sqrt{1-x^2}}{x(\sin x - x)}$.

(c) Evaluate $\displaystyle\sum_{n=0}^{\infty}\frac{(-2)^n}{(n+2)!}$.

(d) Evaluate $\displaystyle\sum_{n=0}^{\infty}\frac{(-1)^n n}{3^n}$.