(4) Suppose that you have done some mathematical modelling. This has produced a differential equation which you have solved by assuming a power series solution. The power series you have found is the following.

$$J_0(x) = \sum_{k=0}^{\infty} (-1)^k \frac{x^{2k}}{4^k (k!)^2}$$

(a) What is the radius of convergence of the power series?

(b) Use Mathematica to plot the partial sums

$$S_N(x) = \sum_{k=0}^{N} (-1)^k \frac{x^{2k}}{4^k (k!)^2},$$

for $N = 1, 2, 3, 4$ over the interval $[-5, 5]$.