Assignment 2

Q1

Use Mathematica to calculate the limit and convergence of the following infinite series

1. $\sum_{p=1}^{\infty} \frac{1}{1+2+3+\cdots p}$
2. $\sum_{n=1}^{\infty} \frac{\sin n}{n}$
3. $\sum_{k=1}^{\infty} \frac{\tanh k}{k}$
4. $\sum_{p=1}^{\infty} \frac{(2p)!}{p!p!}$
5. $\sum_{n=1}^{\infty} \frac{(\log n)^2}{e^n}$

Q2

Find out the coefficients of the power series representation for the following functions:

a. $f(x) = \tan^{-1} x,$

b. $f(x) = e^{x}$

c. $f(x) = \ln(\frac{1}{1+x^2})$

- Use Mathematica to generate the power series of $f(x)$.

- Compare them to their corresponding generating functions $f(x)$ by plotting both on the same plot using $n = 6$ and $n = 20$ terms respectively.