1. (4 pts) Assume that there is a sequence of numbers \( \{a_n\} \) such that
\[
a_1 + a_2 + a_3 + \cdots + a_n = \sqrt{2^{1+3n}}.
\]
Compute
\[
(a) \sum_{n=1}^{\infty} a_n \\
(b) \lim_{n \to \infty} a_n
\]

2. (6 pts) Test the following series for convergence
\[
(a) \sum_{n=1}^{\infty} n \sin(1/n).
\]
\[
(b) \sum_{n=3}^{\infty} (-1)^n \frac{\pi^{2n}}{(2n)!}.
\]
1. (4 pts) Assume that there is a sequence of numbers \( \{a_n\} \) such that
\[
a_1 + a_2 + a_3 + \cdots a_n = \left(1 + \frac{2}{n}\right)^n.
\]
Compute
(a) \( \sum_{n=1}^{\infty} a_n \)
(b) \( \lim_{n \to \infty} a_n \)

2. (6 pts) Test the following series for convergence
(a) \( \sum_{n=1}^{\infty} \tan(1/n) \).
(b) \( \sum_{n=1}^{\infty} \frac{n^{2n}}{(1 + n)^3n} \).