1. Does the following series converge or diverge?

\[ \sum_{n=1}^{\infty} \frac{\sqrt{n + \cos n}}{\sqrt{n^3 + n^4}} \]

2. Does the following series converge or diverge?

\[ \sum_{n=1}^{\infty} \frac{1}{n^{(n/100)}} \]

3. Approximate the definite integral

\[ \int_{0}^{1} \sin(x^3) \, dx \]

with an error of at most \(10^{-3}\). Please give an answer of the form \(a/b\) where \(a\) and \(b\) are integers.

4. Find the interval of convergence of the power series

\[ \sum_{n=2}^{\infty} \frac{2^n(x + 1)^n}{\ln n}. \]

5. Find the 17th derivative of the function

\[ f(x) = \frac{x^2}{(1 + x^3)^2} \]

at \(x = 0\). Please write the answer in the form \(a \cdot b!\) where \(a\) and \(b\) are integers.

6. Find the sum of the series

\[ \sum_{n=2}^{\infty} \frac{n(n-1)}{2^{n-2}}. \]