

Final Test A

試題：

1. (20%) Find $\int \frac{4x^3 + x}{2x^2 + x - 3} dx$.
2. (20%) Show that the series $\sum_{n=1}^{\infty} \frac{4}{4n^2 - 1}$ is convergent, and find the its sum.
3. (20%) Determine whether the series $\sum_{n=1}^{\infty} (-1)^{n-1} \frac{n^2 + 1}{2^n}$ is absolutely convergent, conditional convergent, or divergent.
4. (20%) Find the radius of convergence and the interval of convergence of $\sum_{n=1}^{\infty} \frac{x^n}{n}$.
5. (20%) Find the Taylor series for $f(x) = \ln x$ at 1, and determine its interval of convergence.