

Exam II

Problem 1 Consider the series $4 - 1 + \frac{1}{4} - \frac{1}{16} + \cdots$.

- (a) Find a formula for the n -th term of the series.
- (b) Find the sum of the series.

Problem 2 Consider the series $\sum_{n=1}^{\infty} \frac{1}{(4n-3)(4n+1)}$.

- (a) Find a formula for the partial sums of the series.
- (b) Find the sum of the series.

Problem 3 For which values of x is the series $\sum_{n=1}^{\infty} \frac{x^n}{n^3}$ convergent? What is its radius of convergence?

Problem 4 Let $f(x) = \int_0^x e^{-y^2} dy$.

- (a) Find the Maclaurin series of $f(x)$ and explain why it is convergent to $f(x)$.
- (b) Use (a) to compute $f(1)$ to within 0.1.

Problem 5 Find the Taylor series of the function $f(x) = \sin x$ around $x = -\frac{\pi}{2}$.