

Practice Exam 2

1. Consider the function $\ln(\cos x)$.

(a) Find the Maclaurin series through x^4 .

(b) Find the Taylor series centered at $\frac{\pi}{4}$ through $(x - \frac{\pi}{4})^4$.

2. Find the convergence set for the following series:

$$1 + \frac{3x^2}{4} + \frac{9x^4}{9} + \frac{27x^6}{16} + \frac{81x^8}{25} + \dots$$

3. Recall that

$$\frac{d}{dx} \tan^{-1} x = \frac{1}{1+x^2}.$$

Find a power series for $x^2 \tan^{-1} x$.

4. Consider the equation $y'' + 2y' - 15y = e^{3x}$.

(a) Solve the equation using the method of undetermined coefficients.

(b) Solve the equation using the method of variation of parameters.