(1) Find the interval and radius of convergence for the following:

(a) \( \sum_{n=0}^{\infty} \frac{x^n}{2n - 1} \)

(b) \( \sum_{n=0}^{\infty} \frac{x^n}{n!} \)

(c) \( \sum_{n=0}^{\infty} \frac{(x - 2)^n}{n^2 + 1} \)

(d) \( \sum_{n=0}^{\infty} n!(2x - 1)^n \)

(2) Write \( f(x) = \frac{1}{4 + 3x} \) as a power series. For which values of \( x \) does the series converge?

(3) Determine a series expansion for \( y = \ln (x - 1) \). What is its interval of convergence?

(4) Determine a series expansion for \( y = \frac{x^3}{2 + x^2} \). What is its interval of convergence?

(5) Use a power series to find \( \int \frac{x}{1 - x^8} \, dx \).

(6) Write a power series for \( \frac{1}{(1 - x)^2} \). \textit{Hint: Write out a series for} \( \frac{1}{1-x} \) \textit{and differentiate both sides.}

(7) Find a Taylor series for \( f(x) = \frac{1}{2} \) centered at \( x = 1 \).

(8) Use a Maclaurin series to find \( \int \sin (x^2) \, dx \).