

1. Find the sum S for the following series. Hint: you can decompose the fraction into two fractions using use partial fractions. The series can then be calculated as a telescoping series.

$$S = \sum_{n=1}^{\infty} \frac{4}{4n^2 - 1}$$

2. Prove that $f(x) = \sqrt{16 - x^2}$ is continuous on $[-4, 4]$.

3. Find the global maximum and minimum of the function $f(x) = 2x^3 - 3x^2 - 12x + 1$ on the interval $[-2, 0]$.

4. Consider

$$f(x) = \frac{1}{1-x}$$

- (a) Find the Maclaurin series of $f(x)$.

(b) Find the convergence interval for the series obtained from part (a) of question 4, using the ratio test.