Problem Set 8

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Problem 1: Find the first three terms in the Taylor Series of the function $f(x) = x^3 + x$, at $a = -1$.

Problem 2: Determine if the following series converges or diverges. If it converges, find its sum.

$$\sum_{n=0}^{\infty} \frac{2^{2n+2}}{5^n}$$

Problem 3: Use any test to check the convergence or divergence of the given series.

$$\sum_{n=1}^{\infty} \frac{n}{2^n} \frac{n!}{(n+1)!}$$

Problem 4: Use any test to check the convergence or divergence of the given series.

$$\sum_{n=1}^{\infty} \frac{(-1)^n (x-1)^n}{\sqrt{n+1}}$$

Problem 5: Find the power series representation for $\ln(1-x)$ and its radius of convergence.

Problem 6: Find the first three nonzero terms in the Maclaurin series for $f(x) = e^x \sin(x)$.

Problem 7: Use any test to check the convergence or divergence of the given series.

$$\sum_{n=2}^{\infty} \frac{1}{n\sqrt{\ln(n)}}$$