

Problem Set 6

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Problem 1: Find the value of p for which the series is convergent.

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

Problem 2: Find the value of p for which the series is convergent.

$$\sum_{n=3}^{\infty} \frac{1}{n \ln n [\ln(\ln n)]^p}$$

Problem 3: Find the value of p for which the series is convergent.

$$\sum_{n=1}^{\infty} \frac{\ln n}{n^p}$$

Problem 4: Find the interval of convergence for f, f' , and f'' .

$$f(x) = \sum_{n=1}^{\infty} \frac{x^n}{n^2}$$

Problem 5: Find the value of p for which the series is convergent.

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

Problem 6: Find the value of the integral:

$$\int_0^{1/2} \frac{dx}{x^2 - x + 1}$$

Problem 7: Find the sum of the following series.

$$(i) \sum_{n=2}^{\infty} n(n-1)x^n, |x| < 1,$$

$$(ii) \sum_{n=2}^{\infty} \frac{n^2 - n}{2^n}$$

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