Problem Set 5

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Problem 1: Apply the root test to the following series.

$$\sum_{n=1}^{\infty} \left(\frac{n}{2n+3} \right)^n$$

Problem 2: Apply the root test to the following series.

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

Problem 3: Apply the ratio test to the following alternating series.

$$\sum_{n=1}^{\infty} (-1)^n \frac{n!}{1000^n}$$

Problem 4: Evaluate the following series using any test.

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

Problem 5: Evaluate the following series converges or diverges.

$$\sum_{n=2}^{\infty} \frac{1}{\sqrt{n^3 - n^2}}$$

Problem 6: Evaluate the following series converges or diverges.

$$\sum_{n=1}^{\infty} (0.8)^{-n} \, n^{-0.8}$$

Problem 7: Evaluate the following series converges or diverges.

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

Problem 8: State whether the following series converges or diverges.

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