Practice Exam

- Evaluate the integral, then determine convergence or divergence

1. $$\int_0^4 \frac{dx}{(x-1)^2}$$

2. Show that $\int_1^{+\infty} \frac{1}{x^p}\,dx$ converges for $p > 1$ and diverges for $p \le 1$.

- determine convergence or divergence of the following: (Justify answers!)

3. $$\left\{ \frac{n!}{2^n} \right\}_{n=1}^{\infty}$$

4. $$\left\{ \frac{\sin^2(n)}{2^n} \right\}_{n=1}^{\infty}$$

5. $$\sum_{n=0}^{\infty} \frac{(-1)^n}{2^n}$$

6. $$\sum_{n=0}^{\infty} \left(\frac{5}{2^n} + \frac{(-1)^n}{5^n} \right)$$

• Determine Convergence / Divergence for the following; if convergent specify which type: Absolute, conditional.

7] $$\sum_{n=0}^{\infty} (-1)^n \frac{n}{e^n}$$

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

9] $$\sum_{n=2}^{\infty} (-1)^n \left(\frac{\ln(n)}{\ln(n^2)}\right)^n$$

10] $$\sum_{n=1}^{\infty} (-1)^n \frac{(2n)!}{2^n n! n}$$