

1 Questions:

2 10.5 # 43:

Prove that $\sum_{n=1}^{\infty} \frac{2^{n^2}}{n!}$ diverges.

3 Determine if the following series converge or diverge:

- $\sum_{n=1}^{\infty} \frac{3^n n^2}{n!}$
- $\sum_{n=1}^{\infty} \frac{\sin(2n)}{1 + 2^n}$
- $\sum_{n=1}^{\infty} \frac{\sqrt{n^2 - 1}}{n^3 + 2n^2 + 5}$
- $\sum_{n=1}^{\infty} (-1)^n \frac{\ln(n)}{\sqrt{n}}$
- $\sum_{n=1}^{\infty} \frac{1}{(\ln n)^{\ln n}}$
- $\sum_{n=1}^{\infty} \left(\frac{n}{n+1}\right)^{n^2}$