

$$1). \sum_{k=1}^{\infty} k^2 e^{-k}$$

$$2). \sum_{n=1}^{\infty} (-1)^n \cos\left(\frac{1}{n^2}\right)$$

DETERMINE WHETHER OR NOT THE  
SERIES CONVERGE:

$$3). \sum_{n=1}^{\infty} (-1)^n \frac{\ln n}{\sqrt{n}}$$