Mar. 10, 2017, 25 minutes

• The quiz has 3 problems. Total 10 + 1 points.

QUESTION 1. (5 PTS) Find all $x \in \mathbb{R}$ such that $\sum_{n=1}^{\infty} \frac{e^{nx}}{n^2}$ is convergent. Justify your claim.

QUESTION 2. (5 PTS) Let a_n , $b_n > 0$ and assume $\sum_{n=0}^{\infty} a_n$, $\sum_{n=0}^{\infty} b_n$ are convergent. Prove that $\sum_{n=0}^{\infty} c_n$ is convergent where $c_n = a_n b_n$.

QUESTION 3. (1 BONUS PT) Let $a_n > 0$ and assume $\sum_{n=0}^{\infty} a_n, \sum_{n=0}^{\infty} b_n$ are convergent. Prove that $\sum_{n=0}^{\infty} c_n$ is convergent where $c_n = a_n b_n$.