

Q4: First we take note that $\mu(\cup_{i=1}^{\infty} E_i) \leq \sum_{i=1}^{\infty} \mu(E_i) < \infty$ and clearly this implies that $\mu(E_1) < \infty$. Using insight gleaned from Q3b about $\mu(\limsup_n E_n)$ we evaluate that:

$$\begin{aligned}\mu(\limsup_n E_n) &= \mu\left(\bigcap_{k \geq 1} \bigcup_{n \geq k} E_n\right) \\ &= \lim_{k \rightarrow \infty} \mu\left(\bigcup_{n \geq k} E_n\right) && \text{(by measure continuity and assumption)} \\ &\leq \lim_{k \rightarrow \infty} \sum_{n=k}^{\infty} \mu(E_n) \\ &= 0 && \text{(since the sum converges, the tail must converge to 0)}\end{aligned}$$