In class, we defined a function $\mu : \mathcal{B} \times \Omega \to \mathbb{R}$ so that

$$\mu((-\infty, r], \omega) = \mathbb{P}[X \leq r]|\omega$$

with probability 1. Let $\mathcal{L}$ be the class of $\mathcal{B}$-sets $H$ such that $\mu(H, \cdot)$ is $\mathcal{G}$-measurable. Show that $\mathcal{L}$ is a $\lambda$-system, and prove that this means that $\mu(H, \cdot)$ is $\mathcal{G}$-measurable for every $H \in \mathcal{B}$. 