$\text{Be } \mathcal{B}, \ (X_t)_{t \in \mathbb{R}^+} \text{ on } (\Omega, \mathcal{F}, P)$

The first hitting time of $\mathcal{B}$ by $(X_t)$ is

$$T_\mathcal{B} = \inf\{t : X_t \in \mathcal{B}\}$$

Let $(F_t)_{t \in \mathbb{R}^+}$ be right continuous, $(X_t)$ adapted to $(\mathcal{F}_t)$

a) if $X_t$ is right continuous, $T_\mathcal{B}$ is a stopping time for $\mathcal{B}$ open

b) if $X_t$ is continuous, then $T_\mathcal{B}$ is a stopping time for a countable union of closed sets $\mathcal{B}$

If $T_\mathcal{B}$ is a stopping time of $\{T_\mathcal{B} < t \} \in \mathcal{F}_t \iff T_\mathcal{B} < t \in \mathcal{F}_t \text{ as of } (\mathcal{F})$