Problems - 3.7

(13) (a) Show that the family F of all intervals of the form $I_n = (\frac{1}{n+2}, \frac{1}{n})$ for $n \in \mathbb{N}$ covers the interval $J = (0, 1)$.

(b) Show that no subfamily (finite or infinite) of F covers J.

(15) Let F_1 be the family of all intervals $I_n = (\frac{1}{2^n}, 2)$ for $n \in \mathbb{N}$. Show the F_1 covers that interval $J = (0, 1)$. Does any finite subfamily of F_1 cover J? Prove your answer.