

Q1: Let $A \subset \mathbb{R}^n$ be closed. Define $G_k = \{x : d(x, A) < \frac{1}{k}\}$. We have that each G_k is open, and $A = \bigcap_{k \geq 1} G_k$. It follows immediately that every open set is an F_σ set, since any open set is the complement of some closed set. Taking the complements in \mathbb{R}^n , we write our open set as the union of closed sets.