R problems

Due Friday October 2

- Read Folland Chapter 0 §6

- Show that the two notions of completeness of $\mathbb{R}$ are equivalent.

- Prove the following statement:

  A metric space (X, ρ) is separable if and only if there exists a countable family of open sets $\{\mathcal{O}_i\}_i$ such that for any open set $\mathcal{O} \subset X$

$$\mathcal{O} = \bigcup_{\mathcal{O}_i \subset \mathcal{O}} \mathcal{O}_i$$