1. Show that $\mathcal{R}[a,b]$ is closed in $B[a,b]$ and that integration is continuous on $\mathcal{R}[a,b]$. (That is, show that the map taking f to $\int_a^b f$ is continuous.)

2. Let Δ be the standard Cantor set. Determine if χ_Δ is Riemann integrable.

3. Let $l : \mathcal{P}(\mathbb{R}) \to [0,\infty]$, and suppose l is monotone. Prove that l is finitely additive and countably subadditive if and only if it is countably additive.

4. Carothers 16.3 *Hint:* Take advantage of Proposition 16.4.

5. Carothers 16.4

6. Carothers 16.12

7. Carothers 16.16

8. Carothers 16.24 (A subset of $\mathbb{R}$ is a G_δ set if it is a countable intersection of open sets.) Also, determine if your proof allows you to conclude that $m^*(U \setminus E) = 0$.

9. Carothers 16.25

10. Carothers 16.28