1. Carothers 1.4

2. Carothers 1.11

3. Carothers 1.15

4. Carothers 1.21

5. Carothers 1.24

6. Suppose $\limsup_{n\to\infty} x_n = -\infty$, as defined in terms of eventual upper bounds. Show that

$$\overline{\lim_{n\to\infty}} x_n = -\infty,$$

as defined in the text.

7. Let (r_n) be an enumeration of $\mathbb{Q} \cap [0,1]$. Show that $\limsup n \to \infty = 1$.

8. Prove that

$$\limsup x_n + \liminf y_n \leq \limsup(x_n + y_n) \leq \limsup x_n + \limsup y_n$$

so long as neither of the right- or left-hand sides are of the form $\infty - \infty$.

9. Carothers 1.36