1. Working from the definition of continuity in a metric space, show that a function $f : X \to Y$ is continuous at $x \in X$ if and only if whenever $(x_n)_{n=1}^{\infty}$ is a sequence in X converging to x, $(f(x_n))_{n=1}^{\infty}$ converges to $f(x)$.

2. Let (f_n) be a sequence of continuous functions from $[0,1]$ to $\mathbb{R}$. Suppose the sequence converges uniformly to a function f. Prove that f is continuous.

3. Carothers 1.26

4. Carothers 4.11

5. Carothers 4.14

6. Carothers 5.8

7. Carothers 5.17

8. Carothers 5.19

9. Carothers 5.24

10. Carothers 5.25

11. Carothers 5.26

12. Carothers 5.28