Note: The book has Exercises, which are interspersed among the prose, and Problems, which appear at the ends of the chapters. It can be easy to confuse the two. Note the bold blue Exercises below.

1. **Exercise 2.22**

2. **Exercise 2.23**

3. Problem 2-4

4. Problem 2-5 (brief justifications only)

5. Problem 2-10

   (You'll need the definition of a Hausdorff space, which we will see on Friday.)

6. Problem 2-15 (a)

7. (This is a modification of **Exercise 2.28**)

   Consider the map $\exp : [0,1) \to S^1$ given by $\exp(x) = e^{2\pi i x}$. This map is continuous (for example, it is sequentially continuous as a map between metric spaces). From familiar properties of trigonometric functions it is a bijection (though it would not be if we expanded the range to $[0,1]$ and it would not be if we shrunk the range!). Your job is to show that its inverse function is not continuous. Hint: Find a sequence $\{x_n\}$ in S^1 that converges to some point x, and yet $f^{-1}(x_n) \not\to f^{-1}(x)$.