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. Exercises are denoted in blue.

1. Problem 2-23
2. Problem 3-2
3. Problem 3-3 (you'll want to read the hugely useful Gluing Lemma first)
4. **Exercise 3.7**
5. Give a rock solid proof that the cylinder $M = \{(x, y, z) \in \mathbb{R}^3 : x^2 + y^2 = 1\}$ is a 2-manifold.
6. Using metric space arguments only, show that a sequence $\{x_n\}$ in $\mathbb{R}^k$ converges to a limit x if and only if each projection sequence $\{\pi_j(x_n)\}$ converges to $\pi_j(x)$, $1 \le j \le k$.
7. Problem 3-6 (wait until after Friday to start this)
8. (Thanks Torin for musing this question out loud)

   Let X and Y be topological spaces such that every

   $$f : X \to Y$$

   is continuous. Show that either X is discrete or Y is indiscrete.