Large-Scale Comments

1. Given that many courses using the book might not employ *every* section, it would be extremely helpful to add a glossary of all notation used throughout the book to make it easier to find anything not covered.
2. Throughout the first part of the book, lots of definitions are given with iffs. E.g., "Call an object x a _____ iff it satisfies properties _____." This isn't as consistently adhered to in the second half.

Chapter 3

1. Notational inconsistency. Section 3.1, page 46: "there is a designated set U_x in X with $x \in U_x$ such that $f(U_x) \subset V$." Here, the X should be in math font, i.e. X.
2. Possible undesirable formatting. Section 3.1, page 48: in the statement of theorem 3.1 ("Let $\{U_i\}_{i=1}^n$ be a finite collection of open sets"), "finite" is not italicized, whereas the surrounding text is. This is likely due to the use of `\emph` inside an italicized environment. While this is indeed the expected behavior, it might be worth considering using boldface together with italics to emphasize finite in this context — however, it's certainly a matter of personal preference.

Chapter 4

1.

Chapter 11

1. Possibly ambiguous parse structure. Section 11.4, page 167: "Another category of theorem we will prove is fixed point theorems." While this sentence is grammatically correct if parsed as "Another (category of (theorem we will prove)) is (fixed point theorems)," it is easy for a first-time reader to parse the sentence as "Another (category of theorem) we will prove is (fixed point theorems)," which I think has a number agreement error ("category of theorem" is singular, "is" is singular, "fixed point theorems" is plural — easy to not realize "fixed point theorems" is the title of the category). Not sure if this is actually a problem though.
2. Number agreement error. Section 11.4, page 167: "Another type of theorem that we will prove are theorems about geometric separation." This is sort of the dual of the part above — "type of theorem that we will prove" is singular no matter how you parse it, "are" is plural.

Chapter 12

1. Notational error. Exercise 12.1, page 170: "Show that the torus T^2 is homeomorphic to $\mathbb{S}^1 \times \mathbb{S}^1$." Torus should be denoted $\mathbb{T}^2$.
2. Possible error. Section 12.1, page 172 — "The basis for the topology is the collection of open cones with the cone point at the origin." I believe this should be double cones?

Chapter 15

1. Small typesetting inconsistency. Section 15.1, definition of a standard n-ball:

$$B^n = \left\{(x_1, \ldots, x_n) \in \mathbb{R}^n \;\middle|\; x_1^2 + \ldots + x_n^2 \leq 1\right\}.$$

In the definition of of the n-cube above this, $\cdots$ (`\cdots`) is used to indicate continuation of $\times$. Here, and in the definition of the standard n-sphere below it, $\ldots$ (`\ldots`) is used to indicate continuation of $+$. This may be a matter of personal preference, but I've always assumed standard practice is to use $\ldots$ (`\ldots`)for the continuation of enumerations (e.g., sets or lists), and $\cdots$ (`\cdots`) for the continuation of operations. Either way, it probably ought to be consistent between $+$ and $\times$.

2. Possible clarification suggestion. Section 15.1, definition of the standard n-sphere. We define

$$\mathbb{S}^n = \left\{(x_0, \ldots, x_n) \in \mathbb{R}^{n+1} \;\middle|\; x_0^2 + \cdots + x_n^2 = 1\right\}.$$

   Since we're reindexing from 0 here (instead of adding an x_{n+1} coordinate), it might be worth pointing that out to the reader, especially seeing as both of the previous examples started their indexing at 1. This could easily be incorporated into the note below without adding too much text, however it's non-essential.

3. Possible grammatical error. Section 15.1, definition of a manifold: "An *n-dimensional manifold* or *n-manifold* is a separable, metric space, M [...]". It seems like one or more of these commas should not be there — in this context, isn't "metric" usually used as an adjective? Either way, the comma usage is inconsistent with that in theorem 15.4 ("for a separable, metric space M^n, the following are equivalent").

4. Notational inconsistency. Section 15.1. "For example, in the closed disk $\mathbb{D}^2$, [...]". We defined $\mathbb{D}^2$ to refer to the unit square in the section above. Should this be B^2 instead?

5. Possibly incomplete definition. Section 15.2, definition of affinely independent. "recall that a set of points $v_0, \ldots, v_k$ in $\mathbb{R}^n$ is *affinely independent* if $\{v_1 - v_0, \ldots, v_k - v_0\}$ is a linearly independent set." As far as I can tell, v_0 is not privileged, hence it should be mentioned that we require this to hold for all v_i?

6. Possibly incomplete definition. Section 15.2, definition of convex combination. "A *convex combination* of $v_0, \ldots, v_k$ is a linear combination of those points whose coefficients sum to 1." I believe it should also be mentioned that we require said coefficients to be non-negative.

7. Unclear definition. Section 15.2, definition of the underlying space of a simplicial complex. "[...] with a topology of sets whose intersection with each simpliex σ in K is open in σ." From it's unclear from this which topology we're supposed to use to determine if the intersection is open in σ — I'm assuming the standard topology on $\mathbb{R}^n$?