The following problems will be relevant for your writing quiz on Thursday, 10/27/16.

Skill / Computational Problems. These problems are not handed in or graded, and do not involve enough writing to be the basis of a writing quiz, but are a good way to check that you understand the concepts used in the writing problems.

(1) Do the True / False problems at the beginning of the 2.4 exercises.

(2) Find a specific bijection between $(0, 1)$ and $[0, 1)$ to show the sets are equinumerous. Explain why your function is a bijection.

(3) Let $\mathscr{P}(S)$ be the power set of S. Determine whether each of the following is True of False. Explain your answers.

   (a) For every set S, $\emptyset \subseteq \mathscr{P}(S)$.

   (b) For every set S, $\emptyset \in \mathscr{P}(S)$.

   (c) $\{2\} \subseteq \mathscr{P}(\{2, 3\})$

   (d) $\{2\} \in \mathscr{P}(\{2, 3\})$

   (e) $\{\{2\}\} \subseteq \mathscr{P}(\{2, 3\})$

Writing Problems. Your writing quiz on Thursday will be based on the problems below. A problem on the quiz could appear exactly as stated in the book, or it could be a slightly modified version of a problem below.

(4) Prove: if S is denumerable, it is equinumerous with a proper subset of itself.

(5) Prove: every infinite subset has a denumerable subset.

(6) Prove $\mathbb{N} \times \mathbb{N}$ is countable. (Hint: you could use an argument similar to what we used for $\mathbb{Q}^+$. Alternatively, Theorem 2.4.10 could be useful.)

(7) If A and B are countable, prove $A \times B$ is countable. (Hint: again, Theorem 2.4.10 could be useful!)

Notice that exercises with a star have answers or hints in the back of the book. If those problems are assigned, use the back of the book to check your work. If a similar problem is assigned, you can do the starred problem to check whether you understand the concepts.