Excercise 1.1 Read *The Secret to Raising Smart Kids* By Carol Dweck and write a few pagagraphs about what you learned and how it may help you be successful in a proof-based math class.

I really enjoyed this article. I believe that The Secret to Raising Smart Kids hit the nail right on the head. While reading, I was reminded of the satisfaction of improvement. When I look back at my proudest achievement, it took me two years to complete. I spent hours with little progress. Regardless, my understanding of the problem grew tremendously. In October, my friends and I participated in the University of Waterloo's senior math contest. Many of the concepts used were new to us. We spent hours every day preparing for the test. Even though I didn't do very well, it's still one of the biggest reasons I got interested in math. That month of preparation was the most productive I've been.

Currently, I'm on summer break. I plan to focus on understanding and improving my skills when I return. Specifically with Science, I hope to obsess over it. After I finish this chapter, I plan to order Ordinary Differential Equations by Morris Tenenbaum and Harry Pollard to help me learn physics and chemistry.

This isn't the first time I am reading this book. I've read through most of the book previously. However, I did not spend the time doing the problems. In my opinion, this was a huge mistake. I am currently reading the book again, this time working through the problems.

Excercise 1.2 Explain the error in the following "proof" that $2 = 1$.
Let x = y. Then,

$$x^2 = xy \tag{1}$$
$$x^2 - y^2 = xy - y^2 \tag{2}$$
$$(x+y)(x-y) = y(x-y) \tag{3}$$
$$x + y = y \tag{4}$$
$$2y = y \tag{5}$$
$$2 = 1 \tag{6}$$
$$\tag{7}$$

Answer : On line 4, the proof divides by $x - y$, however since $x = y$ this step divides by 0.

Excercise 3.9 Write down all subsets of each of the following.

(a) $\{1, 2, 3\}$

(b) $\{\mathbb{N}, \mathbb{Q}, \mathbb{R}\}$

(c) $\{\mathbb{N}, \{\mathbb{Q}, \mathbb{R}\}\}$

(d) $\emptyset$

Answer (a) $\emptyset, \{1\}, \{2\}, \{3\}, \{1,2\}, \{1,3\}, \{2,3\}, \{1,2,3\}$
Answer (b) $\emptyset, \{\mathbb{N}\}, \{\mathbb{Q}\}, \{\mathbb{R}\}, \{\mathbb{N},\mathbb{Q}\}, \{\mathbb{N},\mathbb{R}\}, \{\mathbb{Q},\mathbb{R}\}, \{\mathbb{N},\mathbb{Q},\mathbb{R}\}$
Answer (c) $\emptyset, \{\mathbb{N}\}, \{\{\mathbb{Q},\mathbb{R}\}\}, \{\mathbb{N}, \{\mathbb{Q},\mathbb{R}\}\}$
Answer (d) $\emptyset$