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.

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) $\emptyset$