Chapter 7

Prove the following statements.

Exercise (12). There exists a positive real number x for which $x^2 < \sqrt{x}$.

Proof: Write your answer here. □

Exercise (18). There is a set X for which $\mathbb{N} \in X$ and $\mathbb{N} \subseteq X$.

Proof: Write your answer here. □

Exercise (21). Every real solution of $x^3 + x + 3 = 0$ is irrational.

Proof: Write your answer here. □

Exercise (31). If $n \in \mathbb{Z}$, then $\gcd(n, n+1) = 1$.

Proof: Write your answer here. □

Exercise (35). Suppose $a, b \in \mathbb{N}$. Then $a = \gcd(a, b)$ if and only if $a \mid b$.

Proof: Write your answer here. □

Chapter 8

Use the methods introduced in this chapter to prove the following statements.

Exercise (4). If $m, n \in \mathbb{Z}$, then $\{x \in \mathbb{Z} : mn \mid x\} \subseteq (\{x \in \mathbb{Z} : m \mid x\} \cap \{x \in \mathbb{Z} : n \mid x\}$.

Proof: Write your answer here. □

Exercise (6). Suppose A, B and C are sets. Prove that if $A \subseteq B$, then $A - C \subseteq B - C$.

Proof: Write your answer here. □

Exercise (7). Suppose A, B and C are sets. If $B \subseteq C$, then $A \times B \subseteq A \times C$.

Proof: Write your answer here. □

Exercise (9). If A, B and C are sets, then $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$.

Proof: Write your answer here. □

Exercise (10). If A and B are sets in a universal set U, then $\overline{A \cap B} = \overline{A} \cup \overline{B}$.

Proof: Write your answer here. □

Exercise (14). If A, B and C are sets, then $(A \cup B) - C = (A - C) \cup (B - C)$.

Proof: Write your answer here. □

Exercise (Reflection Problem).

- How long did it take you to complete each problem? What part of the assignment took the most time? Why?

  Response: Write your answer here. □

- What was easy for you? Why do you think that was so?

  Response: Write your answer here. □

- What was challenging for you? What made it challenging?

  Response: Write your answer here. □

- Compare your answers to the odd numbered exercises to those in the back of the textbook. What did you learn from this comparison?

  Response: Write your answer here. □