Discrete Mathematics with Applications, 4th edition
Susanna S. Epp

Supplementary Exercises: Chapter 1

1. **Section 1.1**: Fill in the blanks using a variable to rewrite the given statement: The square of any negative real number is positive.

   (a) Given any negative real number r, the square of ____.

   (b) For any real number r, if r is ____, then ____.

   (c) If a real number r is ____, then ____.

2. **Section 1.2**

   (a) Is $2 \in \{1, 2, 3\}$?

   (b) Is $\{2\} \in \{\{1\}, \{2\}, \{3\}\}$?

   (c) Is $2 \in \{\{1\}, \{2\}, \{3\}\}$?

   (d) Is $\{2\} \subseteq \{1, 2, 3\}$?

   (e) Is $\{2\} \subseteq \{\{1\}, \{2\}, \{3\}\}$?

3. **Section 1.3**: Let $A = \{-2, -1, 0, 1, 2\}$ and $B = \{1, 2, 3, 5\}$, and define a relation R from A to B as follows: For all $(x, y) \in A \times B$,

   $$x \, R \, y \text{ means that } y^2 > x^2.$$

   (a) Write R as a set of ordered pairs.

   (b) Is R a function? Justify your answer.