Homework 1

Questions on sets

• Textbook Section 1.1: Questions 12, 14, 24, 26, 32

• Questions not from the textbook:
  
  (1) Write the following sets by listing their elements

  \[ A = \{ x^2 : x \in \mathbb{Z}, \ 0 \leq 2x + 5 < 10 \} \]

  \[ B = \{ m \in \mathbb{N} : 5 \mid m \} \]

  Now, given the set \( A \) above, determine the set

  \[ C = \{ r \in \mathbb{Q} : r \geq 0 \text{ and } x^2 + 2ax + r = 0 \text{ for } x \in \mathbb{Z}, \ a \in A \} \]

  and write it by listing its elements.

  (2) Write the following sets in set builder notation:

  \[ D = \{ 1, 5, 9, 13, \ldots \} \]

  \[ E = \{ -12, -6, -4, -3, -2, -1, 1, 2, 3, 4, 6, 12 \} \]

  \[ F = \left\{ \frac{1}{2}, \frac{3}{5}, \frac{4}{10}, \frac{5}{17}, \frac{26}{\ldots} \right\} \]

Questions on logic

• Textbook Section 2.2: Question 8

• Textbook Section 2.3: Question 8

• Textbook Section 2.4: Question 2

• Textbook Section 2.5: Questions 2, 10