Exercise 01 - Sets

Create a text file named 'exercises01.txt' that contains the solutions to each problem below.

1. Provide five members and five non-members of the set

$$\{x : \exists\, n \in \mathbb{N}, x = 2n \wedge \exists\, m \in \mathbb{N}, x = 3m\}$$

2. List the elements of each of the following sets

   (a) $\mathbf{A} = \{10^n : n \in \mathbb{N} \wedge 0 \leq n \leq 4\}$

   (b) $\mathbf{B} = \{x : x \in \mathbb{N} \wedge x \leq 20 \wedge \forall\, m, n \in \mathbb{N} - \{x\}, x \neq mn\}$

3. Given $\mathbf{A}, \mathbf{B} \subseteq \mathbf{S}$ such that $\mathbf{S} = \{1, 2, 3, 4, 5, 6\}$m $\mathbf{A} = \{1, 2, 3\}$ and $\mathbf{B} = \{1, 2, 4\}$, find

   (a) $\mathbf{A} \cup \mathbf{B}$

   (b) $\mathbf{A} \cap \mathbf{B}$

   (c) $\mathbf{A} - \mathbf{B}$

   (d) $\mathbf{B}'$

   (e) $\mathbf{B} - \mathbf{A}'$

4. Given $\mathbf{A} = \{a, b, c, d\}$ and $\mathbf{B} = \{i, j, k\}$, find $\mathbf{A} \times \mathbf{B}$ and $\mathbf{B} \times \mathbf{A}$.

5. Given $\mathbf{C} = \{a, b, c, d\}$, find $\wp(\mathbf{C})$ and $|\wp(\mathbf{C})|$.