

## Exercises

**Exercise 1.** Consider a set  $A = \{2, 4, 5, 11\}$  ordered by  $\leq$ . Is  $\leq$  a total order or a partial order on  $A$ ? What are the minimal/least/maximal/greatest elements? Let  $A \subset \mathbb{N}$ . What are the bounds?

**Exercise 2.** Consider a set  $A = \{2, 4, 5, 11\}$  ordered by divisibility  $|$ . Is  $|$  a total order or a partial order on  $A$ ? What are the minimal/least/maximal/greatest elements? Let  $A \subset \mathbb{N}$ . What are the bounds?

**Exercise 3.** Draw the Hasse diagram of the powerset of  $\{a, b, c\}$  ordered by inclusion  $\subseteq$ . Is the relation  $\subseteq$  a total order or a partial order on  $\{a, b, c\}$ ?

**Exercise 4.** Draw the Hasse diagram of the set  $A = \{1, 2, 3, 4, 5, 6\} \subset \mathbb{N}$  ordered by divisibility  $|$ . Is  $|$  a total order to a partial order on  $A$ ?

**Exercise 5.** Consider the set  $\mathbb{N} \subset \mathbb{Z}$  ordered by  $\leq$ . Is there a minimal/maximal/least/greatest element? Is the set  $\mathbb{N}$  bounded? What are the bounds?

**Exercise 6.** Consider a subset  $[a, b] \subset \mathbb{N}$  ordered by  $\leq$ . Is there a minimal/maximal/least/greatest element? Is the set bounded? What are the bounds?

**Exercise 7.** Consider the set  $\mathbb{Z}$  ordered by  $\leq$ . What are the minimal/maximal/least/greatest elements? What are the bounds?

**Exercise 8.** Consider the subset  $\mathbb{Z}^+$  of positive integers. What are the minimal/maximal/least/greatest elements? What are the bounds?

**Exercise 9.** Consider the subset  $(\sqrt{2}, 5] \subset \mathbb{Q}$ . What are the minimal/maximal/least/greatest elements? What are the bounds?

**Exercise 10.** Consider the set  $\mathbb{C}$ . What are the minimal/maximal/least/greatest elements? What are the bounds?

**Exercise 11.** Show that any real number  $m \in \mathbb{R}$  is an upper and lower bound for an empty set  $\emptyset$ .