

## Quiz # 1.

**Problem 1. a.** Given sets  $A$  and  $B$  define  $A \setminus B$  and  $A \cap B$ .

**b.** Let  $A = \{\emptyset, a, b, \{1\}, x\}$  and  $B = \{a, 1, x\}$ . Find  $A \setminus B$  and  $A \cap B$ .

**Solution. a.**

$$A \setminus B = \{x \mid x \in A \text{ and } x \notin B\}, \quad A \cap B = \{x \mid x \in A \text{ and } x \in B\}.$$

**b.**

$$A \setminus B = \{\emptyset, b, \{1\}\}, \quad A \cap B = \{a, x\}.$$

**Problem 2.** Let  $P, Q$  be statements. Provide truth tables for  $(P \Rightarrow Q)$ ,  $(P \text{ and } Q)$ ,  $(P \text{ or } Q)$ , not  $P$ .

**Solution.** See the attached table. Note that we used that

$$(P \Rightarrow Q) = ((\text{not } P) \text{ or } Q).$$