Mengenlehre Verknüpfungen – Lösungen

1. a) $A \cap B = \{3,6\}$ b) $A \cap B = \{c\}$ c) $A \cap B = \{\ \}$
   d) $A \cap B \cap C = \{\ \}$ e) $A \cap B = \{2,4,6,\ldots\}$ f) $A \cap B = \{\ \}$

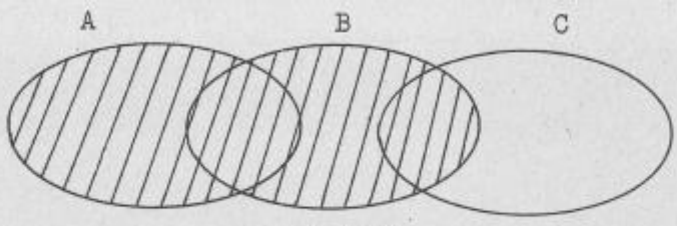
2. a) $A \cup B = \{1,2,3,4,5,7,9\}$ b) $A \cup B = \{1,2,3,4,5,6\}$
   c) $A \cup B = \{a,b,c,d,e,f\}$ d) $A \cup B \cup C = \{1,3,4,5,6\}$
   e) $A \cup B = \{1,2,3,4,5,6,\ldots\}$ f) $A \cup B = \{1, 2, 3, 4, 5, 6, \ldots\}$

3. a) $A \setminus B = \{a,b,c,d\}$ b) $A \setminus B = \{b,c\}$
   c) $A \setminus B = \{1,2,3\}$ d) $A \setminus B = \{\ \}$
   e) $A \setminus B = \{\ \}$ f) $A \setminus B = \{1,3,5,7,\ldots\}$

4. a) $\overline{A_G} = \{2,4,6,8,\ldots\}$ b) $\overline{B_G} = \{1,3,5,7,\ldots\}$
   c) $\overline{C_G} = \{\ \}$ d) $\overline{D_G} = \{1,2,3,4,\ldots\}$

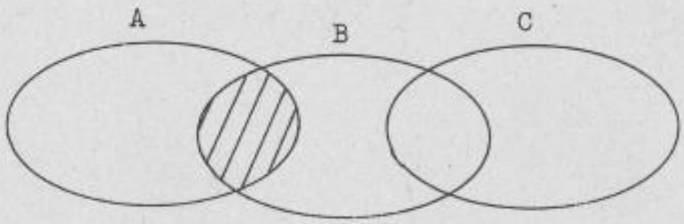
5. a) $A \cap B = \{2,4,6\}$ b) $B \cap C = \{2\}$
   c) $A \cap B \cap C = \{2\}$ d) $A \cup B = \{1,2,3,4,5,6,8\}$
   e) $B \cup C = \{1,2,3,4,6,8\}$ f) $A \cup B \cup C = \{1,2,3,4,5,6,8\}$
   g) $A \setminus B = \{1,3,5\}$ h) $B \setminus A = \{8\}$
   i) $(A \setminus B) \setminus C = \{1,3,5\} \setminus \{1,2,3\} = \{5\}$

6. a)



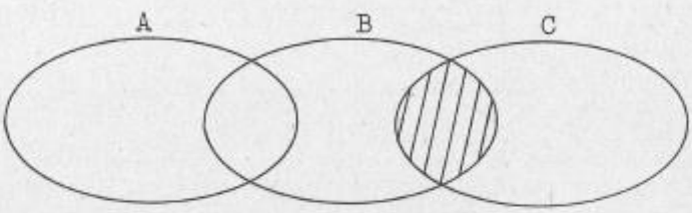
$A \cup B$

b)



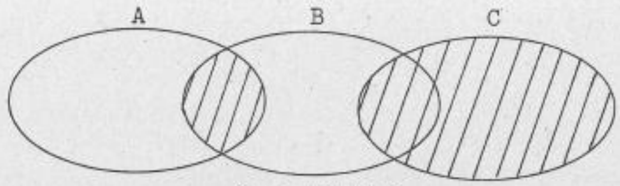
$A \cap B$

c)



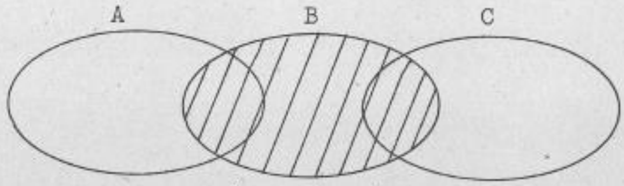
$(A \cup B) \cap C$

d)



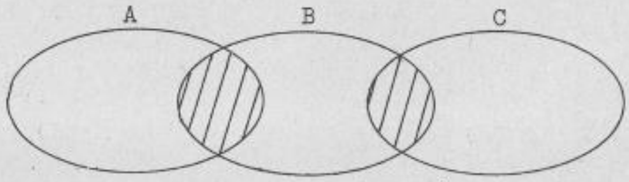
$(A \cap B) \cup C$

e)



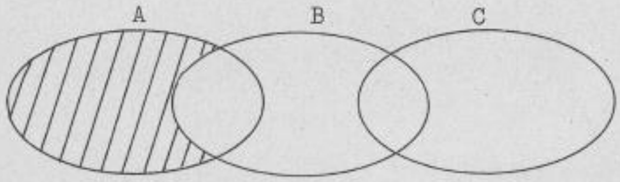
$(A \cup B) \cap (B \cup C)$

f)



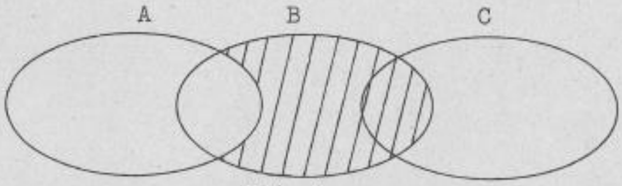
$(A \cap B) \cup (B \cap C)$

g)



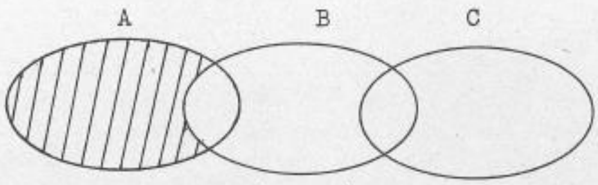
$A \setminus B$

h)



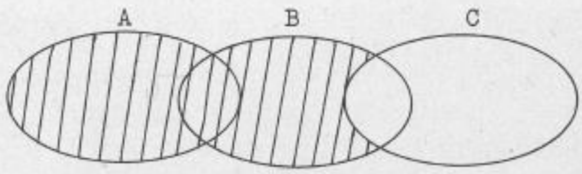
$B \setminus A$

i)



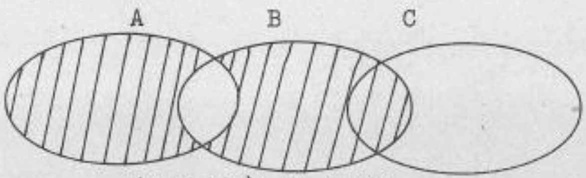
$A \setminus (A \cap B)$

j)



$(A \cup B) \setminus C$

k)



$(A \cup B) \setminus (A \cap B)$

7. a) $A \cap B$ b) $A \cap B \cap C$ c) $(A \cap B) \cup (B \cap C)$
d) $(A \cap B) \cup (A \cap C)$ e) $B \setminus A$ f) $B \setminus (A \cup C)$
g) $\overline{(A \cup B)}_G$ h) $\overline{((A \cup B) \setminus (A \cap B))}_G$

13. a) Wenn $A \subset B$, dann $A \cap B = A$
b) Wenn $B \subset A$, dann $A \cap B = B$
c) Wenn $A \subset B$, dann $A \cup B = B$
d) Wenn $B \subset A$, dann $A \cup B = A$
e) Wenn $A \subset B$, dann $A \setminus B = \{\}$
f) Wenn $B \subset A$, dann $B \setminus A = \{\}$

14. Wenn $A \setminus B = \{\}$, dann gibt es für die Mengen A und B folgende Möglichkeiten:
(1) $A = B$; (2) $A \subset B$; (3) $A = \{\}$, B beliebig
Diese drei Fälle kann man durch $A \subseteq B$ zusammenfassen.

15. a) $B = \{\}$ b) $A = \{\}$