

Algebra-Aufgaben: Mengenlehre 5

1. In dieser Aufgabe verwenden wir die folgenden Mengen:

$$\begin{aligned} \mathbb{A} &:= \{4, 8, 12, 16, 20\} \\ \mathbb{B} &:= \{2, 4, 8, 16, 32\} \\ \mathbb{C} &:= \{1, 2, 3, \dots, 19, 20\} \end{aligned}$$

Welche der folgenden Aussagen sind *wahr*:

- | | | | | | |
|------|---------------------------------|-------|---|------|-------------------------------------|
| i. | $\mathbb{A} \subset \mathbb{C}$ | ii. | $2 \in \mathbb{C}$ | iii. | $\mathbb{C} \subset \mathbb{A}$ |
| iv. | $2 \subset \mathbb{V}_2$ | v. | $\mathbb{V}_4 \subset \mathbb{A}$ | vi. | $ \mathbb{A} < 32$ |
| vii. | $\{ \} \subset \mathbb{C}$ | viii. | $\mathbb{A} = \mathbb{V}_4 \cap \mathbb{C}$ | ix. | $ \mathbb{A} > 2$ |
| x. | $\mathbb{B} \subset \mathbb{B}$ | xi. | $\mathbb{B} \in \mathbb{B}$ | xii. | $\mathbb{B} \not\subset \mathbb{B}$ |

Bestimme die folgenden Mengen in der aufzählenden Form:

- (a) $\mathbb{D} = \{x \in \mathbb{C} \mid x \in \mathbb{A} \vee x \in \mathbb{B}\}$
- (b) $\mathbb{E} = \{x \in \mathbb{C} \mid x \in \mathbb{A} \wedge x \in \mathbb{B}\}$
- (c) $\mathbb{F} = \{x \in \mathbb{C} \mid x \in \mathbb{B} \vee x \in \mathbb{A}\}$
- (d) $\mathbb{G} = \{x \mid x \in \mathbb{A} \wedge x \in \mathbb{B}\}$

2. *Die Regeln von de Morgan*

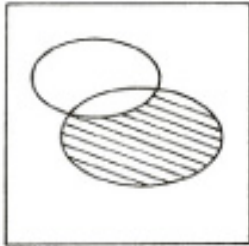
Stelle in einem Mengendiagramm die folgenden Mengen dar:

- (a) $\mathbb{A}^c \cap \mathbb{B}^c$
- (b) $\mathbb{A}^c \cup \mathbb{B}^c$
- (c) $(\mathbb{A} \cap \mathbb{B})^c$
- (d) $(\mathbb{A} \cup \mathbb{B})^c$

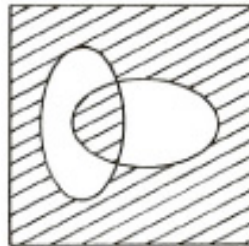
Was stellst du fest?

3. Stelle die schraffierten Flächen durch Mengenverknüpfungen dar:

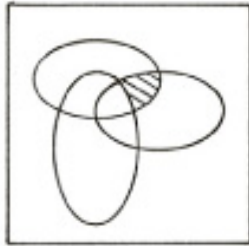
(a)



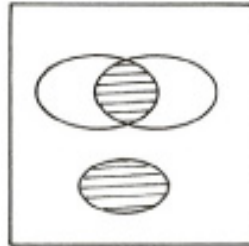
(b)



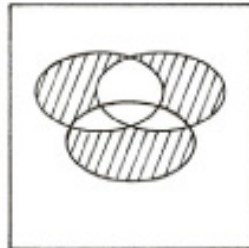
(c)



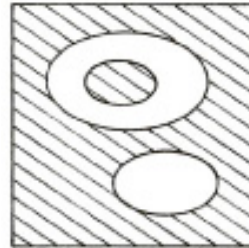
(d)



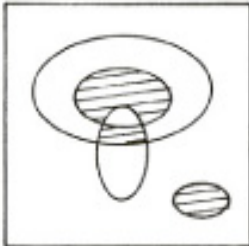
(e)



(f)



(g)



(h)

