
 Section 1.7: The Algebra of Sets
Exercises

Give the membership tables for the following expressions.

1. $A \cap A$
2. $A \cup U$
3. $A \cap \emptyset$
4. $\overline{A} \cup B$
5. $\overline{A \cup B}$
6. $\overline{A} \cup \overline{B}$
7. $A \cap (A \cup B)$
8. $\overline{A} \cup (B \cap C)$
9. $A \cap \overline{B} \cap \overline{C}$
10. $A \cup \overline{C} \cup B \cup \overline{A} \cup \overline{B}$
11. $\overline{A} \cup B \cup (A \cap \overline{B})$
12. $(A \cap \overline{B} \cap \overline{C}) \cup (A \cap \overline{B} \cap C)$

Are the resulting sets equal to each other?

13. $\overline{A \cap B}$ and $\overline{A} \cap \overline{B}$
14. $\overline{A \cup B}$ and $\overline{A} \cap \overline{B}$
15. $A \cup (B \cap C)$ and $(A \cup B) \cap C$
16. $A \cup (A \cap B)$ and A
17. $A \cap (\overline{A} \cup B)$ and $A \cup B$
18. $(A \cup B) \cup C$ and $A \cup (B \cup C)$

Consider the sets $U = \{1, 2, 3, 4, 5, 6\}$, $A = \{2, 4, 6\}$, and $B = \{3, 4, 5, 6\}$. Use the **computer representation of sets** to find the following.

19. $A \cap \overline{B}$
20. $\overline{A} \cup B$
21. $\overline{\overline{A \cup B}}$

$$22. (\overline{A} \cap B) \cup (A \cap \overline{B})$$

Consider the sets $U = \{1, 2, 3, \dots, 20\}$, $A = \{1, 2, 3, \dots, 8\}$, $B = \{2, 4, 6, \dots, 18\}$ and $C = \{2, 5, 7, 13, 14\}$. Use the **computer representation of sets** to find the following.

$$23. \overline{\emptyset \cap \overline{C} \cup \overline{B}}$$

$$24. (\overline{A} \cup B) \cap C$$

$$25. \overline{\emptyset \cup \overline{C} \cap \overline{B}}$$

$$26. \overline{A \cup \overline{B}} \cap (\overline{A} \cup \overline{C})$$

$$27. (A \cap \overline{B}) \cup (\overline{B} \cup C)$$