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$$\Omega = \{1, 2, 3, 4, 5, 6, 7, 8\}$$

$$E_1 = \{1, 2, 3, 4\}, E_2 = \{2, 4, 6, 8\}, E_3 = \{6, 7, 8\}$$

a)  $E_1 \cap E_2 = \{2, 4\}$

$$E_1 \cup E_2 = \{1, 2, 3, 4, 6, 8\}$$

$$\overline{E_1} \cap \overline{E_3} = \{5, 6, 7, 8\} \cap \{1, 2, 3, 4, 5\} = \{5\}$$

$$\overline{E_1} \cap \overline{E_3} = \overline{\emptyset} = \Omega$$

$$E_1 \setminus \overline{E_2} = E_1 \setminus \overline{\{2, 4, 6, 8\}} = \{1, 2, 3, 4\} \setminus \{1, 3, 5, 7\} = \{2, 4\}$$

$$\overline{E_2} \cup \overline{E_3} = \{1, 3, 5, 7\} \cup \{1, 2, 3, 4, 5\} = \{1, 2, 3, 4, 5, 7\}$$

$$\overline{E_2} \cap \overline{E_3} = \overline{\{6, 8\}} = \{1, 2, 3, 4, 5, 7\}$$

b)  $E_1 \cap \overline{E_2} = \{1, 2, 3, 4\} \cap \{1, 3, 5, 7\} = \{1, 3\}$

$$E_1 \setminus (E_1 \cap E_2) = \{1, 2, 3, 4\} \setminus \{2, 4\} = \{1, 3\}$$

Hinweis: Anders als die Aufgabenstellung behauptet, „zeigen“ Sie damit nicht, dass die Formel

$$E_1 \cap \overline{E_2} = E_1 \setminus (E_1 \cap E_2)$$

gilt ...

c) Zu den de-Morgan-Regeln:

$$- \overline{E_1 \cap E_2} = \overline{\{2, 4\}} = \{1, 3, 5, 6, 7, 8\},$$

$$\overline{E_1} \cup \overline{E_2} = \{5, 6, 7, 8\} \cup \{1, 3, 5, 7\} = \{1, 3, 5, 6, 7, 8\}$$

$$- \overline{E_1 \cup E_2} = \overline{\{1, 2, 3, 4, 6, 8\}} = \{5, 7\},$$

$$\overline{E_1} \cap \overline{E_2} = \{5, 6, 7, 8\} \cap \{1, 3, 5, 7\} = \{5, 7\}$$