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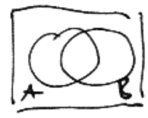
E_1: einstellig $\quad E_1 = \{1, 2, \ldots, 9\} \quad |E_1| = 9 \quad P(E_1) = 0{,}09$

E_2: ≤ 42 $\quad E_2 = \{1, 2, \ldots, 42\} \quad |E_2| = 42 \quad P(E_2) = 0{,}42$

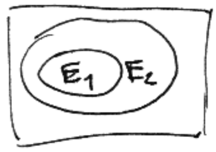
E_3: ≥ 60 und gerade $\quad E_3 = \{60, 62, 64, \ldots, 100\} \quad |E_3| = 21 \quad P(E_3) = 0{,}21$

$E_1 \cup E_2, \; E_1 \cup E_3, \; E_2 \cup E_3, \; E_1 \cup \overline{E_2}, \; \overline{E_1} \cup \overline{E_2}$

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

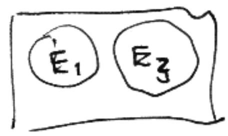


a) $P(E_1 \cup E_2) = 0{,}09 + 0{,}42 - P(\underbrace{E_1 \cap E_2}_{E_1}) = 0{,}09 + 0{,}42 - 0{,}09 = 0{,}42$



(Das ist kein Venn-Diagramm)

b) $P(E_1 \cup E_3) = 0{,}09 + 0{,}21 - P(E_1 \cap E_3) = 0{,}3 - P(\emptyset) = 0{,}3$



c) $P(E_2 \cup E_3) = 0{,}42 + 0{,}21 - 0 = 0{,}63$ (wie bei b))

d) $\overline{E_2} = \{43, 44, \ldots, 100\}, \quad P(\overline{E_2}) = 1 - 0{,}42 = 0{,}58$

$P(E_1 \cup \overline{E_2}) = 0{,}09 + 0{,}58 - 0$ (wie bei b)) $= 0{,}67$

e) $\overline{E_1} = \{10, 11, 12, \ldots, 100\}, \quad P(\overline{E_1}) = 1 - 0{,}09 = 0{,}91$

$P(\overline{E_1} \cup \overline{E_2}) = 0{,}91 + 0{,}58 - P(\overline{E_1} \cap \overline{E_2})$

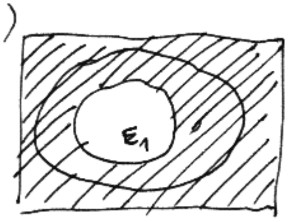
$= 0{,}91 + 0{,}58 - P(\overline{E_1 \cup E_2})$ (de Morgan)

$= 0{,}91 + 0{,}58 - (1 - P(E_1 \cup E_2))$

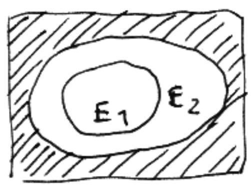
$= 0{,}91 + 0{,}58 - 1 + 0{,}42$ (nach a))

$= 0{,}91$

$(\overline{E_2} \subseteq \overline{E_1})$



$\overline{E_1}$



$\overline{E_2}$

e) kürzer: $P(\overline{E_1} \cup \overline{E_2}) \underset{\text{de Morgan}}{=} P(\overline{E_1 \cap E_2}) = 1 - P(E_1 \cap E_2) \underset{E_1 \subseteq E_2}{=} 1 - P(E_1) = 1 - 0{,}09 = 0{,}91$