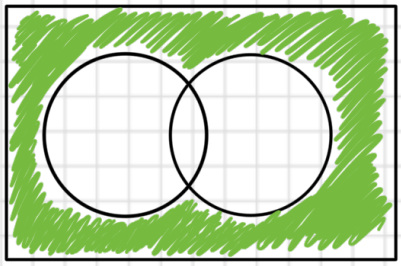
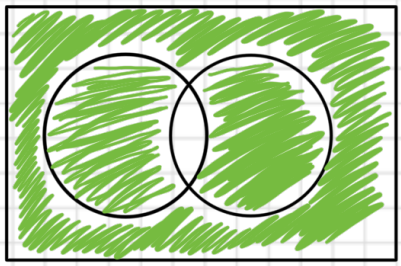
a) $\overline{(A \cup B)} = \bar{A} \cap \bar{B}$ | $\overline{(A \cap B)} = \bar{A} \cup \bar{B}$





b) $P(A) = 3/8$, $P(B) = 1/2$ and $P(A \cap B) = 1/4$

(a) $P(A \cup B) = P(A) + P(B) - P(A \cap B) = \frac{3}{8} + \frac{1}{2} - \frac{1}{4} = \boxed{\frac{5}{8}}$

(b) $P(\bar{A}) = 1 - P(A) = 1 - \frac{3}{8} = \boxed{\frac{5}{8}}$ | $P(\bar{B}) = 1 - P(B) = 1 - \frac{1}{2} = \boxed{\frac{1}{2}}$

(c) $P(\bar{A} \cap \bar{B}) = P(\overline{A \cup B}) = 1 - P(A \cup B) = 1 - \frac{5}{8} = \boxed{\frac{3}{8}}$

(d) $P(A \cap \bar{B}) = P(A) - P(A \cap B) = \frac{3}{8} - \frac{1}{4} = \boxed{\frac{1}{8}}$

(e) $P(A|B) = \frac{P(A \cap B)}{P(B)} = \frac{1/4}{1/2} = \boxed{\frac{1}{2}}$

(f) $P(A|\bar{B}) = \frac{P(A \cap \bar{B})}{P(\bar{B})} = \frac{1/8}{1/2} = \boxed{\frac{1}{4}}$

c) $P(A) = 0{,}6$ and $P(A \cup B) = 0{,}9$

a) Incompatible

$P(A \cap B) = 0 \rightarrow P(A) + P(B) - P(A \cup B) = 0 \rightarrow P(B) = P(A \cup B) - P(A) = 0{,}9 - 0{,}6 = \boxed{0{,}3}$

b) Independientes

- $P(A \cap B) = P(A) \cdot P(B) = 0{,}6 \cdot P(B)$
- $P(A \cup B) = P(A) + P(B) - P(A \cap B) \rightarrow 0{,}9 = 0{,}6 + P(B) - 0{,}6 \cdot P(B) \rightarrow 0{,}9 = 0{,}6 + 0{,}4 \cdot P(B) \rightarrow 0{,}3 = 0{,}4\,P(B) \rightarrow$

$\rightarrow P(B) = \frac{0{,}3}{0{,}4} = \boxed{0{,}75}$