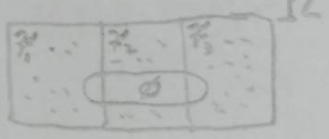
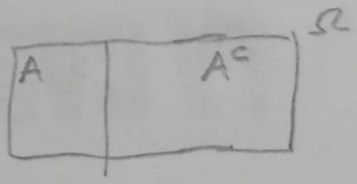
3. a) $P(\phi) = \frac{|\phi|}{|\Omega|}$, por convención $|\phi| = 0$

$\Rightarrow P(\phi) = \frac{0}{|\Omega|} = 0$



b) $P(A^c) = \frac{|A^c|}{|\Omega|}$

Por definición de A^c, sabemos que

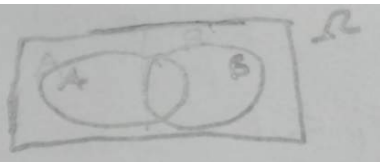


$|A^c| = |\Omega| - |A|$

$P(A^c) = \frac{|\Omega| - |A|}{|\Omega|} = 1 - \frac{|A|}{|\Omega|}$; Por def de probabilidad de A: $P(A) = \frac{|A|}{|\Omega|}$

$\Rightarrow P(A^c) = 1 - P(A)$

f) $P(A \cup B) = \frac{|A \cup B|}{|\Omega|} = \frac{|A| + |B| - |A \cap B|}{|\Omega|}$



$$P(A \cup B) = \frac{|A|}{|\Omega|} + \frac{|B|}{|\Omega|} - \frac{|A \cap B|}{|\Omega|}$$

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