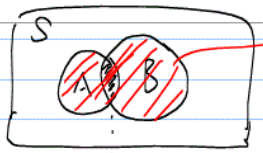
CDA 6530

Note Title

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



$A \cup B$

$A \cap B$

$P(A \cup B) = P(B) + P(B^c \cap A)$

$P(B^c \cap A) \stackrel{?}{=} P(A) - P(A \cap B)$

$P(B^c \cap A) + P(A \cap B) = P(A)$

- $P(A|B) = P(AB)/P(B)$

$P(AB) = P(A|B) \cdot P(B)$

$P(s|B) = P(s)$ if $s \in B$

- A box with 5000 chips, 1000 from company X, other from Y. 10% from X is defective, 5% from Y is defective.
- A="chip is from X", B="chip is defective"

$$P(B) = \frac{1000 \times 0.1 + 4000 \times 0.05}{5000} = \frac{300}{5000} = 6\%$$

$$P(A \cap B) = P(AB) = \frac{1000 \times 0.1}{5000} = \frac{100}{5000} = 2\%$$

$$P(A|B) = \frac{100}{300} = \frac{1}{3}$$

- $P(A|B) \stackrel{?}{=} P(AB)/P(B)$

$\frac{1}{3}$ ↳ $0.02/0.06 = 1/3$