$$P(A) > 1 - \epsilon_1,\ P(\overline{A}) = 1 - P(A) < \epsilon_1$$

$$P(B) > 1 - \epsilon_2,\ P(\overline{B}) = 1 - P(B) < \epsilon_2$$

$$0 \leq P(A \bigcup B) \leq 1$$

$$P(AB) = P(A) + P(B) - P(A \bigcup B) > 1 - \epsilon_1 + 1 - \epsilon_2 - 1 = 1 - \epsilon_1 - \epsilon_2$$