1. $P(\phi) = 0$
2. $P(S) = 1$
3. $0 \leq P(A) \leq 1$
4. $P(A \cup B) = P(A) + P(B) - P(A \cap B)$
5. $P(A \cap B) = P(A) + P(B) - P(A \cup B)$
6. $P(A - B) = P(A \cap B^c) = P(A) - P(A \cap B)$
7. $P(A^c) = 1 - P(A)$
8. $P(A^c \cap B^c) = P(A \cup B)^c$
9. $P(A^c \cup B^c) = P(A \cap B)^c$

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23 P

$\boxed{4}$ $P(A \cup B) = 0.76$ , $P(A \cup B^c) = 0.87$

$P(A)$ ?

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

$$P(A \cup B) = P(A) + P(B) - P(A \cap B) = 0.76$$

$$P(A \cup B^c) = P(A) + P(B^c) - P(A \cap B^c) = 0.87$$

$$\cancel{P(A)} + 1 - P(B) - \cancel{P(A)} + P(A \cap B) = 0.87$$

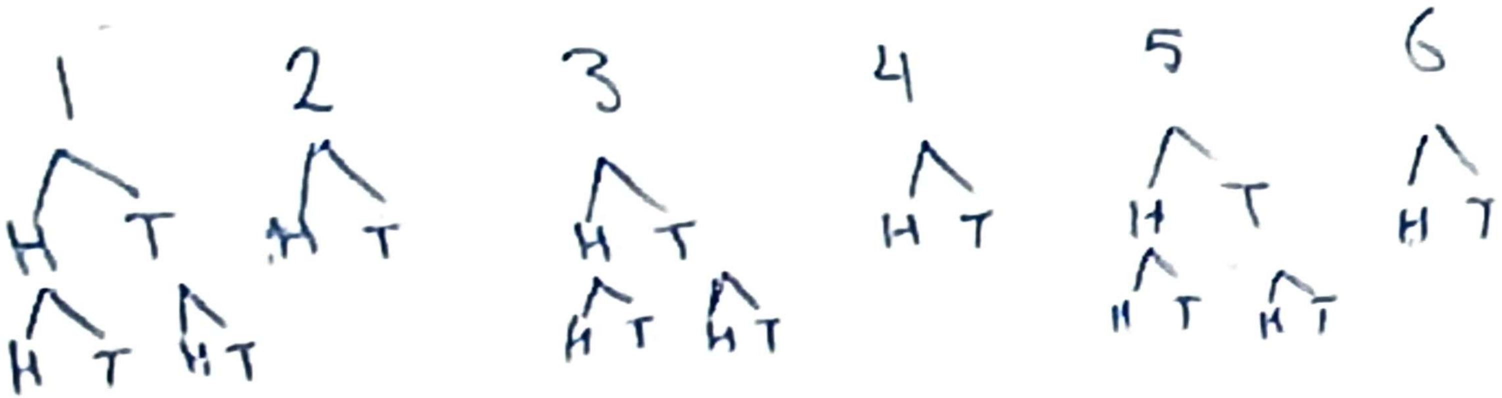
$$1 - P(B) + P(A \cap B) = 0.87$$

$$1 + P(A) = 0.76 + 0.87 \Rightarrow \boxed{P(A) = 0.63}$$

23 P

$\boxed{5}$ dice : 2, 4, 6 $\Rightarrow$ Coin once

dice : 1, 3, 5 $\Rightarrow$ Coin twice




$S = \{1HH, 1HT, 1TH, 1TT, 2H, 2T, \ldots\ldots, 6T\}$

Q.

$\boxed{7}$

$S = \{HHH, HHT, HTH, HTT, THH, THT, TTH, TTT\}$

Let A be the event of having at least one head

$A = \{HHH, HHT, HTH, HTT, THH, THT, TTH\}$

$P(A) = \dfrac{7}{8}$

$$P(A|B) = \frac{P(A \cap B)}{P(B)}$$

$$P(A|B) = P(A)$$

$A, B$ independent $\Rightarrow P(A \cap B) = P(A) \cdot P(B)$

$\boxed{11}$

$S = \{(1,1),(1,2),(1,3),\dots,(6,6)\}$

Let $A$ be the event that the sum is 9

Let $B$ be the event that at least one dice showed 6

$$P(B|A) = \frac{P(B\cap A)}{P(A)} = \frac{2/36}{4/36} = \frac{1}{2}$$

$A = \{(3,6),(4,5),(5,4),(6,3)\}$ $\quad P(A) = \frac{4}{36}$

$B = \{(1,6),(2,6),(3,6),(4,6),(5,6),(6,1),\dots(6,6)\}$

$A\cap B = \{(3,6),(6,3)\}$ $\quad P(A\cap B) = \frac{2}{36}$

$\boxed{16}$ A, B independent

$P(A \cap B^c)$

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

$= P(A) - P(A) \cdot P(B)$

$= P(A)[1 - P(B)]$

$= P(A) \cdot P(B^c)$

$A, B^c$ are independent

??

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

[6] A, B independent

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

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

$= 1 - P(A \cup B)$

$= 1 - [P(A) + P(B) - P(A \cap B)]$

$= 1 - P(A) - P(B) + P(A) \cdot P(B)$

$= P(A^c) - P(B)[1 - P(A)]$

$= P(A^c) - P(B) \cdot P(A^c)$

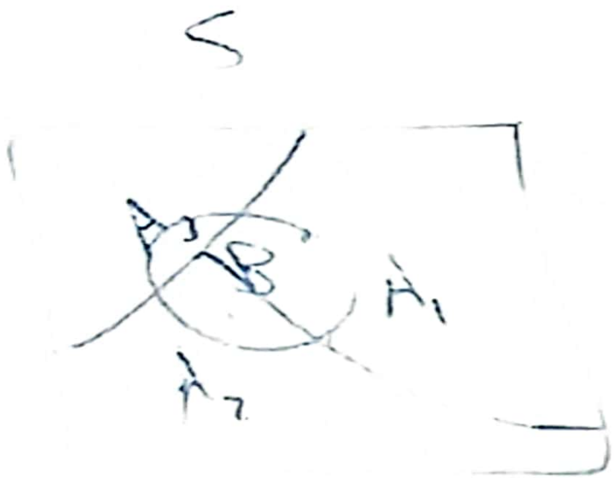
??

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

$= P(A^c)[1 - P(B)]$

$= P(A^c) \cdot P(B^c)$

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



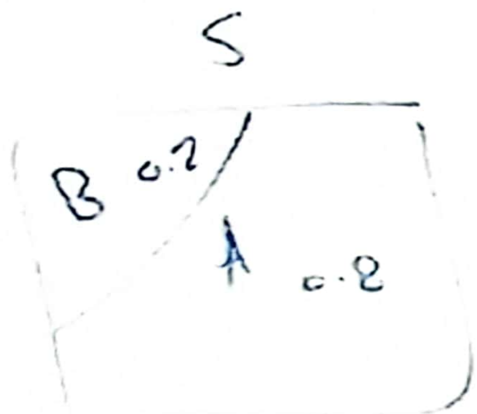

$$P(B) = P(A_1 \cap B) + P(A_2 \cap B) + P(A_3 \cap B)$$

$$P(B) = P(A_1) \cdot P(B|A_1) + P(A_2) \cdot P(B|A_2) + P(A_3) \cdot P(B|A_3)$$

$$P(A_1|B) = \frac{P(A_1 \cap B)}{P(B)} = \frac{P(A_1) \cdot P(B|A_1)}{P(B)}$$

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

$P(A) = 0.8$ , $P(B) = 0.2$




Let D be the event the product is defective

$P(D \mid A) = 0.05$

$P(D \mid B) = 0.01$

$\boxed{a}$ $P(A \cap D^c) = P(A) - P(A \cap D)$

$= P(A) - P(A) \cdot P(D \mid A)$

$= 0.8 - (0.8)(0.05) =$

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

$P(A) = 0.8$ , $P(B) = 0.2$ , $P(D|A) = 0.05$

$P(D|B) = 0.01$

$\boxed{b}$ $P(D) = P(D \cap A) + P(D \cap B)$

$= P(A) \cdot P(D|A) + P(B) \cdot P(D|B)$

$= (0.8)(0.05) + (0.2)(0.01) =$

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$P(A) = 0.3$ , $P(B) = 0.45$ $P(C) = 0.25$

Let $D$ ~~be~~ event that the Product is defectiv

$P(D|A) = 0.02$ , $P(D|B) = 0.03$

$P(D|C) = 0.01$

$$P(A|D) = \frac{P(A\cap D)}{P(D)} = \frac{P(A)\cdot P(D|A)}{P(D)} :$$

$$\begin{aligned} P(D) &= P(D\cap A) + P(D\cap B) + P(D\cap C) \\ &= P(A)\cdot P(D|A) + P(B)\cdot P(D|B) + P(C)\cdot P(D|C) \end{aligned}$$