1 - Propietats de la probabilitat

I · $P(\bar{A}) = 1 - P(A)$

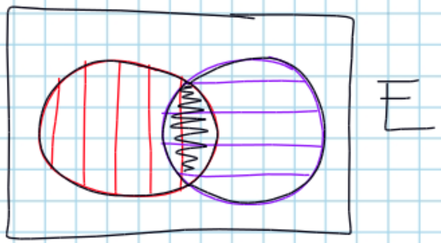
II · $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

III · $P(\overline{A \cup B}) = P(\bar{A} \cap \bar{B})$

IV · $P(\overline{A \cap B}) = P(\bar{A} \cup \bar{B})$

] Lleis de Morgan

$P(A)$ $P(B)$



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

Pàg 249 (Exercici resolt) (I)

$P(A) = 0'6$

$P(B) = 0'7$

$P(A \cup B) = 0'9$

a) $P(\bar{A})$ c) $P(A \cap B)$

b) $P(\bar{B})$ d) $P(\bar{A} \cup \bar{B})$

a) $P(\bar{A}) = 1 - P(A) =$

$= 1 - 0'6 = \boxed{0'4}$

b) $P(\bar{B}) = 1 - P(B)$

$= 1 - 0'7 = \boxed{0'3}$

c) $P(A \cap B) =$ II

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

$0'9 = 0'6 + 0'7 - P(A \cap B)$

$P(A \cap B) = \boxed{0'4}$

d) IV $P(\bar{A} \cup \bar{B}) = P(\overline{A \cap B})$

$P(\overline{A \cap B}) = 1 - P(A \cap B)$

$1 - 0'4 = \boxed{0'6}$

Pág 249 → Ex 2

$P(A) = 0'4$

$P(B) = 0'7$

$P(\bar{A} \cup B) = 0'8$

a) $P(\overline{A \cap B})$

b) $P(A \cap B)$

c) $P(A \cup B)$

IV

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

$P(\overline{A \cap B}) = \boxed{0'8}$

0'8

b) $P(\overline{A \cap B}) = 1 - P(A \cap B)$ // $P(A \cap B) = 1 - P(\overline{A \cap B})$

$P(A \cap B) = \boxed{0'2}$ ← $P(A \cap B) = 1 - 0'8$

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

$P(A \cup B) = 0'4 + 0'7 - 0'2 = \boxed{0'9}$

$P(\bar{A}) = 1 - P(A)$

$P(A) = 1 - P(\bar{A})$

3

$P(M \cup N) = 0'6$

$P(M \cap N) = 0'1$

$P(\bar{M}) = 0'7$

(I) a) $P(M) = 1 - P(\bar{M}) = \boxed{0'3}$

(II) b) $P(N) =$

$P(M \cup N) = P(M) + P(N) - P(M \cap N)$

$0'6 = 0'3 + P(N) - 0'1$

$P(N) = \boxed{0'4}$

(I) c) $P(\bar{N}) = 1 - P(N) = \boxed{0'6}$

d) $P(\bar{M} \cap \bar{N}) = P(\overline{M \cup N}) =$

$P(\overline{M \cup N}) = 1 - P(M \cup N) = 1 - 0'6 = \boxed{0'4}$

- Probabilitat condicionada i esdeveniments independents.

$$P(A/B) = \frac{P(A \cap B)}{P(B)}$$ (P. condicionada)

2 Sucesos són independents si $\longrightarrow$ $P(A \cap B) = P(A) \cdot P(B)$

7] $P(A)=\frac{2}{5}$; $P(B)=\frac{1}{3}$ $P(\bar{A}\cap\bar{B})$ $\frac{1}{3}$

Morgan

III/IV $P(\bar{A}\cap\bar{B})=P(\overline{A\cup B})=1-P(A\cup B)=1-\frac{1}{3}=\boxed{\frac{2}{3}}$

I

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

$P(A\cup B)=\frac{2}{3}$

$\frac{2}{3}=\frac{2}{5}+\frac{1}{3}-P(A\cap B)$

$P(A\cap B)=\frac{1}{15}$

8] $P(A \cup B) = \frac{3}{4}$ $P(\bar{B}) = \frac{2}{3}$ // $P(B) = \frac{1}{3}$

$P(A \cap B) = \frac{1}{4}$

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

$\frac{3}{4} = P(A) + \frac{1}{3} - \frac{1}{4}$

$\boxed{P(A) = \frac{2}{3}}$

(I) b) $P(B) = 1 - P(\bar{B}) = \boxed{\frac{1}{3}}$

c) $P(\bar{A} \cap B) = P(B) - P(A \cap B)$

$\frac{1}{3} - \frac{1}{4} = \boxed{\frac{1}{12}}$

11] $P(A)=0'7$; $P(B)=0'6$ $P(A\cup B)=0'9$

a) A i B són independents? $0'4 \neq 0'42$

b) $P(A/\bar{B})$ i $P(B/\bar{A})$ → Són independents

$P(A\cap B)=P(A)\cdot P(B) \Rightarrow 0'4=0'7\cdot 0'6$

$0'4=0'42$

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

$0'9=0'7+0'6-P(A\cap B) \Rightarrow \boxed{P(A\cap B)=0'4}$

b) $P(A/\bar{B})=\dfrac{P(A\cap\bar{B})}{P(\bar{B})}=\dfrac{P(A)-P(A\cap B)}{1-P(B)}=\dfrac{0'7-0'4}{1-0'6}=\dfrac{0'3}{0'4}=\boxed{0'75}$

$P(B/\bar{A})=\dfrac{P(B\cap\bar{A})}{P(\bar{A})}=\dfrac{P(B)-P(B\cap A)}{1-P(A)}=\dfrac{0'6-0'4}{1-0'7}=\dfrac{0'2}{0'3}=\boxed{\dfrac{2}{3}}$

c) $p(A \cap \overline{B}) = p(A) - p(A \cap B)$

$0'1 - 0'09 = \boxed{0'01}$

8) $\boxed{\begin{array}{l} p(B/A) = 0'9 \\ p(A/B) = 0'2 \\ p(A) = 0'1 \end{array}}$

a) $p(A \cap B)$; $p(B)$

$\underset{0'9}{p(B/A)} = \underset{p(A) \to 0'1}{\boxed{p(A \cap B) = 0'09}}$

$P(A/B) = \dfrac{P(A \cap B)}{P(B)} \Rightarrow 0'2 = \dfrac{0'09}{p(B)} \Rightarrow p(B) = \dfrac{0'09}{0'2} =$

$\boxed{P(B) = 0'45}$

b) $p(A \cap B) = p(A) \cdot p(B)$

$0'09 = 0'1 \cdot 0'45 \Rightarrow 0'09 = 0'045$ Són independents

- Llei de Laplace

$$P(S) = \frac{\text{nº Casos favorables}}{\text{nº Casos Totals.}}$$

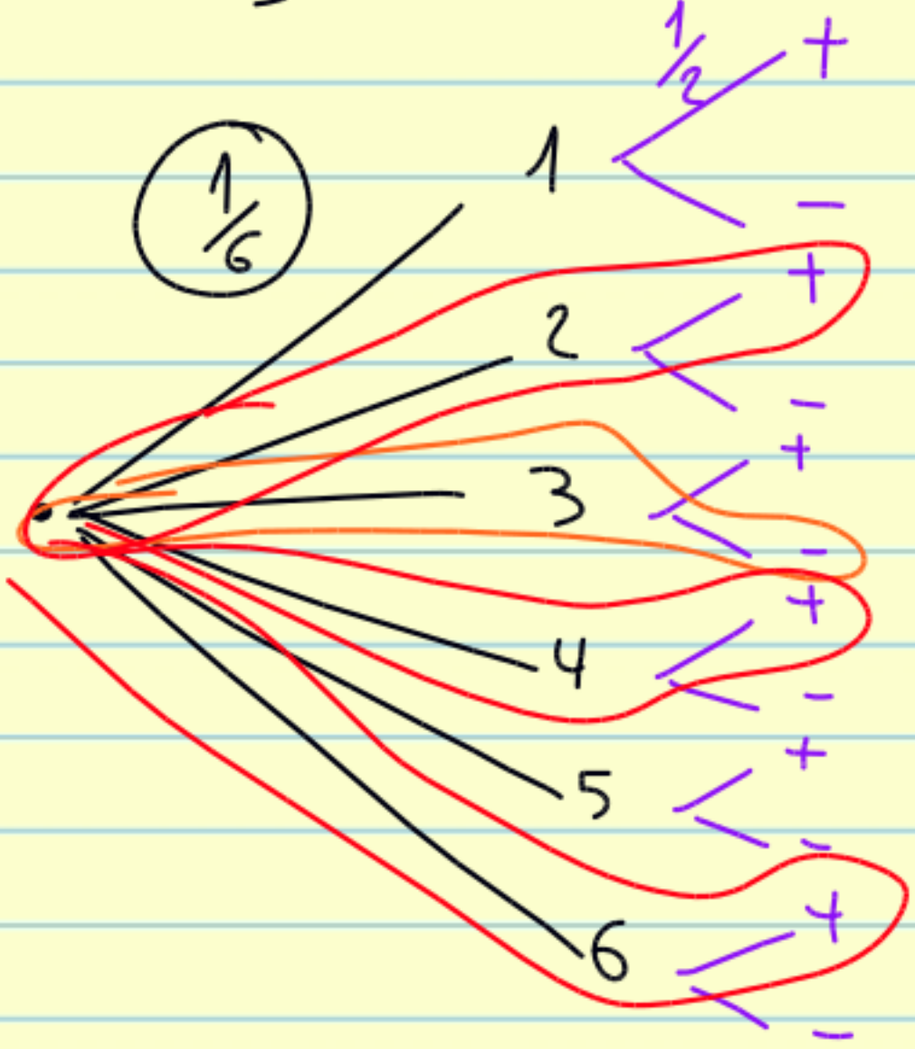
$$P(2) = \frac{1}{6}$$

$$P(\geq 4) = \frac{4}{6} = \frac{2}{3}$$

$$P(>4) = \frac{3}{6} = \frac{1}{2}$$

(1r) + (+) (2n)

- Diagrama d'arbre



a) $P(3 \cap -) = \frac{1}{6} \cdot \frac{1}{2} = \boxed{\frac{1}{12}}$

b) $P(\text{parell} \cap +) = P(2 \cap +) + P(4 \cap +) + P(6 \cap +)$

$\frac{1}{12} + \frac{1}{12} + \frac{1}{12} = \frac{3}{12} = \boxed{\frac{1}{4}}$

Total → 15
A → Duen ulleres
B → Són nines

$P(A) = \frac{4}{15} = 0'27$

$P(B) = \frac{11}{15} = 0'73$

$P(A \cup B) = \frac{12}{15}$

i → ∩
ò → ∪

$P(A \cap B) =$

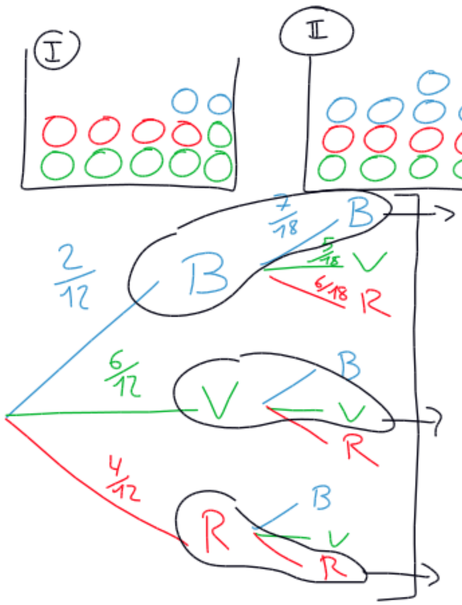
(II) $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$P(\overline{A \cup B})$ // $P(\overline{A} \cap \overline{B})$

$P(A \cap \overline{B})$ // $P(A/\overline{B})$ $\frac{P(A \cap B)}{P(B)}$

$P(B/\overline{A})$ // $P(\overline{A}/\overline{B})$

Pàgina 265 : ex 20



$p(\overline{mc})$ = colors diferents

a) $p(\text{mateix color}) = \frac{17}{54}$

$P(B \cap B) + p(V \cap V) + p(R \cap R)$

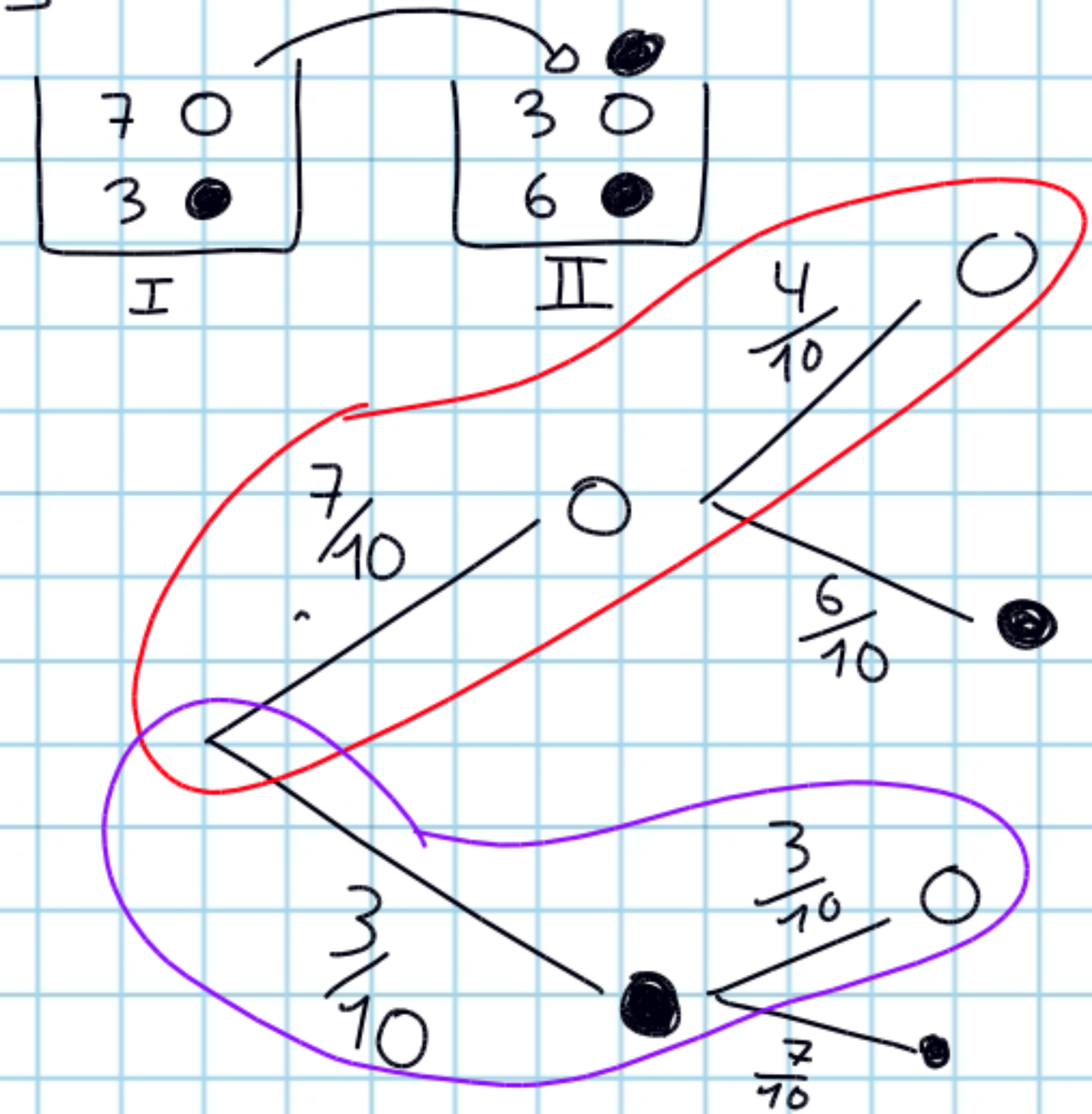
$\frac{2}{12} \cdot \frac{7}{18} + \frac{6}{12} \cdot \frac{5}{18} + \frac{4}{12} \cdot \frac{6}{18} = \boxed{\frac{17}{54}}$

b) $p(\text{diferent color})$

$P(d.c) = 1 - p(\text{mateix color})$

$1 - \frac{17}{54} = \boxed{\frac{37}{54}}$

Pàgina 265 - Ex 21



$$P(2n\,O) = \downarrow$$

$$P(B \cap \bar{B}) + P(N \cap \bar{B}) \quad \downarrow$$

$$\frac{7}{10} \cdot \frac{4}{10} + \frac{3}{10} \cdot \frac{3}{10} = \frac{37}{100}$$

$$= 0'37$$

b)