Foglio ②

Es ①

① $\binom{25}{2}\binom{2}{1} = 25 \cdot 24 = 600$

② $\binom{1}{1}\binom{24}{1} \cdot 2 = \frac{24!}{1! \cdot 23!} \cdot 2 = 24 \cdot 2 = 48$

tra tutti i rime ma ne scelgo 1

2 carte

$P(A) = \frac{48}{600} = 0{,}08$

Es ②

Bonus

Es ④

1) $\binom{13}{10}$

2) $\binom{4}{2}\binom{11}{8}$

3) $\binom{4}{1}\binom{11}{9}$

Es ⑤

1 $\Omega = \{$Disp. di 7 persone su 7 sgabelli$\}$

$|\Omega| = 7!$

$A = \{$Alfredo e Bianca vicini$\}$

$|A| = \underbrace{\binom{2}{1}\binom{1}{1}}_{\text{piazzo Alfredo e Bianca}} \cdot \underbrace{6}_{\text{6 posti}} \cdot (5!) = 2 \cdot 6 \cdot 5!$

→ piazzo gli altri

$P(A) = \frac{12 \cdot 5!}{7!}$

2) $B = \{$ Alfredo e Bianca vicini su tavolo tondo $\}$

$|B| = \binom{4}{1}\binom{1}{1} \cdot 7 \cdot 5!$

Es 6

$\Omega = \{$ combinazioni di 5 carte tra 52 $\}$

$|\Omega| = \binom{52}{5}$

1) Poker

$A = \{$ 4 carte stesso valore + 1 carta $\}$

$|A| = \binom{4}{4} \cdot \binom{48}{1} \cdot 13$ valori

$$P(A) = \frac{\binom{4}{4} \cdot \binom{48}{1} \cdot 13}{\binom{52}{5}}$$

2 Colore

$B = \{$ 5 carte stesso seme $\}$

$|B| = \binom{13}{5} \cdot 4$

$$P(B) = \frac{\binom{13}{5} \cdot 4}{\binom{52}{5}}$$

3 Full

$C = \{$ Tris e coppia $\}$

$|C| = \binom{4}{2} \cdot 13 \cdot 12 \binom{4}{3}$ $\quad P(C) =$

Foglio 3

Es 1

1) $\binom{9}{3}\binom{6}{3}\binom{3}{3}\cdot 3$

2) $6!$

3) $\dfrac{\binom{9}{3}\binom{6}{3}\binom{5}{3}}{3!}$

4) $\dfrac{\binom{5}{3}\binom{9}{2}\binom{4}{2}}{2!}$

5) 1

Es 2

$\Omega = \{ (\omega_1, \dots, \omega_{10}) \mid \omega_i = 1 \dots 40 \}$

$|\Omega| = \binom{40}{10}$

1) $\binom{1}{1}\binom{1}{1}\binom{1}{1}\binom{37}{7}$ $\quad \mathbb{P}(A) = \dfrac{\binom{37}{7}}{\binom{40}{10}}$

2) $\binom{34}{4}$ $\quad \mathbb{P}(B) = \dfrac{\binom{34}{4}}{\binom{40}{10}}$

$\dfrac{4}{40} \cdot \dfrac{4}{39}$ $\quad 4!$

Es 3

Foglio (4)

Es (5)

1) $P(dif) = P(A) \cdot P(dif|A) + P(B) \cdot P(dif|B) + P(C) \cdot P(dif|C)$

$$= P(A) \cdot \frac{P(dif \cap A)}{P(A)} + \dots + = 0.4 \cdot 0.02 + 0.1 \cdot 0.03 + 0.5 \cdot 0.04$$

$$\downarrow \qquad = 0.031$$

$$\frac{P(di|A) \cdot P(A)}{\cancel{P(A)}}$$

2)

$$P(A|dif) = \frac{P(A) \cdot P(diff|A)}{P(A) \cdot P(dif|A) + P(B) P(dif|B) + P(C) \cdot P(dif|C)} = \frac{0.4 \cdot 0.02}{0.031}$$

$$P(B|dif) = \frac{P(B) \cdot P(diff|B)}{P(A) \cdot P(dif|A) + P(B) P(dif|B) + P(C) \cdot P(dif|C)} = \frac{0.1 \cdot 0.03}{0.031}$$

$$P(C|dif) = \frac{P(C) \cdot P(dif|C)}{P(A) \cdot P(dif|A) + P(B) P(dif|B) + P(C) \cdot P(dif|C)} = \frac{0.5 \cdot 0.04}{0.031}$$

Es (6)

1) $P(ric.1) = P(inv. 1) \cdot P(ric 1 | inv 1) + P(inv 0) \cdot P(ric 1 | inv 0)$

$$= 0.55 \cdot \frac{P(ric 1 \cap in 1)}{P(inv 1)} + 0.45 \cdot \frac{P(ric 1 \cap inv 0)}{P(inv 0)}$$

$$= 0.55 \cdot 0.91 + 0.45 \cdot 0.06 = 0.5275$$

2) $0.45 \cdot 0.94 + 0.55 \cdot 0.09 = 0.4725$

3) $P(\text{inv } 1 \mid \text{ric } 1) = \dfrac{P(\text{inv } 1 \cap \text{ric } 1)}{P(\text{ric } 1)} = \dfrac{0.55 \cdot 0.91}{0.5275} = 0{,}94$

4) $P(\text{inv } 0 \mid \text{ric } 0) = \dfrac{P(\text{inv } 0 \cap \text{ric } 0)}{P(\text{ric } 0)} = \dfrac{0.45 \cdot 0.94}{0.4725} = 0{,}89$

Es 7

1) $P(\text{unica alla } 5^a) = P(\text{perde prima 4 e unica } 5) = (1-p)^4 \cdot p = (19/37)^4 \cdot 18/37$
$\approx 0{,}034$

2) $P(\text{unica almeno } 2)$

$$= \sum_{k=2}^{10} \binom{10}{k} p^k (1-p)^{10-k} = \sum_{k=2}^{10} \binom{10}{k} \cdot \left(\frac{18}{37}\right)^k \cdot (1-p)^{10-k}$$

Foglio 5

Es ①

1)

$P(\text{stesso sex}) = P(\text{omo}) + P(\text{etero}) \cdot P(\text{stesso sex} \mid \text{etero})$

$= p + (1-p) \cdot 0{,}5 = p + \frac{1}{2} - \frac{1}{2}p = \frac{1}{2}p + \frac{1}{2}$

$P(\text{omo} \mid \text{stesso sex}) = \dfrac{P(\text{omo} \cap \text{stesso sex})}{P(\text{stesso sex})} = \dfrac{p}{\frac{1}{2}p + \frac{1}{2}}$

2)

$P(\text{sesso dif}) = P(\text{etero}) \cdot P(\text{sesso dif} \mid \text{etero}) = (1-p) \cdot 0{,}5 = \frac{1}{2} - \frac{1}{2}p$

$\dfrac{P(\text{sesso dif} \cap \text{etero})}{P(\text{etero})}$

Es ②

1) $P(\text{Testa}) = P(TC) \cdot P(T \mid TC) + P(TT) \cdot P(T \mid TT)$

$= \frac{1}{3} \cdot \frac{1}{2} + \frac{1}{3} \cdot 1 = \frac{1}{6} + \frac{1}{3} = \frac{1+2}{6} = \frac{3}{6} = \frac{1}{2}$ ✓

2) $P(TC \mid T) = \dfrac{P(TC) \cdot P(T \mid TC)}{P(\text{Testa})} = \dfrac{\frac{1}{3} \cdot \frac{1}{2}}{\frac{1}{2}} = \frac{1}{3}$

3) $P(TT \mid T) = \dfrac{P(TT) \cdot P(T \cap TT)}{P(\text{Testa})} = \dfrac{\frac{1}{3} \cdot 1}{\frac{1}{2}} =$

Es 3

1) $P(\text{voti si} \mid \text{vota}) = P(V)\, P(\text{Vota si} \cap \text{Vota}) = \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$

2) k si

1° Parte $\Rightarrow$ k votanti

$$P(k \text{ votanti}) = \sum_{i=k}^{n} \binom{n}{i} p_v^{i} (1-p)^{n-i} = \sum_{i=k}^{n} \binom{n}{i} p_v^{i}$$

2° Parte $\Rightarrow$ Tra i m votanti, k si

$$P(k \text{ si } m \text{ votanti}) = \binom{m}{k} p_{si}^{k} (1-p_{si})^{m-k} = \binom{m}{k} \cdot p_{si}^{k}$$

$$P(k \text{ si}) = \sum_{i=k}^{n} \binom{n}{m} \cdot p_v^{i} \cdot \binom{m}{k} p_{si}^{k}$$

Es 5

1) 200 lanci 67 T

$$\binom{200}{67} p^{67} (1-p)^{133}$$