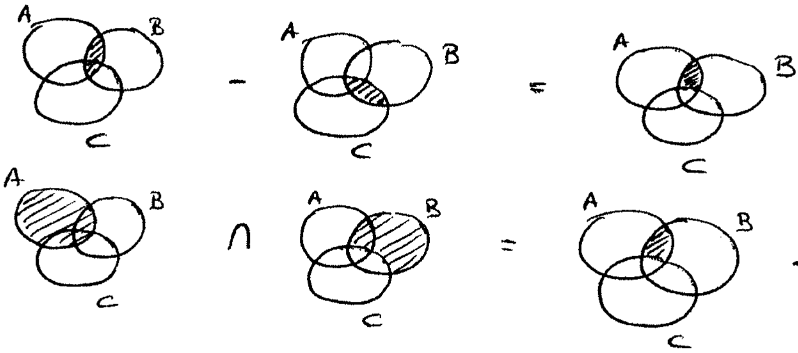
① a)



$\longleftarrow (A\cap B)-(A\cap C)$

$\longleftarrow A\cap(B-C)$

Coinciden

b) $(A\cap B)-(A\cap C) = (A\cap B)\cap\overline{A\cap C} = (A\cap B)\cap(\overline{A}\cup\overline{C}) = (A\cap B\cap\overline{A})\cup(A\cap B\cap\overline{C}) =$

$= \emptyset \cup (A\cap B\cap\overline{C}) = A\cap B\cap\overline{C} = A\cap(B-C)$ ✓

②
$A\cup B$ = "la bola extraída o es par o es múltiplo de 3" $= \{2,3,4,6,8,9\}$
$A\cap B$ = " " " es un nº par múltiplo de 3" $= \{6\}$
$\overline{A}\cup\overline{B}$ = " " " o es impar o no es múltiplo de 3" $= \{1,2,3,4,5,7,8,9\}$

También:
$\overline{A}\cup\overline{B} = \overline{A\cap B}$ = "la bola extraída no es un nº par múltiplo de 3" $= E-\{6\}$

$\overline{A}\cap B$ = "la bola extraída es un nº par que no es múltiplo de 3" $= \{2,4,8\}$

③
$E = \{1,2,3,4,5,6\}$
↑ significa que el mayor de los dos números es el 1.

X	1	2	3	4	5	6
P	1/36	3/36	5/36	7/36	9/36	11/36

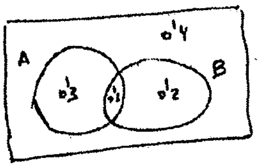
MAX	1	2	3	4	5	6
1	1	2	3	4	5	6
2	2	2	3	4	5	6
3	3	3	3	4	5	6
4	4	4	4	4	5	6
5	5	5	5	5	5	6
6	6	6	6	6	6	6

④
$E = \{2,3,4,5,6\}$

X	2	3	4	5	6
P	1/36	4/36	10/36	12/36	9/36

SUMA	3	3	3	2	2	1
3	6	6	6	5	5	4
3	6	6	6	5	5	4
3	6	6	6	5	5	4
2	5	5	5	4	4	3
2	5	5	5	4	4	3
1	4	4	4	3	3	2

⑤



$P(A\cup B) = 0'3+0'1+0'2 = \boxed{0'6}$

También: $P(A\cup B) = P(A)+P(B)-P(A\cap B) = 0'4+0'3-0'1 = 0'6$

$P(A/B) = \dfrac{P(A\cap B)}{P(B)} = \dfrac{0'1}{0'3} = \dfrac{1}{3} = \boxed{0'\overline{3}}$

$P(A\cup\overline{B}) = 0'3+0'1+0'4 = \boxed{0'8}$

También: $P(A\cup\overline{B}) = P(\overline{\overline{A}\cap B}) = 1-P(\overline{A}\cap B) = 1-0'2 = 0'8$

$P(\overline{A}\cap B) = \boxed{0'2}$

$P(\overline{A}/B) = \dfrac{P(\overline{A}\cap B)}{P(B)} = \dfrac{0'2}{0'3} = \dfrac{2}{3} = \boxed{0'\overline{6}}$

También: $P(\overline{A}/B) = 1-P(A/B) = 1-\dfrac{1}{3} = \dfrac{2}{3}$

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

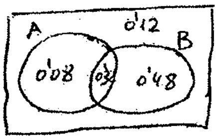
(6) $P(A\cup B) = P(A) + P(B) - P(A\cap B) = P(A) + P(B) - P(A)\cdot P(B/A) = P(A)+P(B) - P(A)\cdot P(B)$

Por ser A y B independientes

$0'88 = 0'4 + P(B) - 0'4 \cdot P(B)$

$0'48 = 0'6\, P(B)$

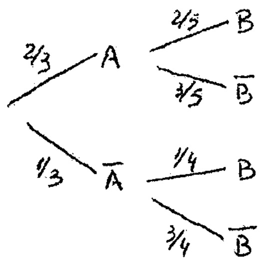
$\frac{0'48}{0'6} = P(B) \longrightarrow \boxed{P(B) = 0'8} \longrightarrow P(A\cap B) = P(A)\cdot P(B) = 0'4 \cdot 0'8 = 0'32$



$P\left((A\cup B) \cap \overline{A\cap B}\right) = 0'08 + 0'48 = \boxed{0'56}$

También $(A\cap \overline{B}) \cup (B \cap \overline{A})$

(7)



$P(A\cap B) = \frac{2}{3}\cdot\frac{2}{5} = \frac{4}{15} \neq 0 \Rightarrow$ A, B no son mutuamente excluyentes

$P(B) = \frac{2}{3}\cdot\frac{2}{5} + \frac{1}{3}\cdot\frac{1}{4} = \frac{4}{15} + \frac{1}{12} = \frac{21}{60} = \frac{7}{20}$

$P(B) = \frac{7}{20}$

$P(B|A) = \frac{2}{5}$

$\boxed{\text{B y A no son independientes}}$

$P(\overline{B}) = 1 - \frac{7}{20} = \boxed{\frac{13}{20}}$

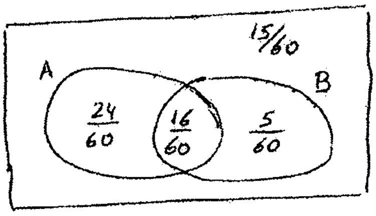
$P(A\cup\overline{B}) = P(A) + P(\overline{B}) - P(A\cap\overline{B}) = P(A) + P(\overline{B}) - P(A)\cdot P(\overline{B}/A) =$

$= \frac{2}{3} + \frac{13}{20} - \frac{2}{3}\cdot\frac{3}{5} = \frac{2}{3} + \frac{13}{20} - \frac{2}{5} = \boxed{\frac{11}{12}}$

También:

$P(B/A) = \frac{P(B\cap A)}{P(A)} \longrightarrow \frac{2}{5} = \frac{P(A\cap B)}{2/3} \longrightarrow P(A\cap B) = \frac{4}{15} = \frac{16}{60}$

$P(B) = \frac{7}{20} = \frac{21}{60}$ Hecho como antes. $\quad P(A) = \frac{2}{3} = \frac{40}{60}$



$P(A)\cdot P(B) = \frac{2}{3}\cdot\frac{7}{20} = \frac{7}{30}$

$P(A\cap B) = 4/15$

Son distintos $\Rightarrow$ A, B no son independientes

$P(\overline{B}) = \frac{24}{60} + \frac{15}{60} = \frac{39}{60} = \frac{13}{20}$

$P(A\cup\overline{B}) = \frac{24}{60} + \frac{16}{60} + \frac{15}{60} = \frac{55}{60} = \frac{11}{12}$ ✓

(8) $P = P(M_1)\times P(\overline{M}_2/M_1) + P(F_1)\times P(\overline{F}_2/F_1) + P(Q_1)\times P(\overline{Q}_2/Q_1) =$

$= \frac{4}{12}\times\frac{8}{11} + \frac{6}{12}\times\frac{6}{11} + \frac{2}{12}\times\frac{10}{11} = \frac{88}{132} = \boxed{\frac{2}{3}}$

(9) a) Con reemplazamiento:

$P(\text{colores distintos}) = P(B_1\cap N_2\cap R_3) + P(B_1\cap R_2\cap N_3) + P(N_1\cap B_2\cap R_3) + P(N_1\cap R_2\cap B_3) +$

$+ P(R_1\cap B_2\cap N_3) + P(R_1\cap N_2\cap B_3) = \frac{6}{15}\cdot\frac{5}{15}\cdot\frac{4}{15} + \frac{6}{15}\cdot\frac{4}{15}\cdot\frac{5}{15} + \cdots + \frac{4}{15}\cdot\frac{5}{15}\cdot\frac{6}{15} =$

$= 6\cdot\frac{6}{15}\cdot\frac{5}{15}\cdot\frac{4}{15} = \boxed{\frac{48}{225}} = \boxed{\frac{16}{75}} = 0'21\overline{3}$

b) Sin reemplazamiento:

$P(\text{colores distintos}) = \frac{6}{15}\cdot\frac{5}{14}\cdot\frac{4}{13} + \frac{6}{15}\cdot\frac{4}{14}\cdot\frac{5}{13} + \cdots + \frac{4}{15}\cdot\frac{5}{14}\cdot\frac{6}{13} = 6\cdot\frac{6}{15}\cdot\frac{5}{14}\cdot\frac{4}{13} = \boxed{\frac{24}{91}} = 0'2637$

(10)

	E	I	
A	12	3	15
$\bar{A}$	3	3	6
	15	6	21

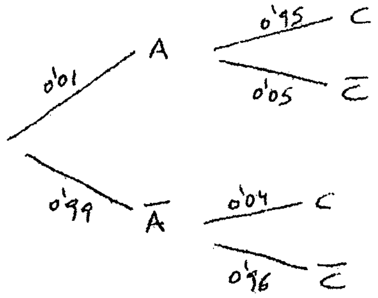
$n(A) = 12+3 = 15$

$n(\bar{A}) = 21-15 = 6$

$n(\bar{A}\cap I) = 6-3 = 3$

$$P(E/A) = \frac{12}{15} = \frac{4}{5} = \boxed{0'8}$$

(11)



A = "Tener accidente"

C = "Perder la carga"

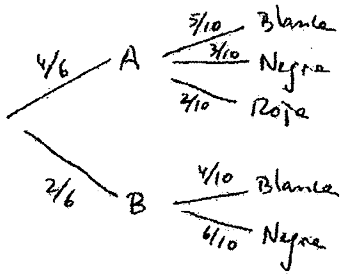
a) $P(\bar{A}\cap C) = 0'99 \cdot 0'96 = \boxed{0'9504}$

b) $P(\bar{A}/C) = \dfrac{P(\bar{A}\cap C)}{P(C)} = \dfrac{0'99 \cdot 0'04}{0'01\cdot 0'95 + 0'99\cdot 0'04} = \dfrac{0'0396}{0'0491} = \boxed{0'81}$

c) $P(A/\bar{C}) = \dfrac{P(A\cap \bar{C})}{P(\bar{C})} = \dfrac{0'01\cdot 0'05}{0'01\cdot 0'05 + 0'99\cdot 0'96} = \dfrac{0'0005}{0'9509} = \boxed{0'00053}$

d) $P(C) = 0'01\cdot 0'95 + 0'99\cdot 0'04 = \boxed{0'0491}$

(12)



$$P(\text{Blanca}) = \frac{4}{6}\cdot\frac{5}{10} + \frac{2}{6}\cdot\frac{4}{10} = \frac{28}{60} = \boxed{\frac{7}{15}}$$

$$P(\overline{\text{Roja}}) = 1 - P(\text{Roja}) = 1 - \frac{4}{6}\cdot\frac{2}{10} = 1 - \frac{8}{60} = \frac{52}{60} = \boxed{\frac{13}{15}}$$

$$P = P(M_1)\times P(\overline{M_2}/M_1) + P(F_1)\times P(\overline{F_2}/F_1) + P(Q_1)\times P(\overline{Q_2}/Q_1) =$$

$$= \frac{4}{12}\times\frac{8}{11} + \frac{6}{12}\times\frac{6}{11} + \frac{2}{12}\times\frac{10}{11} = \frac{88}{132} = \boxed{\frac{2}{3}}$$

(13)

A = Acertar

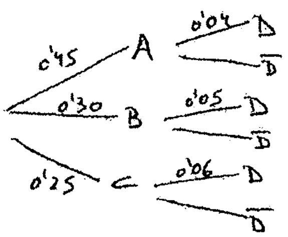
$P(\text{no quedar eliminado}) = P(A) + P(\bar{A})\cdot P(A) + P(\bar{A})\cdot P(\bar{A})\cdot P(A) =$

$= 0'8 + 0'2\cdot 0'8 + 0'2\cdot 0'2\cdot 0'8 = \boxed{0'992}$

<u>También</u>

$P(\text{no quedar eliminado}) = 1 - P(\text{quedar eliminado}) = 1 - 0'2\cdot 0'2\cdot 0'2 = 0'992$

(14)



$$P(D) = 0'45\cdot 0'04 + 0'30\cdot 0'05 + 0'25\cdot 0'06 = \boxed{0'048}$$

(15)

a) $\binom{6}{2} = 15$ parejas distintas de chicos
$\binom{5}{2} = 10$ " " " chicas $\Big\} \to 15 \times 10 = \boxed{150 \text{ maneras distintas}}$

b) $\binom{5}{1} = 5$ chicos que pueden acompañar a Tim
$\binom{4}{1} = 4$ chicas " " " " Anna $\Big\} \to 5 \times 4 = \boxed{20 \text{ maneras distintas}}$

c) $P = \frac{20}{150} = \boxed{\frac{2}{15}}$

d) 1 pareja de chicos: Fred y Tim
$\binom{4}{2} = 6$ parejas de chicas sin Anna $\Big\} \to 1 \times 6 = 6$

$\binom{4}{1} = 4$ chicos que acompañan a Fred, sin Tim
$\binom{4}{1} = 4$ chicas que formen pareja con Anna $\Big\} \to 4 \times 4 = 16$

$\to 6 + 16 = 22$ maneras según lo indicado $\to P = \frac{22}{50} = \boxed{\frac{11}{25}}$

5 chicos (cualquiera salvo Fred)
$\binom{5}{2} = 10$ parejas de chicas $\Big\} \to 5 \times 10 = 50$ maneras con Fred

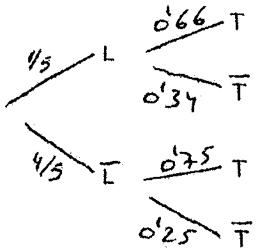
(16) $P = P\{3\} \cdot P\{3,4,5,6\} + P\{4,5,6\} \cdot P\{3\} = \frac{1}{6} \cdot \frac{4}{6} + \frac{3}{6} \cdot \frac{1}{6} = \boxed{\frac{7}{36}} = 0'194$

También:

MENOR	1	2	3	4	5	6
1	1	1	1	1	1	1
2	1	2	2	2	2	2
3	1	2	3	3	3	3
4	1	2	3	4	4	4
5	1	2	3	4	5	5
6	1	2	3	4	5	6

(17)

a) $P(T) = \frac{1}{5} \cdot 0'66 + \frac{4}{5} \cdot 0'75 = \boxed{0'73} = \frac{183}{250}$



b) $P(L|T) = \frac{P(L \cap T)}{P(T)} = \frac{\frac{1}{5} \cdot 0'66}{0'73} = \boxed{0'18} = \frac{11}{61}$

(18) $\frac{2}{3} < P[\text{dar en el blanco al menos una vez}] = 1 - P[\text{no acertar ninguna}]$

$P(\text{no acertar ninguna}) < 1 - \frac{2}{3} = \frac{1}{3}$

n intentos $\left(\frac{3}{4}\right)^n < \frac{1}{3}$ $\quad n=1 \to \left(\frac{3}{4}\right)^1 \nless \frac{1}{3}$ $\quad n=2 \to \left(\frac{3}{4}\right)^2 \nless \frac{1}{3}$ $\quad \Big|$ $\quad n=3 \to \left(\frac{3}{4}\right)^3 \nless \frac{1}{3}$ $\quad n=4 \to \left(\frac{3}{4}\right)^4 < \frac{1}{3} \to \boxed{4 \text{ veces}}$

También: $\log\left(\frac{3}{4}\right)^n < \log(1/3) \to n \log(3/4) < \log(1/3) \to n > \frac{\log(1/3)}{\log(3/4)} = 3'82 \to \boxed{n = 4}$

porque es negativo $\log(3/4)$

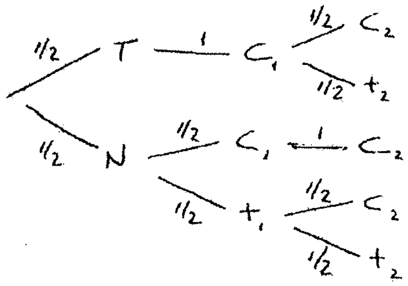
(19)

a) $P = 3 \cdot \frac{2}{3} \cdot \frac{2}{3} \cdot \frac{1}{3} \cdot 2 \cdot \frac{3}{4} \cdot \frac{1}{4} = \boxed{\frac{1}{6}} = 0'1\hat{6}$

b) $P = \left(\frac{1}{3}\right)^3 \cdot \left(\frac{1}{4}\right)^2 + 3 \cdot \left(\frac{1}{3}\right)^2 \cdot \frac{2}{3} \cdot 2 \frac{1}{4} \cdot \frac{3}{4} + 3 \cdot \frac{1}{3} \cdot \left(\frac{2}{3}\right)^2 \cdot \left(\frac{3}{4}\right)^2 =$

$= \frac{1}{432} + \frac{36}{432} + \frac{106}{432} = \frac{145}{432} = \boxed{0'34}$

(20)

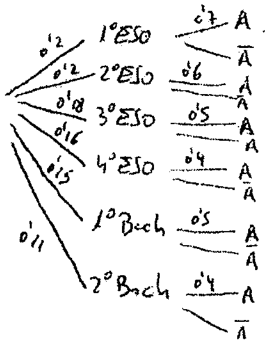


T = "elegir moneda Trucada"
N = " " " normal"
C = "Salir Cara"
+ = "Salir Cruz"

$$P(C_2) = \frac{1}{2}\times 1\times\frac{1}{2} + \frac{1}{2}\cdot\frac{1}{2}\cdot 1 + \frac{1}{2}\cdot\frac{1}{2}\times\frac{1}{2} = \frac{1}{4}+\frac{1}{4}+\frac{1}{8} = \boxed{\frac{5}{8}} = 0'625$$

$$P(C_1/C_2) = \frac{P(C_1\cap C_2)}{P(C_2)} = \frac{\frac{1}{2}\cdot 1\cdot\frac{1}{2} + \frac{1}{2}\cdot\frac{1}{2}\cdot 1}{\frac{5}{8}} = \frac{\frac{1}{4}+\frac{1}{4}}{\frac{5}{8}} = \boxed{\frac{4}{5}} = 0'8$$

(21)



$$P(A) = 0'2\cdot 0'7 + 0'2\cdot 0'6 + 0'18\cdot 0'5 + 0'16\cdot 0'4 + 0'15\cdot 0'5 + 0'11\cdot 0'4 = \boxed{0'533}$$

$$P(1^\circ Bach / A) = \frac{P(1^\circ Bach \cap A)}{P(A)} = \frac{0'15\cdot 0'5}{0'533} = \frac{0'075}{0'533} = \boxed{0'14}$$

(22)

'x' negros
25-x blancos

$$P(\text{dos discos de mismo color}) = \frac{x}{25}\times\frac{x-1}{24} + \frac{25-x}{25}\cdot\frac{24-x}{24} = \frac{x(x-1)+(25-x)(24-x)}{25\cdot 24}$$

$$P(\text{dos discos de distinto color}) = \frac{x}{25}\cdot\frac{25-x}{24} + \frac{25-x}{25}\cdot\frac{x}{24} = \frac{2x(25-x)}{25\cdot 24}$$

$$\frac{x(x-1)+(25-x)(24-x)}{\cancel{25\cdot 24}} = \frac{2x(25-x)}{\cancel{25\cdot 24}}$$

$$x^2 - x + 600 - 25x - 24x + x^2 = 50x - 2x^2$$

$$4x^2 - 100x + 600 = 0$$

$$x^2 - 25x + 150 = 0 \qquad x = \frac{25\pm\sqrt{625-600}}{2} = \frac{25\pm 5}{2}$$

$\boxed{\text{15 discos negros y 10 blancos}}$
ó
$\boxed{\text{10 discos negros y 15 blancos}}$

(23)

$$P(\text{Ganar el primer tirador}) = P(C_1) + P(X_1)\cdot P(X_2)\cdot P(C_3) + P(X_1)\cdot P(X_2)\cdot P(X_3)\cdot P(X_4)\cdot P(C_5) + \dots =$$

$$= \frac{1}{2} + \frac{1}{2}\cdot\frac{1}{2}\cdot\frac{1}{2} + \frac{1}{2}\cdot\frac{1}{2}\cdot\frac{1}{2}\cdot\frac{1}{2}\cdot\frac{1}{2} + \dots = \frac{1}{2} + \frac{1}{8} + \frac{1}{32} + \dots =$$

Es una serie geométrica con razón $= \frac{1}{4}$

$$= \frac{1/2}{1-1/4} = \frac{1/2}{3/4} = \boxed{\frac{2}{3}}$$

$$P(\text{Ganar el segundo tirador}) = 1 - \frac{2}{3} = \boxed{\frac{1}{3}}$$

En consecuencia, el que empieza tiene el doble de probabilidades de ganar que el 2º tirador.