M00 P1#7

$$X = 1 - \frac{1}{5} - \frac{2}{5} - \frac{1}{10} = \frac{10-2-4-1}{10} = \frac{3}{10}$$

$$P[\text{Suma}=6] = P[(X_1=2 \cap X_2=4) \cup (X_1=4 \cap X_2=2) \cup (X_1=X_2=3)] =$$

$$= \frac{2}{5}\cdot\frac{3}{10} + \frac{3}{10}\cdot\frac{2}{5} + \frac{1}{10}\cdot\frac{1}{10} = \frac{6}{50} + \frac{6}{50} + \frac{1}{100} = \frac{25}{100} = \boxed{\frac{1}{4}}$$

N00 P1#6

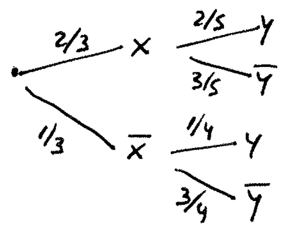
$P(A) = a$
$P(B) = b$

A, B independientes $\Rightarrow P(A\cap B) = P(A)\cdot P(B) \Rightarrow a\cdot b = 0'3$

$P(A\cap \overline{B}) = 0'3 \Rightarrow P(A) - P(A\cap B) = 0'3 \Rightarrow a - 0'3 = 0'3 \Rightarrow \boxed{a = 0'6} \rightarrow b = \frac{0'3}{0'6} = \boxed{0'5}$

$P(A\cup B) = P(A) + P(B) - P(A\cap B) = 0'6 + 0'5 - 0'3 = \boxed{0'8}$

M01 P1#11



a) $P(\overline{Y}) = \frac{2}{3}\cdot\frac{3}{5} + \frac{1}{3}\cdot\frac{3}{4} = \frac{2}{5} + \frac{1}{4} = \boxed{\frac{13}{20}}$

b) $P(\overline{X}\cup\overline{Y}) = P(\overline{X\cap Y}) = 1 - P(X\cap Y) =$

$= 1 - \frac{2}{3}\cdot\frac{2}{5} = 1 - \frac{4}{15} = \boxed{\frac{11}{15}}$

N02 P1#5

$1, 2, 3, 4, 5, \ldots\ldots, 1000$

a) múltiplos de 4: $4, 8, 12, \ldots 1000$

$4\times1, 4\times2, 4\times3, \ldots, 4\times250 \Rightarrow 250$ múltiplos de 4

$P(\dot{4}) = \frac{250}{1000} = \boxed{\frac{1}{4}}$

b) múltiplos de 6: $6, 12, 18, \ldots, 996$

mcm $(4, 6) = 12$

múltiplos de 12: $12, 24, \ldots, 996$

$P(\dot{4}\cap\dot{6}) = P(\dot{12}) = \frac{83}{1000} = \boxed{0'083}$

$1000 : 6 = 166$ múltiplos de 6 (resto 4) $\rightarrow 1000 - 4 = 996$

$1000 : 12 = 83$ múltiplos de 12 (resto 4) $\rightarrow 1000 - 4 = 996$

M05 TZ1 P1#10

	TV	$\overline{TV}$	
C	15	6	21
$\overline{C}$	25	4	29
	40	10	50

a) $P(TV\cap C) = \frac{15}{50} = \boxed{0'30}$

b) $P(TV|C) = \frac{15}{21} = \boxed{\frac{5}{7}}$

M05 TZ2 P1#5

a) $P(\text{Sólo Medicina}) = \frac{8}{11}\cdot\frac{7}{10}\cdot\frac{6}{9}\cdot\frac{5}{8}\cdot\frac{4}{7} = \boxed{\frac{4}{33}}$

b) $P(\text{2 de Medicina y 3 de Derecho}) = \frac{11!}{2!\,3!}\cdot\frac{8}{11}\cdot\frac{7}{10}\cdot\frac{3}{9}\cdot\frac{2}{8}\cdot\frac{1}{7} = \boxed{\frac{2}{33}}$

M05 P1#18

X Negros
$25-X$ Blancos

$P(\text{Mismo Color}) = P((N_1\cap N_2)\cup(B_1\cap B_2)) = \frac{X}{25}\cdot\frac{X-1}{24} + \frac{25-X}{25}\cdot\frac{24-X}{24} =$

$= \frac{X^2 - X + 600 - 25X - 24X + X^2}{600} = \frac{2X^2 - 50X + 600}{600}$

$P(\text{Distinto Color}) = P((N_1\cap B_2)\cup(B_1\cap N_2)) = \frac{X}{25}\cdot\frac{25-X}{24} + \frac{25-X}{25}\cdot\frac{X}{24} =$

$= \frac{2(25X - X^2)}{600} = \frac{50X - 2X^2}{600}$

$P(\text{Mismo Color}) = P(\text{Distinto Color}) \Rightarrow \dfrac{2x^2-50x+600}{600} = \dfrac{50x-2x^2}{600} \Rightarrow$

$\Rightarrow 4x^2-100x+600=0 \;;\; x^2-25x+150=0 \;;\; x=\dfrac{25\pm\sqrt{625-600}}{2} = \dfrac{25\pm 5}{2} \nearrow 15,\ \searrow 10$

$\boxed{\text{Hay 15 discos de un color y 10 del otro}}$

M07 TZ1 P1#2

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

$0'6 = 0'5 + 0'3 - P(A\cap B) \Rightarrow \boxed{P(A\cap B)=0'2}$

$P(A)\cdot P(B) = 0'5\cdot 0'3 = 0'15$

$P(A\cap B) = 0'2$ ⟶ Como son distintos, no son independientes

b) $P(B|A) = \dfrac{P(A\cap B)}{P(A)} = \dfrac{0'2}{0'5} = \boxed{0'4}$

Muestra 08 P1#26

$P(\overline{A}/\overline{B}) = \dfrac{P(\overline{A}\cap\overline{B})}{P(\overline{B})} = \dfrac{P(\overline{A\cup B})}{P(\overline{B})} = \dfrac{1-P(A\cup B)}{1-P(B)} = \dfrac{1-5/12}{1-1/3} = \dfrac{7/12}{2/3} = \boxed{\dfrac{7}{8}}$

Muestra 06 P2#4
Muestra 08 P1#51

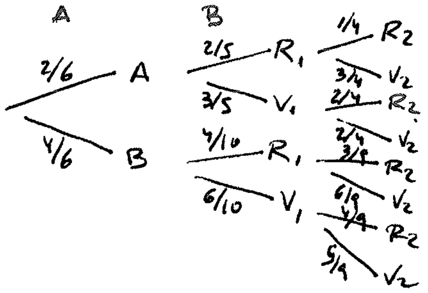
a) $\left[\begin{array}{c}2R\\3V\end{array}\right]$ $P(R_1\cap R_2) = \dfrac{2}{5}\cdot\dfrac{1}{4} = \dfrac{2}{20} = \boxed{0'1}$

b) $\left[\begin{array}{c}4R\\ \text{'m' } V\end{array}\right]$ $P(R_1\cap R_2) = \dfrac{4}{m+4}\cdot\dfrac{3}{m+3} = \dfrac{12}{m^2+7m+12}$

$P(R_1\cap R_2) = \dfrac{2}{15} \Rightarrow \dfrac{2}{15} = \dfrac{12}{m^2+7m+12} \;;\; 2m^2+14m+24 = 180 \;;$

$m^2+7m-78=0 \;;\; m = \dfrac{-7\pm\sqrt{49+312}}{2} = \dfrac{-7\pm 19}{2} \nearrow 6 \checkmark,\ \searrow \cancel{-13}$

c) $\underset{A}{\left[\begin{array}{c}2R\\3V\end{array}\right]}$ $\underset{B}{\left[\begin{array}{c}4R\\6V\end{array}\right]}$



$P(R_1\cap R_2) = \dfrac{2}{6}\cdot\dfrac{2}{5}\cdot\dfrac{1}{4} + \dfrac{4}{6}\cdot\dfrac{4}{10}\cdot\dfrac{3}{9} = \boxed{\dfrac{11}{90}}$

d) $P(A/R_1\cap R_2) = \dfrac{P(A\cap R_1\cap R_2)}{P(R_1\cap R_2)} = \dfrac{\frac{2}{6}\cdot\frac{2}{5}\cdot\frac{1}{4}}{\frac{11}{90}} = \boxed{\dfrac{3}{11}}$

N08 P2#11

6 Niños ⟵ Elegir 2
5 Niñas ⟵ Elegir 2

a) $\binom{6}{2}\cdot\binom{5}{2} = 15\cdot 10 = \boxed{150 \text{ maneras}}$

b) $\binom{5}{1}\cdot\binom{4}{1} = \boxed{20 \text{ maneras}}$ con Tim y Anna

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

d) 5 Niños ⟵ Elegir 1 (porque Fred ya está elegido)
5 Niñas ⟵ Elegir 2

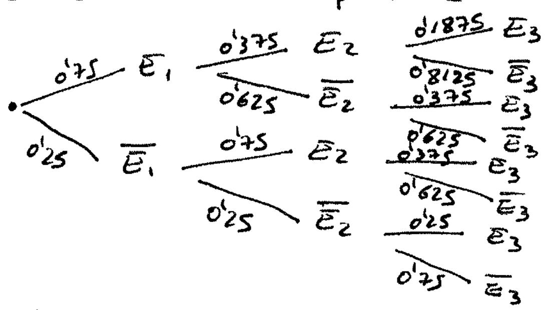
$P((\overline{T}\cap A)\cup(T\cap\overline{A})) = \dfrac{4}{5}\cdot\dfrac{2}{5} + \dfrac{1}{5}\cdot\dfrac{3}{5} = \boxed{\dfrac{11}{25}}$

$P(\overline{A}_1\cap\overline{A}_2) = \dfrac{4}{5}\cdot\dfrac{3}{4} = \dfrac{3}{5}$

$P((A_1\cap\overline{A}_2)\cup(\overline{A}_1\cap A_2)) = \dfrac{1}{5}\cdot\dfrac{4}{4} + \dfrac{4}{5}\cdot\dfrac{1}{4} = \dfrac{2}{5}$

N12
P2#7

E: Éxito en la partida



a) $P(E_1 \cap E_2 \cap E_3) = 0'75 \cdot 0'375 \cdot 0'1875 = \boxed{\frac{27}{512}}$

b) $P((E_2 \cap \bar{E}_3) \cup (\bar{E}_2 \cap E_3) / E_1) = \dfrac{P((E_1 \cap E_2 \cap \bar{E}_3) \cup (E_1 \cap \bar{E}_2 \cap E_3))}{P(E_1)} =$

$= \dfrac{\cancel{0'75} \cdot 0'375 \cdot 0'8125 + \cancel{0'75} \cdot 0'625 \cdot 0'375}{\cancel{0'75}} = 0'375 \cdot 0'8125 + 0'625 \cdot 0'375 = \boxed{\frac{69}{128}}$

N14
P1#4

a) $A \cap B = \emptyset \Rightarrow P(A \cup B) = P(A) + P(B) = \boxed{0'7}$

A, B independientes $\Rightarrow P(A \cap B) = P(A) \cdot P(B) = 0'2 \cdot 0'5 = 0'1$

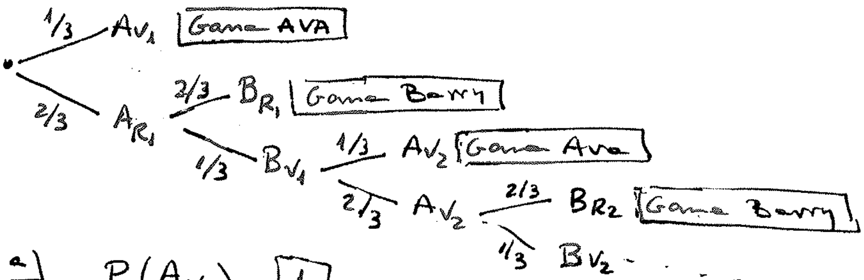
$P(A \cup B) = P(A) + P(B) - P(A \cap B) = 0'2 + 0'5 - 0'1 = \boxed{0'6}$

b) Como $A \cap B$ está contenido tanto en A como en B, su probabilidad será menor que la de A y que la de B. Por lo tanto: $P(A \cap B) \le 0'2 \Rightarrow P(A/B) = \dfrac{P(A \cap B)}{P(B)} \le \dfrac{0'2}{0'5} = 0'4$

$\boxed{0 \le P(A/B) \le 0'4}$

N14
P2#12

A_{R_n}: Ava saca bola Roja en su n^{a} tirada
A_{V_n}: Ava " " Verde " " " "
B_{R_n}: Barry " " Roja " " " "
B_{V_n}: Barry " " Verde " " " "



a) $P(A_{V_1}) = \boxed{\frac{1}{3}}$

b) $P(B_{R_1}) = \frac{2}{3} \cdot \frac{2}{3} = \boxed{\frac{4}{9}}$

c) $P(A_{V_1} \cup (A_{R_1} \cap B_{V_1} \cap A_{V_2}) \cup (A_{R_1} \cap B_{V_1} \cap A_{R_2} \cap B_{V_2} \cap A_{V_3})) =$

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

$= \frac{1}{3} \cdot [1 + \frac{2}{9} + \frac{4}{81}] = \boxed{\frac{103}{243}}$

c) $P(\text{Gana Ava}) = \frac{1}{3} \cdot [1 + \frac{2}{9} + \frac{4}{81} + \frac{8}{729} + \dots] =$

$= \frac{1}{3} \cdot \frac{1}{1 - 2/9} = \frac{1}{3} \cdot \frac{1}{7/9} = \frac{9}{21} = \boxed{\frac{3}{7}}$

↑
Suma de ∞ términos de una progresión geométrica

MLS
T21
P1#10

P : Perder un partido
$\overline{P}$: No perder un partido. Es decir, ganarlo o empatarlo

Casos en los que Roy perdería su trabajo :

- 5 derrotas $\boxed{PPPPP}$ $\quad P(5 \text{ derrotas}) = \left(\frac{1}{3}\right)^5 = \frac{1}{243}$
- Con 4 derrotas, si son :

$$\left.\begin{array}{l} PPPP\overline{P} \\ PPP\overline{P}P \\ P\overline{P}PPP \\ \overline{P}PPPP \end{array}\right\} \rightarrow P(\,) = 4\cdot\left(\frac{2}{3}\right)^1\left(\frac{1}{3}\right)^4 = \frac{8}{243}$$

- Con 3 derrotas, si son :

$$\left.\begin{array}{l} PPP\overline{P}\,\overline{P} \\ \overline{P}PPP\overline{P} \\ \overline{P}\,\overline{P}PPP \end{array}\right\} \quad P(\,) = 3\cdot\left(\frac{1}{3}\right)^3\cdot\left(\frac{2}{3}\right)^2 = \frac{12}{243}$$

$$P(\text{Perder el Trabajo}) = \frac{1}{243} + \frac{8}{243} + \frac{12}{243} = \boxed{\frac{7}{81}}$$