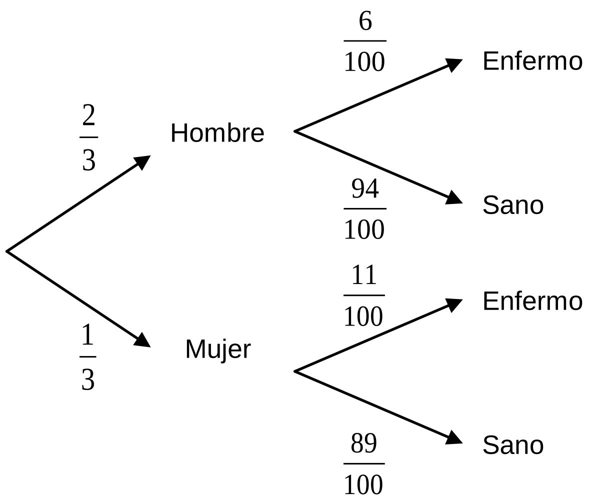
Probabilidad

1) Sean los sucesos **H =** "ser hombre" y **M** = "ser mujer"**.** Sabemos que $p(H)=2p(M)$

a) Como $p(M)+p(H)=1$,sustituyendo: $2p(M)+p(M)=1\Rightarrow 3p(M)=1\Rightarrow p(M)=\frac{1}{3}$, luego $\boxed{p(H)=\frac{2}{3}}$

b) Sea el suceso **E** ="estar enfermo"



$$p(E)=P(E/H)p(H)+p(E/M)p(M)=\frac{6}{100}\cdot\frac{2}{3}+\frac{11}{100}\cdot\frac{1}{3}=\frac{12}{300}+\frac{11}{300}\Rightarrow \boxed{p(E)=\frac{23}{300}}$$

c) Hay que calcular $p(H/E)=\frac{P(E/H)p(H)}{p(E)}=\frac{6/100\cdot 2/3}{23/300}=\frac{12/300}{23/300}\Rightarrow \boxed{p(H/E)=\frac{12}{23}}$

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2) Sean los sucesos Sean los sucesos **H =** "ser hombre" , **M** = "ser mujer" y **D** = "ser daltónico"

Sabemos que $p(H\cap D)=\frac{1}{12}$, $p(M\cap D)=\frac{1}{24}$ y que $p(H)=\frac{1}{2}=p(M)$

a) $p(D/H)=\frac{p(D\cap H)}{p(H)}=\frac{\frac{1}{12}}{\frac{1}{2}}=\frac{2}{12}=\boxed{\frac{1}{6}}$

b) $p(D/M)=\frac{p(D\cap M)}{p(M)}=\frac{\frac{1}{24}}{\frac{1}{2}}=\frac{2}{24}=\boxed{\frac{1}{12}}$

c) $p(D)=p(D/H)p(H)+p(D/M)p(M)=\frac{1}{6}\cdot\frac{1}{2}+\frac{1}{12}\cdot\frac{1}{2}=\frac{1}{12}+\frac{1}{24}=\frac{3}{24}=\boxed{\frac{1}{8}}$

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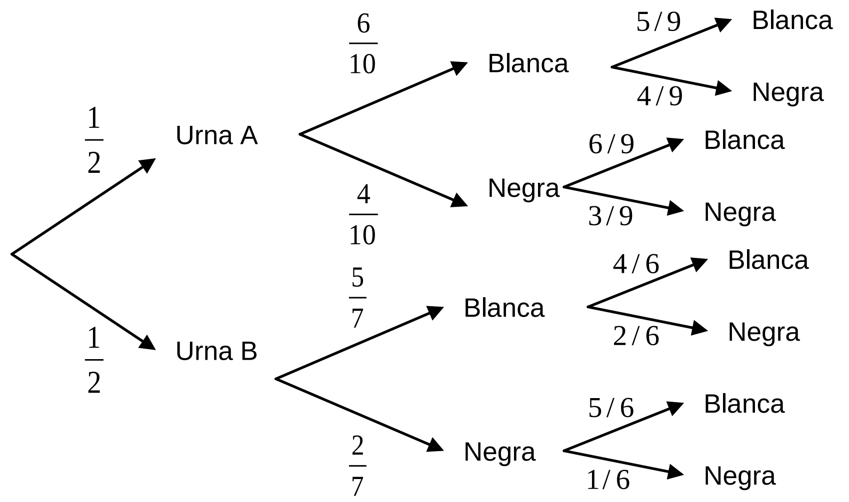
3) Sean los sucesos **A =** "elegir urna A" , **B** = "elegir urna B", **Bl** = "elegir bola blanca" y **N** = elegir bola negra"

a) $p(BlBl)=p(BlBl/A)p(A)+p(BlBl/B)p(B)=\frac{6}{10}\cdot\frac{5}{9}\cdot\frac{1}{2}+\frac{5}{7}\cdot\frac{4}{6}\cdot\frac{1}{2}=\frac{1}{6}+\frac{5}{21}=\boxed{\frac{17}{42}}$



b) p(mismo color) $= p(BlBl) + P(NN)$. Como ya hemos calculado $p(BlBl)$ calculamos $p(NN)$

$$p(NN) = p(NN/A)\,p(A) + p(NN/B)\,p(B) = \frac{4}{10}\cdot\frac{3}{9}\cdot\frac{1}{2} + \frac{2}{7}\cdot\frac{1}{6}\cdot\frac{1}{2} = \frac{12}{180} + \frac{1}{42} = \frac{19}{210}$$

Así $p(BlBl) + P(NN) = \frac{17}{42} + \frac{19}{210} = \boxed{\frac{52}{105}}$

c) p(distinto color) $= 1 -$ p(mismo color) $= 1 - \frac{52}{105} = \boxed{\frac{53}{105}}$

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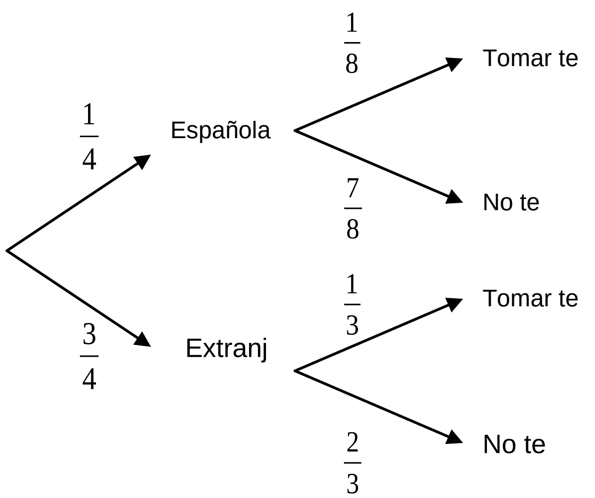
4) Sean los sucesos **E** = "ser española" **, Ex =** "ser extranjera y **T =** "desayunar te"



a) $p(T) = p(T/E)\,p(E) + p(T/Ex)\,p(Ex) = \frac{1}{8}\cdot\frac{1}{4} + \frac{1}{3}\cdot\frac{3}{4} = \frac{1}{32} + \frac{1}{4} = \boxed{\frac{9}{32}}$

b) $p(\overline{E}/T) = 1 - p(E/T) = 1 - \frac{p(T/E)\,p(E)}{p(T)} = 1 - \frac{1/8 \cdot 1/4}{9/32} = 1 - \frac{1/32}{9/32} = 1 - \frac{1}{9} = \boxed{\frac{8}{9}}$

c) $p(E/\overline{T}) = \dfrac{p(\overline{T}/E)\,p(E)}{p(\overline{T})} = \dfrac{(1-p(T/E))\,p(E)}{1-p(T)} = \dfrac{\left(1-\frac{1}{8}\right)\cdot \frac{1}{4}}{1-\frac{9}{32}} = \dfrac{\frac{7}{8}\cdot\frac{1}{4}}{\frac{23}{32}} = \dfrac{\frac{7}{32}}{\frac{23}{32}} = \boxed{\dfrac{7}{23}}$

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5) Sabemos que $p(A) = \dfrac{2}{3}$, $p(B) = \dfrac{3}{4}$ y $p(A \cap B) = \dfrac{5}{8}$

a) $p(A \cup B) = p(A) + p(B) - p(A \cap B) = \dfrac{2}{3} + \dfrac{3}{4} - \dfrac{5}{8} = \boxed{\dfrac{19}{24}}$

b) $p(\overline{B}) = 1 - p(B) = 1 - \dfrac{3}{4} = \boxed{\dfrac{1}{4}}$

c) $p(\overline{A} \cap \overline{B}) = leyes\ de\ Morgan = p(\overline{A \cup B}) = 1 - p(A \cup B) = 1 - \dfrac{19}{24} = \boxed{\dfrac{5}{24}}$

d) $p(A/B) = \dfrac{p(A \cap B)}{p(B)} = \dfrac{\frac{5}{8}}{\frac{3}{4}} = \dfrac{20}{24} = \boxed{\dfrac{5}{6}}$

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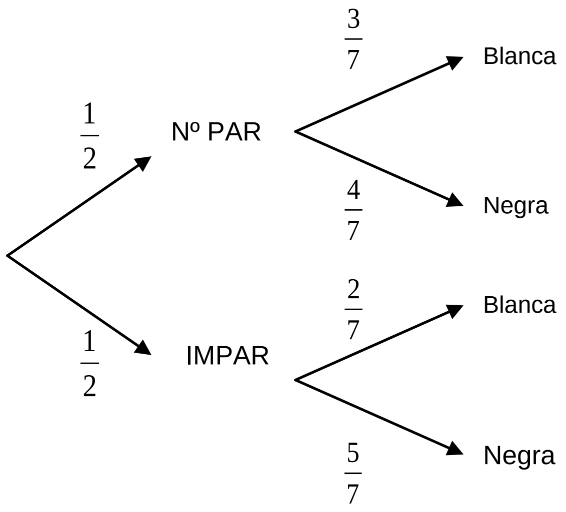
6) Sean los sucesos **P** = "sacar par" , **I** = "sacar impar", **B** ="sacar bola blanca" y **N** = "sacar negra"



a) $p(BB/\,par) = \dfrac{1}{2}\cdot\dfrac{3}{4} - \dfrac{5}{8} =$

b) $p(BB) = p(BB/\,Par)\,p(\,par) + p(BB/\,\text{Impar})\,p(\text{Impar}) = \dfrac{1}{2}\cdot\dfrac{3}{4} - \dfrac{5}{8} =$

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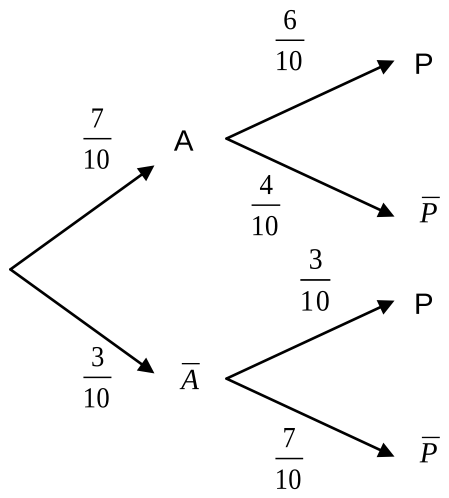
7) Sean los sucesos: **A** = "Ser mayor de 40 años" , **P** = "ser propietario"

Sabemos que $p(A) = \dfrac{70}{100}$ y $p(P/A) = \dfrac{60}{100}$ y $p(P/\overline{A}) = \dfrac{30}{100}$



a) $p(P) = p(P/A)p(A) + p(P/\overline{A})p(\overline{A}) = \frac{6}{10}\cdot\frac{7}{10} + \frac{3}{10}\cdot\frac{3}{10} = \frac{42}{100} + \frac{9}{100} = \boxed{\frac{51}{100}}$

b) $p(A/P) = \frac{p(P/A)p(A)}{p(P)} = \frac{\frac{6}{10}\cdot\frac{7}{10}}{\frac{51}{100}} = \frac{\frac{42}{100}}{\frac{51}{100}} = \frac{42}{51} = \boxed{\frac{14}{17}}$

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8) Sabemos que $p(A) = \frac{1}{3}$, $p(B) = \frac{1}{5}$ y $p(A\cup B) = \frac{7}{15}$

a) Como $p(A\cup B) = p(A) + p(B) - p(A\cap B) \Rightarrow p(A\cap B) = p(A) + p(B) - p(A\cup B) = \frac{1}{3} + \frac{1}{5} - \frac{7}{15} = \boxed{\frac{1}{15}}$

b) $p(A\cap \overline{B}) = p(A) - p(A\cap B) = \frac{1}{3} - \frac{1}{15} = \boxed{\frac{4}{15}}$

c) $p(\overline{A}\cap \overline{B}) = leyes\ de\ Morgan = p(\overline{A\cup B}) = 1 - p(A\cup B) = 1 - \frac{7}{15} = \boxed{\frac{8}{15}}$

d) $p(A/\overline{B}) = \frac{p(A\cap \overline{B})}{p(\overline{B})} = \frac{\frac{4}{15}}{1-\frac{1}{5}} = \frac{\frac{4}{15}}{\frac{4}{5}} = \frac{5}{15} = \boxed{\frac{1}{3}}$

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9) En el lanzamiento dos veces de un dado hay 36 casos posibles:

$$E = \left\{\begin{matrix}(1,1),(1,2),(1,3),(1,4),(1,5),(1,6),(2,1),(2,2),(2,3),(2,4),(2,5),(2,6),(3,1),(3,2),(3,3),(3,4),(3,5),(3,6),(4,1),(4,2),(4,3),\\(4,4),(4,5),(4,6),(5,1),(5,2),(5,3),(5,4),(5,5),(5,6),(6,1),(6,2),(6,3),(6,4),(6,5),(6,6)\end{matrix}\right\}$$

a) Sea el suceso **A** ="suma de los resultados es 4" $= \{(1,3),(3,1),(2,2)\} \Rightarrow p(A) = \frac{3}{36} = \boxed{\frac{1}{12}}$

b) Si la suma es cuatro, ahora el espacio muestral es: $\{(1,3),(3,1),(2,2)\}$, si ha de salir 1 en el primer lanzamiento,

$\boxed{p = \frac{1}{3}}$

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10) Sean los sucesos: **Max** = "máxima dificultad" , **Med** = "dificultad media" y **Es =** "dificultad escasa", y **A** = "aprobar"

Sabemos que: $p(Max)=\frac{3}{10}$, $p(Med)=\frac{5}{10}$, $p(Es)=\frac{2}{10}$ y $p(A/Max)=\frac{1}{8}$, $p(A/Med)=\frac{2}{5}$, $p(A/Es)=\frac{3}{4}$

a) $p(A)=p(A/Max)p(Max)+p(A/Med)p(Med)+p(A/Es)p(Es)=\frac{1}{8}\cdot\frac{3}{10}+\frac{2}{5}\cdot\frac{5}{10}+\frac{4}{3}\cdot\frac{2}{10}=\frac{3}{80}+\frac{1}{5}+\frac{3}{20}=\boxed{\frac{31}{80}}$

b) Por Bayes: $p(Max/A)=\frac{p(A/Max)p(Max)}{p(A)}=\frac{\frac{1}{8}\cdot\frac{3}{10}}{\frac{31}{80}}=\frac{\frac{3}{80}}{\frac{31}{80}}=\boxed{\frac{3}{31}}$

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11) $p(\text{al menos 1 disco bien colocado})=1-p(\text{ningun disco bien colocado})=1-\frac{2}{3}\cdot\frac{2}{3}\cdot\frac{2}{3}=1-\left(\frac{2}{3}\right)^3=1-\frac{8}{27}=\boxed{\frac{19}{27}}$

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12) En el lanzamiento de dos dados hay 36 casos posibles:

$$E=\left\{\begin{matrix}(1,1),(1,2),(1,3),(1,4),(1,5),(1,6),(2,1),(2,2),(2,3),(2,4),(2,5),(2,6),(3,1),(3,2),(3,3),(3,4),(3,5),(3,6),(4,1),(4,2),(4,3),\\(4,4),(4,5),(4,6),(5,1),(5,2),(5,3),(5,4),(5,5),(5,6),(6,1),(6,2),(6,3),(6,4),(6,5),(6,6)\end{matrix}\right\}$$

a) Si **A** = "sacar 5 en algún dado", los casos favorables a A son: 11

$\{(5,1),(5,2),(5,3),(5,4),(5,5),(5,6),(1,5),(2,5),(3,5),(4,5),(6,5)\}$, luego $p(A)=\boxed{\frac{11}{36}}$

b) Sea **B** = "obtener un doble", $B=\{(1,1),(2,2),(3,3),(4,4),(5,5),(6,6)\}$, luego $p(B)=\frac{6}{36}=\boxed{\frac{1}{6}}$

c) **A** $\cap$ **B** ="sacar algún 5 y sacar doble"= $\{(5,5)\}\Rightarrow p(A\cap B)=\boxed{\frac{1}{36}}$

d) $p(A\cup B)=p(A)+p(B)-p(A\cap B)=\frac{11}{36}+\frac{1}{6}-\frac{1}{36}=\frac{11}{36}+\frac{6}{36}-\frac{1}{36}=\frac{16}{36}=\boxed{\frac{4}{9}}$

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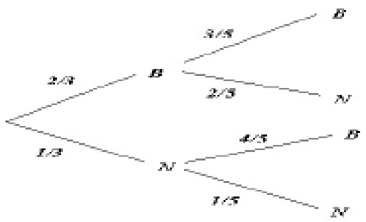
13) Sean los sucesos **B =** "elegir bola blanca" , **N** = "elegir bola negra".

Se tiene que $p(B)=\frac{4}{6}=\frac{2}{3}$ y $p(N)=\frac{2}{6}=\frac{1}{3}$



a) $p(1^o B\cap 2^o B)=\frac{2}{3}\cdot\frac{3}{5}=\boxed{\frac{2}{5}}$

b) $p(1^o N/2^o N)=\frac{p(2^o N/1^o N)p(1^a N)}{p(2^o N)}=$

$$\frac{\frac{1}{3}\cdot\frac{1}{5}}{p(2^a N/1^a B)p(1^a B)+p(2^a N/1^a N)p(1^a N)}=\frac{\frac{1}{3}\cdot\frac{1}{5}}{\frac{2}{3}\cdot\frac{2}{5}+\frac{1}{3}\cdot\frac{1}{5}}=\frac{\frac{1}{15}}{\frac{4}{15}+\frac{1}{15}}=\frac{\frac{1}{15}}{\frac{5}{15}}=\boxed{\frac{1}{5}}$$

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14) Sabemos que $p(A)=0.6$, $p(B)=0.5$ y $p(\overline{A}\cup\overline{B})=0.7$

a) $p(\overline{A}\cup\overline{B})=p(\overline{A\cap B})=1-p(A\cap B)\Rightarrow p(A\cap B)=1-p(\overline{A}\cup\overline{B})=1-0.7=\boxed{0.3}$

Como $p(A)\cdot p(B)=0.6\cdot 0.5=0.3=p(A\cap B)$, los sucesos **A y B son independientes**

b) $p(A\cup B)=p(A)+p(B)-p(A\cap B)=0.6+0.5-0.3=\boxed{0.8}$

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15) Sean los sucesos **A =** "comprar producto A" , **B** = "comprar producto B". Sabemos que $p(A)=0.6$, $p(B)=0.5$ y $p(B/\overline{A})=0.4$.

a) Hay que calcular $p(B\cap\overline{A})$

$$p(B/\overline{A})=\frac{p(B\cap\overline{A})}{p(\overline{A})}\Rightarrow p(B\cap\overline{A})=p(B/\overline{A})p(\overline{A})=p(B/\overline{A})(1-p(A))=0.4\cdot(1-0.6)=0.4\cdot 0.4=\boxed{0.16}$$

b) Nos piden $p(\overline{A}\cap\overline{B})$

- $p(B\cap\overline{A})=p(B)-p(A\cap B)\Rightarrow 0.16=0.5-p(A\cap B)\Rightarrow p(A\cap B)=0.5-0.16=0.34$
- $p(A\cup B)=p(A)+p(B)-p(A\cap B)=0.6+0.5-0.34=0.76$

Como $p(\overline{A}\cap\overline{B})=p(\overline{A\cup B})=1-p(A\cup B)=1-0.76=\boxed{0.24}$

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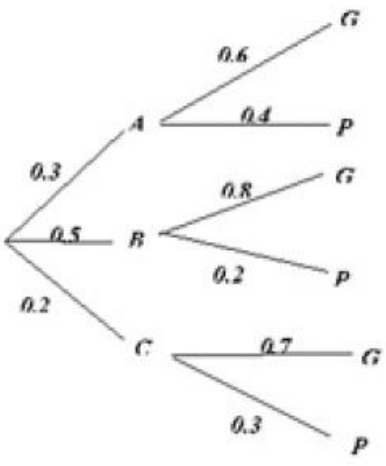
16) Sean los sucesos: **A =** "remitir al bufete A" , **B** = "remitir al bufete B" y **C** = "remitir al bufete C", **A** = "ganar un caso" y **B** = "perder un caso". Sabemos que $p(A)=0.3$, $p(B)=0.5$, $p(C)=0.2$, además $p(G/A)=0.6$, $p(G/B)=0.8$ y $p(G/C)=0.7$.

a) $p(G)=p(G/A)p(A)+p(G/B)p(B)+P(G/C)p(C)=0.6\cdot 0.3+0.8\cdot 0.5+0.7\cdot 0.2=0.18+0.4+0.14=\boxed{0.72}$

b) $p(A/G)=\dfrac{p(G/A)p(A)}{p(G)}=\dfrac{0.6\cdot 0.3}{0.72}=\dfrac{0.18}{0.72}=\boxed{0.25}$



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17) Sean los sucesos: **A =** "fabricar modelo A" , **B** ="fabricar modelo B", **C** = "fabricar modelo C" , **D** = "tener motor diesel"

Se sabe que $p(A)=\dfrac{6}{10}$, $p(B)=\dfrac{3}{10}$, $p(D/A)=\dfrac{3}{10}$, $p(D/B)=\dfrac{2}{10}$ y $p(D)=\dfrac{3}{10}$

a) Como $A \cup B \cup C = E \Rightarrow p(A) + p(B) + p(C) = 1 \Rightarrow p(C) = 1 - p(A) - p(B) = 1 - \frac{6}{10} - \frac{3}{10} = \boxed{\frac{1}{10}}$

b) $p(A/D) = \frac{p(D/A)p(A)}{p(D)} = \frac{\frac{3}{10} \cdot \frac{6}{10}}{\frac{3}{10}} = \frac{6}{10} = \boxed{\frac{3}{5}}$

c) $p(D) = p(D/A)p(A) + p(D/B)p(B) + p(D/C)p(C) \Rightarrow \frac{3}{10} = \frac{3}{10} \cdot \frac{6}{10} + \frac{2}{10} \cdot \frac{3}{10} + p(D/C) \cdot \frac{1}{10} =$

$= \frac{18}{100} + \frac{6}{100} + p(D/C) \cdot \frac{1}{10} = \frac{24}{100} + p(D/C) \cdot \frac{1}{10} \Rightarrow p(D/C) \cdot \frac{1}{10} = \frac{3}{10} - \frac{24}{100} = \frac{6}{100} \Rightarrow p(D/C) = 10 \cdot \frac{6}{100} = \boxed{\frac{3}{5}}$

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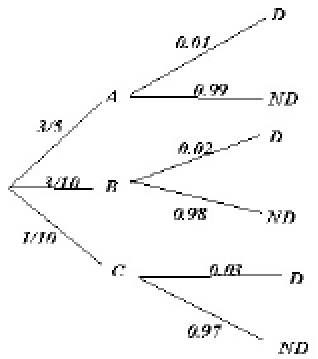
18) Sean los sucesos: **A =** "ser fabricado por A" , **B** =" ser fabricado por B", **C** = "ser fabricado por C" , **D** = "tornillo defectuoso" y **ND** = "no ser tornillo defectuoso"

Se sabe que $p(A) = 0.6$, $p(B) = 0.3$, $p(C) = 0.1$, $p(D/A) = 0.01$ y $p(D/B) = 0.02$ y $p(D/C) = 0.03$

a) $p(D) = p(D/A)p(A) + p(D/B)p(B) + p(D/C)p(C) = 0.01 \cdot 0.6 + 0.02 \cdot 0.3 + 0.03 \cdot 0.1 = 0.006 + 0.006 + 0.003 =$

$= 0.015$. Como $p(\overline{D}) = 1 - p(D) = 1 - 0.015 = \boxed{0.985}$

b) $p(A/\overline{D}) = \frac{p(\overline{D}/A)p(A)}{p(\overline{D})} = \frac{(1 - p(D/A)) \cdot 0.6}{0.985} = \frac{(1 - 0.01) \cdot 0.6}{0.985} = \frac{0.99 \cdot 0.6}{0.985} = \frac{0.594}{0.985} = \boxed{0.603}$



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19) Sean los sucesos: **A =** "elegir película A" , **B** =" elegir película B" y **C** = "elegir película C".

Sabemos que $p(A) = \frac{8}{22}$, $p(B) = \frac{9}{22}$, $p(C) = \frac{5}{22}$. Los sucesos A, B y C son independientes

a) $p(AAA \cap BBB \cap CCC) = p(AAA) + p(BBB) + p(CCC) = \frac{8}{22} \cdot \frac{7}{21} \cdot \frac{6}{20} + \frac{9}{22} \cdot \frac{8}{21} \cdot \frac{7}{20} + \frac{5}{22} \cdot \frac{4}{21} \cdot \frac{3}{20} = \boxed{\frac{15}{154}}$

b) $p(AAC \cap ACA \cap CAA) = \frac{8}{22} \cdot \frac{7}{21} \cdot \frac{5}{20} + \frac{8}{22} \cdot \frac{5}{21} \cdot \frac{7}{20} + \frac{5}{22} \cdot \frac{8}{21} \cdot \frac{7}{20} = 3 \cdot \frac{5}{22} \cdot \frac{8}{21} \cdot \frac{7}{20} = \boxed{\frac{1}{11}}$

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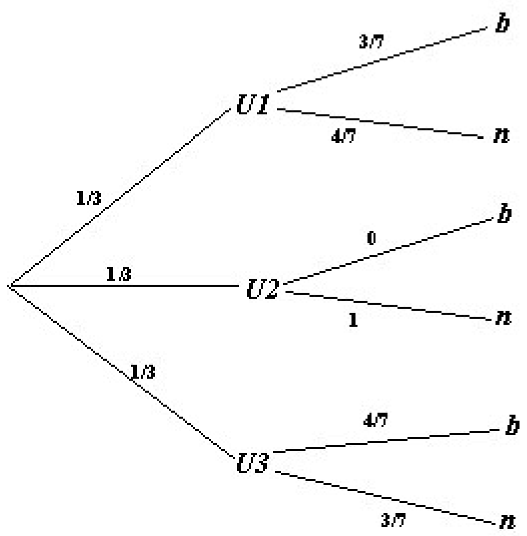
20) Sea el suceso **G** = "ganar el premio" y **P** = "pierda el premio"

a) $p(G) = \frac{2}{500} = \boxed{0.004}$ **b)** $p = 1 - p(P1^{o} \cap P2^{o}) = 1 - \frac{498}{500} \cdot \frac{497}{499} = \boxed{0.00799}$

21) Sean los sucesos: **U1 =** "elegir urna U1" , **U2** =" elegir urna U2" , **U3** = "elegir película U3", **b** = " elegir bola blanca" y **n** = "elegir bola negra".

Sabemos que $p(U1) = p(U2) = p(U3) = \frac{1}{3}$, además:



a) $p(n) = p(n/U1)p(U1) + p(n/U2)p(U2) + p(n/U3)p(U3) = \frac{4}{7}\cdot\frac{1}{3} + 1\cdot\frac{1}{3} + \frac{3}{7}\cdot\frac{1}{3} = \frac{4}{21} + \frac{1}{3} + \frac{3}{21} = \frac{14}{21} = \boxed{\frac{2}{3}}$

b) $p(U2/n) = \frac{p(n/U2)p(U2)}{p(n)} = \frac{1\cdot {}^{1}\!/\!{}_{3}}{{}^{2}\!/\!{}_{3}} = \boxed{\frac{1}{2}}$

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22) La probabilidad de que salga una cara cualquiera es $\frac{1}{6}$

a) $p(66 \cap 66 \cap 66) = \left(\frac{1}{6}\cdot\frac{1}{6}\right)^3 = \boxed{\left(\frac{1}{36}\right)^3}$

b) $p = \left(\frac{5}{6}\cdot\frac{5}{6}\right)^3 = \boxed{\left(\frac{5}{36}\right)^3}$

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23) Sea el suceso: **A =** "acertar en el blanco", con $p(A) = 0.3$ y $p(\overline{A}) = 0.7$

a) $p(\text{acertar en 3 intentos}) = 1 - p(\text{no acertar en 3 intentos}) = p(\overline{A})p(\overline{A})p(\overline{A}) = (0.7)^3 = \boxed{0.657}$

b) $p(\text{acertar en el 3º intento}) = p(\overline{A})p(\overline{A})p(A) = (0.7)^2 \cdot 0.3 = \boxed{0.147}$

$p(\text{acertar en el 2º intento}) = p(\overline{A})p(A) = 0.7 \cdot 0.3 = \boxed{0.21}$

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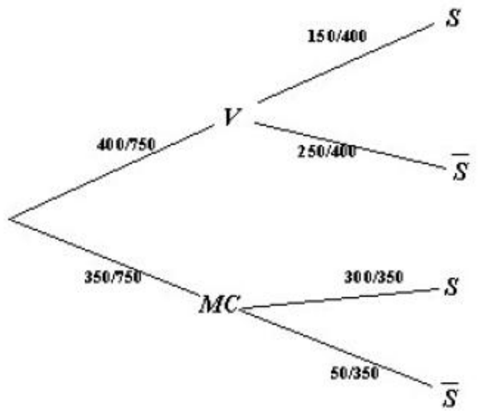
24) Sean los sucesos: **V =** "pagar con tarjeta V" , **MC =** "pagar con tarjeta MC", **S** = "compra superior a 150 €"

Sabemos que $p(V)=\frac{400}{750}$, $p(MC)=\frac{350}{750}$, $p(S/MC)=\frac{300}{350}$ y $p(S/V)=\frac{150}{400}$

a) $p(S)=p(S/V)p(V)+p(S/MC)p(MC)=\frac{150}{400}\cdot\frac{400}{750}+\frac{300}{350}\cdot\frac{350}{750}=\frac{150}{750}+\frac{300}{750}=\frac{450}{750}=\boxed{\frac{3}{5}}$

b) $p(MC/\bar{S})=\frac{p(\bar{S}/MC)p(MC)}{p(\bar{S})}=\frac{50/350\cdot 350/750}{1-3/5}=\frac{50/750}{2/5}=\frac{1/15}{2/5}=\frac{5}{30}=\boxed{\frac{1}{6}}$



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25) Sean los sucesos: **A =** "votar al candidato A" , **B** =" votar al candidato B" y **Abs** = "abstenerse".

Sabemos que $p(A)=\frac{45}{100}=0.45$ **,** $p(B)=\frac{35}{100}=0.35$ **,** $p(Abs)=\frac{20}{100}=0.2$ **.**

a) $p(AAA)=p(A)^3=(0.45)^3=\boxed{0.091}$

b) $p(AAB)+p(ABA)+p(BAA)=0.45\cdot0.45\cdot0.35+0.45\cdot0.35\cdot0.45+0.35\cdot0.45\cdot0.45=3\cdot(0.45)^2\cdot0.35=\boxed{0.21}$

c) $p(Abs)=0.2\Rightarrow p(No\ Abs)=1-0.20=0.80$

$p(\text{alguno se abstiene})=1-p(\text{ninguno se abstiene})=1-(0.8)^3=\boxed{0.488}$

---

26) a) Si **R** = "sacar rey", $p(RRR)=\frac{4}{40}\cdot\frac{3}{39}\cdot\frac{2}{38}=\frac{1}{2470}=\boxed{0.0004}$

b) Si **F** = "sacar figura", $p(F\cap5\cap6)=\frac{12}{40}\cdot\frac{4}{39}\cdot\frac{4}{38}=\frac{4}{1235}=\boxed{0.0032}$

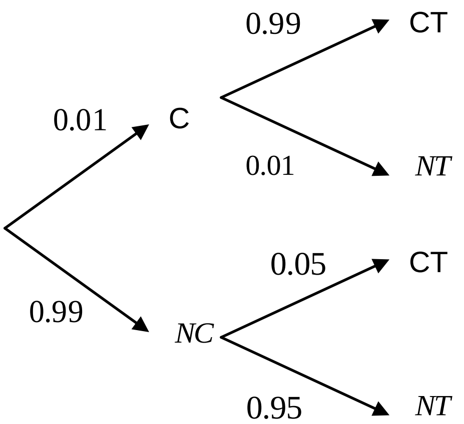
c) Si **A** = "sacar as", $p(As,3,6)=p(As\cap3\cap6)+p(3\cap As\cap6)+p(6\cap3\cap As)=3\cdot\frac{4}{40}\cdot\frac{4}{39}\cdot\frac{4}{38}=\frac{8}{1235}=\boxed{0.0065}$

---

27) Sean los sucesos: **C =** "contaminada", **NC** =" no contaminada", **CT=** "contaminada según el test" y **NT =** "no contaminada según el test"

Sabemos que: $p(NC)=0.99$, $p(CT/NC)=0.05$, $p(CT/C)=0.99$

Nos piden $p(NC/CT)$. Como $p(NC/CT)p(CT)=p(CT/NC)p(NC)\Rightarrow p(NC/CT)=\frac{p(CT/NC)p(NC)}{p(CT)}=$



$$= \frac{0.05 \cdot 0.99}{p(CT/C)p(C) + p(CT/NC)p(NC)} = \frac{0.0495}{0.99 \cdot 0.01 + 0.05 \cdot 0.99} = \frac{0.0495}{0.0594} = \boxed{0.83}$$

---

28) Sean los sucesos: **A =** "ser divisible por 2", **B** =" ser divisible por 3", **C** =" ser divisible por 6",

Al haber 20 números la probabilidad de elegir cada uno es $\frac{1}{20}$

$A = \{2, 4, 6, 8, 10, 12, 14, 16, 18, 20\} \Rightarrow p(A) = \frac{10}{20}$ **,** $B = \{3, 6, 9, 12, 15, 18\} \Rightarrow p(B) = \frac{6}{20}$ **,** $C = \{6, 12, 18\} \Rightarrow p(C) = \frac{3}{20}$

$A \cap B = \{6, 12, 18\} \Rightarrow p(A \cap B) = \frac{3}{20}$

a) $p(A \cup B) = p(A) + p(B) - p(A \cap B) = \frac{10}{20} + \frac{6}{20} - \frac{3}{20} = \boxed{\frac{13}{20}}$

b) Como $\overline{C} = \{1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 13, 14, 15, 17, 19, 20\}$, $B \cap \overline{C} = \{3, 9, 15\} \Rightarrow p(B \cap \overline{C}) = \boxed{\frac{3}{20}}$

---

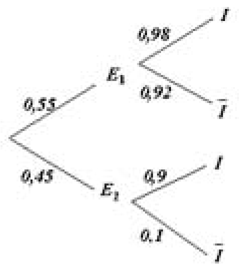
29) Sean los sucesos: **E_1 =** "ser realizada por E_1", **E_2** =" ser divisible por E_2",

I ="obtener indemnización",

Sabemos que $p(E_1) = 0.55$, $p(E_2) = 0.45$, $p(I/E_1) = 0.98$ y $p(I/E_2) = 0.90$

$p(I) = p(I/E_1)p(E_1) + p(I/E_2)p(E_2) = 0.98 \cdot 0.55 + 0.9 \cdot 0.45 = 0.944$

$p(E_2/I) = \frac{p(I/E_2)p(E_2)}{p(I)} = \frac{0.90 \cdot 0.45}{0.944} = \boxed{0.429}$



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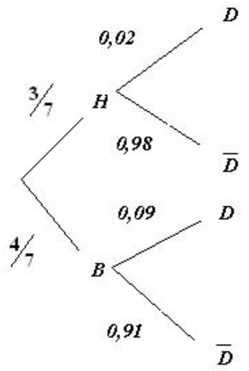
30) Sean los sucesos: **H =** "bombilla halógena", **B** =" bajo consumo", **D** = "ser defectuosa"

Se conoce $p(H) = \frac{3}{7}$, $p(B) = \frac{4}{7}$ $p(D/H) = 0.02$ y $p(D/B) = 0.09$

$$p(\overline{D}) = p(\overline{D}/H)p(H) + p(\overline{D}/B)p(B) = 0.98\cdot\frac{3}{7} + 0.91\cdot\frac{4}{7} = 0.94$$

$$p(H/\overline{D}) = \frac{p(\overline{D}/H)p(H)}{p(\overline{D})} = \frac{0.98\cdot 3/7}{0.94} = \boxed{0.44}$$



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31) Sean los sucesos: **A =** "se enciende el indicador 1º", **B** ="se enciende el indicador 2º". Sabemos que $p(A) = 0.95$ y $p(B) = 0.9$

a) $p = p(\overline{A}\cap B) + p(A\cap\overline{B}) =$ como son independientes $= p(\overline{A})p(B) + p(A)p(\overline{B}) = (1-0.95)\cdot 0.9 + 0.95\cdot(1-0.9) =$

$= 0.05\cdot 0.9 + 0.95\cdot 0.1 = \boxed{0.14}$

b) $p(\text{al menos uno}) = 1 - p(\text{ninguno}) = 1 - p(\overline{A}\cap\overline{B}) =$ como son independientes $= 1 - p(\overline{A})p(\overline{B}) =$

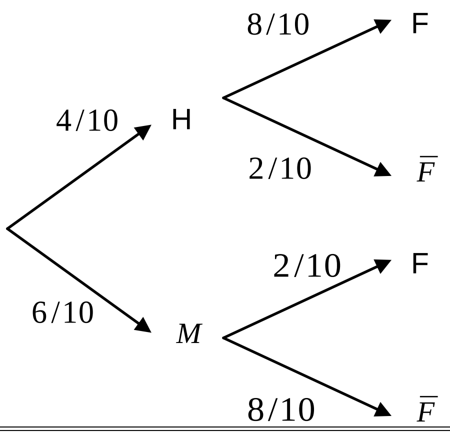
$= 1 - (1-0.95)(1-0.9) = 1 - 0.05\cdot 0.1 = 1 - 0.005 = \boxed{0.995}$

---

32) Sean los sucesos: **H =** "ser hombre", **M =**" ser mujer", **A=** "ser aficionado al fútbol"

Sabemos que: $p(H) = \frac{40}{100}$, $p(M) = \frac{60}{100}$ $p(F/H) = \frac{80}{100}$, $p(F/M) = \frac{20}{100}$

a) $p(F) = p(F/H)p(H) + p(F/M)p(M) = \frac{8}{10}\cdot\frac{4}{10} + \frac{2}{10}\cdot\frac{6}{10} = \frac{32}{100} + \frac{12}{100} = \frac{44}{100} = \boxed{\frac{11}{25}}$



b) $p(M/F)=\dfrac{p(F/M)p(M)}{p(F)}=\dfrac{\frac{2}{10}\cdot\frac{6}{10}}{\frac{44}{100}}=\dfrac{\frac{12}{100}}{\frac{44}{100}}=\dfrac{12}{44}=\boxed{\dfrac{3}{11}}$

---

33) Sean los sucesos: **B =** "el huevo está en buen estado", **R =**" el huevo está roto"

Sabemos que: $p(R)=\dfrac{2}{12}$, $p(B)=\dfrac{10}{12}$

a) $p(BBBB)=\dfrac{10}{12}\cdot\dfrac{9}{11}\cdot\dfrac{8}{10}\cdot\dfrac{7}{9}=\dfrac{56}{132}=\boxed{\dfrac{14}{33}}$

b) $p(\text{Un huevo roto})=P(RBBB)+p(BRBB)+p(BBRB)+p(BBBR)=\dfrac{2}{12}\cdot\dfrac{10}{11}\cdot\dfrac{9}{10}\cdot\dfrac{8}{9}+\dfrac{10}{12}\cdot\dfrac{2}{11}\cdot\dfrac{9}{10}\cdot\dfrac{8}{9}+$

$+\dfrac{10}{12}\cdot\dfrac{9}{11}\cdot\dfrac{2}{10}\cdot\dfrac{8}{9}+\dfrac{10}{12}\cdot\dfrac{9}{11}\cdot\dfrac{8}{10}\cdot\dfrac{2}{9}=4\cdot\dfrac{10}{12}\cdot\dfrac{9}{11}\cdot\dfrac{8}{10}\cdot\dfrac{2}{9}=\dfrac{64}{132}=\boxed{\dfrac{16}{33}}$

---

34) Al lanzar un dado cada cara tiene probabilidad $\dfrac{1}{6}$ de salir

a) $p(111)=p(1)p(1)p(1)=\left(\dfrac{1}{6}\right)^3=\boxed{\dfrac{1}{216}}$

b) $p(\text{al menos un 2})=1-p(\text{ningún 2})=1-\dfrac{5}{6}\cdot\dfrac{5}{6}\cdot\dfrac{5}{6}=1-\dfrac{125}{216}=\boxed{\dfrac{91}{216}}$

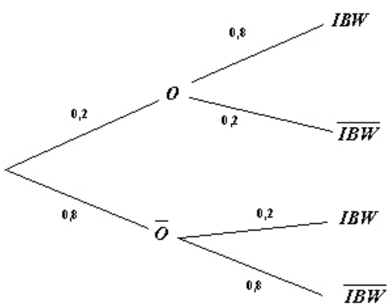
c) $p(\text{tres números distintos})=1-6p(111)=1-6\cdot\dfrac{1}{216}=1-\dfrac{6}{216}=1-\dfrac{1}{36}=\boxed{\dfrac{35}{36}}$

d) $p(\text{suma 4})=p(121)+p(211)+p(112)=3\cdot\dfrac{1}{6}\cdot\dfrac{1}{6}\cdot\dfrac{1}{6}=\dfrac{3}{216}=\boxed{\dfrac{1}{72}}$

---

35) Sean los sucesos: **O =** "realizar operaciones", **IBW =**" consultar InfoBolsaWeb"

Sabemos que: $p(O)=\dfrac{20}{100}=0.2$, $p(IBW/O)=\dfrac{80}{100}=0.8$



a) $p(IBW)=p(IBW/O)p(O)+p(IBW/\bar{O})p(\bar{O})=$

$=0.8\cdot 0.2+0.2\cdot 0.8=0.16+0.16=\boxed{0.32}$

b) $p(O/IBW)=\dfrac{p(IBW/O)p(O)}{p(IBW)}=\dfrac{0.8\cdot 0.2}{0.32}=\dfrac{0.16}{0.32}=\boxed{0.5}$

---

36) $p(A)=\dfrac{1}{2}$, $p(\bar{B})=\dfrac{2}{5}$ y $p(\bar{A}\cup\bar{B})=\dfrac{3}{4}$

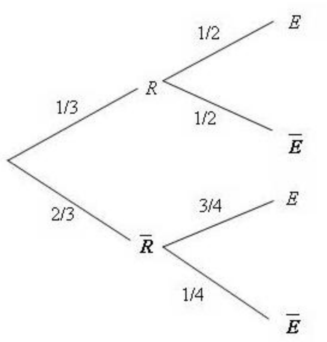
a) Si $p(\bar{A}\cup\bar{B})=\dfrac{3}{4}\Rightarrow p(\overline{A\cap B})=\dfrac{3}{4}\Rightarrow 1-p(A\cap B)=\dfrac{3}{4}\Rightarrow p(A\cap B)=\dfrac{1}{4}$

$$p(B/A)=\frac{p(A\cap B)}{p(A)}=\frac{1/4}{1/2}=\frac{2}{4}=\boxed{\frac{1}{2}}$$

b) Si $p(\overline{A}/B)=1-p(A/B)=1-\frac{p(A\cap B)}{p(B)}=1-\frac{1/4}{1-2/5}=1-\frac{1/4}{3/5}=1-\frac{5}{12}=\boxed{\frac{7}{12}}$

---

37) Sean los sucesos: **R =** "regar", **E =**"estropearse"



Sabemos que: $p(\overline{R})=\frac{2}{3}$, $p(E/R)=p(\overline{E}/R)=\frac{1}{2}$, $p(\overline{E}/\overline{R})=\frac{1}{4}$

Calculamos primero $p(E/\overline{R})=1-p(\overline{E}/\overline{R})=1-\frac{1}{4}=\frac{3}{4}$

Asi: $p(E)=p(E/R)p(R)+p(E/\overline{R})p(\overline{R})=\frac{1}{2}\cdot\frac{1}{3}+\frac{3}{4}\cdot\frac{2}{3}=\frac{1}{6}+\frac{1}{2}=\frac{2}{3}$

La probabilidad pedida: $p(\overline{R}/E)=\frac{p(E/\overline{R})p(\overline{R})}{p(E)}=\frac{3/4\cdot 2/3}{2/3}=\boxed{\frac{3}{4}}$

---

38) a) El espacio muestral será: $E=\{(C,1),(C,2),(C,3),(C,4),(C,5),(C,6),(X,1),(X,2),(X,3),(X,4),(X,5),(X,6)\}$

b) Si **A =** "obtener cara y par" = $\{(C,2),(C,4),(C,6)\}$, luego $p(A)=\frac{3}{12}=\boxed{\frac{1}{4}}$

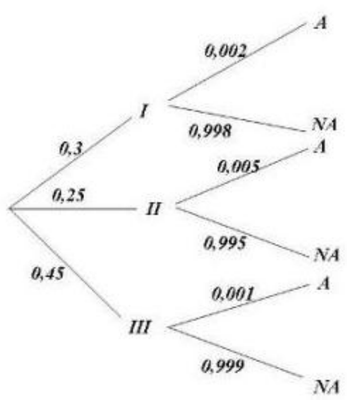
---

39) Sean los sucesos: **I =** "pertenecer a la reserva 1", **II =** "pertenecer a la reserva 2", **III =** "pertenecer a la reserva 3", **A** ="ser tigre albino".

Sabemos que $p(I)=\frac{30}{100}=0.3$, $p(II)=\frac{25}{100}=0.25$, $p(III)=\frac{45}{100}=0.45$.

Además: $p(A/I)=\frac{0,2}{100}=0.002$, $p(A/II)=\frac{0,5}{100}=0.005$, $p(A/III)=\frac{0,1}{100}=0.001$

$p(A)=p(A/I)p(I)+p(A/II)p(II)+p(A/III)p(III)=0.002\cdot 0.3+0.005\cdot 0.25+0.001\cdot 0.45=\boxed{0.0023}$



40) Sean los sucesos: **A =** “elegir bola blanca”, **N =** “elegir bola negra. Con $p(B)=\dfrac{10}{15}$ y $p(N)=\dfrac{5}{15}$

$$p(\text{dos bolas del mismo color})= p(BB)+p(NN)=\frac{10}{15}\cdot\frac{9}{14}+\frac{5}{15}\cdot\frac{4}{14}=\frac{90+20}{210}=\frac{110}{210}=\boxed{\frac{11}{21}}$$

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41) Sean los sucesos: **I =** “tener contratado Internet”, **C =** “tener TV por cable”

Se sabe que $p(I)=\dfrac{40}{100}$, $p(C)=\dfrac{33}{100}$, $p(I\cap C)=\dfrac{20}{100}$

a) $p(C\cap \bar I)=p(C)-p(C\cap I)=\dfrac{33}{100}-\dfrac{20}{100}=\dfrac{13}{100}=\boxed{0.13}$

b) $p(\bar C\cap \bar I)=p(\overline{C\cup I})=1-p(C\cup I)=1-\left(p(A)+p(C)-p(C\cap I)\right)=1-\left(\dfrac{40}{100}+\dfrac{33}{100}-\dfrac{20}{100}\right)=1-\dfrac{53}{100}=\boxed{0.47}$

---

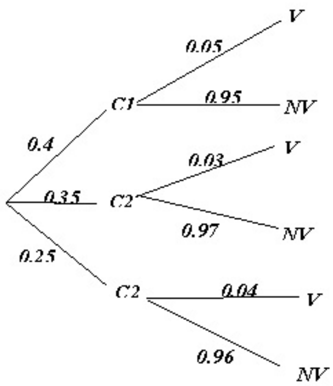
42) Sean los sucesos: **V =** “ser virtuoso”, **C1 =** “estar formado en C1”, **C2 =** “estar formado en C2” y **C3 =** “estar formado en C3”

Sabemos que $p(C1)=\dfrac{40}{100}$, $p(C2)=\dfrac{35}{100}$, $p(C3)=\dfrac{25}{100}$, $p(V/C1)=\dfrac{5}{100}$, $p(V/C2)=\dfrac{3}{100}$, $p(V/C3)=\dfrac{4}{100}$

a) $p(V)=p(V/C1)p(C1)+p(V/C2)p(C2)+p(V/C3)p(C3)=$

$$=\frac{5}{100}\cdot\frac{40}{100}+\frac{3}{100}\cdot\frac{35}{100}+\frac{4}{100}\cdot\frac{25}{100}=\frac{200+105+100}{10000}=\frac{405}{10000}=$$

$$=\frac{81}{2000}=\boxed{0.0405}$$



b) $p(C1/V)=\dfrac{p(V/C1)p(C1)}{p(V)}=\dfrac{\frac{5}{100}\cdot\frac{40}{100}}{\frac{405}{10000}}=\dfrac{200}{405}=\dfrac{40}{81}=\boxed{0.4938}$

---

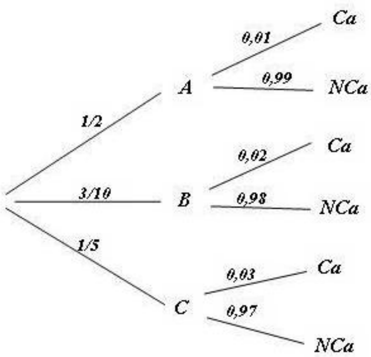
43) Sean los sucesos: **A =** “marca A”, **B =** “marca B”, **C =** “marca C”, **Ca** =”caducado” y **NCa** = “no caducado”

Sabemos que $p(A)=\dfrac{1}{2}$, $p(B)=\dfrac{60}{200}=\dfrac{3}{10}$, $p(C)=\dfrac{40}{200}=\dfrac{1}{5}$, $p(Ca/A)=0.01$, $p(Ca/B)=0.02$ y $p(Ca/C)=0.03$

a) $p(Ca)=p(Ca/A)p(A)+p(Ca/B)p(B)+p(Ca/C)p(C)=$

$$=0.01\cdot\frac{1}{2}+0.02\cdot\frac{3}{10}+0.03\cdot\frac{1}{5}=0.01\cdot 0.5+0.02\cdot 0.3+0.03\cdot 0.2=$$

$$=0.005+0.006+0.006=\boxed{0.017}$$



b) $p(B/Ca)=\dfrac{p(Ca/B)p(B)}{p(Ca)}=\dfrac{0.02\cdot 0.3}{0.017}=\dfrac{0.006}{0.17}=\boxed{0.0352}$

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44) $p(A)=\frac{3}{4}$, $p(B)=\frac{1}{2}$ y $p(\overline{A}\cap\overline{B})=\frac{1}{20}$

- $p(\overline{A}\cap\overline{B})=p(\overline{A\cup B})=1-p(A\cup B)\Rightarrow p(A\cup B)=1-p(\overline{A}\cap\overline{B})=1-\frac{1}{20}=\boxed{\frac{19}{20}}$
- $p(A\cup B)\Rightarrow p(A)+p(B)-p(A\cap B)=\frac{3}{4}+\frac{1}{2}-p(A\cap B)\Rightarrow\frac{19}{20}=\frac{3}{4}+\frac{1}{2}-p(A\cap B)\Rightarrow\frac{19}{20}=\frac{5}{4}-p(A\cap B)\Rightarrow$

  $\Rightarrow p(A\cap B)=\frac{5}{4}-\frac{19}{20}=\boxed{\frac{3}{10}}$
- $p(\overline{A}/B)=1-p(A/B)\Rightarrow 1-\frac{p(A\cap B)}{p(B)}=1-\frac{3/10}{1/2}=1-\frac{6}{10}=\frac{4}{10}=\boxed{\frac{2}{5}}$
- $p(\overline{B}/A)=1-p(B/A)\Rightarrow 1-\frac{p(A\cap B)}{p(A)}=1-\frac{3/10}{3/4}=1-\frac{4}{10}=\frac{6}{10}=\boxed{\frac{3}{5}}$

---

45) $E=\left\{\begin{matrix}(CC1),(CC2),(CC3),(CC4),(CC5),(CC6),(CX1),(CX2),(CX3),(CX4),(CX5),(CX6)\\(CX1),(CX2),(XC3),(XC4),(XC5),(XC6),(XX1),(XX2),(XX3),(XX4),(XX5),(XX6)\end{matrix}\right\}$ (24 casos)

Sea el suceso **G** ="Ganar" , **C** ="Sacar cara" , **X** ="Sacar cruz"

a) $G=\{(CC2),(CC4),(CC6),(CX5),(XC5),(CX6),(XC6)\}$ (7 casos), $p(G)=\boxed{\frac{7}{24}}$

b) $p(CC/G)=\frac{p(CC\cap G)}{p(G)}=\frac{3/24}{7/24}=\boxed{\frac{3}{7}}$

---

46) $p(A)=\frac{1}{4}$, $p(B)=\frac{1}{3}$ y $p(A\cup B)=\frac{1}{2}$

a) $p(A\cup B)=p(A)+p(B)-p(A\cap B)=\frac{1}{4}+\frac{1}{3}-p(A\cap B)\Rightarrow\frac{1}{2}=\frac{7}{12}-p(A\cap B)\Rightarrow p(A\cap B)=\frac{7}{12}-\frac{1}{2}=\frac{1}{12}$

$p(A)p(B)=\frac{1}{4}\cdot\frac{1}{3}=\frac{1}{12}=p(A\cap B)$, luego son independientes

b) $p(\overline{A}/\overline{B})=\frac{p(\overline{A}\cap\overline{B})}{p(\overline{B})}=$ como A y B independientes $=\frac{p(\overline{A})p(\overline{B})}{p(\overline{B})}=p(\overline{A})=\boxed{\frac{3}{4}}$

---

47) Sean los sucesos: **A =** "ver la TV" y **B =** "visitar centros comerciales"

Sabemos que $p(A)=0.46$, $p(B)=0.33$, $p(A\cap B)=0.15$

a) $p(\overline{A}\cap\overline{B})=p(\overline{A\cup B})=1-p(A\cup B)=1-(p(A)+p(B)-p(A\cap B))=1-(0.46+0.33-0.15)=1-0.64=\boxed{0.36}$

b) $p(A\cap B/A\cup B))=\frac{p[A\cap B)\cap(A\cup B)]}{p(A\cup B)}=\frac{p(A\cap B)}{p(A\cup B)}=\frac{0.15}{0.64}=\boxed{0.23}$

48) Sean los sucesos: **Raya =**"se emite raya" y **Punto =**"se emite punto" , **Rpunto** ="se recibe punto" y **Rraya** ="se recibe raya". Sabemos que $p(raya)=\frac{4}{7}$, $p(punto)=\frac{3}{7}$, $p(Rraya/\,punto)=\frac{1}{4}$

$p(Rpunto/\,raya)=\frac{1}{3}$.

a) $p(raya/\,Rraya)=\dfrac{p(Rraya/\,raya)\,p(raya)}{p(Raya)}=\dfrac{\frac{2}{3}\cdot\frac{4}{7}}{p(Rraya/\,punto)\,p(punto)+p(Rraya/\,raya)\,p(raya)}=$

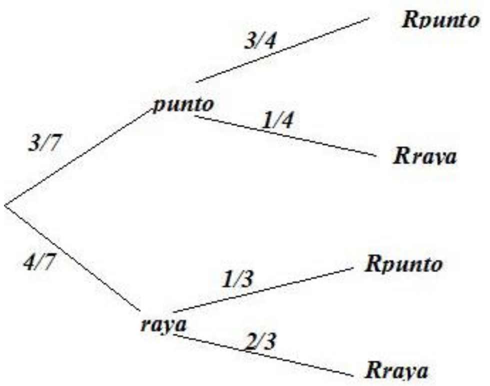
$=\dfrac{\frac{2}{3}\cdot\frac{4}{7}}{\frac{1}{4}\cdot\frac{3}{7}+\frac{2}{3}\cdot\frac{4}{7}}=\dfrac{\frac{8}{21}}{\frac{3}{28}+\frac{8}{21}}=\dfrac{\frac{8}{21}}{\frac{41}{84}}=\boxed{\dfrac{32}{41}}$

b) $p(raya/\,Rpunto)=\dfrac{p(Rpunto/\,raya)\,p(raya)}{p(Rpunto)}=\dfrac{\frac{1}{3}\cdot\frac{4}{7}}{p(Rpunto/\,punto)\,p(punto)+p(Rpunto/\,raya)\,p(raya)}=$

$=\dfrac{\frac{1}{3}\cdot\frac{4}{7}}{\frac{3}{4}\cdot\frac{3}{7}+\frac{1}{3}\cdot\frac{4}{7}}=\dfrac{\frac{4}{21}}{\frac{9}{28}+\frac{4}{21}}=\dfrac{\frac{4}{21}}{\frac{43}{84}}=\boxed{\dfrac{16}{43}}$

Como los sucesos son independientes $p(raya-raya/\,Rpunto-Rpunto)=p(raya/\,Rpunto)\,p(raya/\,Rpunto)=$

$=\frac{16}{43}\cdot\frac{16}{43}=\boxed{\dfrac{256}{1849}}$



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49) $p(A)=\frac{1}{2}$, $p(B)=\frac{1}{3}$, $p(C)=\frac{1}{4}$, $p(A\cup B\cup C)=\frac{2}{3}$, $p(A\cap B\cap C)=0$, $p(A/B)=p(C/A)=\frac{1}{2}$

a) $p(A\cup B\cup C)=p(A)+p(B)+p(C)-p(A\cap B)-p(A\cap C)-p(B\cap C)+p(A\cap B\cap C)$ **(*)**

- $p(A/B)=\dfrac{p(A\cap B)}{p(B)}\Rightarrow\dfrac{1}{2}=\dfrac{p(A\cap B)}{\frac{1}{3}}\Rightarrow p(A\cap B)=\dfrac{1}{2}\cdot\dfrac{1}{3}=\dfrac{1}{6}$
- $p(C/A)=\dfrac{p(C\cap A)}{p(A)}\Rightarrow\dfrac{1}{2}=\dfrac{p(C\cap A)}{\frac{1}{2}}\Rightarrow p(C\cap A)=\dfrac{1}{2}\cdot\dfrac{1}{2}=\dfrac{1}{4}$

Sustituyendo en **(*)** $\frac{2}{3}=\frac{1}{2}+\frac{1}{3}+\frac{1}{4}-\frac{1}{6}-\frac{1}{4}-p(B\cap C)\Rightarrow\frac{2}{3}=\frac{13}{12}-\frac{5}{12}-p(B\cap C)\Rightarrow p(B\cap C)=\frac{2}{3}-\frac{8}{12}=\boxed{0}$

b) $p(\overline{A}\cup\cap\overline{B}\cup\overline{C})=p(\overline{A\cap B\cap C})=1-p(A\cap B\cap C)=1-0=\boxed{1}$

---

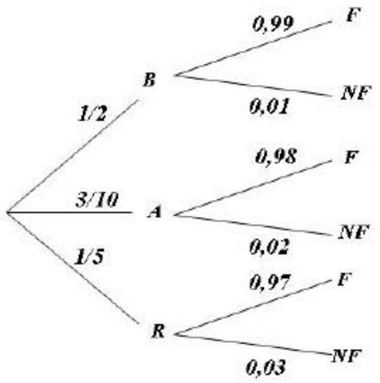
50) Sean los sucesos: **A =** "bombilla azul" , **B =** "bombilla blanca" , **R =** "bombilla roja" , **F =** "la bombilla funciona" y **NF =** "la bombilla no funciona"

Sabemos que:

$p(A)=\frac{120}{400}=\frac{3}{10}$, $p(B)=\frac{200}{400}=\frac{1}{2}$, $p(R)=\frac{80}{400}=\frac{1}{5}$, $p(NF/B)=0.01$, $p(NF/A)=0.02$ y $p(NF/R)=0.03$

a) $p(NF)=p(NF/B)p(B)+p(NF/A)p(A)+p(NF/R)p(R)=0.01\cdot\frac{1}{2}+0.02\cdot\frac{3}{10}+0.03\cdot\frac{1}{5}=\boxed{0.017}$

b) $p(A/NF)=\frac{p(NF/A)}{p(NF)}=\frac{0.02\cdot 3/10}{0.017}=\frac{0.02\cdot 0.3}{0.017}=\boxed{0.35}$



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51) Sean los sucesos: **V =** "crédito vivienda" , **E =** "crédito empresa" , **C =** "crédito consuma" , **Pa =** "crédito pagado" y **NP =** "crédito no pagado"

Sabemos que: $p(V)=\frac{30}{100}=0.3$, $p(E)=\frac{50}{100}=0.5$, $p(C)=\frac{20}{100}=0.2$, $p(NP/V)=\frac{10}{100}=0.1$, $p(NP/E)=\frac{20}{100}=0.2$

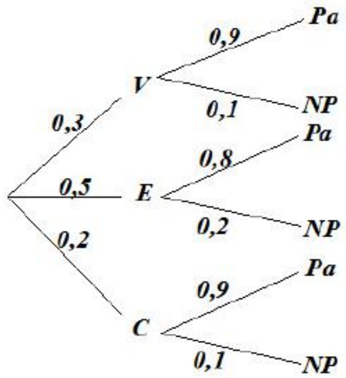
y $p(NP/C)=\frac{10}{100}=0.1$

a) $p(Pa)=p(Pa/V)p(V)+p(Pa/E)p(E)+p(Pa/C)p(C)=$

$=(1-0.1)\cdot 0.3+(1-0.2)\cdot 0.5+(1-0.1)\cdot 0.2=$

$=0.9\cdot 0.3+0.8\cdot 0.5+0.9\cdot 0.2=0.27+0.4+0.18=\boxed{0.85}$

b) $p(C/Pa)=\frac{p(Pa/C)p(C)}{p(Pa)}=\frac{0\cdot 9\cdot 0.2}{0.85}=\frac{0.18}{0.85}=\boxed{0.211}$



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52) Sean los sucesos: **M =** "gustar música moderna" , **C =** "gustar música clásica"

Sabemos $p(M)=0.55$, $p(C)=0.40$, $p(\overline{M}\cap\overline{C})=0.25$

a) $p(\overline{M}\cap\overline{C})=p(\overline{M\cup C})=1-p(M\cup C)\Rightarrow p(M\cup C)=1-p(\overline{M}\cap\overline{C})=1-0.25=\boxed{0.75}$

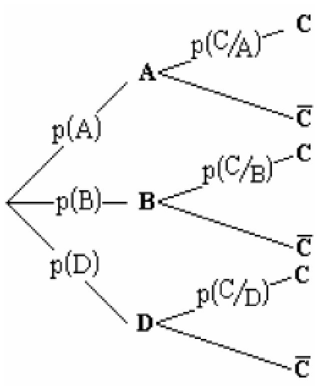
b) $p(M\cup C)=pM)+p(C)-p(M\cap C)\Rightarrow p(M\cap C)=p(M)+p(C)-p(M\cup C)=0.55+0.40-0.75=\boxed{0.2}$

c) $p(\overline{M} \cap C) = p(C) - p(M \cap C) = 0.40 - 0.2 = \boxed{0.2}$

d) $p(M \cap \overline{C}) = p(M) - p(M \cap C) = 0.55 - 0.2 = \boxed{0.35}$

---

53) Sean los sucesos **A =** "moneda con cara y cruz", **B =** "moneda con dos caras", **D =** "moneda con dos cruces", **C =** "sacar cara al lanzar una moneda"



Sabemos $p(A) = \frac{5}{10}$, $p(B) = \frac{3}{10}$, $p(D) = \frac{2}{10}$

$p(C/A) = \frac{1}{2}$, $p(C/B) = 1$, $p(C/D) = 0$

a) $p(C) = p(C/A)p(A) + p(C/B)p(B) + p(C/D)p(D) = \frac{1}{2}\cdot\frac{5}{10} + 1\cdot\frac{3}{10} +$

$+\frac{2}{10}\cdot 0 = \frac{5}{20} + \frac{3}{10} = \frac{5+6}{20} = \boxed{\frac{11}{20}}$

b) $p(A/C) = \frac{p(C/A)p(A)}{p(C)} = \frac{1/2 \cdot 5/10}{11/20} = \frac{5/20}{11/20} = \boxed{\frac{5}{11}}$

---

54) Sabemos que $p(A) = 0.2$ y $p(B) = 0.4$

a) Si A y B son mutuamente excluyentes $A \cap B = \varnothing$, $p(A \cap B) = 0$. Como $p(A)p(B) = 0.2 \cdot 0.4 = 0.08 \neq 0$, se tiene que $p(A \cap B) \neq p(A)p(B)$, luego A y B no son independientes

b) Si A y B son independientes $p(A \cap B) = p(A)p(B) = 0.2 \cdot 0.4 = 0.08$, luego $p(A \cap B) \neq 0$, $A \cap B \neq \varnothing$, los sucesos A y B no son mutuamente excluyentes.

c) Si $p(A/B) = 0 \Rightarrow \frac{p(A \cap B)}{p(B)} = 0 \Rightarrow \boxed{p(A \cap B) = 0}$, luego son mutuamente excluyentes, pero no son independientes (por las mismas razones que en a))

d) Si $A \subset B \Rightarrow A \cap B = A \Rightarrow p(A \cap B) = p(A) = \boxed{0.2}$, como $p(A)p(B) = 0.2 \cdot 0.4 = 0.08 \neq 0.2$, no son independientes

---

55) $p(A) = 0.5$, $p(B) = 0.4$ y $p(A \cap B) = 0.1$.:

a) $p(A \cup B) = p(A) + p(B) - p(A \cap B) = 0.5 + 0.4 - 0.1 = \boxed{0.8}$

b) $p(\overline{A} \cup \overline{B}) = p(\overline{A \cap B}) = 1 - p(A \cap B) = 1 - 0.1 = \boxed{0.9}$

c) $p(A/B) = \frac{p(A \cap B)}{p(B)} = \frac{0.1}{0.4} = \boxed{0.25}$

d) $p(\overline{A} \cap B) = p(B) - p(A \cap B) = 0.4 - 0.1 = \boxed{0.3}$

---

56) a) $p(\text{ al menos un 6}) = 1 - p(ningun\ 6) = 1 - \left(\frac{5}{6}\right)^6 = \boxed{0.66}$

b) $p(6\,\bar{6}\,\bar{6}\,\bar{6}\,\bar{6}\,6)=\frac{1}{6}\cdot\left(\frac{5}{6}\right)^4\cdot\frac{1}{6}=\boxed{0.013}$

---

57) Sabemos que $p(A/C)\geq p(B/C)$, $p(A/\bar{C})\geq p(B/\bar{C})$

- Si $p(A/C)\geq p(B/C)\Rightarrow\frac{p(A\cap C)}{p(C)}\geq\frac{p(B\cap C)}{p(C)}\Rightarrow p(A\cap C)\geq p(B\cap C)$ **(*)**
- Si $p(A/\bar{C})\geq p(B/\bar{C})\Rightarrow\frac{P(A\cap\bar{C})}{p(\bar{C})}\geq\frac{P(B\cap\bar{C})}{p(\bar{C})}\Rightarrow P(A\cap\bar{C})\geq P(B\cap\bar{C})$ **(**)**

Como $\begin{cases}p(A\cap\bar{C})=p(A)-p(A\cap C)\\ p(B\cap\bar{C})=p(B)-p(B\cap C)\end{cases}$, por **(**)** $p(A)-p(A\cap C)\geq p(B)-p(B\cap C)\Rightarrow$

$\Rightarrow p(A)-p(B)\geq p(A\cap C)-p(B\cap C)\geq 0$ (por **(*)**, con lo que $p(A)\geq p(B)$ (opción b)

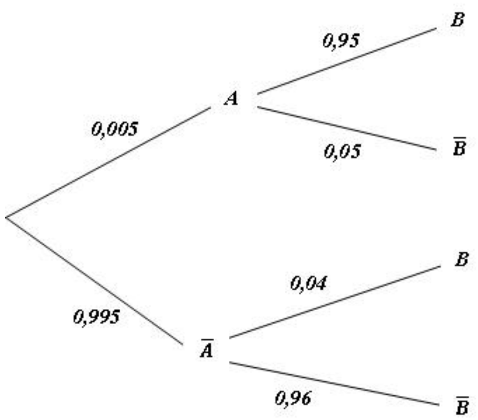
---

58) Sabemos que $p(A)=0.005$; $p(B/A)=0.95$; $p(\bar{B}/\bar{A})=0.96$

a) $p(A\cap\bar{B})=0.005\cdot 0.05=\boxed{0.00025}$

b) $p(B)=p(B/A)p(A)+p(B/\bar{A})p(\bar{A})=0.95\cdot 0.005+0.04\cdot 0.995=$

$=\boxed{0.04455}$



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59) Sean los sucesos **A =** "utilizar la biblioteca", **B =** "utilizar la lavanderia"

Sabemos que $p(A)=\frac{130}{183}$, $p(B/A)=\frac{7}{13}$, $p(B/\bar{A})=\frac{20}{183-130}=\frac{20}{53}$

a) Como $A\cup\bar{A}=E$, $B\cap(A\cup\bar{A})=B\Rightarrow p(B)=p\left[(B\cap A)\cup(B\cap\bar{A})\right]=p(B\cap A)+p(B\cap\bar{A})-$

$-p\left((B\cap A)\cap(B\cap\bar{A})\right)=$ como $\left((B\cap A)\cap(B\cap\bar{A})\right)=B\cap A\cap B\cap\bar{A}=B\cap B\cap A\cap\bar{A}=B\cap\varnothing=\varnothing$

$\Rightarrow p(B)=p(B\cap A)+p(B\cap\bar{A})=p(B/A)p(A)+p(B/\bar{A})p(\bar{A})=\frac{7}{13}\cdot\frac{130}{183}+\frac{20}{53}\cdot\left(1-\frac{130}{183}\right)=\frac{70}{183}+\frac{20}{53}\cdot\frac{53}{183}=$

$=\frac{70}{183}+\frac{20}{183}=\frac{90}{183}=\boxed{\frac{30}{61}}$

b) $p(A/\bar{B})p(\bar{B})=p(\bar{B}/A)p(A)\Rightarrow\frac{p(\bar{B}/A)p(A)}{p(\bar{B})}=\frac{(1-p(B/A))p(A)}{1-p(B)}=\frac{\left(1-7/13\right).130/183}{1-30/61}=\frac{6/13 . 130/183}{31/61}=$

$=\frac{60/183}{31/61}=\frac{20/61}{31/61}=\boxed{\frac{20}{31}}$

---

60) Sabemos que $p(A)=0.6$

a) Si $p(A\cap B)=0$, se tiene que $p(A\cap \overline{B})=p(A)-p(A\cap B)=p(A)=\boxed{0.6}$

b) Si $A\subset B$, $A\cap B=A\Rightarrow p(A\cap B)=p(A)$, luego $p(A\cap \overline{B})=p(A)-p(A)=\boxed{0}$

c) Si $B\subset A$ y $p(B)=0.3$, como $A\cap B=B\Rightarrow p(A\cap B)=p(B)$, luego $p(A\cap \overline{B})=p(A)-p(B)=0.6-0.3=\boxed{0.3}$

d) Si $p(A\cap B)=0.1$, se tiene $p(A\cap \overline{B})=p(A)-p(A\cap B)=0.6-0.1=\boxed{0.5}$

---

61) Sean los sucesos **A =** "energía solar", **B =** "energía eólica". Sabemos que $p(A)=0.4$, $p(B)=0.26$ y $p(A\cap B)=0.12$

a) $p(A\cup B)=p(A)+p(B)-p(A\cap B)=0.4+0.26-0.12=0.66-0.12=\boxed{0.54}$

b) $p(A\cap \overline{B})+p(\overline{A}\cap B)=p(A)-p(A\cap B)+p(B)-p(A\cap B)=0.4-0.12+0.26-0.12=0.66-0.24=\boxed{0.44}$

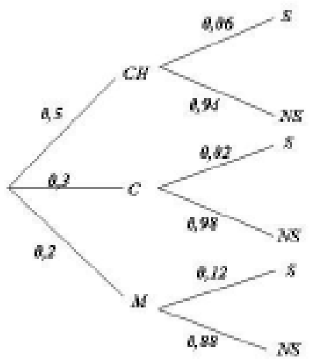
---

62) Sean los sucesos **C =** "camión", **CH =** "coche", **M =** "motocicleta"

S = "superar la velocidad", **NS** ="no superar la velocidad"

Sabemos que $p(C)=0.3$, $p(CH)=0.5$, $p(M)=0.2$ y

$p(S/C)=0.02$, $p(S/CH)=0.06$ y $p(S/M)=0.12$



a) $p(S)=p(S/C)p(C)+p(S/CH)p(CH)+p(S/M)p(M)=$

$=0.02\cdot 0.3+0.06\cdot 0.5+0.12\cdot 0.2=0.006+0.03+0.024=\boxed{0.06}$

b) $p(M/S)=\dfrac{p(S/M)p(M)}{p(S)}=\dfrac{0.12\cdot 0.2}{0.06}=\dfrac{0.024}{0.06}=\boxed{0.4}$

---

63) Sean los sucesos $\mathbf{V_n}$ **=** "nacer niño n-ésimo", $\mathbf{H_n}$ **=** "nacer niña n-ésima". Sabemos que $p(V_n)=0.51$ y $p(H_n)=0.49$

a) $p(V_1\cap V_2/V_2)=\dfrac{p(V_1\cap V_2\cap V_2)}{p(V_2)}=\dfrac{p(V_1\cap V_2)}{p(V_2)}=\dfrac{p(V_1)p(V_2)}{p(V_2)}=p(V_1)=\boxed{0.51}$

b) $p(V_1\cap V_2/V_1\cup V_2)=\dfrac{p[(V_1\cap V_2)\cap(V_1\cup V_2)]}{p(V_1\cup V_2)}=\dfrac{p(V_1\cap V_2)}{p(V_1\cup V_2)}=\dfrac{p(V_1)p(V_2)}{p(V_1)+p(V_2)-p(V_1\cap V_2)}=$

$=\dfrac{0.51\cdot 0.51}{0.51+0.51-0.51\cdot 0.51}=\dfrac{0.2601}{1.02-0.2601}=\dfrac{0.2601}{0.7599}=\boxed{0.34}$

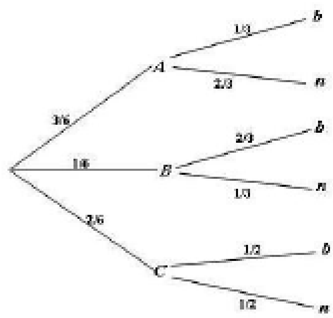
---

64) Sean los sucesos **A =** "elegir urna A", **B =** "elegir urna B", **C** = "elegir urna C"

a = "elegir bola blanca" , **n** ="elegir bola negra"

Sabemos que $p(A)=\dfrac{3}{6}$, $p(B)=\dfrac{1}{6}$, $p(C)=\dfrac{2}{6}$. Además: $p(b/A)=\dfrac{1}{3}$

$p(n/A)=\dfrac{2}{3}$, $p(b/B)=\dfrac{2}{3}$, $p(n/B)=\dfrac{1}{3}$, $p(b/C)=\dfrac{3}{6}=p(n/C)$



a) $p(b)=p(b/A)p(A)+p(b/B)p(B)+p(b/C)p(C)=\dfrac{1}{3}\cdot\dfrac{3}{6}+\dfrac{2}{3}\cdot\dfrac{1}{6}+\dfrac{3}{6}\cdot\dfrac{2}{6}=$

$$= \frac{1}{6} + \frac{1}{9} + \frac{1}{6} = \boxed{\frac{4}{9}}$$

b) $p(C/b) = \dfrac{p(b/C)p(C)}{p(b)} = \dfrac{3/6 \cdot 2/6}{4/9} = \dfrac{1/6}{4/9} = \dfrac{9}{24} = \boxed{\dfrac{3}{8}}$

---

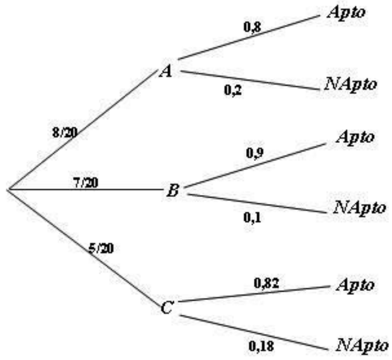
65) Sean los sucesos **Apto** = "superar la prueba"; **A =** "ser del colegio A", **B =** "ser del colegio B", **C** = "ser del colegio C"

Sabemos que $p(A) = \frac{80}{200} = \frac{8}{20}$, $p(B) = \frac{70}{200} = \frac{7}{20}$, $p(C) = \frac{50}{200} = \frac{5}{20}$.

Además $p(Apto/A) = \frac{80}{100} = 0.8$; $p(Apto/B) = \frac{90}{100} = 0.9$; $p(Apto/C) = \frac{82}{100} = 0.82$

a) $p(Apto) = p(Apto/A)p(A) + p(Apto/B)p(B) + p(Apto/C)p(C) =$

$$= 0.8 \cdot \frac{8}{20} + 0.9 \cdot \frac{7}{20} + 0.82 \cdot \frac{5}{20} = \boxed{0.84}$$



b) $p(B/NoApto) = \dfrac{p(NoApto/B)p(B)}{p(NoApto)} = \dfrac{(1-p(Apto/B)) \cdot p(B)}{1-p(Apto)} =$

$$= \frac{(1-0.9)\cdot \frac{7}{20}}{1-0.84} = \frac{0.1 \cdot 0.35}{0.16} = \boxed{0.2187}$$

---

66) Sabemos que $P(A \cap B) = 0.1 \quad P(\overline{A} \cap \overline{B}) = 0.6 \quad p(A/B) = 0.5$

a) Como $p(A/B) = \dfrac{p(A \cap B)}{p(B)} \Rightarrow p(B) = \dfrac{p(A \cap B)}{p(A/B)} = \dfrac{0.1}{0.5} = \boxed{0.2}$

b) $p(\overline{A} \cap \overline{B}) = P(\overline{A \cup B}) = 1 - p(A \cup B) \Rightarrow p(A \cup B) = 1 - p(\overline{A} \cap \overline{B}) = 1 - 0.6 = \boxed{0.4}$

c) $p(A \cup B) = p(A) + p(B) - p(A \cap B) \Rightarrow p(A) = p(A \cup B) - p(B) + p(A \cap B) = 0.4 - 0.2 + 0.1 = \boxed{0.3}$

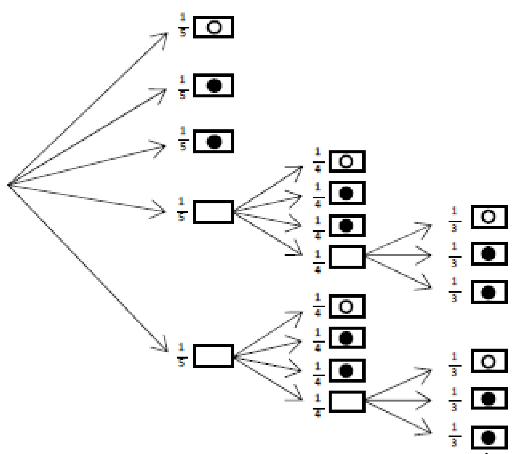
d) $P(\overline{B}/\overline{A}) = \dfrac{p(\overline{B} \cap \overline{A})}{p(\overline{A})} = \dfrac{p(\overline{B \cup A})}{1-p(A)} = \dfrac{1-p(B \cup A)}{1-0.3} = \dfrac{1-0.4}{0.7} = \dfrac{0.6}{0.7} = \boxed{0.8571}$

---

67) Sea A la caja con bola blanca, B_1 y B_2 las cajas con bolas negras y C_1 y C_2 las cajas vacías.

a) Sea G = "el jugador gana"

Según el diagrama de árbol de la derecha:



$$p(G) = p(A) + p(A \cap C_1) + p(A \cap C_2) +$$

$$+ p(A \cap C_1 \cap C_2) + p(A \cap C_2 \cap C_1) =$$

$$= \frac{1}{5} + \frac{1}{5}\cdot\frac{1}{4} + \frac{1}{5}\cdot\frac{1}{4} + \frac{1}{5}\cdot\frac{1}{4}\cdot\frac{1}{3} + \frac{1}{5}\cdot\frac{1}{4}\cdot\frac{1}{3} =$$

$$=\frac{1}{5}+\frac{1}{20}+\frac{1}{20}+\frac{1}{60}+\frac{1}{60}=\frac{20}{60}=\boxed{\frac{1}{3}}$$

b) $p(B_1\cup B_2/\overline{G})=\dfrac{p(B_1\cup B_2)}{p(\overline{G})}=\dfrac{p(B_1)+p(B_2)}{p(\overline{G})}=\dfrac{1/5+1/5}{1-1/3}=\dfrac{2/5}{2/3}=\boxed{\dfrac{3}{5}}$

---

68) Sabemos que $p(A)=\frac{1}{3}$, $p(B/A)=\frac{1}{4}$, $p(A\cup B)=\frac{1}{2}$

a) $p(B/A)=\dfrac{p(B\cap A)}{p(A)}\Rightarrow\dfrac{1}{4}=\dfrac{p(B\cap A)}{1/3}\Rightarrow p(B\cap A)=\dfrac{1}{4}\cdot\dfrac{1}{3}=\boxed{\dfrac{1}{12}}$

b) $p(A\cup B)=p(A)+p(B)-p(A\cap B)\Rightarrow\dfrac{1}{2}=\dfrac{1}{3}+p(B)-\dfrac{1}{12}\Rightarrow p(B)=\dfrac{1}{2}-\dfrac{1}{3}+\dfrac{1}{12}=\boxed{\dfrac{1}{4}}$

c) $p(\overline{B}/A)=1-p(B/A)=1-\dfrac{1}{4}=\boxed{\dfrac{3}{4}}$

d) $p(\overline{A}/\overline{B})=\dfrac{p(\overline{A}\cap\overline{B})}{p(\overline{B})}=\dfrac{p(\overline{A\cup B})}{1-p(B)}=\dfrac{1-p(A\cup B)}{1-1/4}=\dfrac{1-1/2}{3/4}=\dfrac{1/2}{3/4}=\dfrac{4}{6}=\boxed{\dfrac{2}{3}}$

---

69) Sean los sucesos **D =** “ser deportista”, **L =** “ser lector”

Sabemos que $p(D\cup L)=0.55$, $p(D)=0.40$, $p(L)=0.3$.

a) $p(D\cap\overline{L})=p(D-L)=p(D)-p(D\cap L)$ (1)

$p(D\cup L)=p(D)+p(L)-p(D\cap L)\Rightarrow p(D\cap L)=p(D)+p(L)-p(D\cup L)=0.4+0.3-0.55=0.15$

Sustituyendo en (1) $p(D\cap\overline{L})=0.40-0.15\Rightarrow\boxed{p(D\cap\overline{L})=0.25}$

b) $p(D/L)=\dfrac{p(D\cap L)}{p(L)}=\dfrac{0.15}{0.3}\Rightarrow\boxed{p(D/L)=0.5}$

---

70) Sean **NS** = “No quedar satisfecho”; **A =** “atendido sastre A”, **B =** “atendido sastre B”, **C** = “atendido sastre C”

Sabemos que $p(A)=0.55$, $p(B)=0.30$, $p(C)=0.15$.

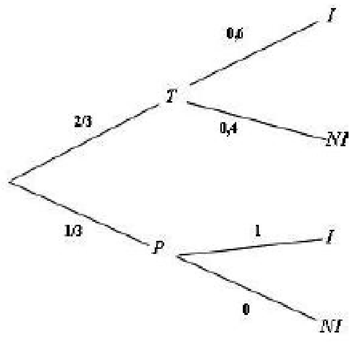
Además $p(NS/A)=0.05$; $p(NS/B)=0.08$; $p(NS/C)=0.10$

a) $p(NS)=p(NS/A)p(A)+p(NS/B)p(B)+p(NS/C)p(C)=\ 0.05\cdot0.55+0.08\cdot0.3+0.10\cdot0.15=\boxed{0.066}$

b) $p(A/NS)=\dfrac{p(NS/A)p(A)}{p(NS)}=\dfrac{0.05\cdot0.55}{0.066}=\boxed{0.41}$

---

71) Sea **T** = "Viajar en clase turista"; **P =** "Viajar en clase preferente", **I =** "Hablar inglés"



Sabemos que $p(T)=\frac{2}{3}$, $p(P)=\frac{1}{3}$, $p(I/P)=1$, $p(\bar{I}/T)=\frac{4}{10}$

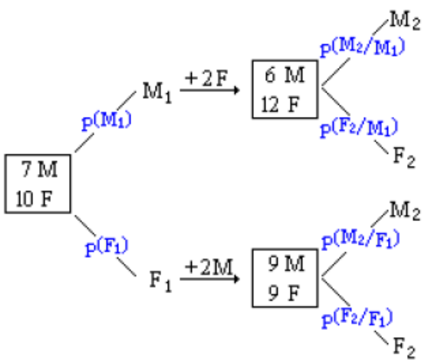
Como $p(\bar{I}/T)=1-p(I/T)\Rightarrow p(I/T)=1-\frac{4}{10}=\frac{6}{10}=\frac{3}{5}$

a) $p(I)=p(I/T)\cdot p(T)+p(I/P)\cdot p(P)=\frac{3}{5}\cdot\frac{2}{3}+1\cdot\frac{1}{3}=\frac{2}{5}+\frac{1}{3}=\boxed{\frac{11}{15}}$

b) $p(T/I)=\text{por Bayes}=\frac{p(I/T)\cdot p(T)}{p(I)}=\frac{\frac{3}{5}\cdot\frac{2}{3}}{\frac{11}{15}}=\frac{\frac{2}{5}}{\frac{11}{15}}=\boxed{\frac{6}{11}}$

---

72) Sea **M** = "Sacar caramelo de menta"; **F =** "Sacar caramelo de fresa"



Se sabe que $p(M)=\frac{7}{17}$ y $p(F)=\frac{10}{17}$

a) $p(F_2)=p(F_2/M_1)\cdot p(M_1)+p(F_2/F_1)\cdot p(F_1)=$

$=\frac{12}{18}\cdot\frac{7}{17}+\frac{9}{18}\cdot\frac{10}{17}=\frac{84}{306}+\frac{90}{306}=\frac{174}{306}=\boxed{\frac{29}{51}}$

b) $p(F_2/F_1)+p(M_2/M_1)=\frac{6}{18}\cdot\frac{7}{17}+\frac{9}{18}\cdot\frac{10}{17}=$

$=\frac{42}{306}+\frac{90}{306}=\frac{132}{306}=\boxed{\frac{22}{51}}$

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73) Sabemos que $p(A)=0.4$, $p(A\cup B)=0.5$, $p(B/A)=0.5$,

a) Calculamos $p(A\cap B)$; $p(B/A)=\frac{p(A\cap B)}{p(A)}\Rightarrow p(A\cap B)=p(B/A)p(A)=0.5\cdot 0.4=0.2$

Como $p(A\cup B)=p(A)+p(B)-p(A\cap B)\Rightarrow 0.5=0.4+p(B)-0.2\Rightarrow\boxed{p(B)=0.3}$

b) $p(A/\bar{B})=\frac{p(A\cap\bar{B})}{p(\bar{B})}=\frac{p(A)-p(A\cap B)}{1-p(B)}=\frac{0.4-0.2}{1-0.3}=\frac{0.2}{0.7}\Rightarrow\boxed{p(A/\bar{B})=0.28}$

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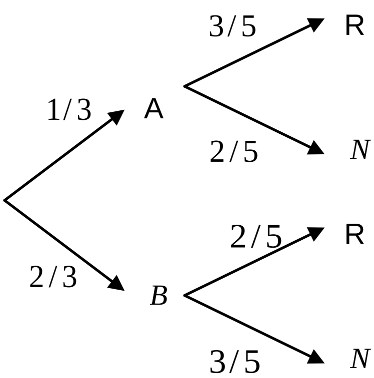
74) Sean los sucesos **A =** "elegir urna A", **B =** "elegir urna B"

R = "elegir bola roja" , **N**="elegir bola negra"



Sabemos que $p(A)=\frac{2}{6}=\frac{1}{3}$, $p(B)=\frac{4}{6}=\frac{2}{3}$,

$p(R/A)=\frac{3}{5}$, $p(N/A)=\frac{2}{5}$, $p(R/B)=\frac{2}{5}$, $p(N/B)=\frac{3}{5}$

a) $p(R) = p(R/A)p(A) + p(R/B)p(B) = \frac{3}{5}\cdot\frac{1}{3} + \frac{2}{5}\cdot\frac{2}{3} = \boxed{\frac{7}{15}}$

b) $p(A/R) = \frac{p(R/A)p(A)}{p(R)} = \frac{\frac{3}{5}\cdot\frac{1}{3}}{\frac{7}{15}} = \frac{\frac{3}{15}}{\frac{7}{15}} = \boxed{\frac{3}{7}}$

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75) Sean los sucesos **A =** "papel de animal", **B =** "papel de persona", **C =** "papel de árbol".

Sabemos que $p(A) = \frac{7}{22}$, $p(B) = \frac{3}{22}$ y $p(C) = \frac{12}{22}$

a) $p(mismo\,papel) = p(AA) + p(BB) + p(CC) = \frac{7}{22}\cdot\frac{6}{21} + \frac{3}{22}\cdot\frac{2}{21} + \frac{12}{22}\cdot\frac{11}{21} = \frac{180}{462} = \boxed{\frac{30}{77}}$

b) $p = p(AAB) + p(ACB) + p(CAB) + p(CCB) = \frac{7}{22}\cdot\frac{6}{21}\cdot\frac{3}{20} + \frac{7}{22}\cdot\frac{12}{21}\cdot\frac{3}{20} + \frac{12}{22}\cdot\frac{7}{21}\cdot\frac{3}{20} +$

$+ \frac{12}{22}\cdot\frac{11}{21}\cdot\frac{3}{20} = \frac{126}{9240} + \frac{252}{9240} + \frac{252}{9240} + \frac{396}{9240} = \frac{1026}{9240} = \boxed{\frac{171}{1540}}$

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76).- Sabemos que $p(FD/E) = \frac{8}{10}$, $p(FD/J) = \frac{6}{10}$, $p(FD/S) = \frac{3}{10}$

Como $p(E) + p(S) + p(J) = 1$ y $p(E) = p(S) = 2p(J)$, operando: $p(E) = \frac{2}{5}$, $p(S) = \frac{2}{5}$, $p(J) = \frac{1}{5}$

a) $p(FD) = p(FD/E)p(E) + p(FD/S)p(S) + p(FD/J)p(J) = \frac{8}{10}\cdot\frac{2}{5} + \frac{6}{10}\cdot\frac{2}{5} + \frac{3}{10}\cdot\frac{1}{5} = \boxed{\frac{31}{50}}$

b) $p(S/\overline{FD}) = \frac{p(\overline{FD}/S)p(S)}{p(\overline{FD})} \Rightarrow \frac{\frac{7}{10}\cdot\frac{2}{5}}{1-\frac{31}{50}} = \frac{\frac{14}{50}}{\frac{19}{50}} = \boxed{\frac{14}{19}}$
