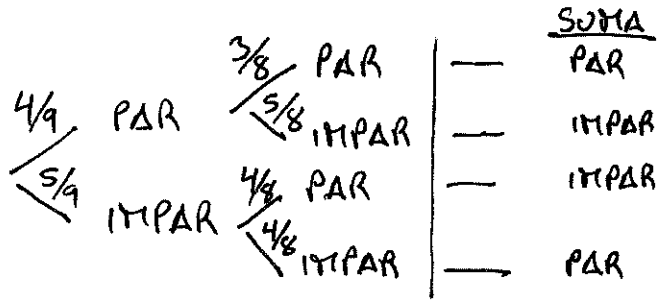
EXAMEN 2ºA MAT. APLIC. CCSS II

SOLUCIONES (Salvo error u omisión) 30-1-07

① a/



$$P(\text{2 tarjetas impares} / \text{suma par}) = \frac{P(\text{2 impares} \cap \text{suma par})}{P(\text{suma par})} = \frac{\frac{5}{9}\cdot\frac{4}{8}}{\frac{4}{9}\cdot\frac{3}{8}+\frac{5}{9}\cdot\frac{4}{8}} = 0'625$$

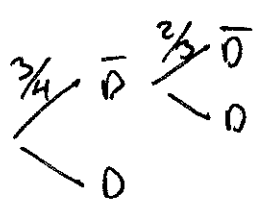
b/ i/ $E = \{(D), (\bar{D}, D), (\bar{D}, \bar{D}, D), (\bar{D}, \bar{D}, \bar{D}, D)\}$

donde $D \equiv$ bombilla defectuosa y $\bar{D} \equiv$ bombilla no defectuosa

ii/ $P(\text{B defectuosa antes del último intento}) =$

$= 1 - P(\text{B defectuosa en el último intento}) =$ ↙

Hago un árbol

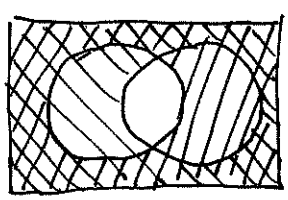


— esta es la rama

$$= 1 - \frac{3}{4}\cdot\frac{2}{3}\cdot\frac{1}{2} = 0'75$$

② a/ $P(A) = 0'3 \quad P(B) = 0'4 \quad P(A \cap B) = 0'2$

i/ $P(\bar{A} \cup \bar{B})$



$\bar{A} \cup \bar{B}$ /// ó \\\ es decir

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

$$P(A/B) = \frac{P(A \cap B)}{P(B)} = \frac{0'2}{0'4} = 0'5$$

ii/ A y B son independientes si $P(A \cap B) = P(A) \cdot P(B)$

$P(A \cap B) = 0'2$

$P(A) \cdot P(B) = 0'3 \cdot 0'4 = 0'12$ $\Big\} \Rightarrow$ no lo son.

b/ Hago una tabla

	RADIO	$\overline{\text{RADIO}}$	
TV	(30)	40	(70)
$\overline{\text{TV}}$	20	10	30
	(50)	50	(100)

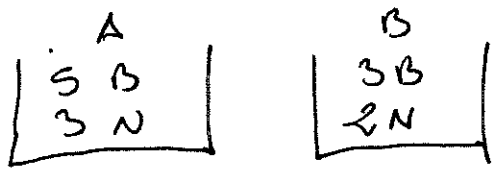
○ datos que me dan

i/ $P(\text{RADIO} \cup \text{TV}) = 1 - P(\overline{\text{RADIO}} \cap \overline{\text{TV}}) = 1 - \frac{10}{100} = \frac{90}{100} = 0'9$

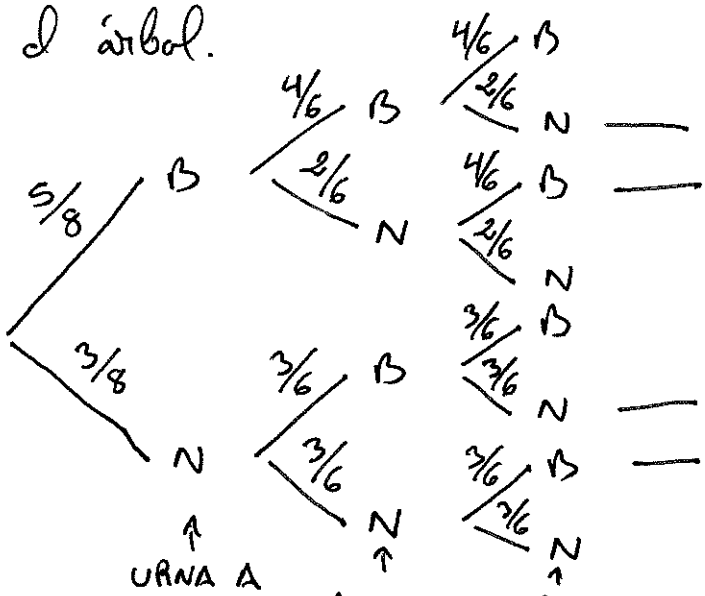
ii/ $P(\text{RADIO} \cap \overline{\text{TV}}) = \frac{20}{100} = 0'2$

iii/ $P(\text{TV}/\text{RADIO}) = \frac{P(\text{TV} \cap \text{RADIO})}{P(\text{RADIO})} = \frac{30/100}{50/100} = \frac{3}{5} = 0'6$

3º



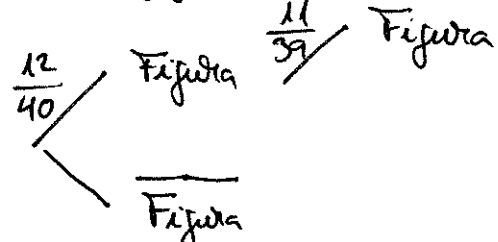
Hago el árbol.



$P(\text{distinto color}) = \frac{5}{8} \cdot \frac{4}{6} \cdot \frac{2}{6} + \frac{5}{8} \cdot \frac{2}{6} \cdot \frac{4}{6} + \frac{3}{8} \cdot \frac{3}{6} \cdot \frac{3}{6} + \frac{3}{8} \cdot \frac{3}{6} \cdot \frac{3}{6} =$

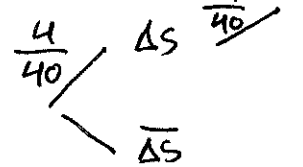
$= 2 \cdot \frac{5}{36} + 2 \cdot \frac{3}{2432} = \frac{5}{18} + \frac{3}{1216} = \frac{19}{36} = 0'5278$ $0'4653$ (2/5)

b/ i/ Dos figuras (sin reemplazamiento)



$P(\text{2 Figuras}) = \frac{12 \cdot 11}{40 \cdot 39} = 0'0846$

ii/ Dos ases (con reemplazamiento)

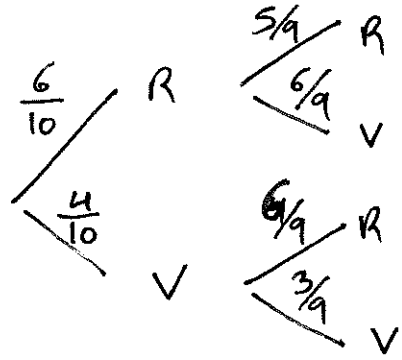


$P(\text{2 ases}) = \left(\frac{4}{40}\right)^2 = 0'01$

(4º) a/ Para ver si son independientes tiene que cumplirse:

$$P(R1^A \cap R2^A) = P(R1^A) \cdot P(R2^A)$$

Hago un árbol (ojo, sin reemplazamiento)



Obtengo que

$P(R1^A) = 6/10 = 0'6 \qquad \frac{3}{5} = 0'6$

$P(R2^A) = \frac{6}{10} \cdot \frac{5}{9} + \frac{4}{10} \cdot \frac{6}{9} = \frac{46}{90} = \frac{23}{45} = 0'5111$

$P(R1^A \cap R2^A) = \frac{6}{10} \cdot \frac{5}{9} = \frac{30}{90} = 0'3333$

Por tanto

$P(R1^A) \cdot P(R2^A) = 0'6 \cdot 0'5111 = 0'3066 \Rightarrow$ no son independientes

$0'6 = 0'36$

b/ i/ $P(z \leq -0'43) = P(z \geq 0'43) = 1 - P(z \leq 0'43) =$

$= 1 - 0'6664 = \underline{0'3336}$

ii/ $P(z \geq -1'08) = P(z \leq 1'08) = \underline{0'8599}$

iii/ $P(1'1 \leq z \leq 2'3) = P(z \leq 2'3) - P(z \leq 1'1) =$

$= 0'9893 - 0'8643 = \underline{0'125}$

iv/ $P(-1'35 \leq z \leq 1'35) = P(z \leq 1'35) - P(z \leq -1'35) =$

$= P(z \leq 1'35) - P(z \geq 1'35) = P(z \leq 1'35) - (1 - P(z \leq 1'35)) =$

$= 2P(z \leq 1'35) - 1 = 2 \cdot 0'9115 - 1 = \underline{0'823}$

(5º) a/ $X \rightsquigarrow N(5, 1'5)$

i/ $P(x \leq 2) = P\left(z \leq \frac{2-5}{1'5}\right) = P(z \leq -2) =$

$= P(z \geq 2) = 1 - P(z \leq 2) = 1 - 0'9772 = \underline{0'0228}$

ii/ $P(3 \leq x \leq 6) = P\left(\frac{3-5}{1'5} \leq z \leq \frac{6-5}{1'5}\right) =$

$= P(-1'33 \leq z \leq 0'67) = P(z \leq 0'67) - P(z \leq -1'33) =$

$= P(z \leq 0'67) - P(z \geq 1'33) = P(z \leq 0'67) - (1 - P(z \leq 1'33)) =$

$= 0'7486 - (1 - 0'9082) = 0'7486 - 0'0918 = \underline{0'6568}$

iii/ $P(-1 \leq x \leq 2) = P\left(\frac{-1-5}{1'5} \leq z \leq \frac{2-5}{1'5}\right) =$

$= P(-4 \leq z \leq -2) = P(z \leq -2) - \cancel{P(z \leq -4)}^{\,0} = P(z \geq 2) =$

$= 1 - P(z \leq 2) = 1 - 0'9772 = \underline{0'0228}$

iv/ $P(x \geq 4) = P\left(z \geq \frac{4-5}{1'5}\right) = P(z \geq -0'67) =$

$= \cancel{1} - P(z \leq 0'67) = \cancel{1} - 0'7486 = \underline{0'2514}$

b/ $X \sim N(12, 2'1)$

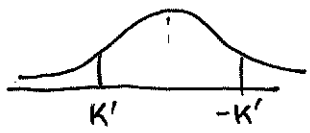
i/ $P(X \leq K) = 0'8742 \Rightarrow$

$\Rightarrow P(Z \leq K') = 0'8742 \Rightarrow K' = 1'15 \Rightarrow$

$\Rightarrow \frac{K-12}{2'1} = 1'15 \Rightarrow K = \underline{14'415}$

ii/ $P(X \geq K) = 0'5603 \Rightarrow$

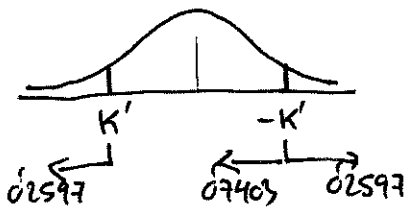
$\Rightarrow P(Z \geq K') = 0'5603$



$0'5603 \Rightarrow -K' = 0'15 \Rightarrow K' = -0'15$

$\Rightarrow \frac{K-12}{2'1} = -0'15 \Rightarrow K = \underline{11'685}$

iii/ $P(X \leq K) = 0'2597 \Rightarrow P(Z \leq K') = 0'2597$



$\Rightarrow -K' = 0'635 \Rightarrow K' = -0'635$

$\Rightarrow \frac{K-12}{2'1} = -0'635 \Rightarrow K = \underline{10'667}$

iv/ $P(X \geq K) = 0'1009 \Rightarrow P(Z \geq K') = 0'1009 \Rightarrow$

$\Rightarrow P(Z \leq K') = 1 - 0'1009 = 0'8991 \Rightarrow$

$\Rightarrow K' = 1'28$

$\Rightarrow \frac{K-12}{2'1} = 1'28 \Rightarrow K = \underline{14'688}$