

Soluciones: Boletín de probabilidad 1

① $P(\bar{A} \cap B) = 0,4$ $P(\bar{A} \cap \bar{B}) = 0,4$ y $P(A \cap B) = 0,1$

$$P(\bar{A} \cap B) = P(B - A) = P(B) - P(A \cap B)$$

$$0,4 = P(B) - 0,1$$

$$P(B) = 0,5$$

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

$$P(A \cup B) = 0,4 + 0,5 - 0,1 = 0,8$$

② $P(A \cap B) = 0,2$ $P(\bar{B}) = 0,7$ y $P(A \cap \bar{B}) = 0,5$

$$P(B) = 1 - P(\bar{B}) = 1 - 0,7 = 0,3$$

$$P(A \cap B) = P(A - \bar{B}) = P(A) - P(A \cap \bar{B})$$

$$0,5 = P(A) - 0,2$$

$$P(A) = 0,7$$

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

$$P(A \cup B) = 0,7 + 0,3 - 0,2 = 0,8$$

③ $P(\bar{A}) = 0,6$ $P(B) = 0,3$ y $P(\bar{A} \cup \bar{B}) = 0,9$

a) $P(A) = 1 - P(\bar{A}) = 1 - 0,6 = 0,4$

$$P(\bar{A} \cup \bar{B}) = P(\overline{A \cap B}) = 1 - P(A \cap B)$$

$$0,9 = 1 - P(A \cap B)$$

$$P(A \cap B) = 0,1$$

A y B son indep si $P(A \cap B) = P(A) \cdot P(B)$

$$0,1 \neq 0,4 \cdot 0,3 \text{ No son independientes}$$

b) $P(\bar{A}/B) = \frac{P(\bar{A} \cap B)}{P(B)} = \frac{P(B) - P(A \cap B)}{P(B)} = \frac{0,3 - 0,1}{0,3} = 0,67$

④ A y B son indep $P(A) = 0,6$ $P(B) = 0,2$

$$P(A \cap B) = P(A) \cdot P(B) = 0,6 \cdot 0,2 = 0,12$$

$$P(A \cup B) = P(A) + P(B) - P(A \cap B) = 0,6 + 0,2 - 0,12 = 0,68$$

$$P(A/B) = \frac{P(A \cap B)}{P(B)} = \frac{0,12}{0,2} = 0,6$$

⑤ $P(A \cap B) = 0,1$ $P(\bar{A} \cap \bar{B}) = 0,6$ y $P(A/B) = 0,5$

a) $P(A/B) = \frac{P(A \cap B)}{P(B)} \Rightarrow 0,5 = \frac{0,1}{P(B)} \Rightarrow P(B) = 0,2$

⑥ $P(\bar{A}) = 0,48$ $P(A \cup B) = 0,82$ y $P(B) = 0,42$

$$P(\bar{A} \cap \bar{B}) = P(\overline{A \cup B}) = 1 - P(A \cup B)$$

$$0,6 = 1 - P(A \cup B) \Rightarrow P(A \cup B) = 0,4$$

a) $P(A) = 1 - P(\bar{A}) = 1 - 0,48 = 0,52$

$$P(A \cap B) = P(A) + P(B) - P(A \cup B) = 0,52 + 0,42 - 0,82 = 0,12$$

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

$$0,12 \neq 0,52 \cdot 0,42 \rightarrow \text{No son independientes}$$

b) $P(A/B) = \frac{P(A \cap B)}{P(B)} = \frac{0,12}{0,42} = 0,29$

b) A y B son indep si $P(A \cap B) = P(A) \cdot P(B)$

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

$$0,4 = P(A) + 0,2 - 0,1 \Rightarrow P(A) = 0,3$$

$$P(A \cap B) \neq P(A) \cdot P(B)$$

$$0,1 \neq 0,3 \cdot 0,2 \rightarrow \text{no son independientes}$$

⑦ $P(A \cap B) = \frac{1}{10} = 0,1$ $P(\bar{A} \cap \bar{B}) = \frac{1}{5} = 0,2$ $P(A/B) = \frac{1}{4} = 0,25$

a) Tenemos que calcular $P(A \cup B)$

$$P(\bar{A} \cap \bar{B}) = P(\overline{A \cup B}) = 1 - P(A \cup B)$$

$$0,2 = 1 - P(A \cup B) \Rightarrow P(A \cup B) = 0,8$$

b) $P(A/B) = \frac{P(A \cap B)}{P(B)} \Rightarrow 0,25 = \frac{0,1}{P(B)} \Rightarrow P(B) = 0,4$

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

$$0,8 = P(A) + 0,4 - 0,1 \Rightarrow P(A) = 0,5$$

8) $P(B/A) = 0,7$ $P(A/B) = 0,4$ y $P(A) = 0,2$

a) $P(B/A) = \frac{P(B \cap A)}{P(A)} \Rightarrow 0,7 = \frac{P(A \cap B)}{0,2} \Rightarrow P(A \cap B) = 0,14$

$P(A/B) = \frac{P(A \cap B)}{P(B)} \Rightarrow 0,4 = \frac{0,14}{P(B)} \Rightarrow P(B) = 0,35$

No son independientes ya que $P(A \cap B) \neq P(A) \cdot P(B)$
 $0,14 \neq 0,35 \cdot 0,2$

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

$P(A \cap B) = P(A) - P(A \cap B)$

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

$P(A \cup B) = 0,35 + 0,14 = 0,49$

9) $P(A) = 0,8$ $P(B) = 0,6$ y $P(\bar{A} \cup \bar{B}) = 0,52$

a) $P(\bar{A} \cup \bar{B}) = P(\overline{A \cap B}) = 1 - P(A \cap B)$

$0,52 = 1 - P(A \cap B) \Rightarrow P(A \cap B) = 0,48$

A y B son indep si $P(A \cap B) = P(A) \cdot P(B)$

$0,48 = 0,8 \cdot 0,6 \rightarrow$ si son independientes

no suceda A ni B $\rightarrow P(\bar{A} \cap \bar{B})$

$P(\bar{A} \cap \bar{B}) = P(\overline{A \cup B}) = 1 - P(A \cup B) = 1 - 0,92 = 0,08$

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

$P(A \cup B) = 0,8 + 0,6 - 0,48 = 0,92$

b) suceda A y no suceda B $\rightarrow A \cap \bar{B}$

$P(A \cap \bar{B}) = P(A) - P(A \cap B) = 0,8 - 0,48 = 0,32$

Soluciones: Boletín de probabilidad 2

10

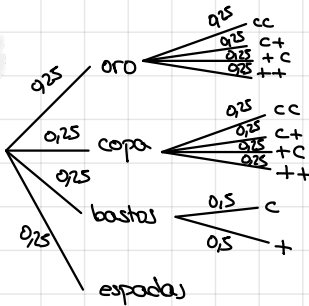
	chico	chica	
susp.	7	3	10
Aprobar	10	7	17
	17	10	27

a) $P(\text{chica} \cap \text{aprobar}) = \frac{7}{27}$

b) $P(\text{chico} \cap \text{suspender}) = \frac{7}{27}$

c) $P\left(\frac{\text{chica}}{\text{suspensa}}\right) = \frac{P(\text{Sn chica})}{P(\text{suspensa})} = \frac{3}{10} = 0,3$

11

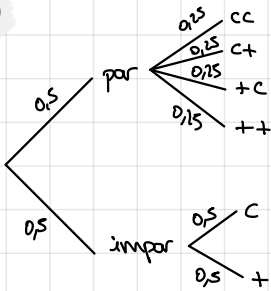


a) $P(\text{alguna cara}) = P(\text{oro}) \cdot P(\text{cc}|\text{oro}) + \dots = 0,25 \cdot 0,25 \cdot 3 + 0,25 \cdot 0,25 \cdot 3 + 0,25 \cdot 0,5 = 0,5$

b) $P(\text{oro} \cap ++) = P(\text{oro}) \cdot P(++|\text{oro}) = 0,25 \cdot 0,25 = 0,0625$

c) $P(cc) = 0,125 \cdot 0,25 + 0,25 \cdot 0,25 = 0,125$

12

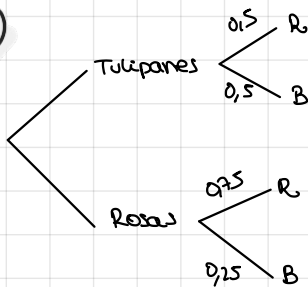


a) $P(\text{alguna cara}) = P(\text{par}) \cdot P(\text{cc}|\text{par}) + P(\text{par}) \cdot P(\text{c+}|\text{par}) + P(\text{par}) \cdot P(\text{+c}|\text{par}) + P(\text{impar}) \cdot P(\text{c}|\text{impar}) = 0,5 \cdot 0,25 \cdot 3 + 0,5 \cdot 0,5 = 0,625$

b) $P(\text{impar} \cap ++) = P(\text{impar}) \cdot P(++|\text{impar}) = 0,5 \cdot 0,5 = 0,25$

c) $P(3 \text{ caras}) = 0$

13



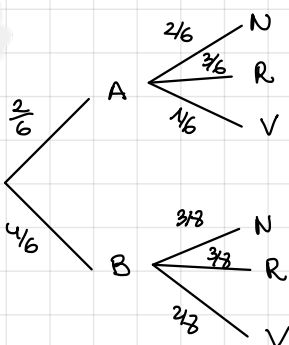
a) $P(T \cap B) = 0,6 \cdot 0,5 = 0,3$

b) $P(B|T) = 0,5$

c) $P(T|B) = \frac{P(T \cap B)}{P(B)} = \frac{0,3}{0,4} = 0,75$

d) $P(B) = P(T) \cdot P(B|T) + P(R) \cdot P(B|R) = 0,6 \cdot 0,5 + 0,4 \cdot 0,25 = 0,4$

14



a) $P(V) = P(A) \cdot P(V|A) + P(B) \cdot P(V|B) = \frac{2}{6} \cdot \frac{1}{6} + \frac{4}{6} \cdot \frac{2}{8} = \frac{2}{9} = 0,2222$

b) $P(V|A) = \frac{1}{6}$

c) $P(A \cap V) = P(A) \cdot P(V|A) = \frac{2}{6} \cdot \frac{1}{6} = \frac{1}{18} = 0,0556$

d) $P(A|V) = \frac{P(A \cap V)}{P(V)} = \frac{1/18}{2/9} = \frac{1}{4} = 0,25$

(15)

	I	$\bar{I}$	
F	12	24	36
$\bar{F}$	36	48	84
	48	72	120

$$a) P(I \cup F) = P(I) + P(F) - P(I \cap F) = \frac{48}{120} + \frac{36}{120} - \frac{12}{120} = 0,6$$

$$b) P(F|I) = \frac{P(F \cap I)}{P(I)} = \frac{12}{48} = 0,25$$

$$c) P(\text{solo } F) = \frac{24}{120} = 0,2$$

(16)

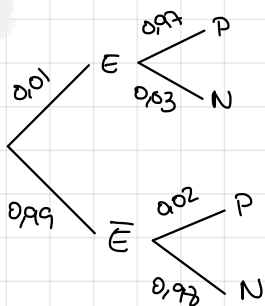
	L	$\bar{L}$	
T	32	15	47
$\bar{T}$	60	13	73
	92	28	120

$$a) P(\bar{T}) = \frac{73}{120} = 0,6083$$

$$b) P\left(\frac{L}{T}\right) = \frac{P(L \cap T)}{P(T)} = \frac{32}{47} = 0,6809$$

$$c) P(L) = \frac{92}{120} = 0,7667$$

(17)

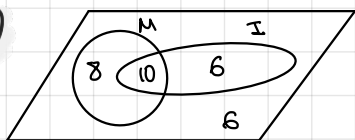


$$a) P(E \cap P) = P(E) \cdot P(P|E) = 0,01 \cdot 0,97 = 0,0097$$

$$b) P(E|P) = \frac{P(E \cap P)}{P(P)} = \frac{0,0097}{0,0295} = 0,3288$$

$$P(P) = P(E) \cdot P(P|E) + P(\bar{E}) \cdot P(P|\bar{E}) = 0,01 \cdot 0,97 + 0,99 \cdot 0,02 = 0,0295$$

(18)



$$a) P(I \cap M) = \frac{10}{30} = 0,333$$

$$b) P(I|M) = \frac{P(I \cap M)}{P(M)} = \frac{10}{18} = 0,5556$$

c)

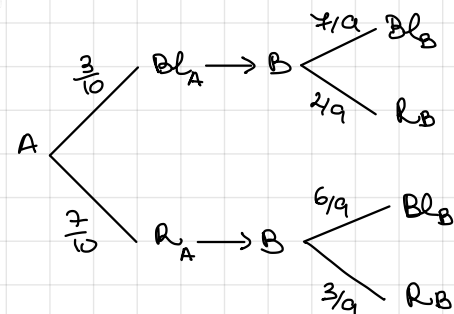
$$P(M) = \frac{18}{30} = 0,6$$

No son indep ya que

$$P(I) = \frac{16}{30} = 0,5333$$

$$P(I \cap M) \neq P(I) \cdot P(M)$$

(19)



$$a) P(B) = P(Bl_A) \cdot P(Bl_B|Bl_A) + P(R_A) \cdot P(Bl_B|R_A) =$$

$$= \frac{3}{10} \cdot \frac{7}{9} + \frac{7}{10} \cdot \frac{6}{9} = 0,7$$

$$b) P(Bl_A \cap Bl_B) = P(Bl_A) \cdot P(Bl_B|Bl_A) = \frac{3}{10} \cdot \frac{7}{9} = 0,2333$$

20

	T	$\bar{T}$	
O	40	15	55
A	35	10	45
	75	25	100

a) $P(O) = 0,55$

b) $P(A|T) = \frac{P(A \cap T)}{P(T)} = \frac{35}{75} = 0,4667$

c) $P(O|\bar{T}) = 0,15$