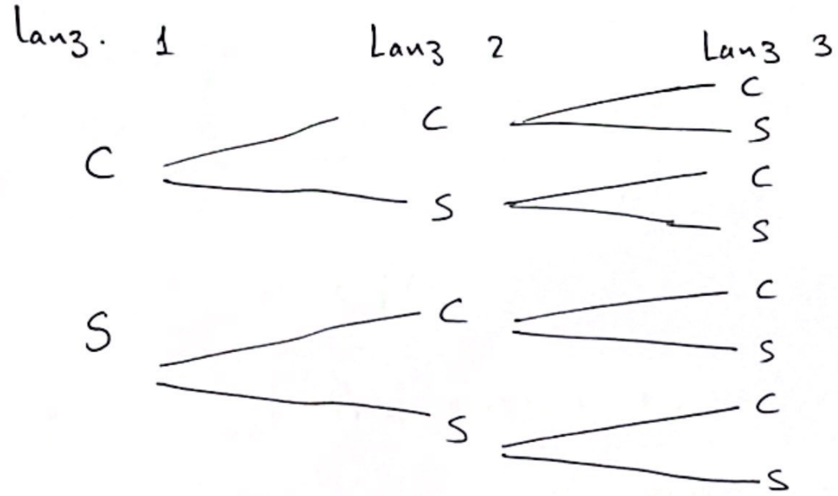
① ⓐ Diagrama de árbol



$\Omega = \{ccc, ccs, csc, css, scc, scs, ssc, sss\}$

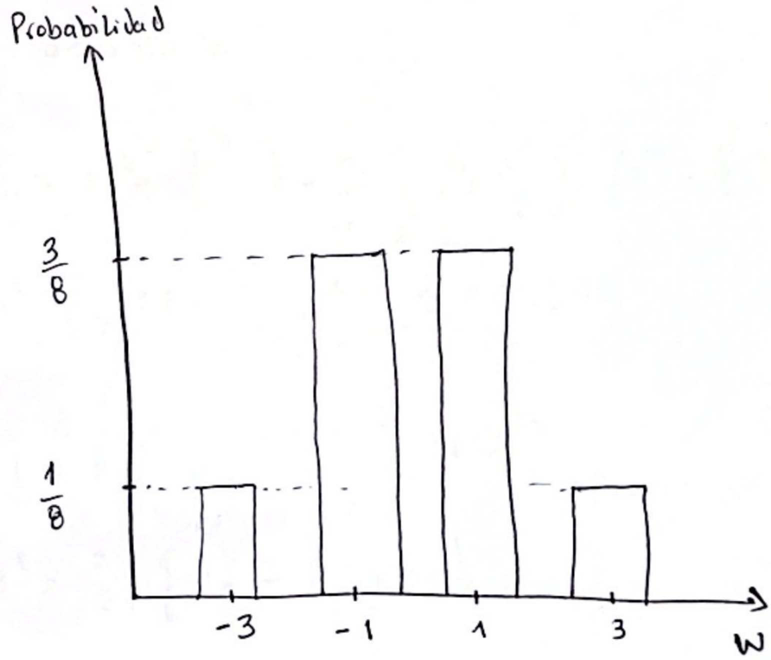
Posibles resultados ; Valor w

CCC - - - - - - 3
CCS - - - - - - 1
CSC - - - - - - 1
CSS - - - - - - -1
SCC - - - - - - 1
SCS - - - - - - -1
SSC - - - - - - -1
SSS - - - - - - -3

ⓑ Dist. probabilidad

Valor w	Prob.
-3	1/8
-1	3/8
1	3/8
3	1/8

ⓒ gráfica.



(2)

x	0	1	2	3	4
$f(x)$	0,41	0,37	0,16	0,05	0,01
$F(x)$	0,41	0,78	0,94	0,99	1

(a) ← F. de distribución acumulada.

(b) $E(x) = \sum_{x=0}^{x=4} x \cdot f(x)$

$E(x) = 0(0{,}41) + 1(0{,}37) + 2(0{,}16) + 3(0{,}05) + 4(0{,}01)$

$\boxed{E(x) = 0{,}88}$ → Valor esperado de "x".

(c) $\sigma^2 = V(x) = \left[\sum_{x=0}^{x=4} x^2 \cdot f(x)\right] - E^2(x)$

$V(x) = \left[(0)^2(0{,}41) + (1)^2(0{,}37) + (2)^2(0{,}16) + (3)^2(0{,}05) + (4)^2(0{,}01)\right] - (0{,}88)^2$

$V(x) = 1{,}62 - (0{,}88)^2 = 0{,}8456$ ← Varianza

$\sigma = \sqrt{V(x)} = \sqrt{0{,}8456}$ → $\boxed{\sigma = 0{,}9196}$ → Desv. estandar.

(3) $f(x) = \begin{cases} \frac{2(1+x)}{27} & \text{si } 2 \leq x \leq 5 \\ 0 & \text{, en otro caso} \end{cases}$

(a) $P(x<4) = \int_2^4 \frac{2(1+x)}{27} dx = \frac{2}{27}\left[x + \frac{x^2}{2} \Big|_2^4\right] = \frac{2}{27}\left[\left(4 + \frac{4^2}{2}\right) - \left(2 + \frac{2^2}{2}\right)\right]$

$\Rightarrow P(x<4) = \frac{2}{27}(12 - 4) = \frac{16}{27} \approx 0{,}59259$

(b) $P(3 \leq x < 4) = \int_3^4 \frac{2(1+x)}{27} dx = \frac{2}{27}\left[x + \frac{x^2}{2} \Big|_3^4\right] = \frac{2}{27}\left[\left(4 + \frac{4^2}{2}\right) - \left(3 + \frac{3^2}{2}\right)\right]$

$\Rightarrow P(3 \leq x < 4) = \frac{2}{27}\left[12 - 7{,}5\right] = \frac{1}{3} \approx 0{,}3333$

(c) Media: $E(X) = \int_2^5 x \cdot f(x)\,dx = \int_2^5 \frac{2x(1+x)}{27}\,dx = \frac{2}{27}\int_2^5 (x + x^2)\,dx$

$= \frac{2}{27}\left[\frac{x^2}{2} + \frac{x^3}{3} \Big|_2^5 \right] = \frac{2}{27}\left[\left(\frac{5^2}{2} + \frac{5^3}{3}\right) - \left(\frac{2^2}{2} + \frac{2^3}{3}\right)\right]$

$= \frac{2}{27}\left(\frac{325}{6} - \frac{14}{3}\right) = \frac{11}{3} \approx 3{,}6667 \leftarrow$ Media.

Varianza: $V(X) = E(X^2) - [E(X)]^2$

$\Rightarrow E(X^2) = \int_2^5 x^2 \cdot \left(\frac{2(1+x)}{27}\right) dx = \frac{2}{27}\int_2^5 (x^3 + x^2)\,dx$

$= \frac{2}{27}\left[\frac{x^4}{4} + \frac{x^3}{3} \Big|_2^5\right] = \frac{2}{27}\left[\left(\frac{5^4}{4} + \frac{5^3}{3}\right) - \left(\frac{2^4}{4} + \frac{2^3}{3}\right)\right]$

$\frac{2}{27}\left[\frac{2375}{12} - \frac{20}{3}\right] = \frac{85}{6} \approx 14{,}16667$

$\Rightarrow V(X) = \frac{85}{6} - \left(\frac{11}{3}\right)^2 = \frac{13}{18} \approx \boxed{0{,}72222} \leftarrow$ Varianza

$\sigma = \sqrt{V(X)} \Rightarrow \sigma = \sqrt{\frac{13}{18}} \Rightarrow \boxed{\sigma \approx 0{,}84984} \leftarrow$ Desv. estandar

④ $f(x) = \begin{cases} \frac{2}{5} & , 23{,}75 \leq x \leq 26{,}25 \\ 0 & , \text{en otro caso.} \end{cases}$

ⓐ $\int f(x)dx = 1$ ← Para que sea una f. de densidad Valida.

$$\int_{23,75}^{26,25} \frac{2}{5} dx = \frac{2}{5}\left(x \Big|_{23,75}^{26,25}\right) = \frac{2}{5}(26{,}25 - 23{,}75) = 1$$

ⓑ $$P(X<24) = \int_{23,75}^{24} \frac{2}{5} dx = \frac{2}{5}\left(x\Big|_{23,75}^{24}\right) = \frac{2}{5}(24-23{,}75) = \boxed{0{,}1 = 10\%}$$

ⓒ $$P(X>26) = \int_{26}^{26,25} \frac{2}{5} dx = \frac{2}{5}\left(x\Big|_{26}^{26,25}\right) = \frac{2}{5}(26{,}25-26) = \boxed{0{,}1 = 10\%}$$

ⓓ Media: $$E(x) = \int x f(x) dx = \int_{23,75}^{26,25} \frac{2}{5} x\, dx = \frac{x^2}{5}\Big|_{23,75}^{26,25} = \frac{1}{5}\left(26{,}25^2 - 23{,}75^2\right)$$

$$\Rightarrow \boxed{E(x) = 25}$$

$$E(x^2) = \int x^2 f(x) dx = \int_{23,75}^{26,25} \frac{2x^2}{5} dx = \frac{2}{15}\left[x^3 \Big|_{23,75}^{26,25}\right] = \frac{2}{15}\left(26{,}25^3 - 23{,}75^3\right)$$

$$\Rightarrow E(x^2) = \frac{2}{15}(4691{,}40625) \Rightarrow E(x^2) = \frac{30025}{48}$$

$$\Rightarrow V(x) = E(x^2) - [E(x)]^2 = \frac{30025}{48} - (25)^2 \approx \underline{0{,}52083}$$

↳ Varianza

$$\sigma = \sqrt{V(x)} = \sqrt{0{,}52083}$$

$$\longrightarrow \boxed{\sigma = 0{,}72169} \rightarrow \text{desv. estandar}$$

(5)

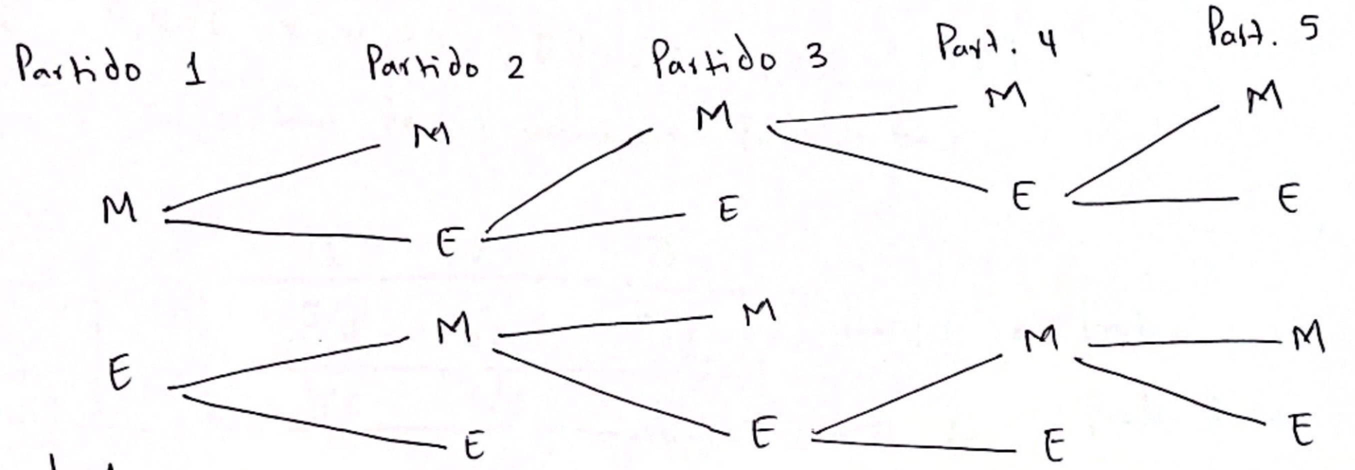
x	7	9	11	13	15	17
$f(x)$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{6}$	$\frac{1}{6}$

$$E(x) = \sum_{x=7}^{x=17} x \cdot f(x)$$

$$E(x) = 7\left(\frac{1}{12}\right) + 9\left(\frac{1}{12}\right) + 11\left(\frac{1}{4}\right) + 13\left(\frac{1}{4}\right) + 15\left(\frac{1}{6}\right) + 17\left(\frac{1}{6}\right)$$

$$E(x) = \frac{38}{3} \approx 12{,}6667$$ ← ganancia esperada.

(6)



Esp. Muestral:

$\Omega = \{MM, MEE, MEMM, MEMEM, MEMEE, EE, EMM, EMEE, EMEMM, EMEME\}$

$X = \#$ Part. gana Enrique: $\Omega = \{0, 2, 1, 2, 3, 2, 1, 3, 2, 3\}$

x	0	1	2	3
$f(x)$	1/10	2/10	4/10	3/10
$F(x)$	1/10	3/10	7/10	1

← f. Probab.

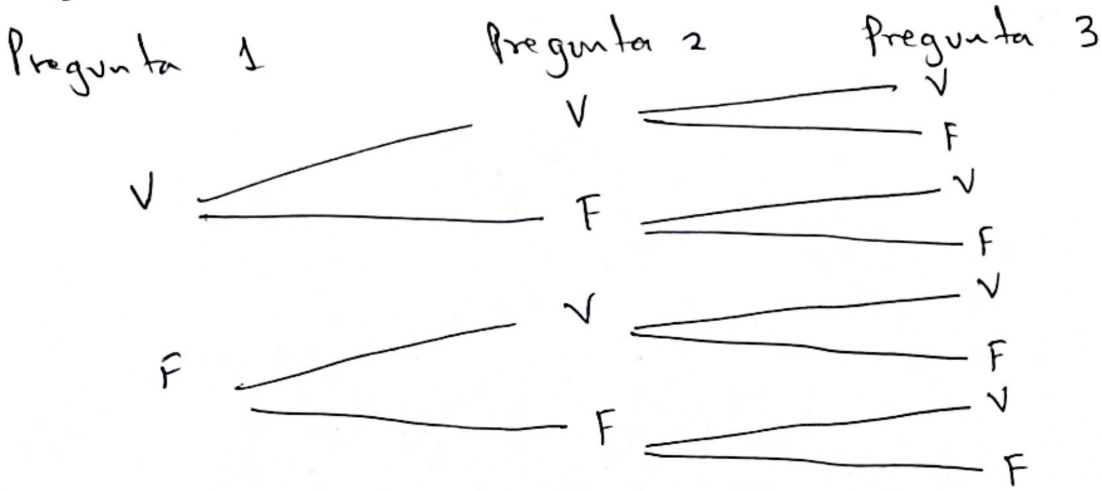
← f. Probab. Acum.

(c) * $P(X=2) = \frac{4}{10} = 0{,}4 \rightarrow 40\%$.

* $P(X \leq 2) = F(2) = \frac{7}{10} = 0{,}7 \rightarrow 70\%$.

* $P(X \leq 3) = F(3) = 1 \rightarrow 100\%$.

7 a Diagrama de árbol



$\Omega = \{VVV, VVF, VFV, VFF, FVV, FVF, FFV, FFF\}$

se puede contestar de 8 maneras la prueba.

W	0	1	2	3	
$f(w)$	$1/8$	$3/8$	$3/8$	$1/8$	← f. de Prob.
$F(w)$	$1/8$	$1/2$	$7/8$	1	← f. de Prob. Acum.

c $P(W=2) = f(2) = \frac{3}{8} = 0,375 \rightarrow 37,5\%$.

$P(W \leq 2) = F(2) = \frac{7}{8} = 0,875 \rightarrow 87,5\%$.

$P(W > 1) = 1 - P(W \leq 1) = 1 - F(1)$

$P(W > 1) = 1 - \frac{1}{2} = \frac{1}{2} = 0,5 \rightarrow 50\%$.