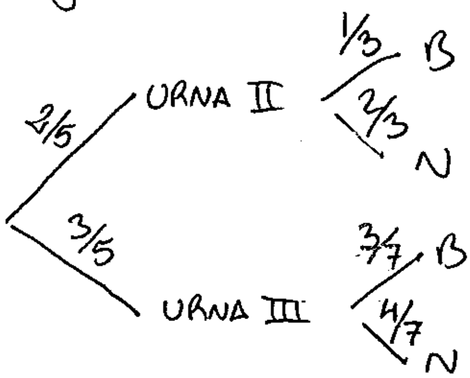
RECUPERACIÓN 2ºA MATEM. APLIC. II

SOLUCIÓN Salvo error u omisión 2-3-10

① Hago un árbol.



a) $P(B) = \frac{2}{5}\cdot\frac{1}{3} + \frac{3}{5}\cdot\frac{3}{7} = 0'3905$

b) $P(\text{URNA II}/B) = \frac{P(\text{URNA II} \cap B)}{P(B)} = \frac{2/15}{0'3905} = 0'3415$

② $X \rightsquigarrow N(\mu, 3)$

a) Por el Teorema Central del Límite y por seguir X una normal

$$\bar{X} \rightsquigarrow N\left(\mu, \frac{\sigma}{\sqrt{n}}\right) = N\left(\mu, \frac{3}{4}\right)$$

b) Sé que $\varepsilon = z_{\alpha/2}\cdot\frac{\sigma}{\sqrt{n}}$

para $1-\alpha = 0'97 \Rightarrow \alpha = 0'03 \Rightarrow \alpha/2 = 0'015$

$P(Z \geq z_{\alpha/2}) = 0'015 \Rightarrow P(Z \leq z_{\alpha/2}) = 0'985 \Rightarrow z_{\alpha/2} = 2'17$

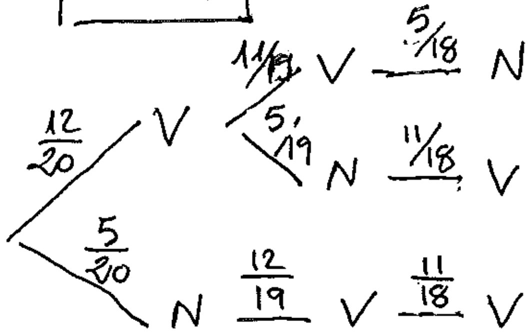
Por tanto $2'17\cdot\frac{3}{\sqrt{n}} = 1 \Rightarrow \sqrt{n} = 6'51 \Rightarrow n \simeq 42'38$

Debo tomar muestra de, al menos, 43 individuos

(3°)

12 V
5 N
3 R

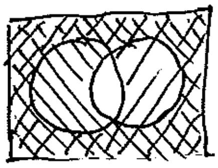
Hago un árbol.



Por tanto

$$P(2V \cup 1N) = 3 \cdot \frac{5 \cdot 11 \cdot 12}{20 \cdot 19 \cdot 18} = 0'2895$$

(4°) $P(A) = 0'6$; $P(B) = 0'2$; $P(\bar{A} \cup \bar{B}) = 0'9$

a/ 

$\bar{A}$ ///
$\bar{B}$ \\\ $\Rightarrow \bar{A} \cup \bar{B}$ /// o \\\ $\Rightarrow$

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

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

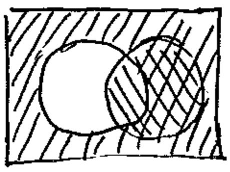
A y B son independientes si $P(A \cap B) = P(A) \cdot P(B)$

$$\left.\begin{array}{l} P(A) \cdot P(B) = 0'6 \cdot 0'2 = 0'12 \\ P(A \cap B) = 0'1 \end{array}\right\} \Rightarrow \text{No son indep.}$$

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

$\Rightarrow P(A \cup B) = 0'2 + 0'6 - 0'1 = 0'7$

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



$\bar{A}$ ///
B \\\

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

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

5º

$\sigma = 0'05$ s

$E = 0'01$ s

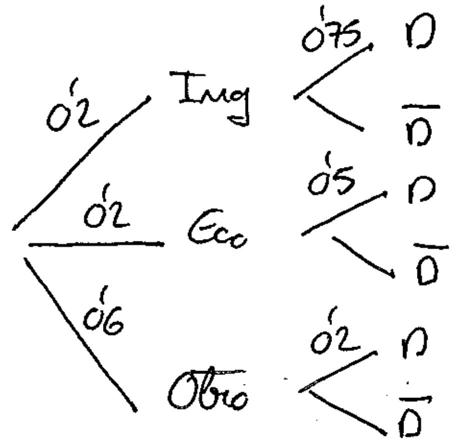
$1-\alpha = 0'99 \Rightarrow z_{\alpha/2} = 2'575$

Sé que $E = z_{\alpha/2} \cdot \frac{\sigma}{\sqrt{n}} \Rightarrow \frac{2'575 \cdot 0'05}{\sqrt{n}} = 0'01 \Rightarrow$

$\Rightarrow \sqrt{n} = 12'875 \Rightarrow n \simeq 165'765.$

Debo elegir una muestra de tamaño mínimo 166.

6º Hago un árbol



$$P(Ing/D) = \frac{P(Ing \cap D)}{P(D)} = \frac{0'2 \cdot 0'75}{0'2 \cdot 0'75 + 0'2 \cdot 0'5 + 0'6 \cdot 0'2} = 0'4054$$

7º

$n = 150$

$\overline{X} = 20000$

$\sigma = 1500$

a) Sé que $I = \left(\overline{X} \pm z_{\alpha/2} \cdot \frac{\sigma}{\sqrt{n}}\right)$

para $1-\alpha = 0'8$; $\alpha = 0'2$; $\alpha/2 = 0'1 \Rightarrow P(Z \geq z_{\alpha/2}) = 0'1 \Rightarrow$

$\Rightarrow P(Z \leq z_{\alpha/2}) = 0'9 \Rightarrow z_{\alpha/2} = 1'28$

$\Rightarrow I = \left(20000 \pm 1'28 \cdot \frac{1500}{\sqrt{150}}\right) = (19843'23, 20156'77)$

b/ $E = z_{\alpha/2} \cdot \frac{\sigma}{\sqrt{n}}$

Para $1-\alpha = 0'9$ $\quad z_{\alpha/2} = 1'645$

$\Rightarrow \quad 1'645 \cdot \frac{1500}{\sqrt{n}} = 142 \Rightarrow \sqrt{n} = 17'38 \Rightarrow n = 301'95$

Deberé elegir una muestra mínima de 302 familias

8º $p \rightsquigarrow N(68, 7)$

Por el Teorema Central del Límite y por seguir p una normal, la suma de los pesos de 6 personas se distribuye

$\sum_{1}^{6} p_i \rightsquigarrow N(n \cdot \mu, \sigma \cdot \sqrt{n}) = N(6 \cdot 68, 7 \cdot \sqrt{6}) = N(408, 17'15)$

Me piden $\qquad$ tipifico

$P\left(\sum_{1}^{6} p_i \leq 432\right) \overset{\downarrow}{=} P\left(z \leq \frac{432-408}{17'15}\right) = P(z \leq 1'4) =$

$= 0'9192$