**① T**

**a)**

| nº hab. munic. (en millares) | $h_i$ | $h_i \cdot a_i$ | $f_i = \dfrac{h_i a_i}{99'9}$ | $n_i$ |
|---|---|---|---|---|
| 0 - 2 | 3'22 | 6'44 | $6'44/99'9 = 0'0644$ | 42792 |
| 2 - 10 | 2'42 | 19'36 | $19'36/99'9 = 0'1937$ | 128641 |
| 10 - 50 | 1'34 | 53'6 | $53'6/99'9 = 0'536$ | 356155 |
| 50 - 100 | 0'41 | 20'5 | $20'5/99'9 = 0'205$ | 136216 |
| | | 99'9 | 1 | 663.804 |

**b)**

| nº hab. | $n_i$ | $N_i$ | $h_i = n_i/a_i$ |
|---|---|---|---|
| 0 - 2 | 44 | 44 | 22 |
| 2 - 10 | 37 | 81 | 4'625 |
| 10 - 50 | 16 | 97 | 0'4 |
| 50 - 100 | 2 | 99 | 0'04 |
| | 99 | | |

Media: Conocemos el nº de municipios y el total de la población $\Rightarrow Med = \dfrac{663804}{99} = 6705'09$ hab.

Si se hace mediante marcas de clase sale menos preciso.

Mediana $M_e = 2 + \dfrac{49'5 - 44}{37} \cdot 8 = 3'189189$ en miles de hab.

Moda:

$$M_o = 0 + 2 \dfrac{(22-0)}{(22-0)+(22-4'625)} = 1'11746 \text{ en miles de hab.}$$

**c)** Será la suma de las frecuencias absolutas de los intervalos 0-2, 2-10 y la parte proporcional del 10-50 esto es $\dfrac{25-10}{40}$

Así: $42792 + 128641 + \dfrac{15}{40} 356155 = 304.991'125$ hab. $\Rightarrow 45'946\%$ del total

**② T**

| $R$ | $t$ | $t+2$ | $1/R$ | $1/R^2$ | $Y$ $ln(t+2)$ | $Y_i/R_i$ | $t^*$ | $t-t^*$ | $(t-t^*)^2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | -0'3 | 1'7 | 1 | 1 | 0'5306 | 0'5306 | -0'4240 | 0'124 | 0'015376 |
| 2 | -0'5 | 1'5 | 0'5 | 0'25 | 0'4054 | 0'2027 | -0'7446 | -0'2446 | 0'059834 |
| 3 | -0'7 | 1'3 | 1/3 | 1/9 | 0'2623 | 0'0874 | -0'8362 | 0'1362 | 0'018369 |
| 4 | -1'5 | 0'5 | 0'25 | 1/16 | -0'6931 | -0'1732 | -0'8795 | -0'6204 | 0'384947 |
| 10 | -3 | | | 1'4236 | 0'5053 | 0'647528 | | -0'1156 | 0'478726 |

**a)**

$$t = -2 + b^{1/R} \Rightarrow t+2 = b^{1/R} \Rightarrow ln(t+2) = \frac{1}{R} ln\, b \Rightarrow Y = B \frac{1}{R}$$

$$\Sigma\left(Y_i - B\frac{1}{R_i}\right)^2 = min \Rightarrow 2\Sigma\left(Y_i - B\frac{1}{R_i}\right)\left(-\frac{1}{R_i}\right) = 0 \Rightarrow B = \dfrac{\Sigma Y_i/R_i}{\Sigma_i 1/R_i^2} = 0'45$$

$$B = \dfrac{0'647528}{1'4236} = 0'454849 \Rightarrow b = e^{0'4548\dots} = 1'575936 \Rightarrow t = -2 + 1'576^{1/R}$$

**b)** RECTA:

| $R^2$ | $t^2$ | $Rt$ |
|---|---|---|
| 1 | 0'09 | -0'3 |
| 4 | 0'25 | -1 |
| 9 | 0'49 | -2'1 |
| 16 | 2'25 | -6 |
| 30 | 3'08 | -9'4 |

$\bar{R} = \dfrac{10}{4} = 2'5$

$\bar{t} = -\dfrac{3}{4} = -0'75$

$\sigma_R^2 = \dfrac{30}{4} - 2'5^2 = 1'25$

$\sigma_t^2 = \dfrac{3'08}{4} - (-0'75)^2 = 0'2075$

$Cov(t,R) = -\dfrac{9'4}{4} - 2'5(-0'75) = -0'475$

$r = \dfrac{-0'475}{\sqrt{1'25}\sqrt{0'2075}} = 0'9326$

$r^2 = 0'86988$

$\sigma_e^2 = \sigma_t^2(1-r^2) = 0'027$

FUNCIÓN

$$\sigma_e^2 = \dfrac{0'478}{4} - \left(\dfrac{0'1156}{4}\right)^2 = 0'1188$$

(37)

a)

| | | y | TxC | ExA | DESESTAC | | b) | I(C2-2010) | |
|---|---|---|---|---|---|---|---|---|---|
| 2009 | C1 | 15 | - | - | 13'84 | | C1 | 0'83 | |
| | C2 | 12 | 15'67 | 0'7658 | 15'83 | | C2 | 0'66 | |
| | C3 | 20 | 17'33 | 1'1540 | 17'26 | | C3 | 1'2 | |
| 2010 | C1 | 20 | 19'33 | 1'0346 | 18'45 | | C1 | 1'2 | |
| | C2 | 18 | 22'67 | 0'7940 | 23'74 | | C2 | 1 | |
| | C3 | 30 | 26'00 | 1'1538 | 25'90 | | C3 | 1'6 | |
| 2011 | $C_1$ | 30 | 26'67 | 1'1248 | 27'68 | | C1 | 1'6 | |
| | $C_2$ | 20 | 28'33 | 0'7059 | 26'38 | | C2 | 1'2 | |
| | $C_3$ | 35 | - | - | 30'22 | | C3 | 1'94 | |
| | | | m. móviles | cociente | | | | | |

$\underline{IVE}$ :

$$c_1 \longrightarrow \frac{1'0346 + 1'1248}{2} = 1'0797$$

$$c_2 \longrightarrow \frac{0'7658 + 0'794 + 0'7059}{3} = 0'7552$$

$$c_3 \longrightarrow \frac{1'1540 + 1'1538}{2} = 1'1539$$

$\underline{IVE \ (en \ \%)}$ :

$c_1$ : 1'0797

$c_2$ : 0'7552

$c_3$ : $\underline{1'1539}$

$\phantom{c_3 : } 2'9888$

En %

$c_1$ — 108'37 %

$c_2$ — 75'80 %

$c_3$ — 115'82 %