A1

$$(A|B) = \left(\begin{array}{ccc|c} 1 & 1 & 1 & 2 \\ 2 & 3 & -4 & 0 \\ 3 & a & 2 & 2 \end{array}\right)$$

(a) $|A| = 6 + 2a - 12 - 9 - 4 + 4a =$

$= 6a - 19$

$|A| = 0 \iff 6a - 19 = 0 \iff \boxed{a = 19/6}$

- Si $a \neq 19/6 \rightarrow |A| \neq 0 \rightarrow rg(A) = 3$, $rg(A|B) = 3$, $nº \text{ incg} = 3$ → Th. R-F → S.C.D.
- Si $a = 19/6 \rightarrow$ SI

$|A| = 0 \rightarrow rg(A) \leq 2$.

$\begin{vmatrix} 1 & 1 \\ 2 & 3 \end{vmatrix} = 1 \neq 0 \rightarrow rg(A) = 2$

$$\begin{vmatrix} 1 & 1 & 2 \\ 2 & 3 & 0 \\ 3 & 19/6 & 2 \end{vmatrix} = 6 + \frac{38}{3} - 18 - 4 = \frac{-10}{3} \neq 0$$

$rg(A|B) = 3$

$\rightarrow rg(A) = rg(A|B) \rightarrow$ S.I.

(b) $a = -1$

$$\left(\begin{array}{ccc|c} 1 & 1 & 1 & 2 \\ 2 & 3 & -4 & 0 \end{array}\right) \xrightarrow{F_2 - 2F_1} \left(\begin{array}{ccc|c} 1 & 1 & 1 & 2 \\ 0 & 1 & -6 & -4 \\ & & & \end{array}\right)$$

$$\left(\begin{array}{ccc|c} 2 & 3 & -4 & 0 \\ 3 & -1 & 2 & 2 \end{array}\right) \begin{matrix} F_2-2F_1 \\ F_3-3F_1 \end{matrix} \left(\begin{array}{ccc|c} 0 & 1 & -6 & -4 \\ 0 & -4 & -1 & -4 \end{array}\right)$$

F_3+4F_2

$$\left(\begin{array}{ccc|c} 1 & 1 & 1 & 2 \\ 0 & 1 & -6 & -4 \\ 0 & 0 & -25 & -20 \end{array}\right)$$

$-25z=-20 \longrightarrow z=\frac{-20}{-25}=\frac{4}{5}$ **$z=4/5$**

$y-6\cdot\left(\frac{4}{5}\right)=-4 \longrightarrow y=-4+\frac{24}{5}=\frac{4}{5}$ **$y=4/5$**

$x+\frac{4}{5}+\frac{4}{5}=2 \longrightarrow x=2-\frac{8}{5}=\frac{2}{5}$ **$x=2/5$**

2A $p(t)=(t-2)^2(1-2t)+252t+116$

$p'(t)=2(t-2)(1-2t)+(t-2)^2(-2)+252$

$=2(t-2t^2-2+4t)-2(t^2-4t+4)+252$

$=-4t^2+10t-4-2t^2+8t-8+252$

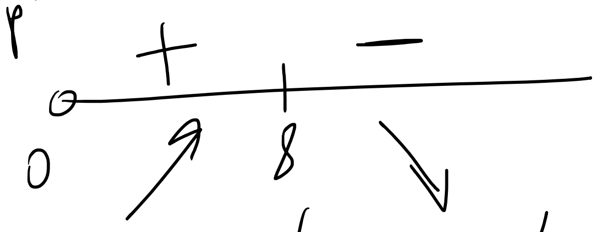
$=-6t^2+18t+240$

$p'(t)=0 \Leftrightarrow -6t^2+18t+240=0$

$-t^2+3t+40=0$

$t=\frac{-3\pm\sqrt{3^2-4\cdot(-1)\cdot 40}}{2(-1)}=\frac{-3\pm 13}{-2}$ $\nearrow \frac{-16}{-2}=8$ $\searrow 10$ ~~$=5$~~

$$t=\frac{-5\pm\sqrt{15-4\cdot(-1)\cdot 40}}{2(-1)}=\frac{-5\pm\ldots}{-2}$$ ↗ … ↘ $\frac{10}{-2}=-5$ (tachado)



⟶ $t=8$ máximo relativo

Máximo a 2013 ⟶ 1592000 habitantes

$p(8)=6^2(-15)+252\cdot 8+116=1592$

1'592 millones

A3 $X\equiv$ "tiempo…" $\sim N(5,2)$

ⓐ $P(X>4)=P\left(Z>\frac{4-5}{2}\right)=P(Z>-0'5)$

$=P(X<0'5)=$ **0'6915**

ⓑ $n=50 \longrightarrow \bar{X}\sim N\left(\mu,\frac{\sigma}{\sqrt{n}}\right)\equiv N\left(5,\frac{2}{\sqrt{50}}\right)$

$P(\bar{X}<6)=P\left(Z<\frac{6-5}{2/\sqrt{50}}\right)=P(Z<3'54)$

$=$ **0'9998**

4A

$n = 1096$

$E = \pm 0'03$

$\alpha = 0'955$

población: individuos de 16-55 años residentes en España.

diseño muestral: Muestra estratificada con M.A.S por estratos

tamaño muestral: 1096

parámetro estudiado: proporción de individuos seguidores de Influencers.

1B

M x

P y

M z

$x + y + z = 3250$€

$x = 2z$

$y = \frac{2}{3}x$

$\left[y = \frac{2}{3}, 2z = \frac{4}{3}z \right]$

$2z + \frac{4}{3}z + z = 3250$

$6z + 4z + 3z = 9750 \rightarrow \left[z = \frac{9750}{13} = 750 \right]$

$y = \frac{4}{3} \cdot 750 = 1000$

$x = 1500$

Solución: Madre 1500 €
Padre 1000 €
Hijo 750 €

23

$$f(x) = \begin{cases} 17x & 0 \le x < 5 \\ -3x^2 + 30x + 10 & 5 \le x < 10 \\ 10 & x \ge 10 \end{cases}$$

$x = 5$

$f(5) = 85$

$\lim_{x \to 5^-} 17x = 85$ $\Rightarrow$ continua en $x = 5$

$\lim_{x \to 5^+} -3x^2 + 30x + 10 = 85$

$x = 10$

$f(10) = 10$

$\lim_{x \to 10^-} -3x^2 + 30x + 10 = 10$ $\Rightarrow$ continua en $x = 10$

$\lim_{x \to 10^-} 10 = 10$

$\lim_{x \to 10^+} 10 = 10$

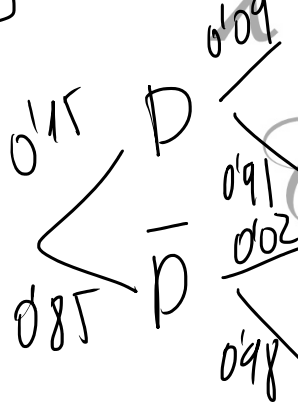
$\longrightarrow f(8) = -3 \cdot 8^2 + 30 \cdot 8 + 10 = 58$ barriles

(b) $[2,3] \longrightarrow f(x) = 17x$

$$A = \int_2^3 17x\,dx = \frac{17x^2}{2}\Big|_2^3 = \frac{17 \cdot 3^2}{2} - \frac{17 \cdot 2^2}{2} = 42'5\ u^2$$

3B

D ≡ "defecto" F ≡ "fuera de plazo"



(a) $p(F) = 0'15 \cdot 0'09 + 0'85 \cdot 0'02 = 0'0305$

(b) $p(D|F) = \frac{0'15 \cdot 0'09}{0'0305} = 0'443$

4B $n = 100$

$p = \frac{25}{100} = 0'25$

$(0'122, 0'378)$ *

$(0'165, 0'335)$

$E = z_{\alpha/2} \sqrt{\frac{p \cdot q}{n}}$

nc ↑ α ↓ $z_{\alpha/2}$ ↑ E ↑ A ↑

pide menor confianza ⇒ solución (0'165, 0'335)