A1 $A\begin{pmatrix} x & 1 & -2 \\ 4 & 1 & 0 \end{pmatrix}$ $B\begin{pmatrix} -2 & 1 \\ -1 & 0 \\ y & 2y \end{pmatrix}$ $C\begin{pmatrix} 2 & -3 \\ -9 & 4 \end{pmatrix}$

ⓐ $A\cdot B = \begin{pmatrix} x & 1 & -2 \\ 4 & 1 & 0 \end{pmatrix}\begin{pmatrix} -2 & 1 \\ -1 & 0 \\ y & 2y \end{pmatrix} = \begin{pmatrix} -2x-1-2y & x-4y \\ -9 & 4 \end{pmatrix}$

$-2x-1-2y=2 \longrightarrow -2x-2y=3$

$x-4y=-3 \longrightarrow \boxed{x=-3+4y}$

$6-8y-2y=3 \rightarrow -10y=-3$

$x=-3+\frac{12}{10}=\frac{-18}{10}=\frac{-9}{5}$ $\boxed{y=+3/10}$

$\boxed{x=\frac{-9}{5}}$

ⓑ $|C|=-19\neq 0$ $\quad C=\begin{pmatrix} 2 & -3 \\ -9 & 4 \end{pmatrix}$

$C^{-1}=\frac{1}{|C|}(\text{Adj } C)^t$ $\quad \text{Adj } C=\begin{pmatrix} 4 & +9 \\ +3 & 2 \end{pmatrix}$

$\boxed{C^{-1}=\frac{-1}{19}\begin{pmatrix} 4 & 3 \\ 9 & 2 \end{pmatrix}}$

A2 $P(x)=12-\frac{2x-8}{x^2+4x+4}$ $\quad x\in[0,60]$

ⓐ $P(30)=12-\frac{52}{1024}=11'9492$ €

ⓑ $\frac{2x-8}{x^2+4x+4}<0$ $\quad 2x-8=0 \rightarrow \boxed{x=4}$

$x^2+4x+4=0 \rightarrow (x+2)^2=0$

$\boxed{x=-2}$

	0		4		60
$2x-8$		$-$		$+$	
x^2+4x+4		$+$		$+$	

Durante 4 minutos

ⓒ $P'(x)=-\frac{2(x^2+4x+4)-(2x-8)\cdot(2x+4)}{\quad}=$

(c) $p'(x) = -\dfrac{2(x^2+4x+4)-(2x-8)\cdot(2x+4)}{(x^2+4x+4)^2} =$

$$= -\frac{2x^2+\cancel{8x}+8-(4x^2+\cancel{8x}-16x-32)}{(x^2+4x+4)^2}$$

$$= -\frac{-2x^2+16x+40}{(x^2+4x+4)^2}$$

$p'(x)=0 \iff 2x^2-16x-40=0$

$x^2-8x-20=0$ → $x=-2 \notin [0,60]$; $x=10$

~~0 2 6 60 − + −~~

$0 \quad - \quad 10 \quad + \quad 60$

~~Máximo $P(2) = 12-\frac{-4}{16} = 12'25$ €~~

Mínimo $P(10) = 12-\frac{4}{64} = 11'9375$ €

Máximo ⇒ $P(0) = 14$ €

$P(60) = 11'9667$ €

$\boxed{A3}$ $\alpha = 0'09$

(a) $A < 0'08 \longrightarrow E < 0'04$ $\qquad \boxed{p=q=0'5}$

$\hat{p} \sim N\left(p, \sqrt{\frac{pq}{n}}\right)$ $\qquad E = z_{\alpha/2}\cdot\sqrt{\frac{pq}{n}}$

$P(Z<z_{\alpha/2}) = 1-\frac{\alpha}{2}$

$1-\frac{0'09}{2} = 0'955 \longrightarrow z_{\alpha/2} = 1'7$

$0'04 = 1'7\cdot\sqrt{\frac{0'5\cdot 0'5}{n}}$

$\sqrt{n} = \frac{1'7\cdot\sqrt{0'5\cdot0'5}}{0'04}$

$\sqrt{n} = 21'25$

$n = 451'56$

$\boxed{\text{Necesitamos } 452}$

(b) $n = 175$

$p = \frac{126}{175} = 0'72$ $\qquad \hat{p} \sim N\left(0'72, \sqrt{\frac{0'72\cdot 0'26}{175}}\right) =$

$= N(0'72, 0'033)$

$p = \frac{126}{175} = 0'72$

$\equiv N(0'72,\ 0'033)$

$\alpha = 0'09$

$E = 1'7 \cdot 0'033 = 0'056$

$IC = (0'72 - 0'056,\ 0'72 + 0'056) \equiv$

$(0'664,\ 0'776)$

$\boxed{B1}$

		M	T		
S	x	4	1	70€	$x \geq 6$
T	y	2	3	50€	$y \geq 4$
		72	48		

Max $f(x,y) = 70x + 50y$

s.a (1) $4x + 2y \leq 72$ →

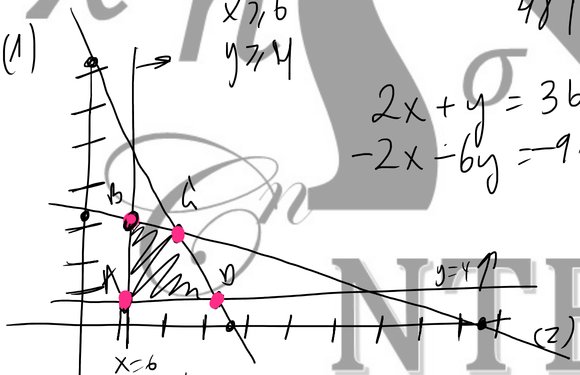
x	y
0	36
18	0

(2) $x + 3y \leq 48$ →

x	y
0	16
48	0

$x \geq 6$

$y \geq 4$



$\left.\begin{array}{l} 2x + y = 36 \\ -2x - 6y = -96 \end{array}\right\}$ $-5y = -60$

$\boxed{y = 12}$

$\boxed{x = 12}$

	$70x + 50y$
A (6,4)	620
B (6,14)	1120
$\boxed{C\ (12,12)}$	$\boxed{1440}$
D (16,4)	1320

12 Sillas
12 taburetes
Benef. 1440€

$\boxed{B2}$ $f(x) = ax^3 + bx^2 + 3x - 6$ $\quad f'(x) = 3ax^2 + 2bx + 3$

$f'(-2) = 0 \rightarrow 12a - 4b + 3 = 0$

$f(-2) = -6 \rightarrow -8a + 4b - 12 = -6$

$f'(-2)=0 \rightarrow 12a-4b+3=0$
$f(-2)=-6 \rightarrow -8a+4b-12=-6$

$$\left.\begin{array}{l} 12a-4b=-3 \\ -8a+4b=6 \end{array}\right\} \qquad 4b=12 \rightarrow \boxed{b=3}$$

$$4a=3 \rightarrow \boxed{a=3/4}$$

$$\boxed{\text{Sol: } a=3/4\,,\ b=3}$$

ⓑ $$\int_0^1 \left(\frac{5x}{\sqrt{8x^2+1}}-3xe^{-4x^2}\right)dx=\frac{5}{16}4-\left(\frac{-3}{8}e^{-4}+\frac{3}{8}\right)=\frac{5}{4}-\frac{3}{8}+\frac{3}{8}e^{-4}=\boxed{\frac{7}{8}+\frac{3}{8}e^{-4}}\approx$$

$$\int_0^1 \frac{5x}{\sqrt{8x^2+1}}dx=\frac{5}{16}\int_0^1 16x\,(8x^2+1)^{-1/2}dx=\frac{5}{16}\left.\frac{(8x^2+1)^{1/2}}{1/2}\right]_0^1=\frac{5}{16}\cdot 6-\frac{5}{16}\cdot 2$$

$$\frac{-3}{8}\int_0^1 -8x\,e^{-4x^2}dx=\frac{-3}{8}\left.e^{-4x^2}\right|_0^1=\frac{-3}{8}e^{-4}+\frac{3}{8}$$

B3

$0'493$ H — $0'809$ — m
$0'507$ M — $0'759$ — m

ⓐ $p(M\cap m)=0'507\cdot 0'759=0'3848$

ⓑ $p=0'493\cdot 0'809+0'507\cdot 0'759=0'784$

ⓒ $p(M|m)=\dfrac{0'3848}{0'784}=0'491$

ⓓ $p(\text{"al menos 1 mujer"})=1-p(\text{"ninguna mujer"})=1-0'493\cdot 0'493\cdot 0'493=\boxed{0'88}$