(b) Si $a=0$

$$\left.\begin{array}{l} x=0 \\ x+2z=0 \\ x+z=0 \end{array}\right\}$$

Tenemos que considerarla de 3 incógnitas aunque ha "desaparecido" y

$$\left.\begin{array}{l} x=0 \\ z=0 \\ y=\lambda \end{array}\right\} \boxed{(0,\lambda,0)}$$

$\boxed{A\cdot 2}$ $f(x)=\dfrac{-x^3+4x}{x^2+3x}+4$

$x^2+3x=0$

$x(x+3)=0 \left\langle \begin{array}{l} x=0 \\ x+3=0;\ x=-3 \end{array}\right.$

(a) Dom f $x\in\mathbb{R}-\{-3,0\}$

$$\lim_{x\to 0}\frac{\cancel{x}(-x^2+4)}{\cancel{x}(x+3)}+4=\frac{4}{3}+4=\frac{16}{3}$$

Si $f(x)=\frac{16}{3}$ en $x=0$ será una función continua.

(b) Asíntotas.

A.V en $x=-3$ porque $\lim\limits_{x\to -3}\dfrac{-x^2+4}{x+3}+4=\pm\infty$

A. Oblicua en $\boxed{y=-x+7}$

$$m=\lim_{x\to\infty}\left(\frac{-x^2+4}{(x+3)\cdot x}+\frac{4}{x}\right)=-1$$

$$n=\lim_{x\to\infty}\left(\frac{-x^2+4}{x+3}+4+x\right)=\lim_{x\to\infty}\frac{-\cancel{x^2}+4+4x+12+\cancel{x^2}+3x}{x+3}$$

$$=\lim_{x\to\infty}\frac{7x+16}{x+3}=7$$

A3 $f(x) = -x^4 + x^3 + 2x^2$

a) Ec. recta tag en $x=-1$

$$f(-1) = -(-1)^4 + (-1)^3 + 2(-1)^2 = -1 - 1 + 2 = 0$$

$$m = f'(-1) = -4(-1)^3 + 3(-1)^2 + 4(-1) = +\cancel{4} + 3 - \cancel{4} = 3$$

$$f'(x) = -4x^3 + 3x^2 + 4x$$

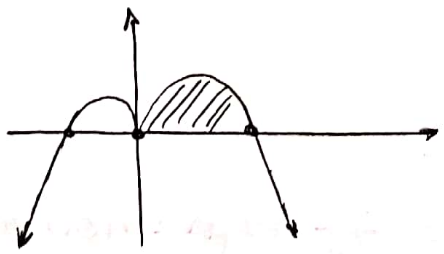
$$y - y_0 = m(x - x_0) \Rightarrow y - 0 = 3(x - (-1))$$

$$\boxed{y = 3x + 3}$$

b) Área $-x^4 + x^3 + 2x^2 = 0$

$$x^2(-x^2 + x + 2) = 0 \begin{cases} x^2 = 0 \\ -x^2 + x + 2 = 0 \end{cases}$$

$$x = \frac{-1 \pm \sqrt{1^2 - 4(-1)\cdot 2}}{2(-1)} = \frac{-1 \pm \sqrt{9}}{-2} = \frac{-1 \pm 3}{-2} \begin{cases} -1 \\ 2 \end{cases}$$



$$\int_0^2 (-x^4 + x^3 + 2x^2)\,dx$$

$$\left[\frac{-x^5}{5} + \frac{x^4}{4} + \frac{2x^3}{3} \right]_0^2 = \frac{-2^5}{5} + \frac{2^4}{4} + \frac{2\cdot 2^3}{3} = \frac{-32}{5} + \frac{16}{4} + \frac{16}{3}$$

$$\frac{-384 + 240 + 320}{60} = \frac{176}{60} = \frac{88}{30} = \boxed{\frac{44}{15}}$$

A-4

Río Cuervo 0,4 $\left\langle \begin{matrix} 0{,}5\ L \\ 0{,}5\ \bar{L} \end{matrix} \right.$

Hoces río Duratón 0,35 $\left\langle \begin{matrix} 0{,}6\ L \\ 0{,}4\ \bar{L} \end{matrix} \right.$

Cañón río Lobo 0,25 $\left\langle \begin{matrix} 0{,}45\ L \\ 0{,}55\ \bar{L} \end{matrix} \right.$

a) $P(\bar{L}) = 0{,}4 \cdot 0{,}5 + 0{,}35 \cdot 0{,}4 + 0{,}25 \cdot 0{,}55$

$= \boxed{0{,}4775}$

b) $P(C/L) = \dfrac{P(C \cap L)}{P(L)} = \dfrac{0{,}4 \cdot 0{,}5}{1 - 0{,}4775} = \dfrac{0{,}2}{0{,}5225} =$

$\boxed{0{,}3828}$

A-5 $\mu = 2$ Km. $\sigma = 0{,}5$ Km. $N(\mu, 0{,}5)$

a) $\varepsilon \leq 0{,}05$ Km

$1-\alpha = 95{,}44 \Rightarrow z_{\alpha/2} = 2$

$0{,}05 = 2 \cdot \dfrac{0{,}5}{\sqrt{n}} \Rightarrow \sqrt{n} = \dfrac{1}{0{,}05} \Rightarrow \boxed{n = 400} \Rightarrow \boxed{n = 401}$

b) $n = 16$ $\qquad \Sigma\bar{x} \in N(16 \cdot 2 ; \sqrt{16} \cdot 0{,}5)$

$P(\Sigma\bar{x} > 30 \text{ Km})$ $\qquad N(32 ; 2)$

$P\left(z > \dfrac{30-32}{2}\right) = P(z > -1) = P(z < 1) = \phi(1)$

$= \boxed{0{,}8413}$

Escaneado con CamScanner

B1

$$A=\begin{pmatrix}3 & 1 & 2\\ 0 & m & 0\\ 1 & -1 & 2\end{pmatrix} \qquad A^2-5A=-4I$$

$$\begin{pmatrix}3 & 1 & 2\\ 0 & m & 0\\ 1 & -1 & 2\end{pmatrix}\cdot\begin{pmatrix}3 & 1 & 2\\ 0 & m & 0\\ 1 & -1 & 2\end{pmatrix}=\begin{pmatrix}11 & 1+m & 10\\ 0 & m^2 & 0\\ 5 & -1-m & 6\end{pmatrix}=A^2$$

$$\begin{pmatrix}11 & 1+m & 10\\ 0 & m^2 & 0\\ 5 & -1-m & 6\end{pmatrix}-5\begin{pmatrix}3 & 1 & 2\\ 0 & m & 0\\ 1 & -1 & 2\end{pmatrix}=\begin{pmatrix}-4 & 0 & 0\\ 0 & -4 & 0\\ 0 & 0 & -4\end{pmatrix}$$

$$\begin{pmatrix}-4 & -4+m & 0\\ 0 & m^2-5m & 0\\ 0 & 4-m & -4\end{pmatrix}=\begin{pmatrix}-4 & 0 & 0\\ 0 & -4 & 0\\ 0 & 0 & -4\end{pmatrix}$$

* $-4+m=0 \Rightarrow m=4.$

* $m^2-5m=-4 \Rightarrow m^2-5m+4=0$

$$m=\frac{5\pm\sqrt{25-4\cdot1\cdot4}}{2}=\frac{5\pm3}{2}\left\langle\begin{matrix}4\\ \cancel{1}\end{matrix}\right.$$

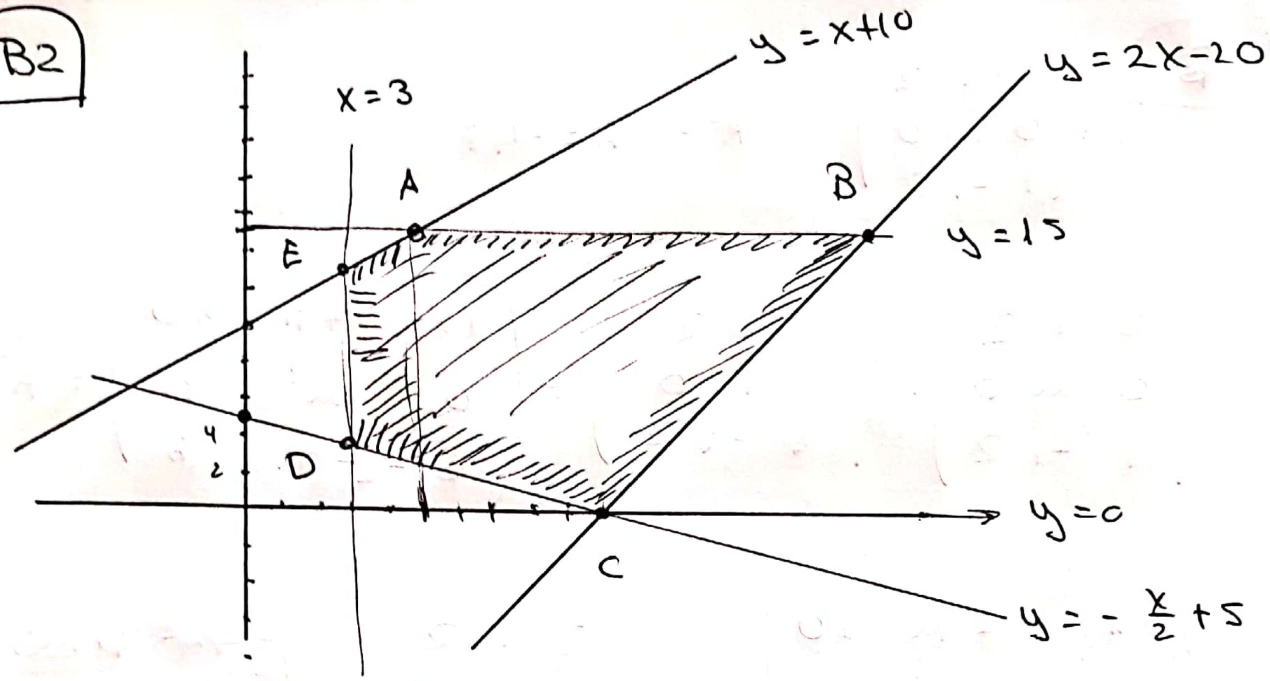
$$\boxed{m=4}$$

* $4-m=0 \Rightarrow m=4$

b) $\begin{vmatrix}3 & 1 & 2\\ 0 & 1 & 0\\ 1 & -1 & 2\end{vmatrix}=6-2=4 \Rightarrow \begin{pmatrix}3 & 0 & 1\\ 1 & 1 & -1\\ 2 & 0 & 2\end{pmatrix}\rightarrow\begin{pmatrix}2 & 4 & -2\\ 0 & 4 & 0\\ -1 & -4 & 3\end{pmatrix}$

$$\boxed{\begin{pmatrix}2 & -4 & -2\\ 0 & 4 & 0\\ -1 & 4 & 3\end{pmatrix}\cdot\frac{1}{4}=A^{-1}}$$

B2



$y = -\frac{x}{2} + 5$

x	y
0	5
10	0

$y = x + 10$

x	y
0	10
5	15

$y = 2x - 20$

x	y
0	-20
10	0

$A(5, 15) \Rightarrow f(x,y) = x + y = 20$

$B(\frac{35}{2}, 15) \Rightarrow \frac{35}{2} + 15 = \frac{75}{2} \Rightarrow$ Máximo.

$C(10, 0) \Rightarrow 10 + 0 = 10$

$D(3, 7/2) \Rightarrow \frac{13}{2} \Rightarrow$ Mínimo.

$E(3, 13) \Rightarrow 16$

B3 $f(x) = 3(x+k)e^{-x/2}$ Dom f $x \in \mathbb{R}$.

a) $f'(1) = 0 \Rightarrow f'(x) = 3 \cdot \left[1 \cdot e^{-x/2} + \left(-\frac{1}{2}\right)e^{-x/2} \cdot (x+k)\right]$

$e^{-1/2}\left[1 - \frac{1+k}{2}\right] = 0 \Rightarrow 1 - \frac{1+k}{2} = 0$

$1 = \frac{1+k}{2} \Rightarrow 2 = 1+k \Rightarrow \boxed{k=1}$

(b) $\boxed{k=1}$

$f'(x) = 3e^{-x/2}\left[1 - \frac{x+1}{2}\right] = \underset{+}{3e^{-x/2}}\left[\underset{?}{\frac{1-x}{2}}\right]$

$(-\infty, 1)$	$(1, \infty)$
$f'(-2) = + \cdot +$	$f'(2) = + -$
Creciente	Decreciente

$f(x)$ creciente $(-\infty, 1)$

$f(x)$ decreciente $(1, \infty)$

$\boxed{B.4}$

EM 0,02 — F 0,6; $\overline{F}$ 0,4

$\overline{EM}$ 0,98

EH 0,05

$\overline{EH}$ 0,95

H y M Independientes.

$P(EH \cap EM) = 0$.

(a) $P(EM \cup EH) = 0,02 + 0,05 = \boxed{0,07}$

(b) $P(EM \cap F) = 0,02 \cdot 0,6 = \boxed{0,012}$

$\boxed{B5}$ $\bar{x} = \dfrac{40+45+38+44+41+40+35+50+40+37}{10}$

$\bar{x} = 41\ l$

$\in N\left(41, \dfrac{7}{\sqrt{10}}\right)$

$1-\alpha = 90\% \Rightarrow z_{\alpha/2} = 1,645$

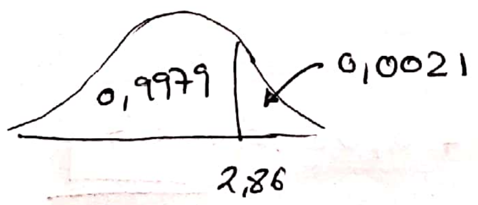
$I_c = \left(41 \pm 1,645 \cdot \dfrac{7}{\sqrt{10}}\right) = \underline{\underline{(37,35 \cdot 44,64)}}$

b) $n = 64$.

Amplitud $= 5 \Rightarrow \epsilon = 2,5$

$1-\alpha = ?$

$2,5 = z_{\alpha/2} \cdot \dfrac{7}{\sqrt{64}} \Rightarrow \dfrac{2,5 \cdot 8}{7} = z_{\alpha/2} \Rightarrow z_{\alpha/2} = 2,86$



$$\begin{array}{r} 0,9979 \\ -\ 0,0021/2 \\ \hline 0,99685 \end{array}$$

$$\boxed{1-\alpha = 99,69\%}$$

A1

ⓐ

$$\left.\begin{array}{l} x+ay=0 \\ x+2z=0 \\ x+ay+(a+1)z=a \end{array}\right\}$$

$$\left(\begin{array}{ccc|c} 1 & a & 0 & 0 \\ 1 & 0 & 2 & 0 \\ 1 & a & a+1 & a \end{array}\right)$$

$$\underbrace{}_{A}$$

$$\underbrace{}_{A'}$$

$$\begin{vmatrix} 1 & a & 0 \\ 1 & 0 & 2 \\ 1 & a & (a+1) \end{vmatrix}=0 \qquad \cancel{2a}-\cancel{2a}-a(a+1)=0$$

$$-a(a+1)=0 \begin{cases} a=0 \\ a+1=0;\ a=-1 \end{cases}$$

Si $\boxed{a=1}$

$$\left(\begin{array}{cc|c|c} \boxed{\begin{array}{cc} 1 & 1 \\ 1 & 0 \end{array}} & \begin{array}{c} 0 \\ 2 \end{array} & \begin{array}{c} 0 \\ 0 \end{array} \\ 1 \quad 1 & 2 & 1 \end{array}\right) \quad Ran(A)=2$$

$$\begin{vmatrix} 1 & 1 & 0 \\ 1 & 0 & 0 \\ 1 & 1 & 1 \end{vmatrix} \neq 0 \quad Ran(A')=3$$

S.I

Si $\boxed{a=0}$

$$\left(\begin{array}{ccc|c} 1 & 0 & 0 & 0 \\ \boxed{1} & 0 & \boxed{2} & 0 \\ \boxed{1} & 0 & \boxed{1} & 0 \end{array}\right) \quad Ran(A)=2$$

$$\begin{vmatrix} 1 & 0 & 0 \\ 1 & 2 & 0 \\ 1 & 1 & 0 \end{vmatrix}=0 \Rightarrow Ran(A')=2$$

Nº Incóg 3

S.C.I